

S-43
50-348/364-CIVP
2/19/92

Staff Exh. 43

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OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

TRAY AND CONDUIT GENERAL DETAILS AND NOTES

THE NOTES CONTAINED HEREIN
ARE TO BE USED FOR UNIT #1
AND UNIT #2 EXCEPT WHERE
INDICATED.

2

005602

9204060344 920219
PDR ADOCK 05000348
PDR

ORIGINAL DRAWING, Rev. 2
TRANSFERRED TO SCS

BECHTEL CORP. JOB 7597-03

SOUTHERN SERVICES INC.

DR	NO.	DATE	REVISION
RAE	1	5-5-71	REV. PER S. S. LTR.
CK	2	1-28-80	INCORP. 26E-623
APP			
DATE			

ALABAMA POWER COMPANY

SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT
DETAIL TRAY & CONDUIT DETAILS & NOTES

SUPERSEDES _____ SCALE _____ SH. 1 OF 29 SHEETS **A-1775412**

NUCLEAR REGULATORY COMMISSION

Docket No. SD-34834-CW Official Exh. No. 43

In the matter of Alabama Power Company

Staff ✓ IDENTIFIED 12:21 p.m. 2/19/92

Applicant _____ RECEIVED 12:23 p.m. 2/19/92

Intervenor _____ REJECTED _____

Cont's Off'r _____ DATE 2/19/92

Contractor _____ Witness _____

Other _____
Reporter L. Esler

SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.
1	2	5	9	12	VOID 2	18J	6	21	2	23L	3	26	VOID 2
1A	7.6	5A	4	13	VOID 2	18K	0	22	1	23M	3	26A	VOID 1
1AA	1	5B	4	14	VOID 2	18L	0	23	1	23N	VOID 1	26B	2
1AB	9	5C	1	15	VOID 3	18M	0	23A	1	23P	3	27	VOID 2
1AC	2	6	5	16	VOID 4	18N	0	23B	0	23Q	VOID 2	27A	VOID 3
2	10	7	2	17	VOID 5	18P	0	23C	0	23R	VOID 1	27B	7
2A	6	7A	6	18	VOID 5	18R	0	23D	0	23S	0	27C	VOID 1
3	16	7B	8	18A	3	18S	0	23E	3	23S-1	VOID 1	27D	1
3A	0	7C	1	18B	3	18T	0	23E-1	0	23S-2	VOID 1	27E	VOID 1
3B	0	7D	2	18C	3	19U	0	23E-2	0	23T	0	27F	3
3C	0	8	2	18D	3	18V	0	23F	0	23U	VOID 2	28	0
3D	0	9	6	18E	3	19	2	23G	VOID 6	23U-1	VOID 3	29	0
3E	5	10	2	18F	3	19A	5	23H	VOID 4	23U-2	VOID 1		
4	11	10A	1	18G	3	19B	5	23I	4	23V	0		
4A	1	11	VOID 2	18H	2	20	6	23J	4	23W	0		
								23K	3	24	1		
								25	2				

						68	4/7/88	REVISED SH. 6	JOK	JMR	NRA
76	1/3/90	REV. SHEET 23G	JOK	JMR	NRA	67	3/24/88	REVISED SH. 23N	JOK	JMR	NRA
75	9/26/89	REV. SH. 2D	JOK	JMR	NRA	66	4/24/88	REVISED SH. 23 L	JOK	BEA	NRA
74	8/16/89	REV. SH. 11AB, 11AC, 3, 23E, 23J-1, 23J-2, 23M, 23N, 23M, 23X, VOIDED SH. 23H, 23J, 23R, 23R-1, 23S-1, 23S-2, 23U & 23U-1.	JOK	JMR	NRA	65	5/18/89	REVISED SH. 2D	RWK	JMR	NRA
						64	4/28/86	VOIDED SH. 23U-2	RWK	JMR	NRA
						63	9/18/86	REVISED SH. 23U & 23U-1. ADDED SH. 23U-2.	JLD	JMR	NRA
						62	7/29/86	REVISED AS NOTED	JLD	JMR	NRA
73	1/10/88	ADDED SH. 23X, REV. SH. 5, 11AB, 23J-2, 23M & 23U-1 PER PCN B-87-D-4634 REV. D	RWK	JMR	NRA	61	3/18/86	REVISED SH. 4.	JLD	JMR	NRA
						60	7/23/85	REV. PER PCN B-84-1-2748 REV. 0-13	RWK	JMR	NRA
						59	4/3/85	REV'D AS NOTED	RWK	JMR	NRA
72	7/28/89	REV. SH. 23H, 23J, 23J-1 & 23J-2	JQC	JMR	NRA	58	3/23/85	REV. PER PCN B-84-2-3012 REV. 0-4 AS NOTED	JLD	JMR	NRA
						57	1/3/84	REV'D AS NOTED	RWB	JMR	NRA
71	7/6/88	REV. SH. 11B, 16, 23E & 23L VOIDED SH. 23Q	RWK	JMR	NRA	56	4/2/83	REV'D AS NOTED	RWB	JMR	NRA
70	5/2/83	ADDED SH. 23W	RWK	JMR	NRA	55	9/29/83	REV'D AS NOTED	RWB	JMR	NRA
69	4/15/88	ADDED SH 23R-1	RWK	JMR	NRA	54	7/5/83	REV'D AS NOTED	RWB	JMR	NRA
						53	4/7/83	REVISED AS NOTED	RWB	JMR	NRA

NO. DATE REVISIONS BY CHK'D APP'D NO. DATE REVISIONS BY CHK'D APP'D

BECHTEL CORP. JOB 7597-03/20

SOUTHERN SERVICES INC.

DR. RWB
TR. RB
CK. RB
APP. MM
DATE 5/11/87

005603

ALABAMA POWER COMPANY
SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT
DETAIL TRAY & CONDUIT DETAILS & NOTES

SUPERSEDES SCALE SH 1A of 29 A-177541 76

ORIGINAL DRAWING, Rev. TRAY REFERRED TO SCS

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DETAILS & NOTES

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005604

ORIGINAL DRAWING, REV. 1
TRANSFERRED TO SCS

BECHTEL CORP. JOB 7597-03/20

SOUTHERN SERVICES INC.

DR <i>bew</i>	NO.	DATE	REVISION	ALABAMA POWER COMPANY
TR	0	7-21-77	FOR CONSTR.	SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT DETAIL TRAY & CONDUIT DETAILS & NOTES
CK <i>plc/mw</i>	1	7-13-77	REV. AS NOTED	
APP <i>all</i>				SH. IAA OF 29 SHEETS
DATE 3-25-77	SUPERSEDES _____		SCALE _____	A-177541 REV 1

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39) Void	230005605

ORIGINAL DRAWING, Rev. 6
ANSFERRED TO SCS

BECHTEL CORP. JOB 7597-03/20			SOUTHERN SERVICES INC.		
DR <u>beu</u>	NO.	DATE	REVISION	ALABAMA POWER COMPANY	
TR	0	5/18/77	FOR CONSTR.	SUBJECT <u>JOSEPH M. FARLEY NUCLEAR PLANT</u>	
CK <u>R.P.P./TVE</u>	9	4/10/87	REV. PER PCN'S B-88-2-4985 REV. O-10EB-88-2-5005 REV. O-18, JUNE 1984	DETAIL <u>TRAY & CONDUIT DETAILS & NOTES</u>	
APP <u>AVT</u>				GN. <u>IAB</u> OF <u>29</u> SHEETS	REV <u>9</u>
DATE <u>3-25-77</u>	SUPERSEDES _____ SCALE _____			A-177541	

Subject:



Sheets:

40) Void

23R

41) Typical Raceway Termination to Penetration Cabinets

23V

005606

ORIGINAL DRAWING, Rev. 1
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BECHTEL CORP. JOB 7597-03/20

SOUTHERN SERVICES INC.

DR <i>njb</i>	NO	DATE	REVISION	ALABAMA POWER COMPANY SUBJECT <u>JOSEPH M. FARLEY NUCLEAR PLANT</u> TRAY & CONDUIT DETAILS & NOTES SCALE <u>1AC</u> of <u>29</u> SH. <u>A-77541</u> REV <u>2</u>
TR	0	5-5-82	ISSUED FOR CONST.	
CK <i>R/R</i>	2	8/16/89	REV. PER PCN'S 8-88- 2-4985 REV. 0-10 & 8-88-2-5005 REV. 0-18	
APP <i>add kcf</i>				
DATE <u>5-4-82</u>	SUPERSEDES		SCALE <u>1AC</u>	

RACEWAY NOTES - POWER, CONTROL AND INSTRUMENTATION



1.0 CABLE TRAYS

- 1.1 Cable trays for use in the auxiliary building and the turbine building shall be aluminum or hot dip galvanized per NEMA Pub. No. VE-1. Cable trays for use in the containment and outdoors shall be hot dip galvanized after fabrication per NEMA Pub. No. VE-1. All trays have an effective depth of 3". Low level instrumentation trays shall have solid corrugated bottom unless otherwise specified. All other trays shall be ladder type with 9" rung spacing.
- 1.2 Tray width shall be a maximum of 24 inches and a minimum of 6 inches.
- 1.3 The vertical spacing of trays shall be sufficient to permit unobstructed pulling of all cables unless otherwise specified.
- 1.4 With stacked trays, medium voltage power cables shall be in the upper trays, low voltage power and control cables shall be in the intermediate trays, and instrumentation cables shall be in the lower trays.
- 1.5 Fittings, accessories, and hardware shall be of the same materials and finish as the straight trays. Minimum radii of side rails on horizontal elbows, vertical risers, tees, and crosses shall be 24 inches except as otherwise indicated on drawings.
- 1.6 Tray support spans shall not exceed 10 feet. NEMA support locations for fittings shall be followed where practicable.
- 1.7 Tray elevations shown on drawings shall be the bottom of the tray rail.
- 1.8 Wherever a tray crosses a building expansion joint, an expansion connector shall be installed. Ground cable installed on the tray shall be looped to allow for expansion.
- 1.9 Where changes in elevation will not permit standard fittings to be used, adjustable splice plates shall be installed in the field as required. Where standard fittings are used, the degree of incline will be noted on the drawings.
- 1.10 Trays running vertically through floors or grating shall have a removable cover to 7 feet above the floor or grating to provide protection against damage to cables.
- 1.11 At points where trays run vertically through floors, a concrete curb of 3 inch minimum height or a 3" x 3/8" steel toe plate (min.) shall be installed to protect the trays from damage.
- 1.12 Where 20' separation criterion cannot be maintained per the Farley Fire Protection Re-evaluation Report, all redundant trays/channels that contain safe shutdown cables shall be wrapped with KAOWOOL as specified on D-180500 thru D-180560 and A-180561, Sheets 1 thru 49, for Unit 1. For Unit 2 see D-204556, 204565-570, 587-590, 597, 598, 600-603, 630-635, 641-644, 648-653, 672, 686, 687, 689-691, 698, 699, 706, 707, 716, 719, 733-740; 745, 746, 749, 750, 756-760, 764-768, 778-780, 792-794, 797-799, 204800.

005607

ORIGINAL DRAWING, REV. 4 TRANSFERRED TO SCL

BECHTEL CORP. JOB 7597-03/20

SOUTHERN SERVICES INC.

DR. <i>92</i>	NO. DATE	REVISION	ALABAMA POWER COMPANY
TR.	10 7/35	REV PER FCN B-53-2-2442 REV 0-19	
CK. <i>92</i>			SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT
	8 7-13-71	REV. AS NOTED	DETAIL TRAY & CONDUIT DETAILS & NOTES
	9 2-4-81	REV. AS NOTED	
DATE <i>1/25/71</i>	SUPERSEDES	SCALE	SH. 2 OF 22 SHEETS

A-177541 10

- 1.12a Where 3 foot horizontal or 5 foot vertical separation of redundant trays/channels cannot be maintained per Reg. Guide 1.75, barriers of $\frac{1}{2}$ " thick marinite shall be installed between the trays/channels projecting one foot beyond the edge of the tray on both sides. Marinite Type XL was originally used in most installations but Marinite Types I or M are acceptable substitutes. Rigid steel conduit may be used in all future cases to afford separation where 3 ft. horizontal & 5 ft. vertical cannot be maintained.
- 1.13 When cable trays run under grating or wherever they are exposed to the deposit of foreign materials, solid removable covers shall be installed in the topmost tray.
- 1.13A To avoid damage to cable insulation when "spilling out" of a tray, cables will be protected by using tray softeners as manufactured by C. C. Spraliding & Company "Jiffy Trim" or equal.
- 1.13B Under no circumstances are cables to be supported by Ty-Raps; i.e., do not support cables from bottom of tray, tray supports or unistrut.
- 1.13C Cable tray drop-out fittings shall be used
- 1) Where a cable or group of cables leaves a tray between the rungs when, in the judgment of the field engineers, probable vibration or differential movement between the cable and the tray could cause cable damage, and
 - 2) Where bundled groups of cables leave a tray between the rungs.
- 1.13D Where Ty-Raps are used to train and/or secure cables in trays or equipment inside containment; only radiation resistant ties, such as T&B Type TYZ-25M or stainless steel shall be used.

ORIGINAL DRAWING, Rev. 9
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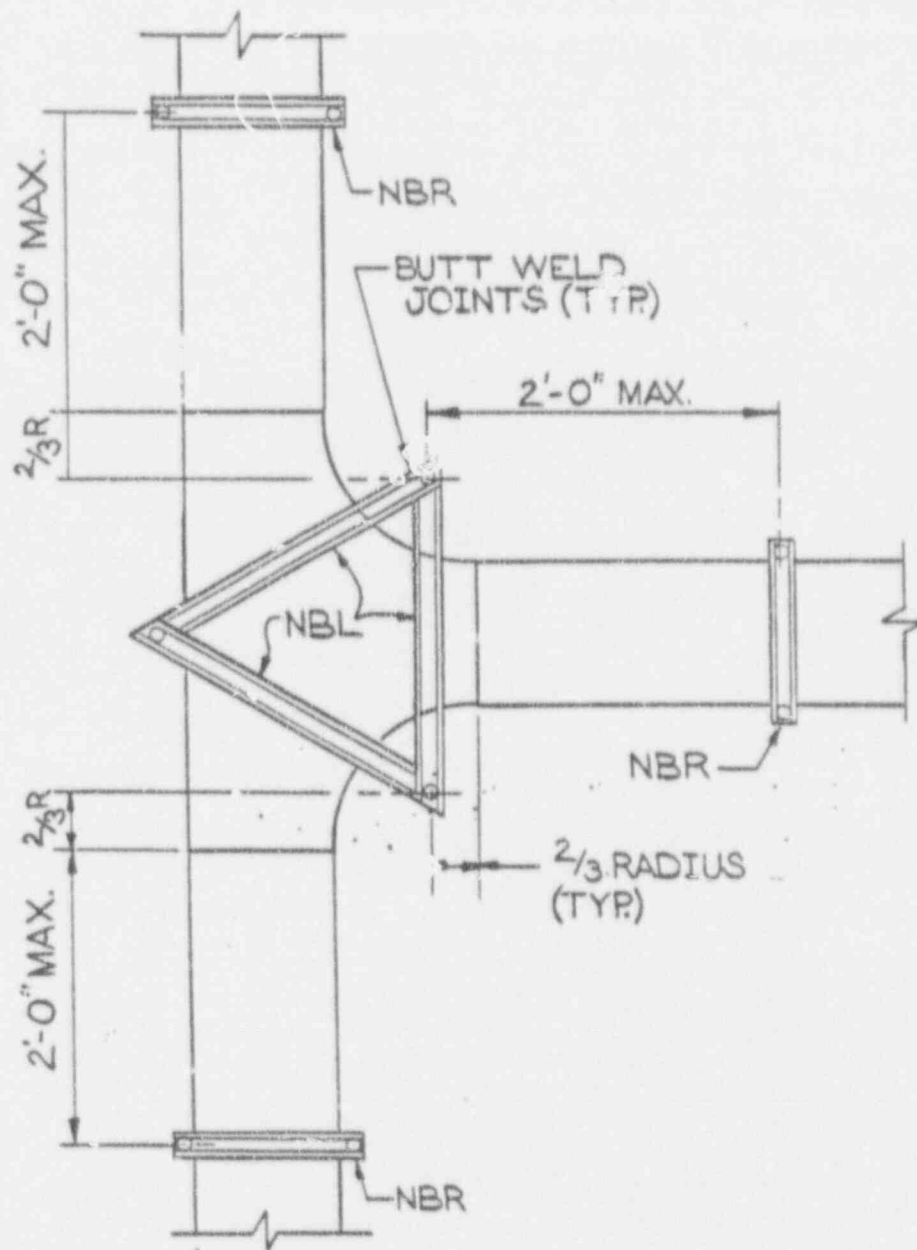
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BECHTEL CORP. JOB 7597-03			SOUTHERN SERVICES INC.		
DR. <i>R. J. SELLERS</i>	NO.	DATE	REVISION	ALABAMA POWER COMPANY	
TR	0	12/17/70	REVISED FOR CONST.	SUBJECT <u>JOSEPH M. FARLEY NUCLEAR PLANT</u>	
CK <i>R. J. SELLERS</i>	6	7/2/74	Rev. per PCN 5-81		
APP <i>W. J. ...</i>			0-1058 Rev. 5-10	DETAIL <u>TRAY & CONDUIT DETAILS / NOTES</u>	
DATE <i>12/17/74</i>	SUPERSEDES _____		SCALE <u>NONE</u>	SH. <u>2A</u> OF <u>29</u> SHEETS	A-177541
					6

ORIGINAL DRAWING, Rev. 13
TRANSFERRED TO SCS

- 1.14 A minimum spacing of one cable diameter shall be maintained in cable trays for medium voltage and large low voltage power cables.
- 1.15 Where penetrations are required in walls or slabs of water tight compartments, cable transit assemblies as manufactured by Nelson Electric Company shall be installed to maintain the watertight integrity. In order to expedite Unit 2 completion, Field may use silicone foam and/or concrete to maintain watertight integrity.
- 1.16 Dimensions shown to cable trays are to the outside edge of the tray rail.
- 1.17 All field joints shall be made with devices which will not diminish the strength of electrical ground continuity of the tray assembly.
- 1.18 Cables in vertical riser trays shall be properly supported. Cable grips shall be used for supporting cables on vertical risers of more than 20' where the cable is not secured to the raceway system.
- 1.19 Any opening into the main control room and in floors of ceilings for vertical ventilated tray installation shall have fire stops in accordance with the details shown herein.
- 1.20 For all cases where deviations of greater than 3" occur from the tray installation dwgs. the field shall submit an FCR to engineering for approval. For deviations less than 3"; it will be the field's responsibility to ensure that there is no interference with piping, ductwork, equipment, etc. since there could be an unfavorable tolerance build-up between the disciplines.
- 1.21 Contents Deleted.
- 1.22 The unsupported horizontal distance for cables shall not exceed:
 For all I.A.C. cables - 48" (Provided cable is secured any distance within, but not to exceed 2'-0" from any box, equipment, device, etc.)
 For cables 1/0 and larger (not I.A.C.)-36"
 For cables smaller than 1/0-24"
- 1.23 The unsupported vertical distance for cables shall not exceed:
 Power cables with IAC - 6'-0"
 Control cables 4'-0"
 & instrumentation cables
- 1.24 Instrumentation tray, by the definition of "totally enclosed" shall have at least 85% of the total surface area of the tray (computed circumferentially) completely covered. The intent here is that at no location should the cables be completely exposed, except where they must pass through a watertight penetration, dropping out of conduits to cable tray or where they run exposed from tray to penetration terminal boxes as per detail 3, D-177698. At these points, the distance of exposed cable shall not exceed two feet. Locations not covered by the 85% criteria are:
 1.24A Instrument cables running between control room equipment and cable spreading room trays as per Sheet 3E of A-177541.
 1.24B Instrument cables for RPI system in the containment building.
 1.24C Control and Instrumentation Cables of the same train, supported in the free air, shall be grouped in separate bundles. Control and Instrumentation bundles shall be separated as far as possible. For Unit 2 refer to design drawing 005609
 1.24D Instrumentation trays used for Neutron Flux Monitoring System.

BECHTEL CORP. JOB 7597-03/20			SOUTHERN SERVICES INC.			
DR	NO.	DATE	REVISION	ALABAMA POWER COMPANY		
	0	5-5-71	FOR APPROVAL	'JOSEPH M. FARLEY NUCLEAR PLANT		
TR	16	9/6/89	REV. PER PCN B-			
CK			88-2-5215 REV. 0-11	SUBJECT TRAY & CONDUIT DETAILS & NOTES		
MM			REV. PER PCN B-83-2-	DETAIL		
APP	15	8/3/85	2-42 REV. 0-19			
DATE	5/5/71		SUPERSEDES	SCALE	SH. 3 OF 29 SHEETS	A-177541 16



TYPICAL SUPPORT FOR HORIZONTAL TEE 005610

NOTE:

THESE ARE NON-SEISMIC INTERMEDIATE SUPPORTS ONLY.

ORIGINAL DRAWING, Rev. 0
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ECHTEL CORP. JOB 7597-03

SOUTHERN SERVICES INC.

DR	NO.	DATE	REVISION
ELB	0	9-7-73	ISSUED FOR CONST.
TR			
CK			
APP			

ALABAMA POWER COMPANY

SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT
 DETAIL TRAY & CONDUIT DETAILS & NOTES

DATE 9/7/73

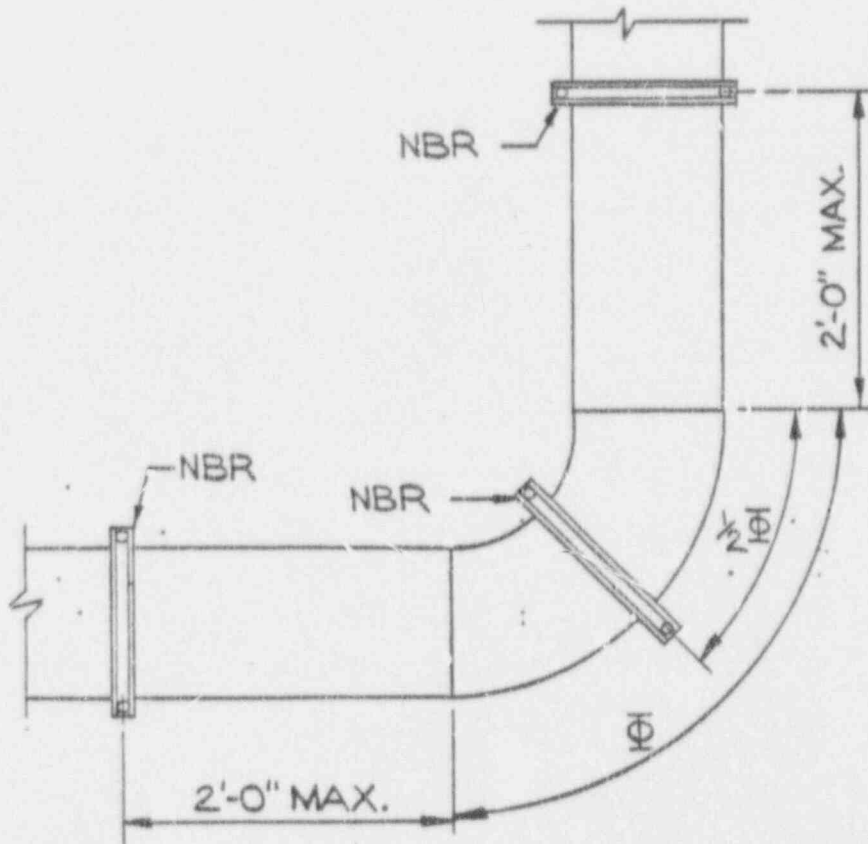
SUPERSEDES

SCALE

SH. 3A OF 29 SHEETS

A-177541

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TYPICAL SUPPORT FOR HORIZONTAL 45° OR 90° ELBOW

NOTE:

THESE ARE NON-SEISMIC INTERMEDIATE SUPPORTS ONLY.

005611

ORIGINAL DRAWING, Rev. 0
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BECHTEL CORP. JOB 7597-03

SOUTHERN SERVICES INC.

DR	NO.	DATE	REVISION
ELB	0	9-7-73	ISSUED FOR CONST.
TR			
CK			
APP			
DATE			

ALABAMA POWER COMPANY

SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT

DETAIL TRAY & CONDUIT DETAILS & NOTES

DATE 9/2/73

SUPERSEDES

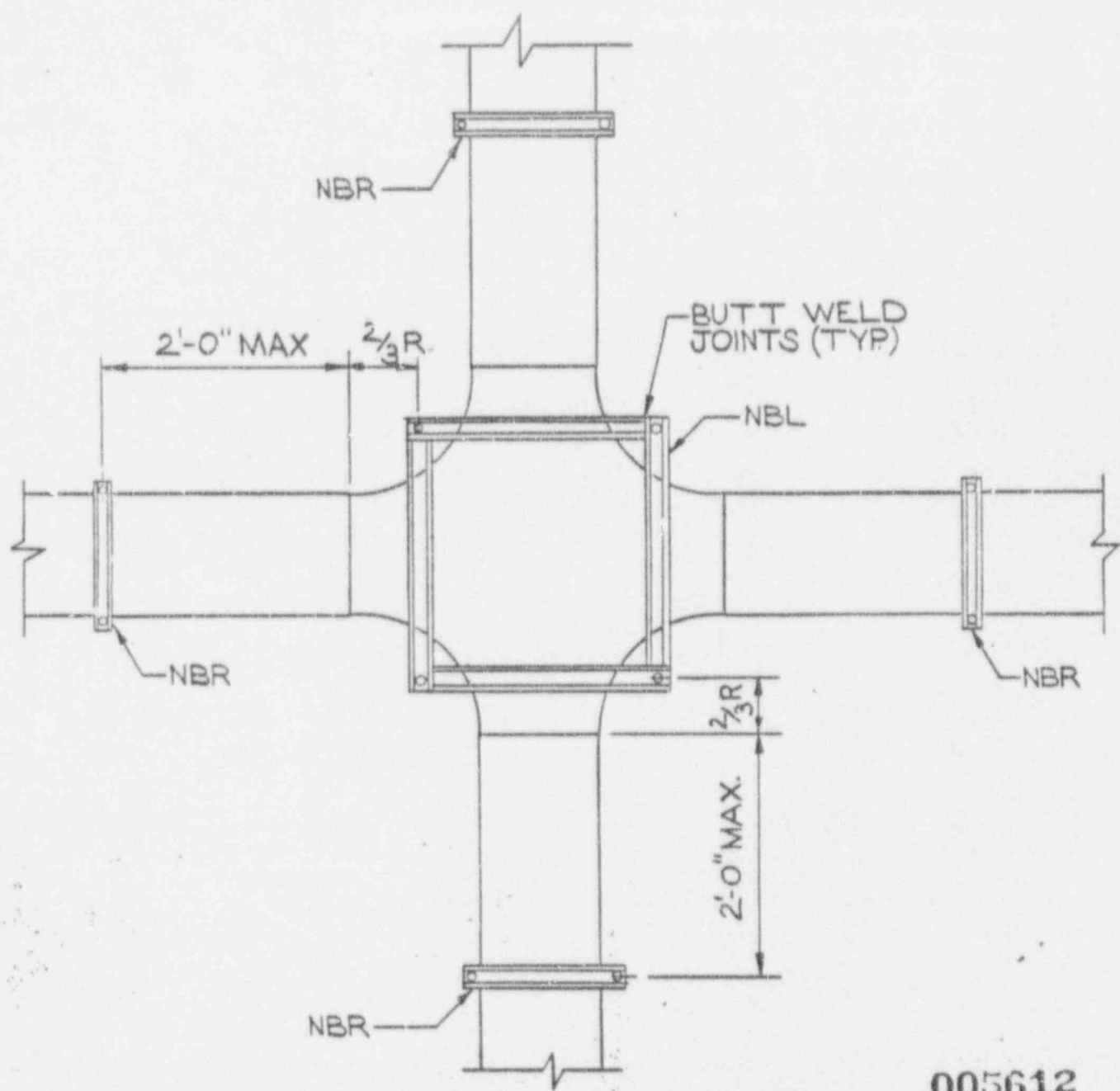
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SH. 3^R OF 29 SHEETS

A-177541

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ORIGINAL DRAWING, Rev. 0
 TRANSFERRED TO SCS



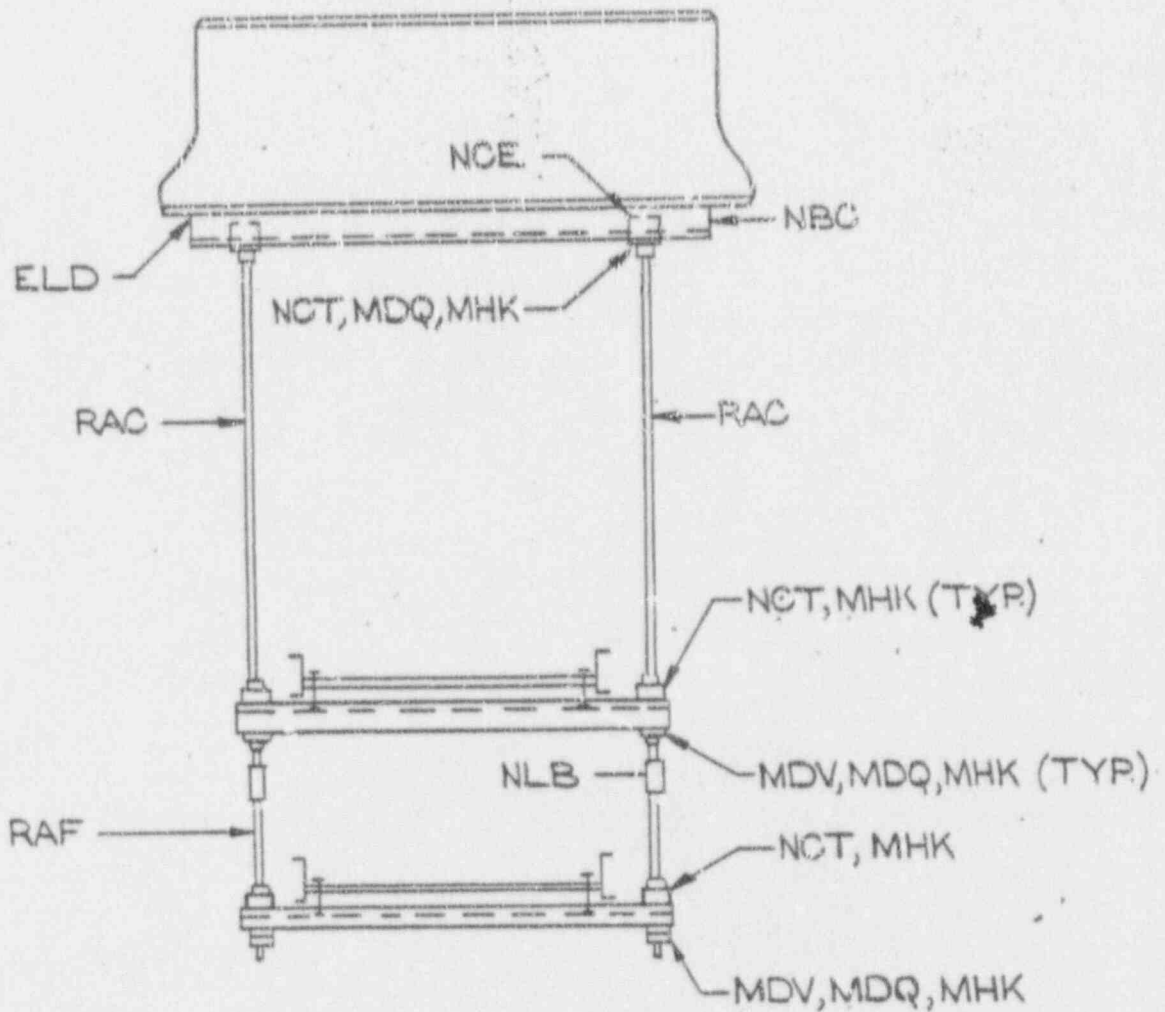
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TYPICAL SUPPORT FOR HORIZONTAL CROSS

NOTE:
 THESE ARE NON-SEISMIC INTERMEDIATE SUPPORTS ONLY.

BECHTEL CORP. JOB 7597-03			SOUTHERN SERVICES INC.		
DR	ELB	NO.	DATE	REVISION	ALABAMA POWER COMPANY
TR		0	9-7-73	ISSUED FOR CONST	SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT
CK	RWR aft				DETAIL TRAY & CONDUIT DETAILS & NOTES
APP	<i>[Signature]</i>				
DATE	9/7/73	SUPERSEDES	SCALE	SH. 30 OF 29 SHEETS	A-177541

ORIGINAL DRAWING, Rev. 0
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TYPICAL HORIZONTAL CABLE SUPPORT FOR TWO TRAYS

NOTE:

THESE ARE NON-SEISMIC INTERMEDIATE SUPPORTS ONLY.

005613

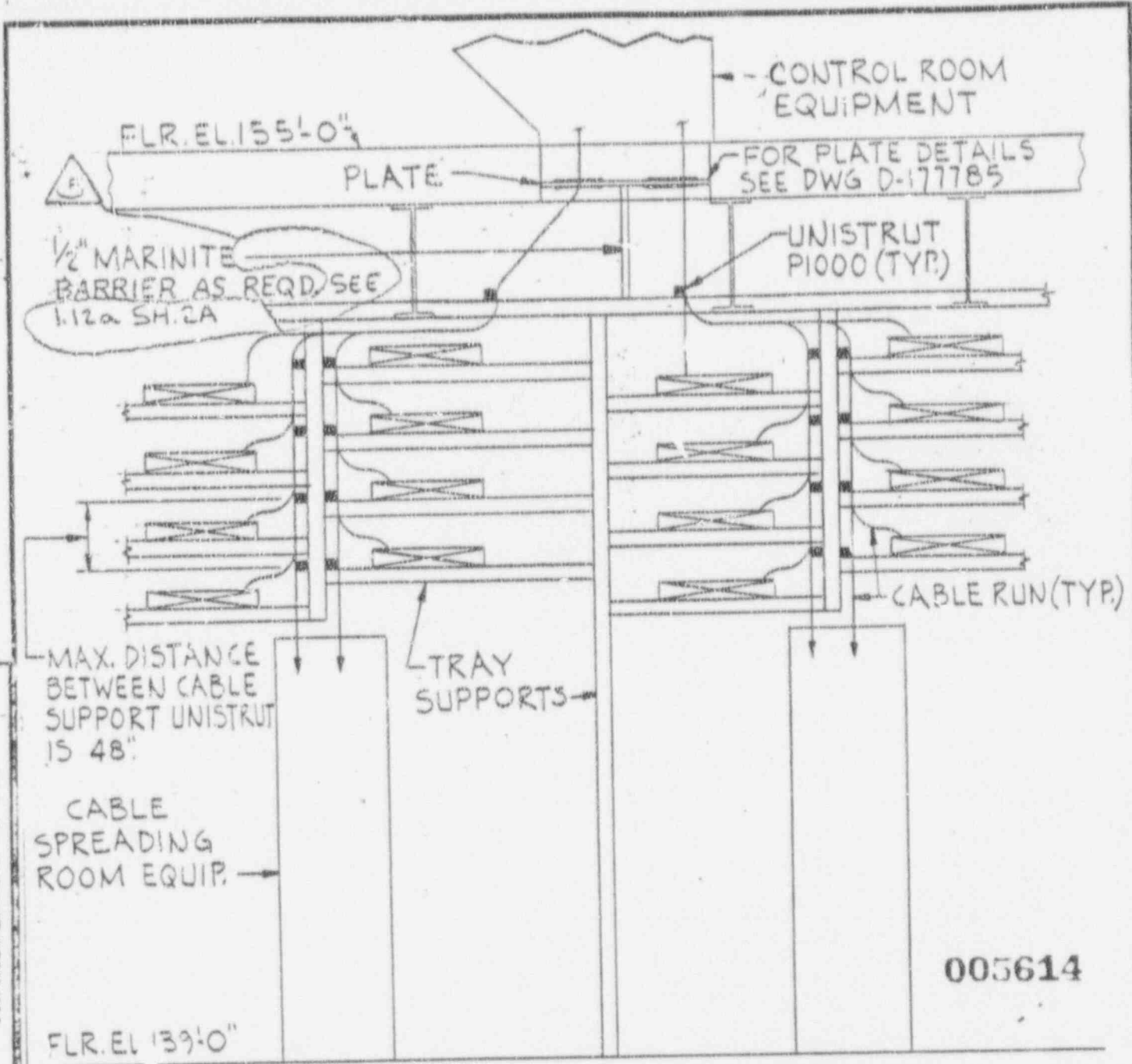
BECHTEL CORP. JOB 7597-03

SOUTHERN SERVICES INC.

DR	NO.	DATE	REVISION
E.L.B.	0	9-7-73	ISSUED FOR CONST.
TR			
CK			
APP			
DATE			

ALABAMA POWER COMPANY
SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT
DETAIL TRAY & CONDUIT DETAIL & NOTES

ORIGINAL DRAWING, Re
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NOTES

1. TYPICAL UNISTRUT ARRANGMENT HUNG FROM TRAY SUPPORTS TO ALLOW CABLE SUPPORTING FROM CONTROL ROOM CABINETS TO CABLE SPREADING ROOM TRAYS AND TERMINATION CABINETS.
2. SEE SUPPORT PLAN DWG D-177930 & TRAY PLAN DWG. D-177754.
3. THIS DETAIL TO BE USED FOR CONTROL CABLES ONLY IN UNIT#2.


UNISTRUT CABLE SUPPORT SYSTEMS (TYP.)

BECHTEL CORP. JOB 7597-03 SOUTHERN SERVICES INC.

DR. <i>RWB</i>	NO.	DATE	REVISION	ALABAMA POWER COMPANY
TR.	0	12/11/73	FOR CONSTRUCTION	JOSEPH M. FARLEY NUCLEAR PLANT
CK. <i>RWR</i>	5	7/29/86	REV. PER PLN 5-81-0-1058 REV. 0-10 <i>WMA</i>	
APP. <i>WMA</i>				DETAIL TRAY & CONDUIT DETAILS & NOTES
DATE 12/11/73	SUPERSEDES		SCALE <i>1/4"</i>	SH. 3E OF 29 SHEETS A-17754 REV 5

ORIGINAL DRAWING, Rev. 9
TRANSFERRED TO 615

2.0 CONDUITS

- 2.1 Rigid conduits shall be aluminum or galvanized steel of standard wall thickness (U-L approved). Embedded conduits shall be galvanized steel and exposed conduits shall be aluminum. All conduits inside the containment shall be galvanized steel.
- 2.2 Flexible steel conduits shall be galvanized with an outer liquid-tight jacket. Fittings shall be of the water-tight compression type.
- 2.3 Fittings shall be of the same material and finish as their conduits, however, malleable iron couplings may be used to couple aluminum conduit to rigid galvanized steel conduit in the following areas of the Aux. Bldg.:
1. Control Room
 2. Cable Spreading Room
 3. Switchgear Rooms
 4. CRDM Room
 5. Computer Room
 6. Elect. Penetration Room
 7. Cable Chases
 8. Laboratories
 9. Balance of Plant except:
 - a. Circulating Water Structures
 - b. Water Treatment Plant
 - c. Cooling Towers
 - d. Cooling Tower Switchgear Bldgs.
 - e. Pump Rooms of River Water Structure
 - f. Pump Rooms of Service Water Structure
 - g. Chlorine Structures
 10. "Pene-Trox" type thread lubricant (or equivalent equal) shall be used when malleable iron fittings are installed.
- 2.4 Connections to motor terminal boxes, instruments, or other equipment subject to vibration or removal shall be made with liquid-tight flexible steel conduit, unless otherwise specified.
- 2.5 Where applicable, weepholes shall be provided at the low point of embedded conduit runs to avoid accumulation of moisture.
- 2.6 A minimum of 4" spacing is required between embedded conduits and the minimum size of embedded conduits shall be 1" unless noted otherwise. 
- 2.7 All conduits to be embedded in concrete shall be inspected to assure continuity and correct position before concrete is poured, and shall be terminated with couplings flush with the finished floor line, except as noted.
- 2.8 All embedded conduit ends shall be plugged or capped during construction. Ends of spare conduits shall be kept capped or plugged.
- 2.9 When a conduit crosses a building expansion joint, a conduit expansion coupling or a liquidtight flexible metal conduit shall be installed to allow for expansion. Flexible conduits are not to exceed 24" in length. A flexible bonding jumper shall be used with each expansion joint or flexible conduit.
- 2.9A Redundant safeguard conduit shall be installed to maintain a minimum of 1" separation.

005615

BECHTEL CORP. JOB 7597-03/20 SOUTHERN SERVICES INC.

DR <i>AS</i>	NO. DATE	REVISION	ALABAMA POWER COMPANY
TR	10/5-8-86	Rev. per PCN B-81	JOSEPH M. FARLEY NUCLEAR PLANT
CK <i>9/15 H/K</i>	11/6-28	2-2156 Rev 0-25	SUBJECT TRAY & CONDUIT DETAILS & NOTES
APP <i>W/K</i>		Rev per comments	DETAIL
DATE <i>1/25/71</i>	SUPERSEDES _____ SCALE _____		SH. 4 OF 29 SHEETS A-177541 11

- 2.10 Standard conduits for power circuits shall be connected to ground at one point in a continuous run by means of a grounding bushing.
- 2.11 All threads on exposed and embedded conduit shall be painted with zinc rich paint before fittings are attached. All conduits cut in the field shall be reamed and free of burrs before installation.
- 2.12 Conduits shall be supported in accordance with the National Electrical Code Table 346-12 unless otherwise specified.
- 2.13 When conduit penetrations are made through secondary walls inside the containment, the conduit shall be installed at such an angle that the bottom of the conduit I.D. on one side of the shield shall be at least 3 inches above the top of the conduit I.D. on the opposite side of the shield.
- 2.13A The type of flexible metal conduit to be used in the Containment Building is Servicair Company "Serviflex" Hose Catalog No. SS63 **-S or equal:

** - Indicates size as follows:

- 06 - 3/4"
- 08 - 1"
- 10 - 1-1/4"
- 12 - 1-1/2"
- 16 - 2"

If the stainless steel "Serviflex" is used, malleable fittings are permitted, provided they are zinc coated.

Also acceptable for use in the Containment is Greenfield Electro-Plated Galvanized Flexible Conduit and Fittings.

005616

ORIGINAL DRAWING, Rev. 1
TRANSFERRED TO SCS

BECHTEL CORP. JOB 7597-03

SOUTHERN SERVICES INC.

DR <i>R/R</i>	NO.	DATE	REVISION	ALABAMA POWER COMPANY	
TR	0	9/11/74	FOR CONSTRUCTION		
CK <i>RWR BT</i>	1	4/4/75	REV PER BE-784-1		
APP <i>WU</i>					
DATE <i>9/11/74</i>	SUPERSEDES _____		SCALE _____	SH. <i>4A</i> OF <i>29</i> SHEETS	<i>A-177541 1</i>

- 2.14 Elevation of conduits in concrete slabs shall be determined by field forces to avoid drains, pipes, recesses, and large reinforcing bars. Conduit elbows shall be located so that the entire bend is below the face of the floor slab.
- 2.15 Where a change of direction is required for conduits in concrete slabs, long radius bends shall be used where possible.
- 2.16 Steel conduits installed in underground runs shall be encased in concrete with 4 inch minimum coverage.
- 2.17 Terminate steel conduits in concrete pull boxes with bushings 2 inches beyond the inside face of the wall unless otherwise specified.
- 2.18 Routing of exposed conduits are shown diagrammatically. Field to determine exact route in the event of conflict with piping, pipe hangers, ductwork, etc. Also, field to maintain a minimum of 1/2" between outside edges of instrumentation & control conduit. For conduit containing 4KV-Power circuits a minimum of 1 conduit diameter spacing must be maintained. For conduit containing 600V-power circuits, spacing must be no less than 1/4 of largest conduit diameter.
- 2.19 The elevation of exposed conduits should be as close to building steel or concrete as is possible to maintain a straight run and/or a minimum of bends.
- 2.20 Conduit hangers and supports shall be a field detail. Use continuous slot framing (Power-strut, Unistrut, etc.) and conduit clamps as furnished.
- 2.21 Conduit runs of not less than 100 feet but having more than two 90 degree bends shall be provided with pull boxes after every second bend. Pull boxes shall be provided every 150 feet \pm in straight conduit runs.
- 2.22 For outdoor or below grade equipment not having threaded hubs, Myers Electric Company "Scru-tite" fittings shall be installed.
- 2.23 All conduits shall be sloped toward pull boxes, or manholes for drainage.
- 2.24 Bedded conduits shall be shown diagrammatically. Final Routing to be determined in field, however stub ups as shown on dwgs. will be firm.
- 2.25 When supporting exposed conduit from walls or ceiling, all conduit larger than 4" require welded studs. Conduit 4" and less may be supported with cinch anchors. All cinch anchors should be installed per manufacturers' specifications.
- 2.26 Field to add reducers bushings, etc. to make final connections to equipment as required.

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ORIGINAL DRAWING, Rev. 8
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BECHTEL CORP. JOB 7597-03

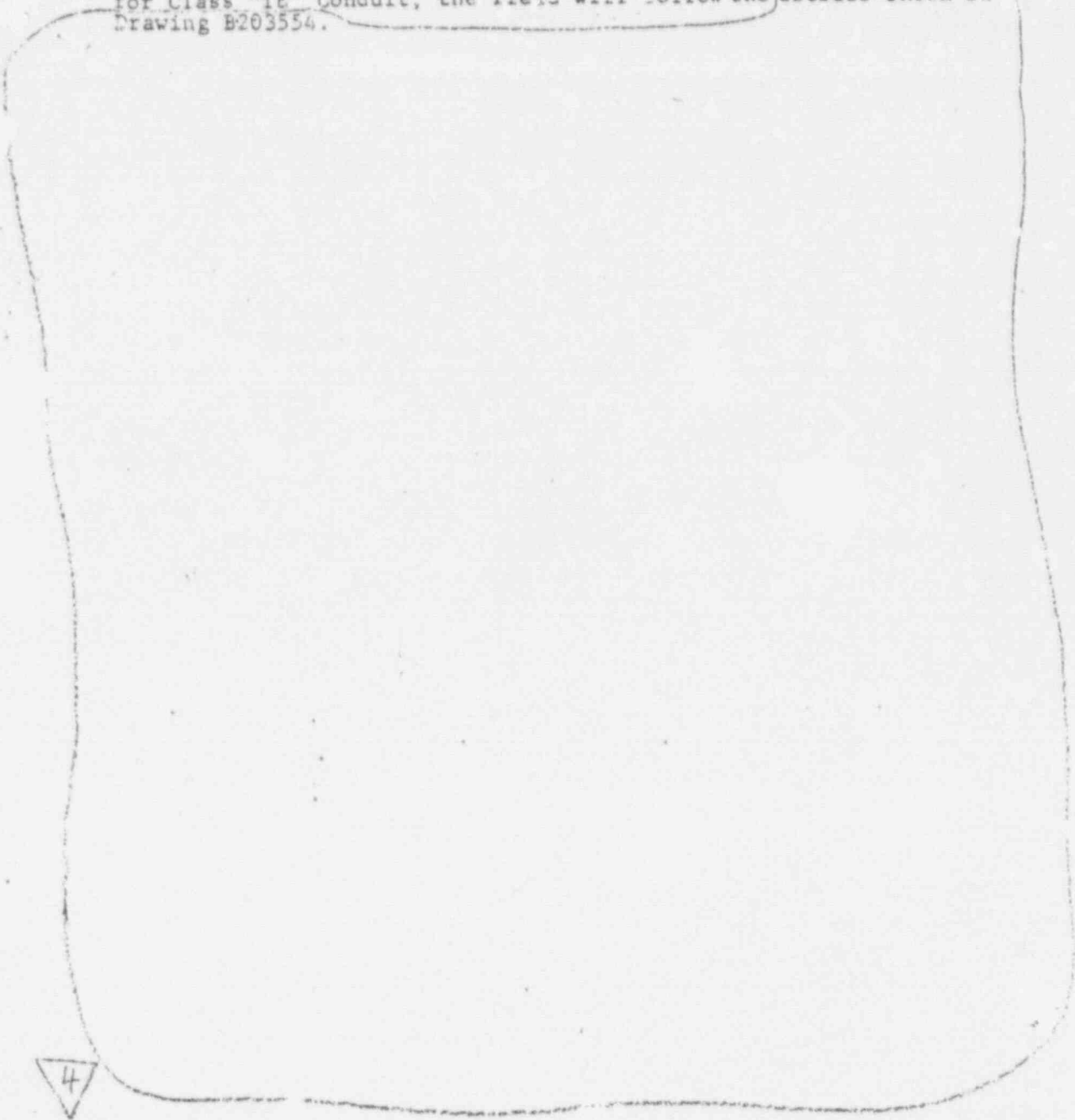
SOUTHERN SERVICES INC.

DR	NO	DATE	REVISION	ALABAMA POWER COMPANY	
95	9	11/18/84	Rev. Per PCN S-84-0-2892 Rev.0	JOSEPH M. FARLEY NUCLEAR PLANT	
TR				SUBJECT	
CK	8	2/4/81	REV. AS NOTED	TRAY & CONDUIT DETAILS & NOTES	
APP	7	9/23/74	REV. PER BE-570	DETAIL	
DATE	3/15/71		SUPERSEDES	SCALE	SH. 5 OF 29 SHEETS

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2.27

Unless otherwise specified, when installing conduit support haagers for Class "1E" Conduit, the field will follow the details shown on Drawing B203554.



4

005618

2.28

Cable Tray Seismic Supports may be utilize to support conduit subject to the following limitations

ORIGINAL DRAWING, Rev. 3
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BECHTEL CORP. JOB 7597-03/20

SOUTHERN SERVICES INC.

DR	NO.	DATE	REVISION
K.L.L.	0	4-6-73	FOR APPROVAL
TR	3	3-28-77	REV. AS NOTED
CK RWR	4	10/18/84	REV. FOR PCN 5-9mc 84-0-2892 Rev. 0

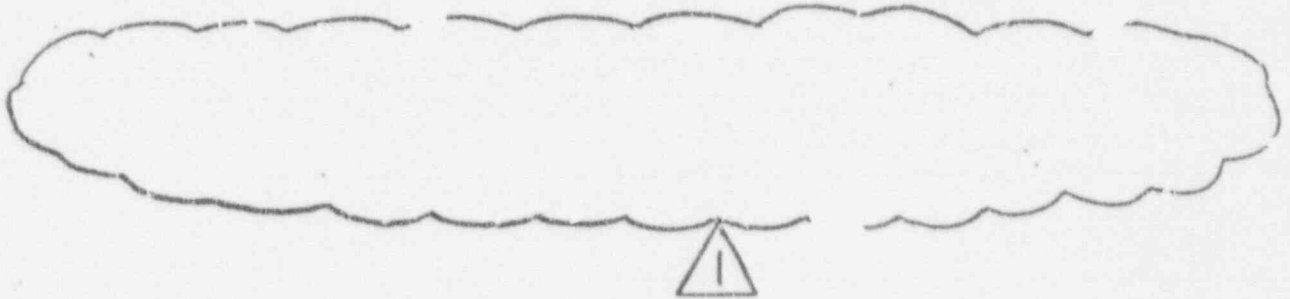
ALABAMA POWER COMPANY

JOSEPH M. FARLEY NUCLEAR PLANT

SUBJECT TRAY & CONDUIT DETAILS & NOTES
DETAIL

- "C" train circuits are those which are capable of performing a "B" function or an "A" function at any given time.

To ensure the integrity of these "C" train circuits, no other cables other than those presently reflected in the EE553 progr. shall be pulled thru "C" tra'n conduits.



005620

ORIGINAL DRAWING, Rev. 1
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"C" TRAIN CONDUIT INSTALLATION

BECHTEL CORP. JOB 7597-03/20

SOUTHERN SERVICES INC.

DR <i>bew</i>	NO. <i>30</i>	DATE <i>9-13-77</i>	REVISION <i>FOR CONSTR.</i>	ALABAMA POWER COMPANY	
TR <i>RIP/</i>	1	2-4-81	REV'D AS NOTED	SUBJECT <i>JOSEPH M. FARLEY NUCLEAR PLANT</i>	
CK <i>W/</i>				DETAIL <i>TRAY & CONDUIT DETAILS & NOTES</i>	
APP <i>W/</i>				SH. <i>50</i> OF <i>29</i> SHEETS	A-177541 Rev <i>1</i>
DATE <i>9-13-77</i>	SUPERSEDES		SCALE		

3.0 CABLE TRAY AND CONDUIT SUPPORT AND FITTINGS

- 3.1 Channel type members and fittings for the support of cable trays and conduits shall be green enamel steel, aluminum, or hot dip galvanized steel, except for those used inside the containment, which shall be hot dip galvanized after fabrication or plain steel coated per SS-1102-31. Plain steel coated fittings are also approved for use in the Auxiliary Building.
- 3.2 Screws, nuts and other parts shall be of the same material and finish as support

4.0 TERMINAL BOXES

- 4.1 In dry locations, other than the containment, pull boxes and outlet boxes shall be aluminum with screw fastened covers. Inside the containment they shall be code gauge galvanized sheet steel. Terminal boxes shall be of the same materials and finish with hinged covers. **STAINLESS STEEL BOXES MAY BE USED IN ALL INDOOR LOCATIONS.**
- 4.2 In wet or damp locations indoors, other than the containment, boxes shall be code gauge aluminum JIC or NEMA 12 type. Inside the containment they shall be code gauge galvanized sheet steel.



- 4.3 Box exteriors inside the containment shall be finished as described in Specification SS-1102-31.
- 4.4 Outdoor boxes used in the intake area shall be stainless steel unless otherwise noted.
- 4.5 Embedded boxes shall be of galvanized steel or epoxy enameled inside and outside to prevent corrosion.
- 4.6 Boxes mounted on concrete surfaces shall be placed a minimum of 1/4 inch off the surface.
- 4.7 Power receptacle boxes shall be mounted 3 feet above the finished floor or grade.
- 4.8 Pushbuttons, magnetic switches, etc. shall be mounted 5'-0" above the floor unless otherwise shown.
- 4.9 BOXES THAT USE SCREWS FOR COVER FASTENING MAY **005621** NECESSARY, WHEN COVER CLAMPS ARE STRIPPED, BE REPLACED WITH BOLT AND NUT OF SAME SIZE OR WITH A LARGER SCREW.

ORIGINAL DRAWING, Rev. 2
TRANSFERRED TO SCS

BECHTEL CORP. JOB 7597-03				SOUTHERN SERVICES INC.	
DR	98	NO.	DATE	REVISION	ALABAMA POWER COMPANY
TR		5	7/6/88	REV'D PER PCN B-5-2-4617 REV. 2-REV	JOSEPH M. FARLEY NUCLEAR PLANT
CK	98-H/2	3	10/8/88	REV. PER PCN B-5-2-4617 REV. 0	TRAY & CONDUIT DETAILS & NOTES
APP	WJW	4	1/27/81	REV. PER PCN B-5-2-4617 REV. 0	
DATE	1/25/71	SUPERSEDES		SCALE NONE	SH. 6 OF 29 SHEETS A-177541 5

5.0 NON-METALLIC CONDUIT

5.1 Non-metallic conduit runs placed in concrete encasements shall be as specified on specific drawings and associated bills of materials.

5.2 All conduit to be embedded in concrete shall be inspected to assure continuity and correct position before concrete is poured.

5.3 All underground conduit shall slope a minimum of 2" per 100 feet toward manholes or between manholes. ²

5.4 ² Terminate non-metallic conduits with female adapter coupling flush with finished floor.

5.5 When duct banks are dead-ended for the purpose of being e ended later, the duct tiers shall be staggered. Each tier shall extend 18 inches farther out than the tier above it.

5.6 Conduit ends shall be plugged or capped during construction. Ends of spare conduits shall be kept capped or plugged.

5.7 Minimum conduit size shall be 1 1/2 inches.

5.8 PVC conduits shall be terminated in concrete pull boxes or manholes with PVC end bells unless otherwise noted.

5.9 PVC conduits may be installed underground without concrete covering; refer to specific drawings for instructions.

005622

ORIGINAL DRAWING, Rev. 2
TRANSFERRED TO SCS

BECHTEL CORP. JOB 7597-03			SOUTHERN SERVICES INC.		
DR. <u>93</u>	NO.	DATE	REVISION	ALABAMA POWER COMPANY	
TR.	1	5-5-71	REV. PER S.S. LTR	SUBJECT. JOSEPH M. FARLEY NUCLEAR PLANT	
CK. <u>93 H/L</u>	2	2-4-81	REV. AS NOTED	DETAIL. TRAY & CONDUIT DETAILS & NOTES	
APP. <u>WLL</u>					
DATE <u>1/25/71</u>	SCALE			SH 7 OF 29 SHEETS	A-177541 2

6.0 Cable Channel

- 6.1 Cable channel for use in the auxiliary building and the turbine building shall be aluminum. Cable channel for use in the containment shall be hot dip galvanized steel after fabrication.
- 6.2 Channel width shall be 4". the side rails shall be 1 1/2" for steel and 1 3/4" for aluminum.
- 6.3 Fittings, accessories, and hardware shall be of the same materials and finish as the straight channel. Minimum Radii of side rails on horizontal & vertical elbows shall be 24" except as otherwise indicated on drawings.
- 6.4 In general, channel systems shall be continuous and where changes in elevation will not permit standard fittings to be used, adjustable splice plates will be installed in the field as required. However; if achieving continuity is impractical due to physical limitations, the requirements for unsupported cable distances as outlined in sections 1.22 and 1.23 shall apply.
- 6.5 Cable channel hangers and supports shall be installed in accordance with Civil Dwg. B-203554. Use continuous slot metal framing (power-strut, unistrut, etc.) and channel clamps as required.
- 6.6 Routing of cable channel is shown diagrammatically. Field to determine exact route in case of conflict with piping, pipe hangers, ductwork, etc. Also, field to maintain proper separation of redundant systems as outlined on Shs. 27B, 27D and 27F.

005623

ORIGINAL DRAWING, Rev. 6
TRANSFERRED TO SCS

BECHTEL CORP. JOB 7597-03

SOUTHERN SERVICES INC.

DR	R.A. Fromm	NO.	DATE	REVISION
		0	4-27-72	Added chn'l notes
TR	9/24/76	6	7/27/76	CORRECTED REF.
CK		2	10-17-73	AS NOTED
		5	7/21/75	REV. G.G
APP	M.M./G.P.			
DATE	5/10/72	SUPERSEDES		

ALABAMA POWER COMPANY

SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT

DETAIL TRAY & CONDUIT DETAILS & NOTES

7.0 RACEWAY MARKING STANDARDS

7.1 General

To facilitate cable pulling and inspection, all raceways shall be permanently marked with their assigned raceway numbers and safeguard train or channel color by means of prefabricated raceway markers or by stencil painting. All raceway markers inside the containment shall be stencil painted. All others shall be prefabricated.

8

7.1.1 Raceways Wrapped With Kaowool

The field is to provide identification for the raceways that are wrapped with kaowool. This can be accomplished by using a stainless steel tag and embossing the raceway numbers on the tag. The tag may then be wrapped around the kaowool bundle with an appropriate tie wire. These tags should be attached at intervals as specified below. (7.2, 7.3).

7.2 Tray & Unistrut Marking

Raceway markers for application on all tray, and unistrut, or equivalent, shall consist of a marker which presents a color diamond of the proper color scheme, as well as the last six digits of the raceway number. These markers shall be applied to the outside of the rail of the raceway, at the side most accessible to view, at the following points along the raceway section:

- (a) At each end of the section designated with a triangle, "▲", on the tray and conduit layout drawing.
- (b) At twenty (20) foot, maximum, intervals along the section.
- (c) At any other point or points required for clarification.

005624

7.3 Conduit & Channel Marking

7.3.1 The conduits and 4 inch channel shall be marked at both ends with a raceway marker which presents a color diamond of the proper color scheme as well as the last six digits of the raceway number. In addition, the conduits and channel shall have a color diamond of the proper color scheme applied at 20 foot intervals along their length, where visible, and on each side of wall and floor penetrations. These diamond markers shall be applied at a position most accessible to view. Conduit and channel shall be marked with a complete raceway marker (last 6 characters plus a diamond marker) on each side of a Nelson penetration where the conduit or channel are not run continuous through the penetration. Where 4 inch channel are not continuous along their length, each discontinuous section shall be marked with a complete raceway marker at one point most accessible to view.

7.3.2 Raceway markers for application of all embedded conduit or sleeves shall be applied to a metal plate which shall be permanently attached to the concrete surface adjacent to each end of the conduit, or metal tags, of compatible material for the area, stamped with the raceway number attached with S.S. wire to the conduit.

7.3.3 Each embedded pull box shall have conduit markers permanently affixed adjacent to conduit entry into pullbox. As an alternate method of labeling embedded conduits lamacoid tags of the proper train color will be glued directly to the finished concrete wall using Good Year Pliobond or equal.

ORIGINAL DRAWING, Rev. 8
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BECHTEL CORP. JOB 7597-03/20

SOUTHERN SERVICES INC.

DR FOR		NO. DATE		REVISION		ALABAMA POWER COMPANY	
TR		0	11-6-72	FOR APPROVAL		SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT	
CK		7	10-6-78	INCORP. 2BE-1953		DETAIL TRAY & CONDUIT DETAILS & NOTES	
APP		8	12/10/82	REF PCN B-81-1090-2			
DATE		6	3-27-77	INCORP. E-3345			
SUPERSEDES		SCALE NONE		SH. 7B OF 29 SHEETS		A-177541	
						REV 8	

7.4 Markers for application on raceways outside the containment will be furnished by Alabama Power Company.

7.5 Stencil painting raceway markers inside the containment shall be done using one of the paints listed in section 7.6, according to the preparation procedures outlined therein.

7.5.1 Each stencil painted raceway numbers shall present the six (6) character raceway number as it appears on the tray and conduit layout drawings. At the right end of each raceway number shall be painted a safeguard train color mark, for all safeguard raceways.

7.5.2 All painted raceway numbers shall be 1/2, 1 or 2 inch depending on available surface area, red, black characters with no background color.

7.5.3 All safeguard color marks shall consist of a 1 inch by 1 inch, minimum, square painted in accordance with the safeguard colors presented in section 7.5.4.

7.5.4 Colors used in raceway number safeguard color marks shall be as tabulated below.

SAFEGUARD CHANNELS AND COLOR CODES

<u>Train Character*</u>	<u>Train Or Channel</u>	<u>Safeguard Color</u>
N**	Non-Safeguard or Normal	None Required
A	Train A	Red
B	Train B	Blue
C***	Train AB	Red and Blue
1	Safeguard Channel 1	Yellow
2	Safeguard Channel 2	Green
3	Safeguard Channel 3	Orange
4	Safeguard Channel 4	Silver Outlined in Black

005625

*Note 1: The train character is that character appearing in the third character position of the spaces marked: _____ on the EE-553-2 raceway installation cards. RACEWAY NO.

**Note 2: Markers for raceways of this train require no safeguard color mark.

***Note 3: Markers for raceways of this train require two (2) safeguard color marks - one red and one blue.

ORIGINAL DRAWING, Rev. 0
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BECHTEL CORP. JOB 7597-03			SOUTHERN SERVICES INC		
DR	DOR	NO.	DATE	REVISION	
		0	11-6-72	FOR APPROVAL	
TR		1	11/18/84	Rev. Per PCN S-	
CK				84-0-2892, Rev. 0	
APP				902R-1026	
DATE	11/6/77	SUPERSEDES		SCALE	NONE
				SH.	7C OF 29 SHEETS
					A-177541 1
			ALABAMA POWER COMPANY		
			SUBJECT: JOSEPH M. FARLEY NUCLEAR PLANT		
			DETAIL: TRAY & CONDUIT DETAILS & NOTES		

7.6

Paints used in stencil painting raceway numbers shall be applied as detailed below.

7.6.1 Surfaces without breaks in the galvanized steel zinc coating and without field welds and cuts, shall be cleaned and prepared in accordance with the paint manufacturer's recommendations for painting galvanized surfaces and the procedure outlined in paragraph 7.6.3.

7.6.2 Surfaces with breaks in the zinc coating, and all field welds and cuts shall be thoroughly cleaned in accordance with the paint manufacturer's recommendations. If stricter instructions do not appear elsewhere, the following shall be considered the minimum acceptable standard: weld spatter and slag shall be removed in accordance with Steel Structures Painting Council (SSPC) - SP3.**The areas shall then be mopped with a recommended solvent, to remove welding flux and other impurities, and washed with fresh water. After air drying, one coat of zinc rich primer, recommended by the paint manufacturer for galvanized surfaces, shall be applied.

7.6.3 After surface preparation in accordance with sections 7.6.1 or 7.6.2, and immediately prior to painting, the surface shall be washed or wiped with Mineral Spirits in accordance with SSPC-1-63, followed by light sanding to get "tooth".

7.6.4 Acceptable paints for use with this procedure are as listed below.

Phenoline No. 305 finish - 1 coat @ 4 to 5 mils
dry film thickness (DFT)

OR

Mobil, 89 series - 1 coat @ 4 mils (DFT)

OR

Pittsburgh Paint Quick Dry Spray Enamel in Aerosol Cans

2

*Colors shall be a visual match with the following:

PHENOLINE (CARBOLINE)

MOBIL

Red #502
Blue #119
Yellow #627
Orange #409
Grey #720
Green #351

Accent Red 12-R-3
Navy Blue 12-B-7
Yellow 20-Y-5
Orange 12-Y-15
Silver Grey 12-F-18
Green 20-G-11

005626

**REFERENCE

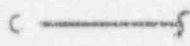
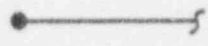
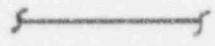
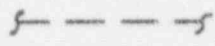
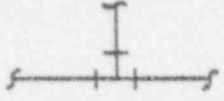
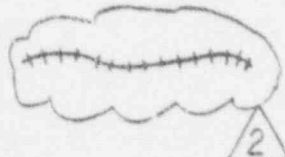


Steel Structures Painting Council
4400 Fifth Avenue
Pittsburgh, Pennsylvania 15213

ORIGINAL DRAWING, Rev. 2
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BECHTEL CORP. JOB 7597-03

SOUTHERN SERVICES INC.

DR	POR	NO.	DATE	REVISION	ALABAMA POWER COMPANY	
TR		0	11-6-72	FOR APPROVAL	SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT	
CK	RWR	1	9/23/74	Per BE-573 & ss noted	DETAIL TRAY & CONDUIT DETAILS & NOTES	
		2	10/29/74	PER BE-595		
APP	<i>[Signature]</i>				SCALE	NONE
DATE	11/6/72	SUPERSEDES				SH. 7D OF 29 SHEETS
						A-177541 2

Symbol	Definition
	Conduit Turning Towards Observer
	Conduit Turning Away From Observer
	Exposed Conduit
	Embedded Conduit
	Conduit Tee Branch
	Flexible Conduit
	Pushbutton
	Power Or Control Panel

005627

ORIGINAL DRAWING, Rev. 2
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BECHTEL CORP. JOB 7597-03

SOUTHERN SERVICES INC.

DR	RAB	NO.	DATE	REVISION
		1	5-5-71	REV. PER S.S.LTR
		2	7-2-76	REV AS NOTED





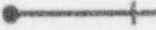
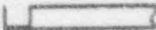
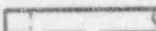



ALABAMA POWER COMPANY

SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT

DETAIL TRAY & CONDUIT DETAILS & NOTES

APP W W
11/25/71

SCALE NONE SH. 8 OF 29 SHEETS A-177541-2

Symbol	Definition
	Pushbutton Control Station
	Motor Starter
	Selector Switch
EP	Indicates Explosion Proof
WR	Indicates Water-Resistant
WP	Indicates Water Proof
	Channel Turning Towards Observer in Plan
	Channel Turning Away From Observer in Plan
	Channel Turning Towards Observer in Section
	Channel Turning Away From Observer in Section
	Welding Receptacles & Portable Pmp. Mtr. Receptacles
	Door Contacts and/or Control Access Barrier 

005628

ORIGINAL DRAWING: G, Rev. 6
TRANSFERRED TO SCS

BECHTEL CORP. JOB 7597-03/20

SOUTHERN SERVICES INC.

DR	NO.	DATE	REVISION
R.A.B.	1	5-5-71	REV. PER S. S. LTR.
TR	5	3-28-77	REV. AS NOTED
CK	6	2-4-81	REV. AS NOTED
APP	4	11-23-79	ADDED SYMBOL FOR SECURITY DOORS

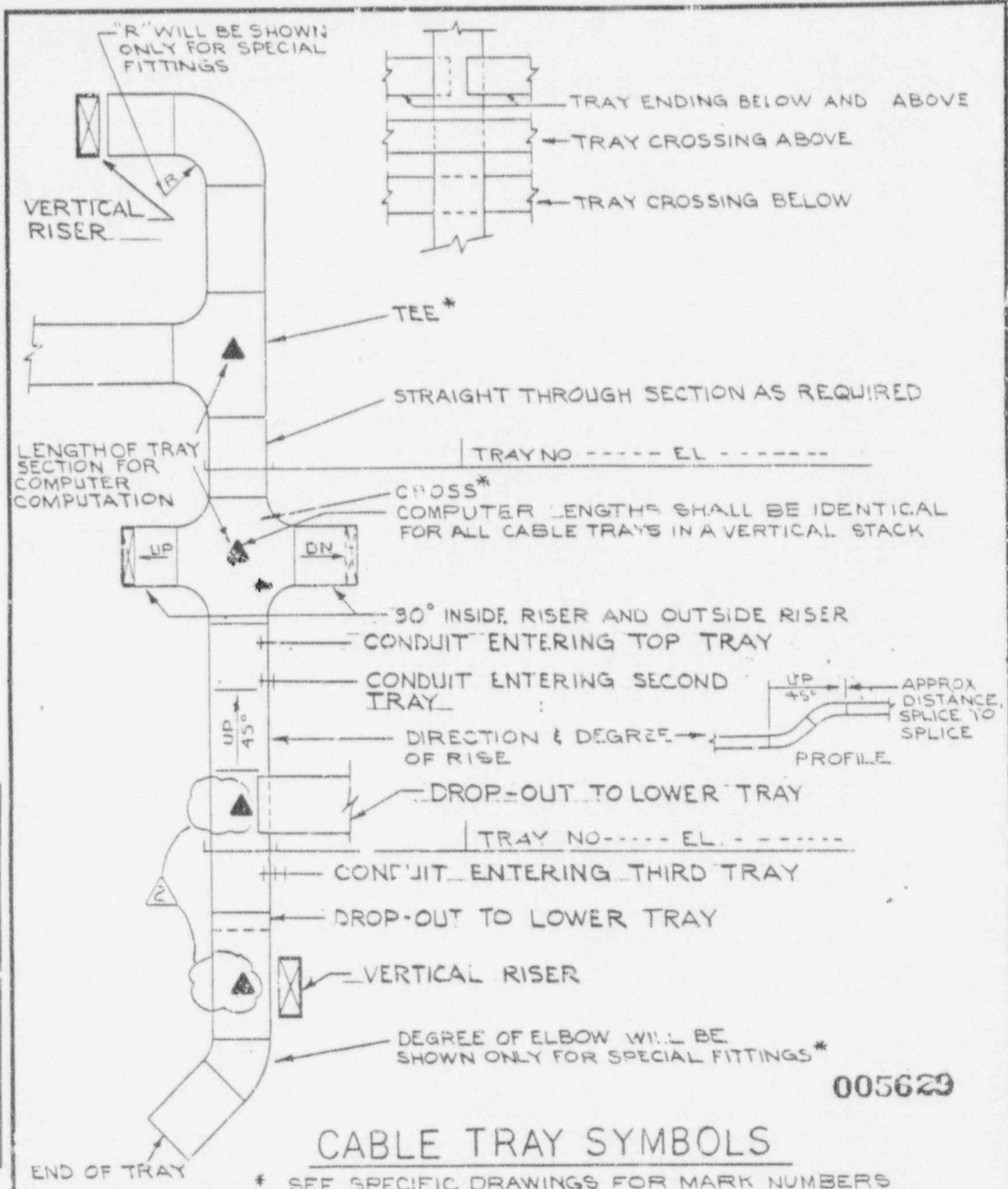
ALABAMA POWER COMPANY

SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT
DETAIL TRAY & CONDUIT DETAILS & NOTES

SCALE NONE SH. 9 OF 29 SHEETS A-1775416

RT REVS

ORIGINAL DRAWING, Rev. 2
TRANSFERRED TO SCS



005629

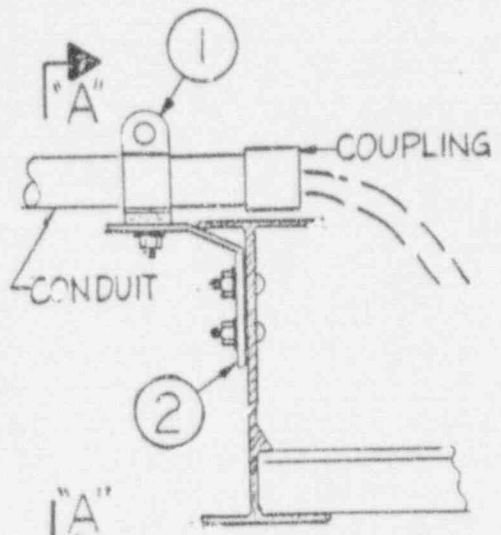
CABLE TRAY SYMBOLS

* SEE SPECIFIC DRAWINGS FOR MARK NUMBERS

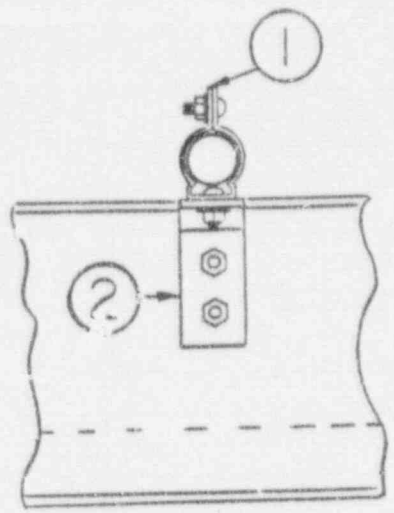
BECHTEL CORP. JOB 7597-03 SOUTHERN SERVICES INC.

DR. MA.	NO.	DATE	REVISION	ALABAMA POWER COMPANY
	1	5-5-71	REV. PER S.S.LTR.	JOSEPH M. FARLEY NUCLEAR PLANT
TR. 9/2 H/L	2	4-25-72	REV. AS NOTED	TRAY & CONDUIT DETAILS & NOTES
CK. M. J.				
APV. M. J.				

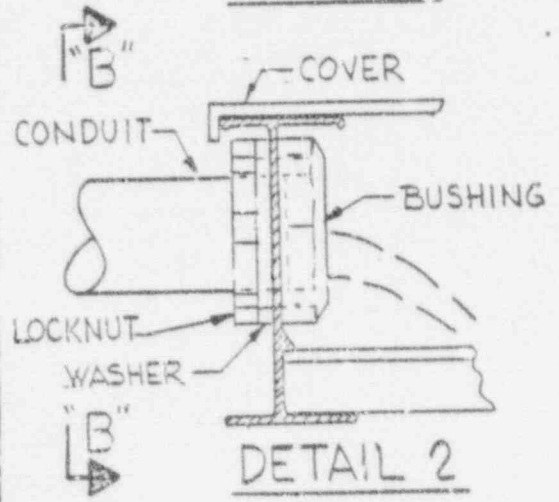
ORIGINAL DRAWING, Rev. 1
 TRANSFERRED TO SCS



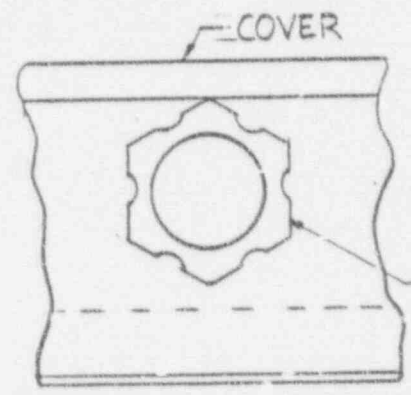
DETAIL 1



SECTION "A-A"



DETAIL 2



SECTION "B-B"

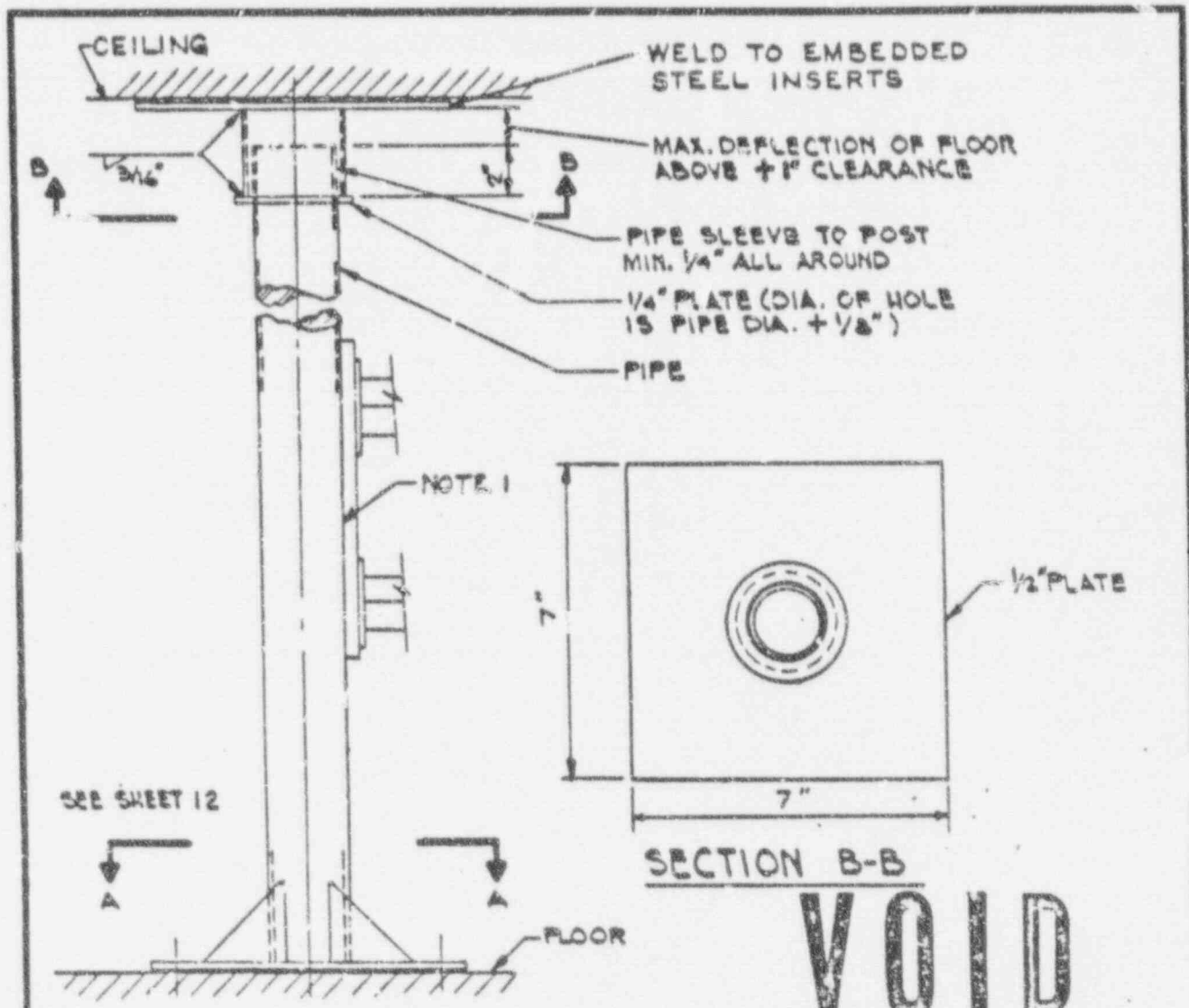
005630

DETAIL "1" : ITEM ① : COUPLING TO SUIT COND. SIZE, WITH CLOSURE BOLT & SQ. NUT
 GRAYBAR CAT # SERIES GHO-B THRU GHB-B. OR EQUAL
 ITEM ② : ADAPTOR, STEEL PLATE - B-LINE CAT. # 97-1150

DETAIL "2" : ALL HARDWARE TO SUIT COND. SIZE UP TO 2" Ø, IF COND. IS
 OVER 2" UTILIZE DETAIL ON SH. 29 OF A-177541
 WITH COND. ENTERING SIDE OF BOX INSTEAD OF TRAY.

CONDUIT TO TRAY DROP OUT

BECHTEL CORP. JOB 7597-03			SOUTHERN SERVICES INC.		
DR. AAM.	NO. 0	DATE 4-6-73	REVISION FOR APPROVAL	ALABAMA POWER COMPANY	
TR.	1	5-13-73	REV. NOTE 2.	SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT	
CK. PIP				DETAIL TRAY & CONDUIT DETAILS & NOTES.	
APP. <i>[Signature]</i>				SCALE NONE	SH. 10A OF 29 SHEETS
DATE 4/6/73	SUPERSEDES			A-177541 1	



VOID
FULL STORY POST FOR CLASS IE CABLE TRAYS

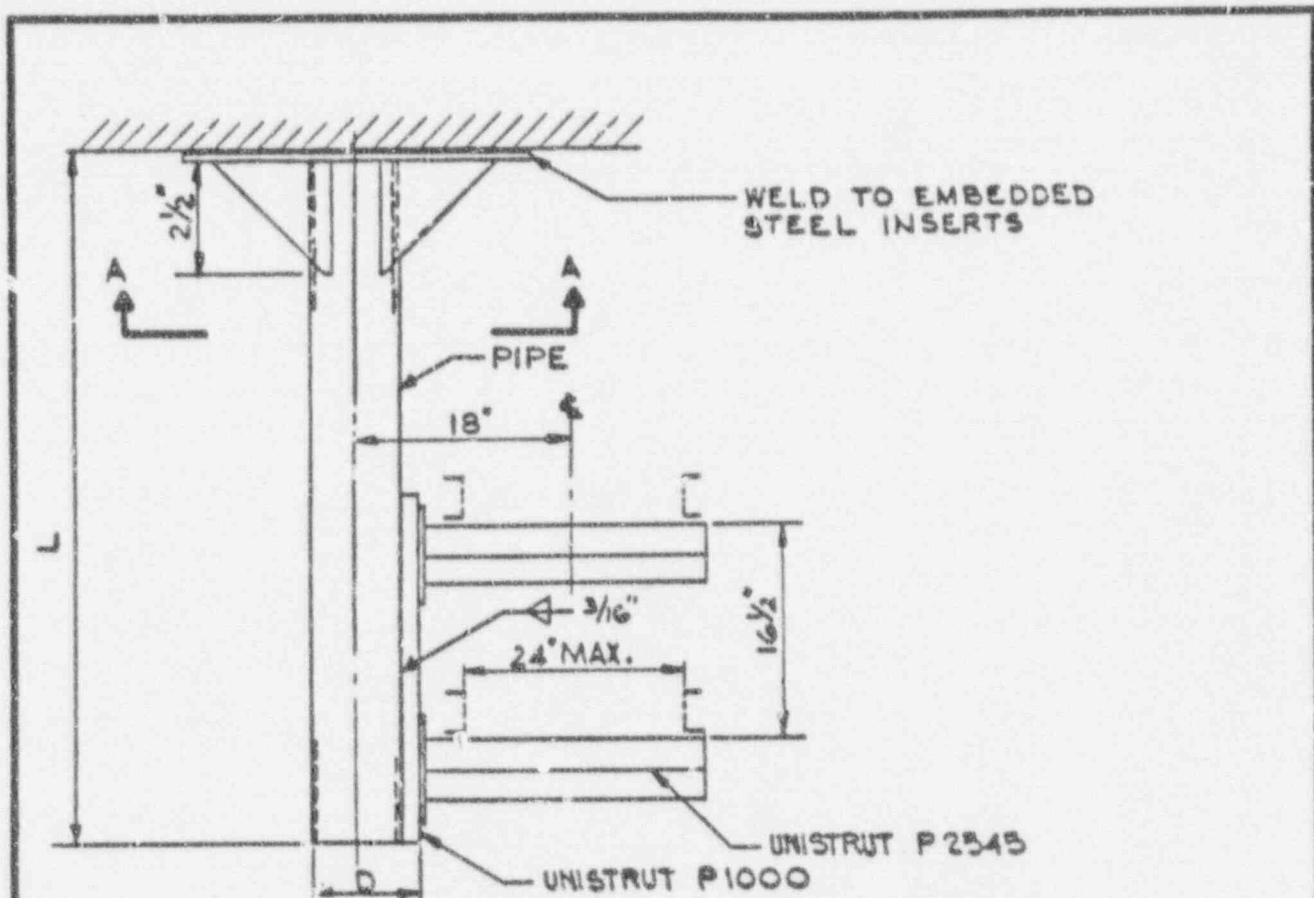
NOTES

005631

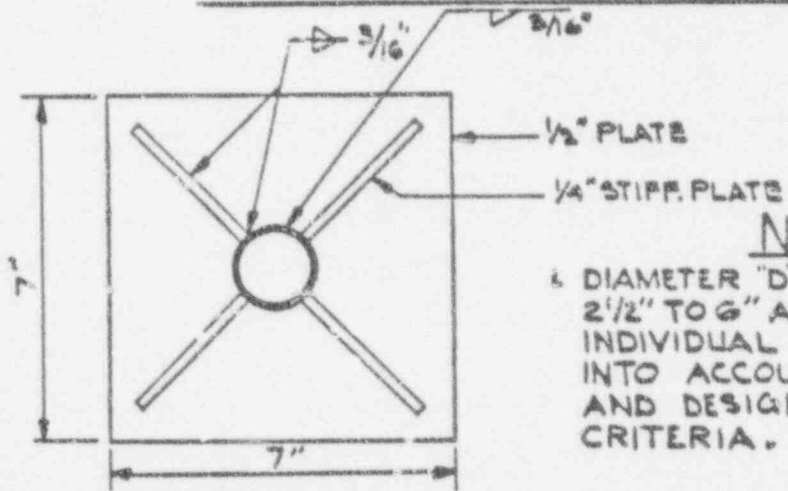
1. ARRANGEMENT FOR CONNECTION OF BRACKETS THAT SUPPORT TRAYS IS THE SAME AS THE HANGER TYPE. SEE SHEET 12.
2. POST DIAMETER IS VARIABLE FROM 2 1/2" TO 6". EACH POST SHALL BE SIZED BY INDIVIDUAL CALCULATIONS TAKING INTO ACCOUNT THE LOAD, LENGTH OF POST, AND DESIGN EARTHQUAKE CRITERIA.

ORIGINAL DRAWING, Rev. 2
 TRANSFERRED TO SCS

BECHTEL CORP. JOB 7597-03			SOUTHERN SERVICES INC.		
DR	A.W.	NO.	DATE	REVISION	ALABAMA POWER COMPANY
TR		1	5-5-71	REV. PER S.S. LTR.	
OK	J.R. H.P.	2	5-8-71	VOIDED	SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT
APP					DETAIL TRAY & CONDUIT DETAILS & NOTES
DATE	4/25/71	SUPERSEDES		SCALE NONE	SHEET 11 OF SHEETS
					A-177541



CABLE TRAY PIPE HANGER FOR FLAT C NC. CEILING
FOR CLASS 1E CABLE TRAYS



SECTION A-A

005632

NOTES

1 DIAMETER "D" IS VARIABLE FROM 2 1/2" TO 6" AND IS DETERMINED BY INDIVIDUAL CALCULATIONS TAKING INTO ACCOUNT LENGTH "L", LOAD, AND DESIGN EARTHQUAKE CRITERIA.

VOID

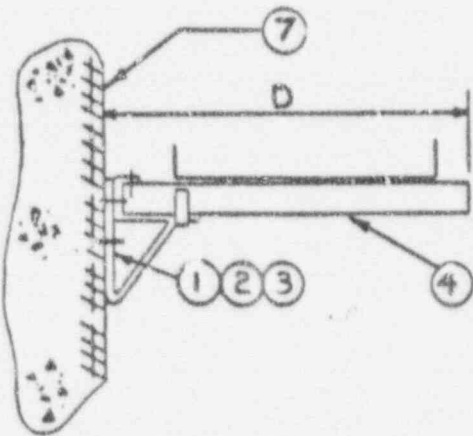
ORIGINAL DRAWING, Rev. 2
TRANSFERRED TO SCS

BECHTEL CORP. JOB 7597-03

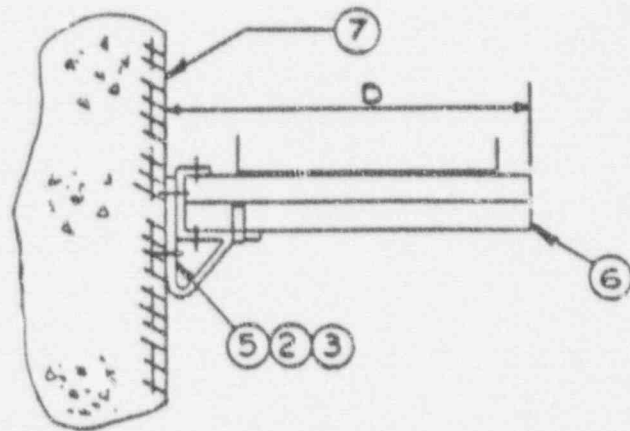
SOUTHERN SERVICES INC.

DR	NO.	DATE	REVISION
A.W.	1	5-5-77	REV. PER S.S. LTR.
TR	2	5-8-76	VOIDED
CK			
APP			
DATE			

ALABAMA POWER COMPANY	
SUBJECT	JOSEPH M. FARLEY NUCLEAR PLANT
DETAIL	TRAY & CONDUIT DETAILS & NOTES
SUPERSEDES	SCALE NONE
DATE	1/25/77
SHEET	12 OF SHEETS
A-177541	



TRAY SIZE	LENGTH D	MAX LOAD
9'	14 3/4"	700 LBS
12'	17 3/4"	525 LBS
18'	23 3/4"	350 LBS
24'	NOT RECOMMENDED	



TRAY SIZE	LENGTH D	MAX LOAD
9'	NOT RECOMMENDED	
12'	17 3/4"	1000 LBS
18'	23 3/4"	725 LBS
24'	29 3/4"	500 LBS

VOID

005633

NOTES

1. ALL MATERIAL UNISTRUT OR EQUIVALENT.
2. TO BE USED IN CLASS 1E RACEWAY SYSTEMS ONLY WHERE VERTICAL SPACING IS CRITICAL.
3. MATERIALS SHOWN IN TABLE AT RIGHT TO BE INCLUDED IN ALL APPLICABLE BILLS OF MATERIALS. ⚠

* LENGTHS AS REQUIRED

BILL OF MATERIALS

NO	QTY	MFG. NO.	DESCRIPTION
1	1	P-1075	BRACKET
2	3	P-1010	NUT
3	3	- - - -	1/2"x1" CAP SCREW
4	*	P-1000	SINGLE CHANNEL
5	1	P-1593	BRACKET
6	*	P-1001	DOUBLE CHANNEL
7	*	P-3253 THRU P-3270	CONCRETE INSERTS

TYPICAL TRAY OR CONDUIT BRACKET

BECHTEL CORP. JOB 7597-03

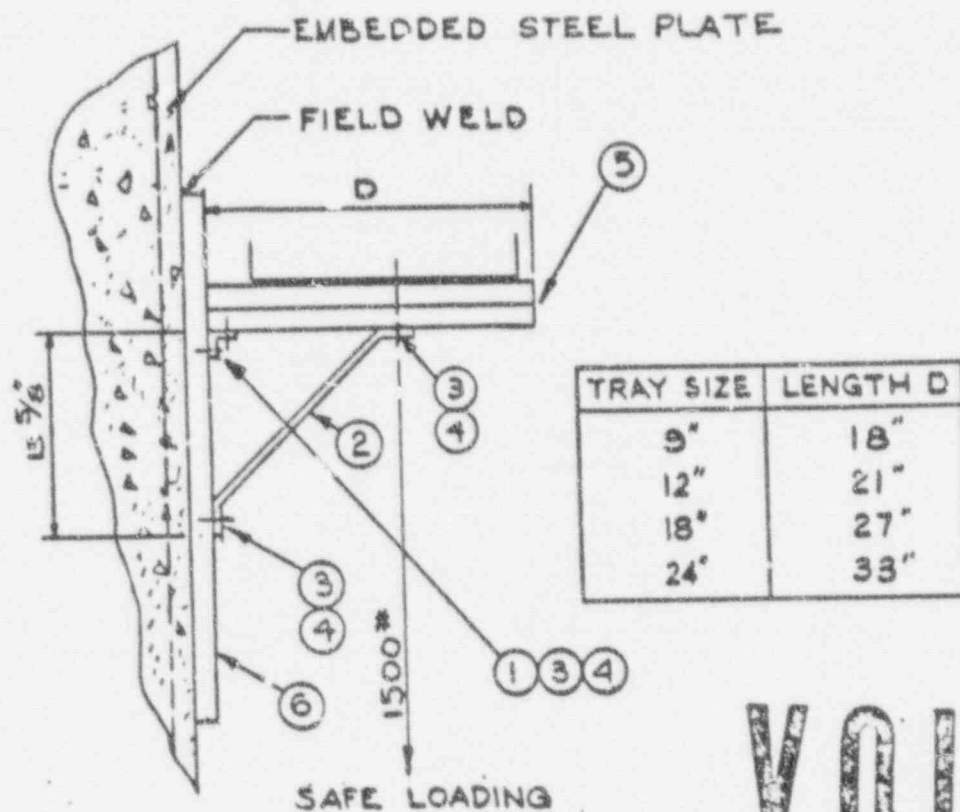
SOUTHERN SERVICES INC.

NO.	DATE	REVISION
1	5-5-71	REV. PER S, S, LTR.
2	5-8-71	VOIDED

ALABAMA POWER COMPANY
SUBJECT: JOSEPH M. FARLEY NUCLEAR PLANT
DETAIL: TRAY & CONDUIT DETAILS & NOTES

DATE: 1/25/71 SUPERSEDES: SCALE: NONE SHEET: 13 OF 25 SHEETS A-177541

ORIGINAL DRAWING, Rev. 2
TRANSFERRED TO SCS



VOID

005634

AUX. BLDG. WALL

NOTES

1. ALL MATERIAL UNISTRUT OR EQUIVALENT.
 2. SEISMIC CRITERIA TO BE CHECKED BY STRUCTURAL SECTION FOR USE IN CLASS 1E TRAY SYSTEMS.
 3. SEE SHEET 13, NOTE 3.
- * LENGTHS AS REQUIRED

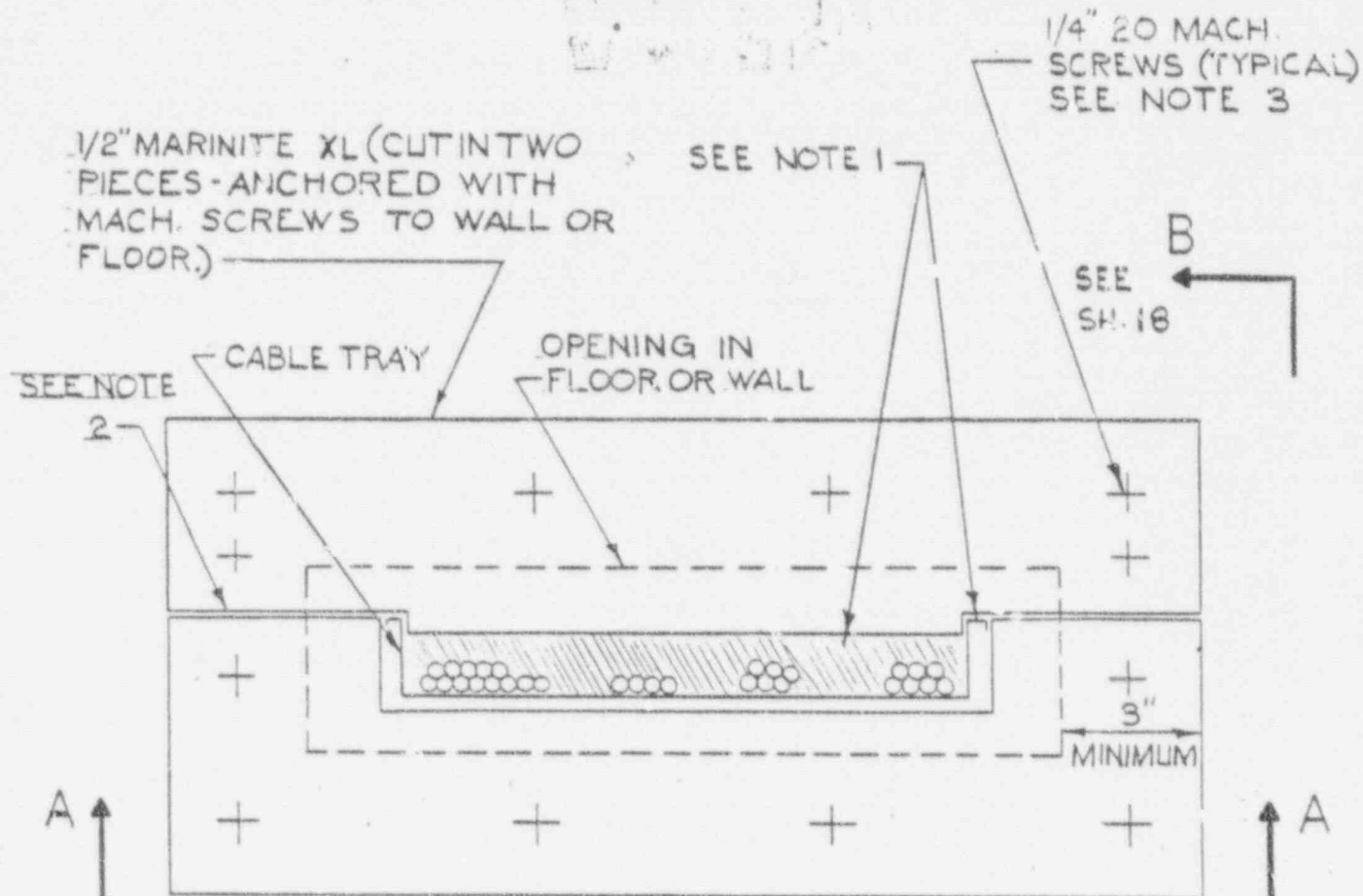
BILL OF MATERIAL			
ITEM	QTY	MFR NO	DESCRIPTION
1	1	P-1026	ANGLE FITTING
2	1	P-2452	BRACE
3	4	P-1010	NUT
4	4	-	1/2" 13x1" CAP SCREW
5	*	P-1001	DOUBLE CHANNEL
6	*	P-1000	SINGLE CHANNEL

TYPICAL
TRAY OR CONDUIT BRACKET SUPPORTED
FROM WALL

BECHTEL CORP. JOB 7597-03			SOUTHERN SERVICES INC.		
DR. M.A.	NO. DATE	REVISION	ALABAMA POWER COMPANY		
TR. 9B	1 5-5-71	REV. PER S.S. LTR.	SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT		
CR. 9B	2 5-8-71	VOIDED	DETAIL TRAY & CONDUIT DETAILS & NOTES		
APP. [Signature]	SUPERSEDES		SCALE NONE	SH. 14 OF 28 SHEETS	A-177541

ORIGINAL DRAWING, Rev. 2
TRANSFERRED TO SCS

ORIGINAL DRAWING, Rev. 5
TRANSFERRED TO SCS



SECTION C-C

(FROM SHEET 16 & 18)

005635

NOTES

1. FILL LARGE VOIDS WITH INORGANIC THERMAL INSULATING WOOL.
2. SEAL OPENING BETWEEN THE TWO PIECES OF MARINITE BOARD WITH 1/4" "FLAMEMASTIC" 71A MASTIC. THE MASTIC SHOULD BE APPLIED TO THE FIRE STOP IN THINNER LAYERS OF ABOUT 1/8" TO AVOID CRACKING AS THE MATERIAL DRIES. TYP. WHERE "FLAMEMASTIC" IS TO BE APPLIED.
3. COVER SCREW HEADS WITH 1/8" THICK "FLAMEMASTIC" 71A MASTIC.
4. FIRE STOPS ARE PROVIDED TO STOP THE PROPAGATION OF FIRE FROM ONE ROOM INTO ANOTHER ON WALLS, FLOORS OR CEILINGS THAT HAVE NO CLASSIFICATION OR RATING.

FIRE STOP FOR CABLE TRAYS THROUGH FLOOR OF WALL OPENINGS

BECHTEL CORP. JOB 7597-03/20

SOUTHERN SERVICES INC.

DR	M.A.	NO.	DATE	REVISION
		5	5-5-82	VOID PER 2EE-961
TR		2	7-2-76	REV. AS NOTED
CK		3	3-28-77	REV. AS NOTED
		4	2-4-81	VOID

ALABAMA POWER COMPANY

SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT

DETAIL TRAY & CONDUIT DETAILS & NOTES

APP. *[Signature]*
11/2/77

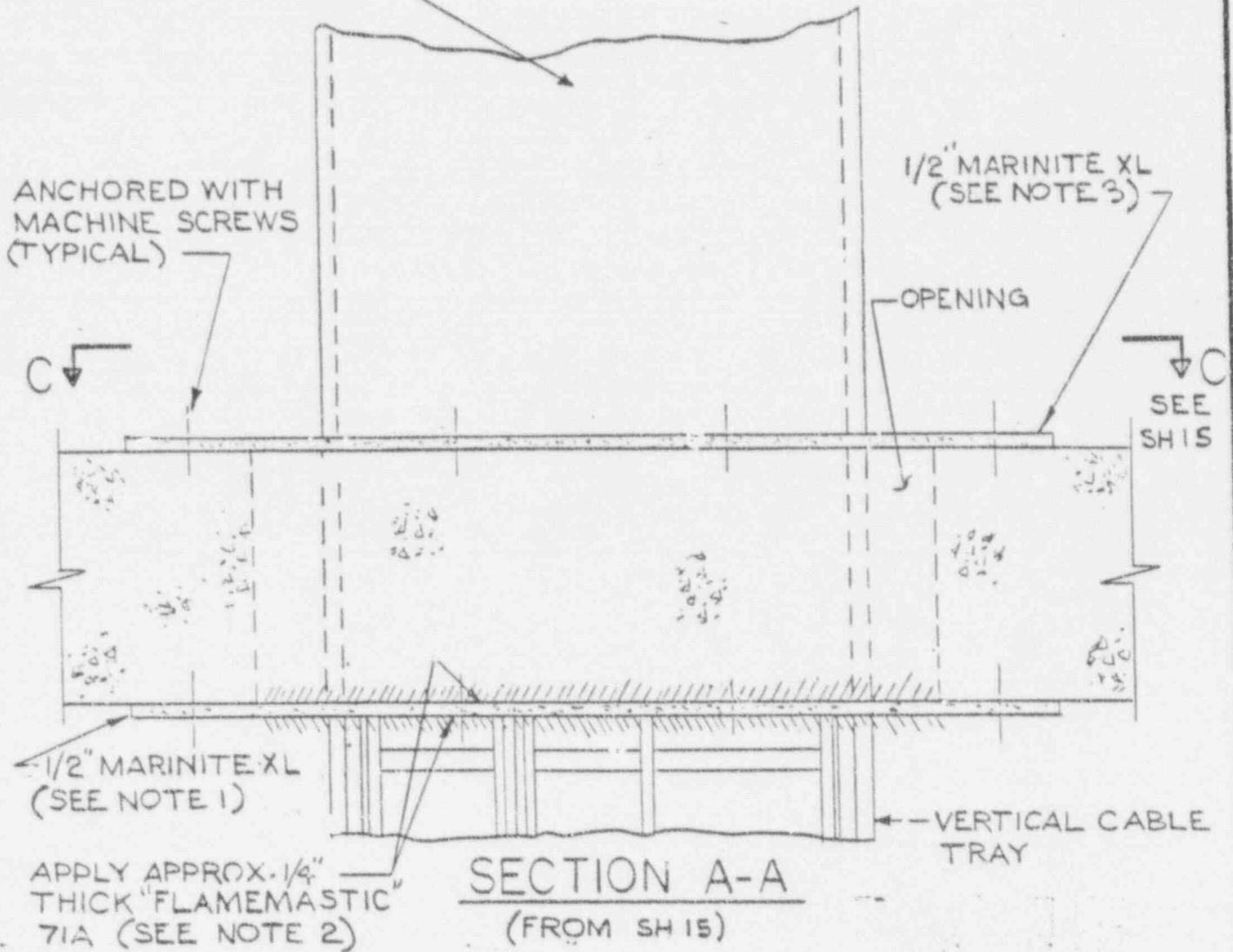
NONE

15 OF 20 SHEETS

A-1775415

REV. 3

VERTICAL CABLE TRAY TO HAVE TRAY COVER A MINIMUM OF 7 FT. ABOVE FLOOR LEVEL TO PROVIDE PROTECTION FOR CABLES.



NOTES

005636

1. INSTALL MARINITE XL AT BOTTOM BEFORE APPLYING "FLAMEMASTIC" INSIDE PENETRATIONS
2. COAT CABLES AND MARINITE XL AT PENETRATION WITH "FLAMEMASTIC" 71A.
3. INSTALL MARINITE XL AT TOP WHEN "FLAMEMASTIC" APPLICATION IS COMPLETED. NO SEALING REQUIRED.

FIRE STOP FOR CABLE TRAYS THROUGH FLOOR OPENINGS

BECHTEL CORP. JOB 7597-03

SOUTHERN SERVICES INC.

DR.	NO.	DATE	REVISION
M.A.	1	5-5-71	REV. PER S.S. LTR.
TR	2	7-27-76	REV. AS NOTED
CK. <i>h/r.</i>	3	2-4-81	VOID
APP. <i>h/r.</i>	4	5-5-82	VOID PER BE-961
DATE 11/25/71	SUPERSEDES _____		

ALABAMA POWER COMPANY

SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT
 DETAIL TRAY & CONDUIT DETAILS & NOTES

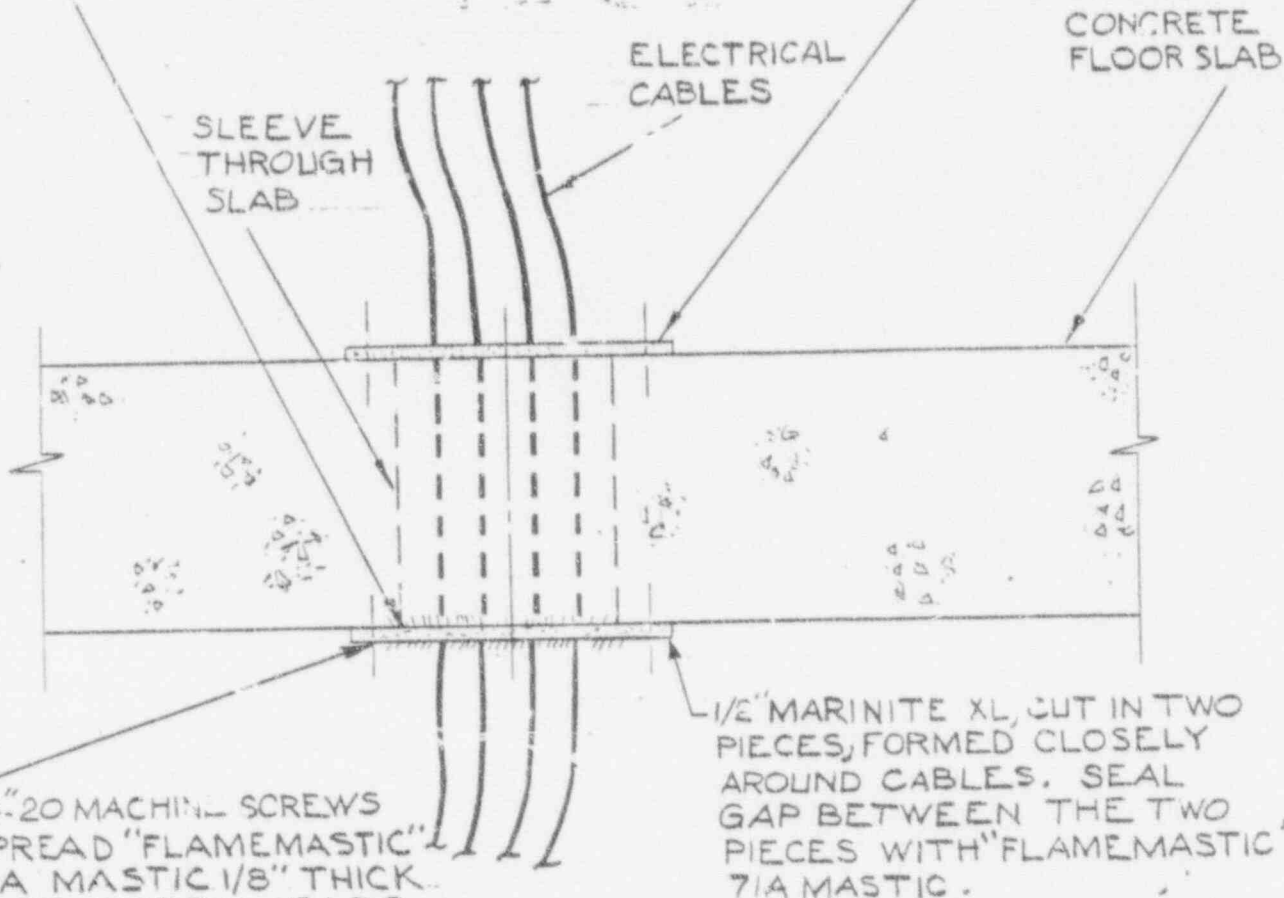
SCALE NONE SH. 16 OF 29 SHEETS A-177541 4

ORIGINAL DRAWING, REV. 2
 TRANSFERRED TO SCS

REV. 2

1/2" MARINITE XL USE INORGANIC THERMAL INSULATING WOOL AS REQUIRED TO FILL LARGE VOIDS. NOT REQUIRED IF SLEEVE IS INSIDE A PANEL.

1/4" THICK "FLAMEMASTIC" 71A APPLIED FROM ABOVE AND BELOW (SEE NOTE 2, SH. 15)



1/4" 20 MACHINE SCREWS
"SPREAD" "FLAMEMASTIC" 71A MASTIC 1/8" THICK OVER SCREW HEADS. (TYP)

1/2" MARINITE XL, CUT IN TWO PIECES, FORMED CLOSELY AROUND CABLES. SEAL GAP BETWEEN THE TWO PIECES WITH "FLAMEMASTIC" 71A MASTIC.

005637

USE INORGANIC THERMAL INSULATING WOOL AS REQUIRED TO FILL LARGE VOIDS AROUND CABLES THROUGH THE MARINITE FORM. SMALL VOIDS UP TO 1/4" CAN BE FILLED WITH "FLAMEMASTIC" COMPOUND. THE THERMAL INSULATING WOOL SHALL BE B&W'S KAO WOOL BULK OR EQUAL.

FIRE STOP FOR CABLES THROUGH FLOOR SLEEVES

BECHTEL CORP. JOB 7597-03/20

SOUTHERN SERVICES INC.

DR.	NO.	DATE	REVISION
M.A.	5	5-5-82	VOID PER 2BE-961
TR	2	7-2-76	REV. AS NOTED
K	3	3-28-77	REV. AS NOTED
APP	4	2-4-81	VOID
DATE	SUPERSEDES		

ALABAMA POWER COMPANY
SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT
DETAIL TRAY & CONDUIT DETAILS & NOTES

SCALE NONE

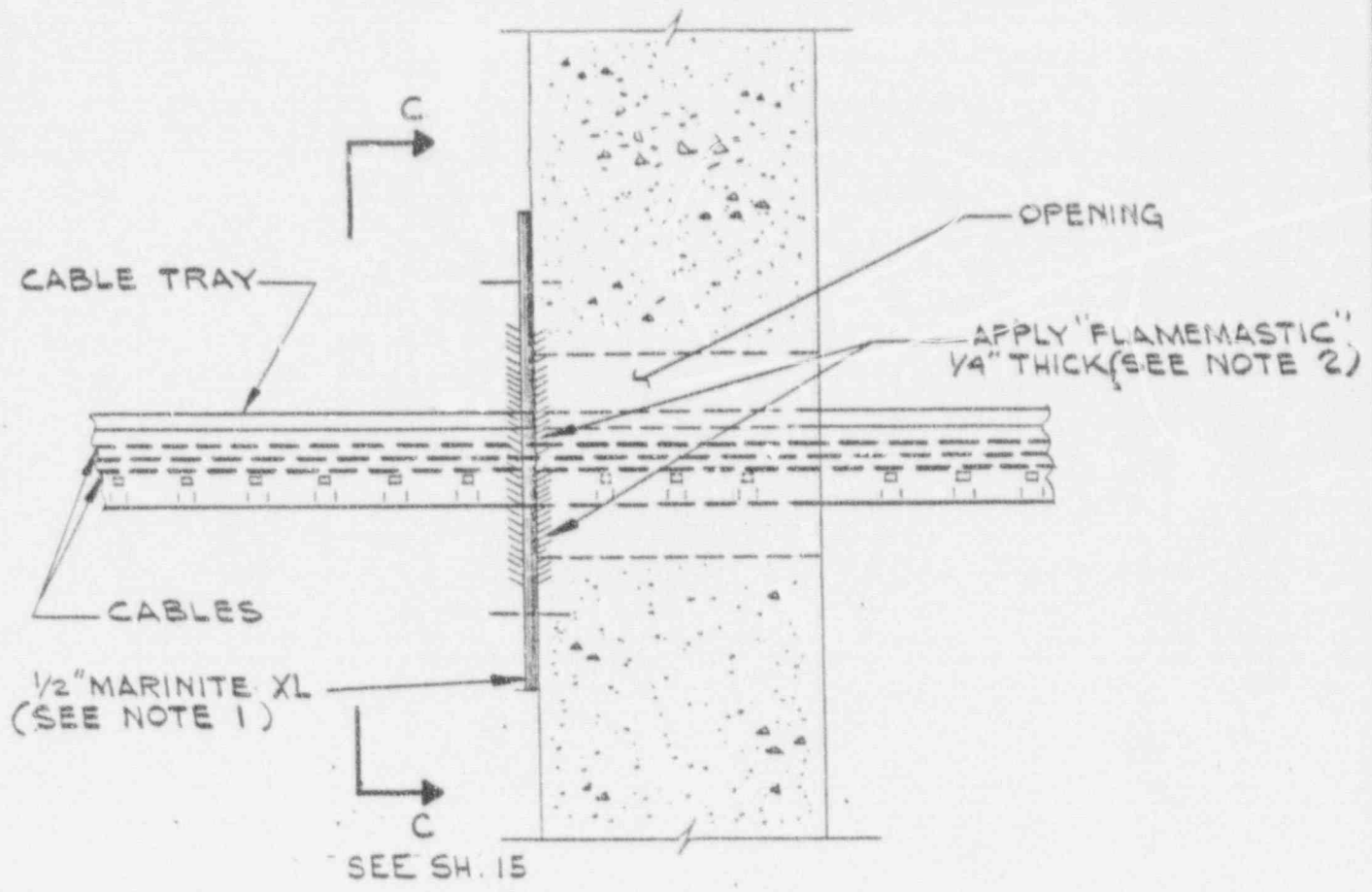
SH. 17 OF 29 SHEETS

A-177541 5

ORIGINAL DRAWING, Rev. 5
TRANSFERRED TO SCS

RT
REV
3

ORIGINAL DRAWING, Rev. 5
 TRANSFERRED TO SCS



SECTION B-B
 (FROM SHEET 15)

NOTES

1. INSTALL MARINITE XL FORM BEFORE APPLYING "FLAMEMASTIC" INSIDE PENETRATION.
2. COAT CABLES AND MARINITE-XL INSIDE AND OUTSIDE PENETRATION WITH "FLAMEMASTIC" 71A.

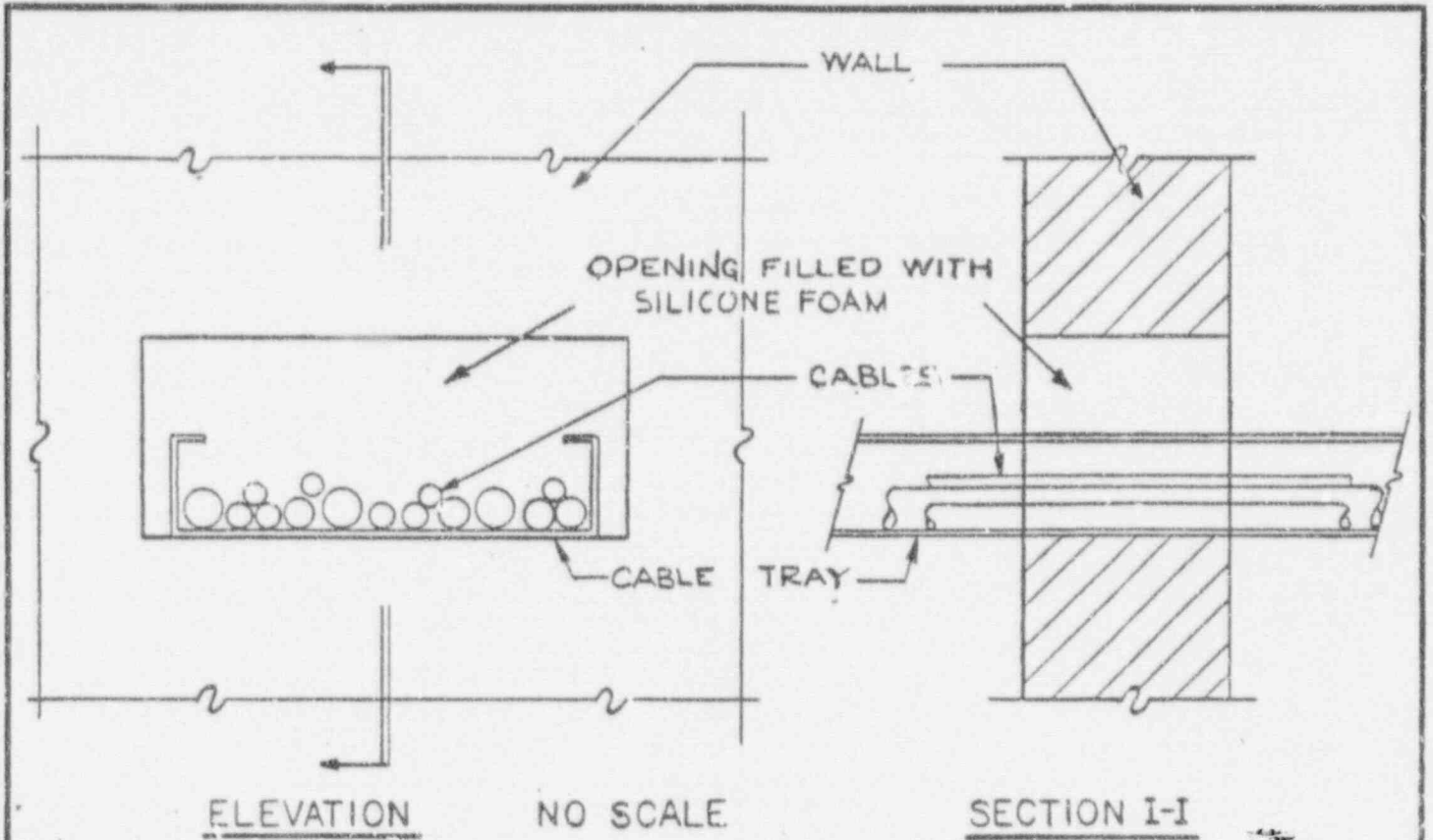
005638

FIRE STOP FOR CABLE TRAYS THROUGH WALL OPENINGS

BECHTEL CORP. JOB 7597-03/20			SOUTHERN SERVICES INC.	
DR. A.W.	NO. 5	DATE 5-5-82	ALABAMA POWER COMPANY	
TR.	2	DATE 7-2-76	SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT	
CK. J.B. H.E.	3	DATE 3-28-77	DETAIL TRAY & CONDUIT DETAILS & NOTES	
APP. M.H.	4	DATE 2-4-81	SCALE NONE	
DATE 1/25/71	SUPERSEDES		SH. 18 OF 20 SHEETS	A-177541 5

REV 3

ORIGINAL DRAWING, Rev. _____
TRANSFER. J TO SCS



NOTES

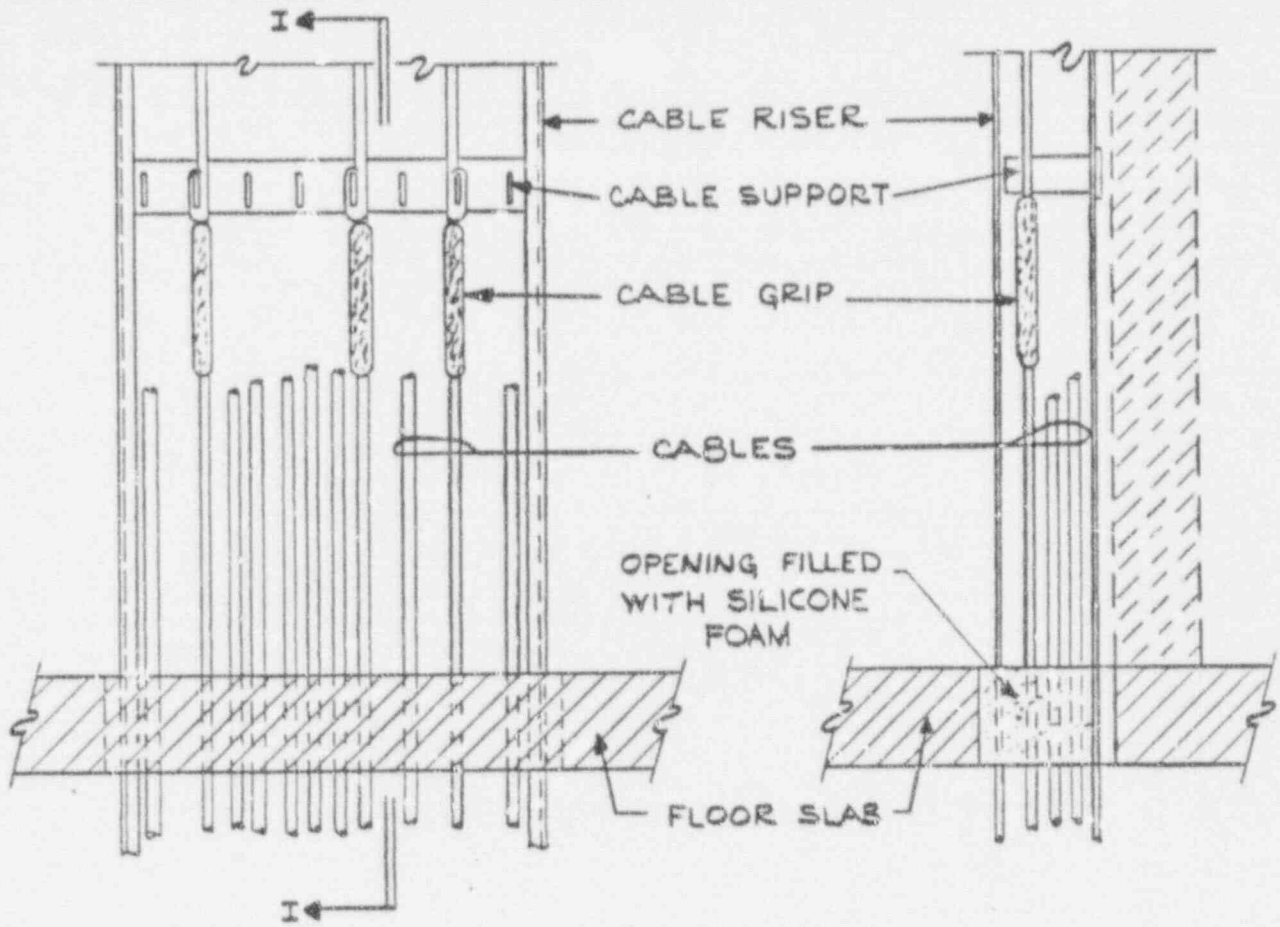
1. FIRE SEALS ARE PROVIDED ON FIRE RATED WALLS WHICH MAY BE COINCIDENT WITH AIRTIGHT WALLS.
2. FIRE-RATED FLOORS, WALLS AND CEILINGS ARE DELINEATED ON ARCHITECTURAL DWG'S. D-176058 THRU 063 AND D-206058 THRU 063,
3. AIRTIGHT AND WATERTIGHT FLOORS, WALLS AND CEILINGS ARE DELINEATED ON ARCHITECTURAL DWG'S. D-176065 THRU 072 AND D-206065 THRU 072,
4. FIRE SEALS AND AIR SEALS ARE TO BE INSTALLED IN ACCORDANCE WITH SPEC. SS-1102-132 AND AS OUTLINED HERE IN.

005659

BECHTEL CORP. JOB 7597-03/20 SOUTHERN SERVICES INC.

DR. <i>ELB</i>	NO.	DATE	REVISION	ALABAMA POWER COMPANY
TR.	0	3/26/74	FOR CONSTRUCTION	SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT DETAIL TRAY & CONDUIT DETAILS & NOTES
CK. <i>RWR</i>	3	3-28-77	ADDED NOTES	
AP. <i>M. M. [Signature]</i>	2	7-2-76	REV. AS NOTED	
DATE <i>3/15/74</i>	SUPERSEDES _____		SCALE _____	WH. <i>18A</i> OF <i>29</i> SHEETS A-177541 REV. 3

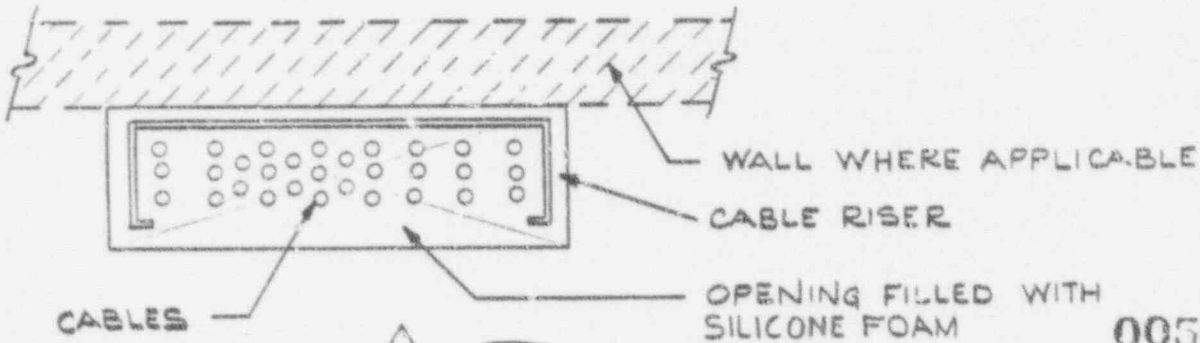
ORIGINAL DRAWING, Rev. 3
 TRANSFERRED TO SCS



ELEVATION

NO SCALE

SECTION I-I



CABLES

WALL WHERE APPLICABLE
 CABLE RISER

OPENING FILLED WITH
 SILICONE FOAM

005650

PLAN

3

NOTE

1. FOR GENERAL NOTES SEE SH. 18A

BECHTEL CORP. JOB 7597-03/20

SOUTHERN SERVICES INC.

DR	NO.	DATE	REVISION
A.L.L.	0	3/2/74	FOR CONSTRUCTION
R.W.R.	3	4-14-77	ADDED NOTE
	2	2-2-76	REV. AS NOTED

ALABAMA POWER COMPANY

SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT

DETAIL TRAY & CONDUIT DETAILS & NOTES

APPROVED: [Signature]
 DATE: 3/15/74

SUPERSEDES

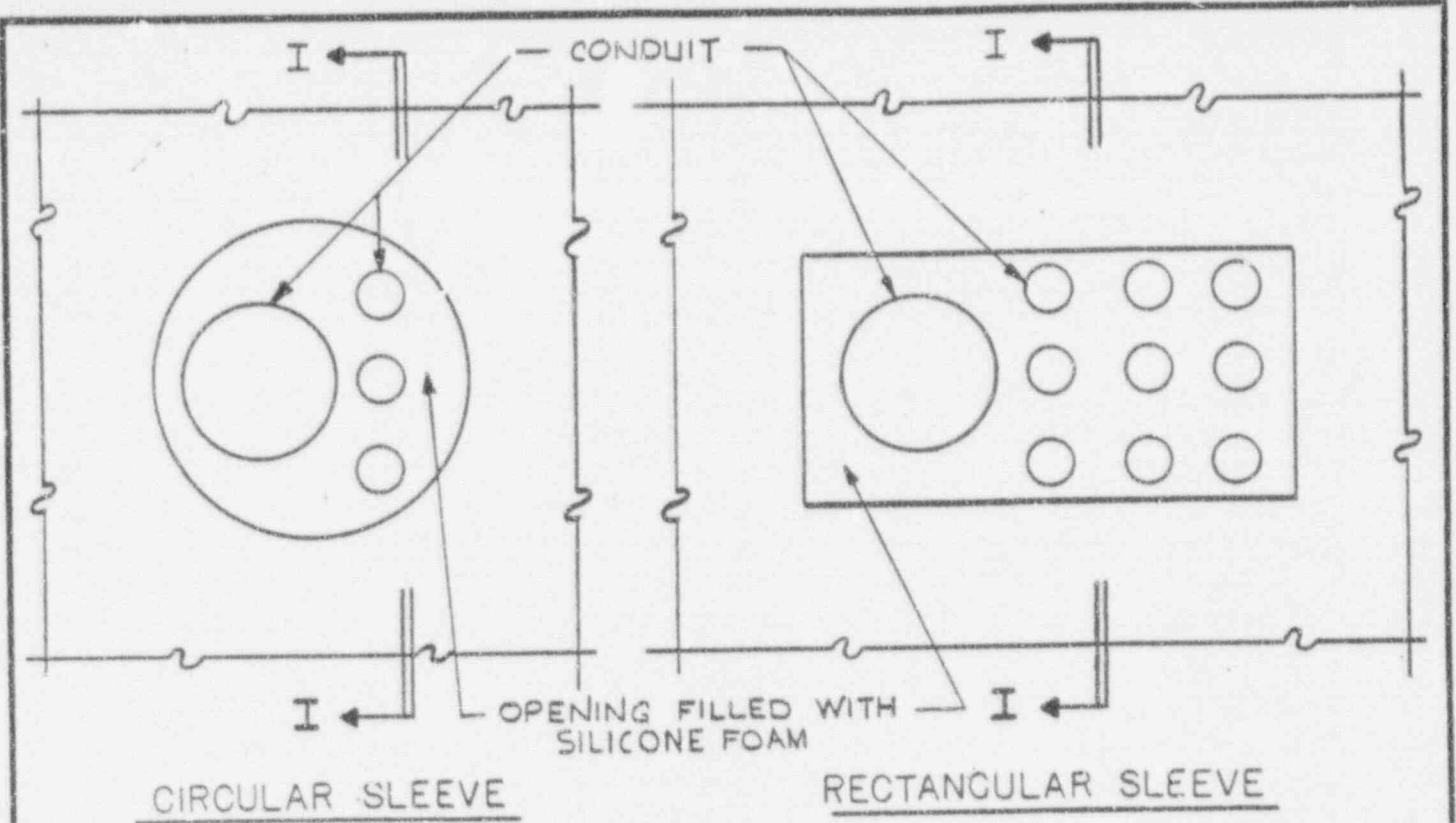
SCALE

BY 19B OF 29 SHEETS

A-177541

REV 3

ORIGINAL DRAWING, R. 5
 TRANSFERRED TO 6CS

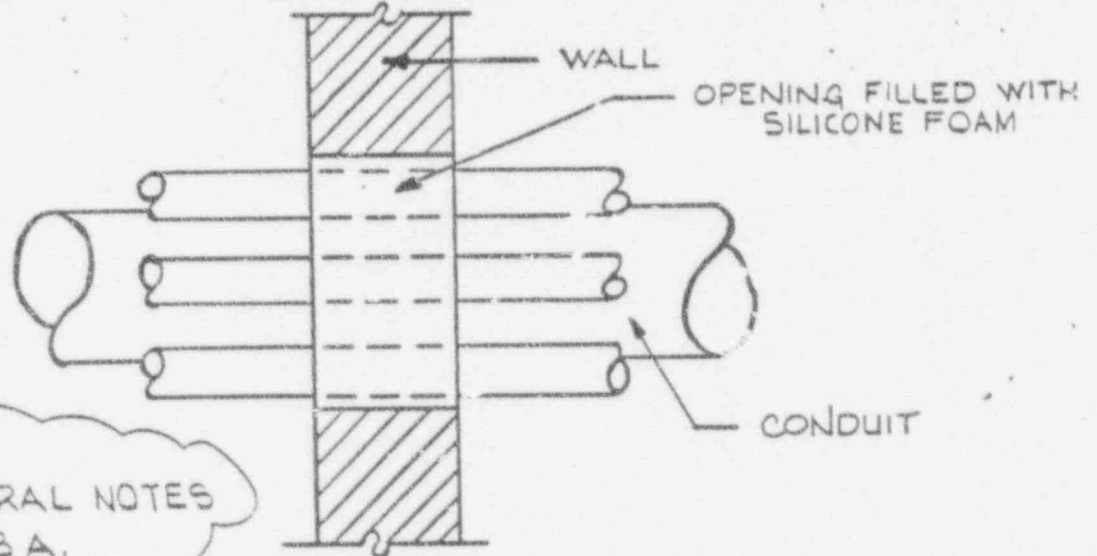


CIRCULAR SLEEVE

RECTANGULAR SLEEVE

ELEVATIONS

NO SCALE



SECTION I-I

NO SCALE

NOTES

1. FOR GENERAL NOTES SEE SH. 18A.

005641

BECHTEL CORP. JOB 7597-03/20

SOUTHERN SERVICES INC.

DR.	NO.	DATE	REVISION
K.L.L.	0	3/16/74	FOR CONSTRUCTION
R.W.R.	3	4-14-77	ADDED NOTE
	2	7-2-76	REV AS NOTED

DATE 3/15/74 SUPERSEDES _____ SCALE _____

ALABAMA POWER COMPANY

SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT

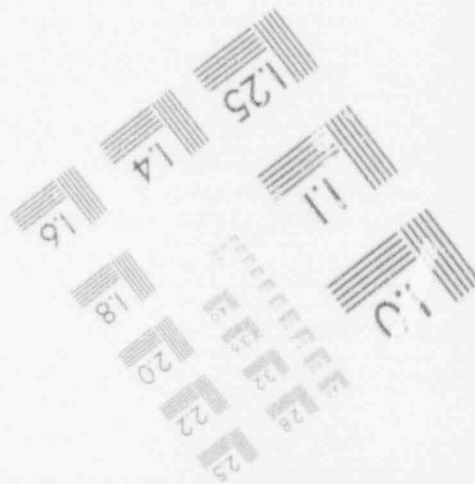
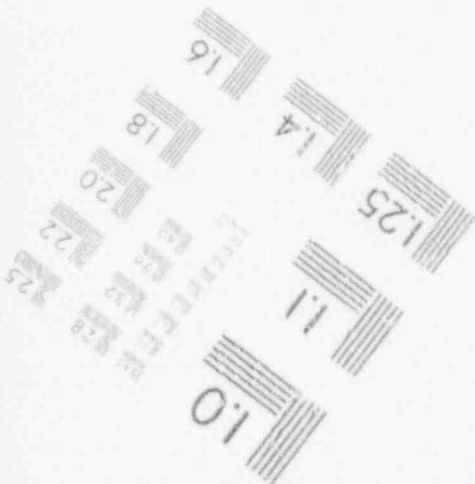
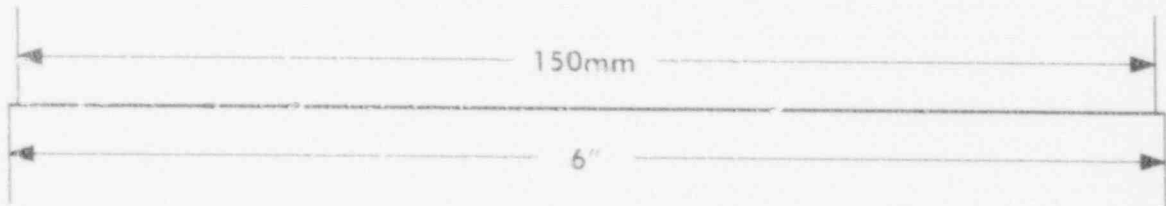
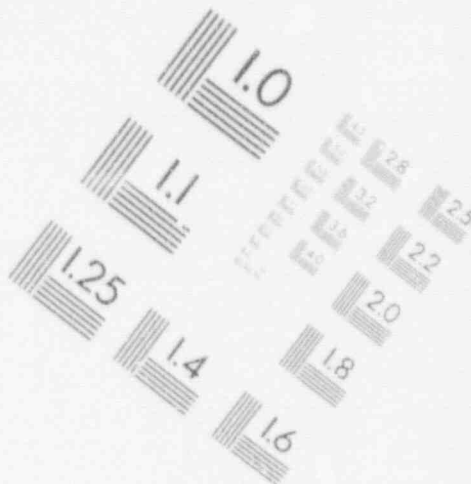
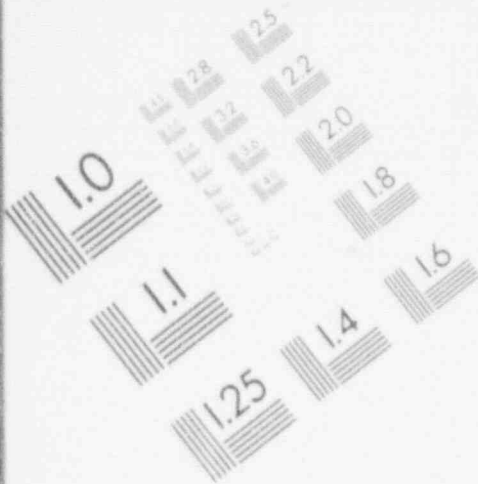
DETAIL TRAY & CONDUIT DETAILS & NOTES

A-177541 3

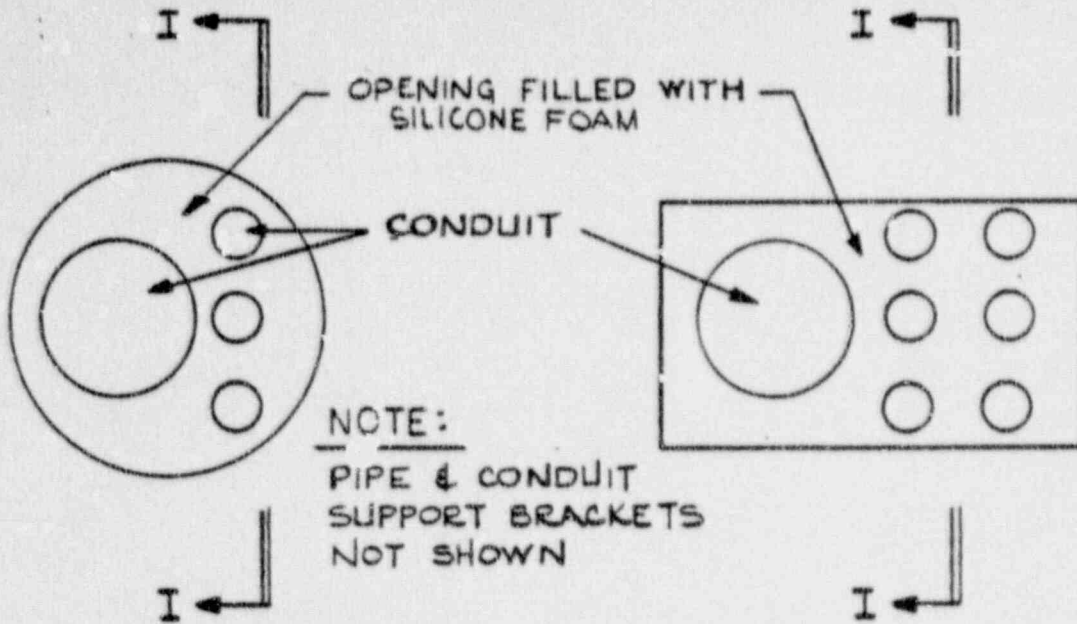
(21)

2

IMAGE EVALUATION TEST TARGET (MT-3)



PHOTOGRAPHIC SCIENCES CORPORATION
770 BASKET ROAD
P.O. BOX 338
WEBSTER, NEW YORK 14580
(716) 265-1600

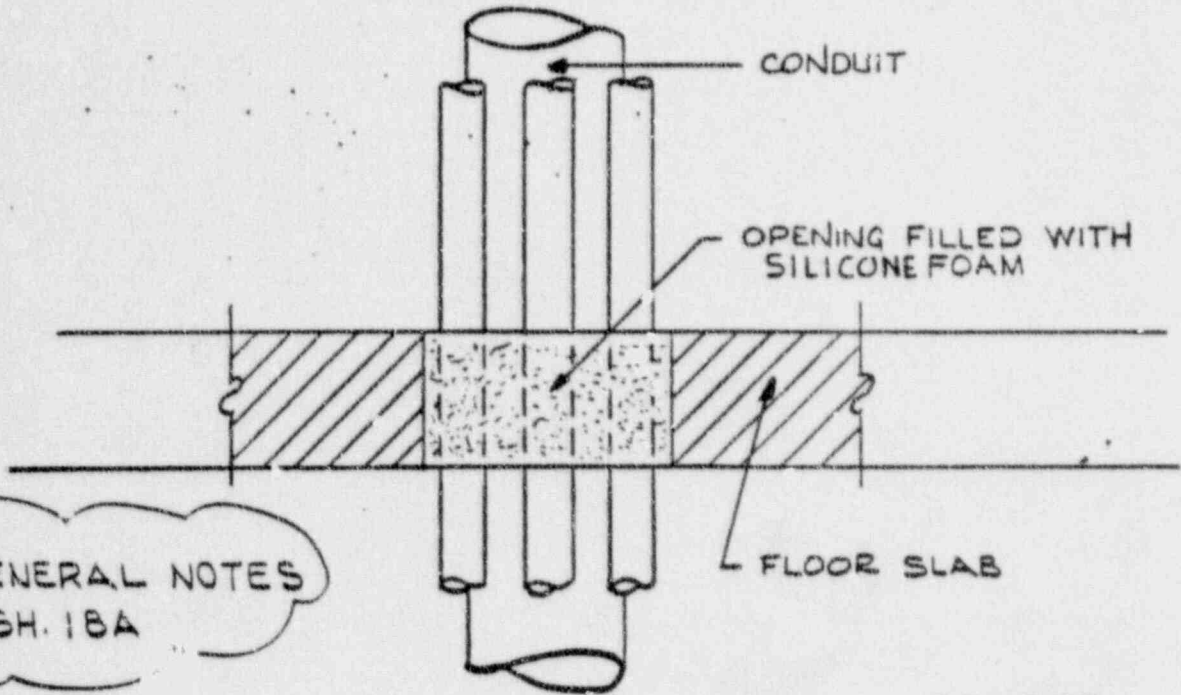


PLAN OF CIRCULAR SLEEVE

PLAN OF RECTANGULAR SLEEVE

NOTE:
PIPE & CONDUIT
SUPPORT BRACKETS
NOT SHOWN

NO SCALE



SECTION I-I

005642

NO SCALE
FIGURE 8

ORIGINAL DRAWING, Rev. 1
TRANSFERRED TO SCS

NOTE

1. FOR GENERAL NOTES
SEE SH. 18A

BECHTEL CORP. JOB 7597-03/20

SOUTHERN SERVICES INC.

DR	NO.	DATE	REVISION
RLL	0	3/26/74	FOR CONSTRUCTION
RWR	3	4-14-74	ADDED NOTE
U. Updegraff	2	7-2-76	REV. AS NOTED
DATE	3/27/74		SUPersedes

ALABAMA POWER COMPANY

SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT

DETAIL TRAY & CONDUIT DETAILS & NOTES

SCALE _____ SH. 18D OF 29 SHEETS A-177541 3

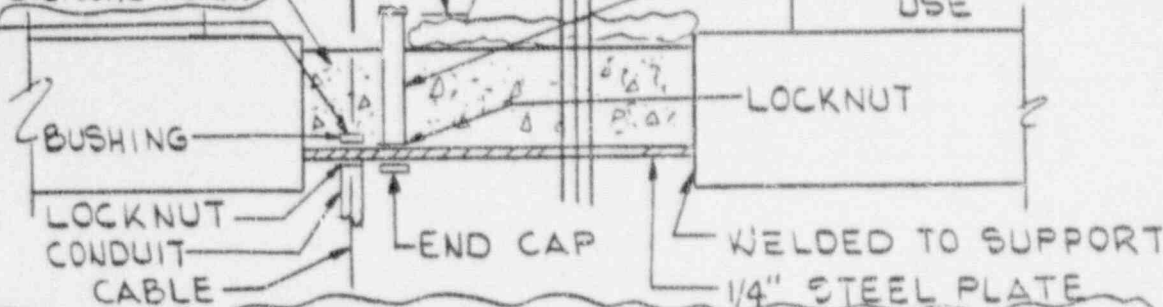
SILICONE FOAM AS SPECIFIED ON SHEET # 18A (MIN. 12)

EXISTING CABLES TO TERMINAL BLOCK

SEAL CONDUIT WITH MINERAL WOOL & SILICONE FOAM PRIOR TO POURING OF SILICONE FOAM UNDER CAB.

1" ABOVE SILICONE FOAM

SPARE CONDUIT CAPPED ON BOTH ENDS FOR FUTURE USE

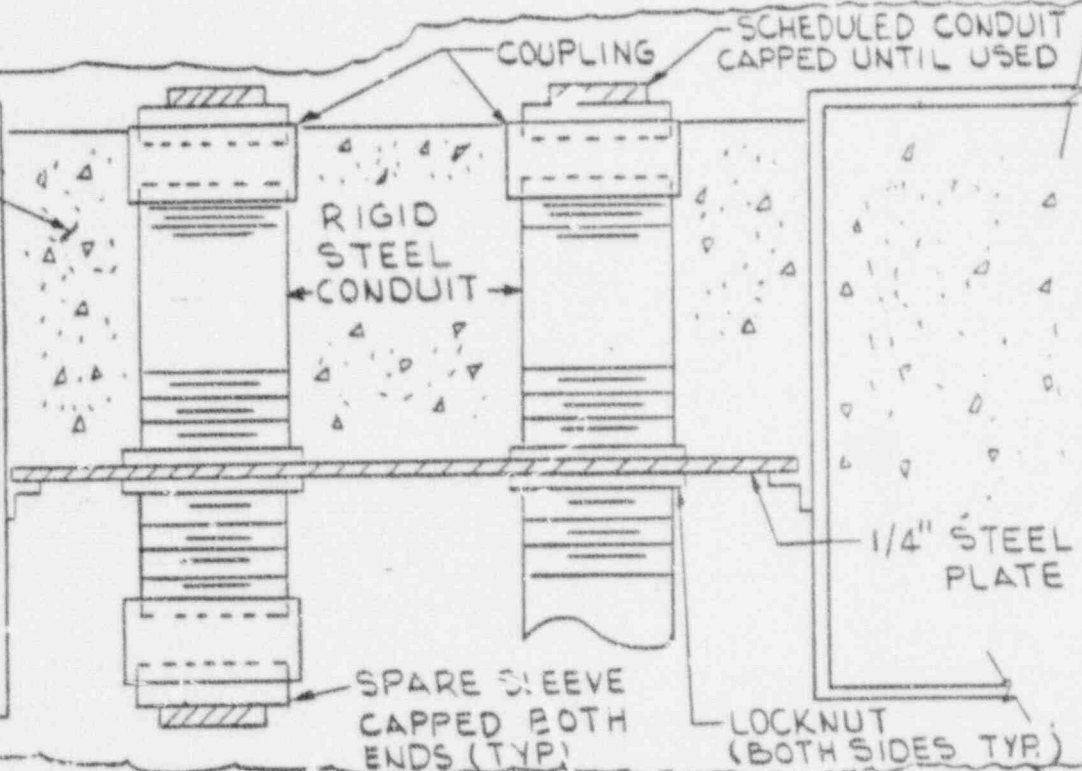


FIRE SEAL & AIR SEAL FOR CABLE AND CONDUITS THROUGH UNIT #1 CONTROL ROOM FLOOR

005643

ORIGINAL DRAWING, Rev. 7
TRANSFERRED TO SCS

FILL WITH 6 1/2" MINIMUM DEPTH OF AQUABAR OR EQUIV. AFTER SLEEVES ARE INSTALLED



FIRE SEAL & AIR SEAL FOR CABLE AND CONDUITS THROUGH UNIT #2 CONTROL ROOM FLOOR

3

BECHTEL CORP. JOB 7597-03/20

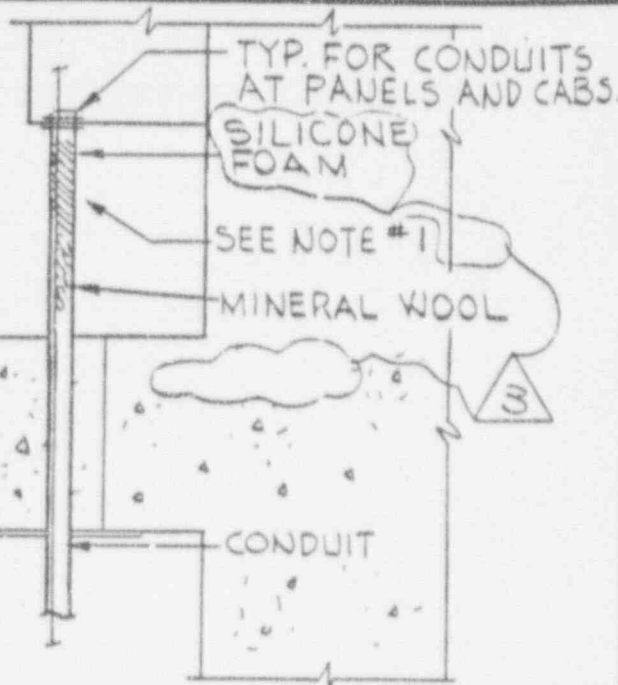
SOUTHERN SERVICES INC.

DR	NO.	DATE	REVISION
G. HOPKINS	0	3/26/74	FOR CONSTRUCTION
RWR	3	3-28-77	INCORPORATED 2BE-181-3
U. [Signature]	2	7-2-76	REV. AS NOTED

ALABAMA POWER COMPANY
SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT
DETAIL TRAY & CONDUIT DETAILS & NOTES

FILL WIREWAY THROUGH CONTROL ROOM FLOOR WITH MINERAL WOOL AND SILICONE FOAM AT FLOOR LINE AFTER ALL CABLE IS PULLED

SILICONE FOAM OR CONCRETE AS SPECIFIED ON SH. 18E.



FIRE STOP AIR SEAL FOR WIREWAY & CONDUIT THROUGH CONTROL ROOM FLOOR

NOTE

1. RACEWAYS THAT ORIGINATE OUTSIDE THE CONTROL ROOM MUST BE SEALED WITH A MINIMUM OF 12" OF SILICONE FOAM AT THE CONDUIT TERMINATION IN THE CONTROL ROOM AFTER ALL CABLE IS PULLED.

ORIGINAL DRAWING Rev. 3 TRANSFERRED TO SCS

005644

BECHTEL CORP. JOB 7597-03/20

SOUTHERN SERVICES INC.

DR	NO.	DATE	REVISION
RW BEAVERS	0	11-4-74	FOR CONSTRUCTION
TR			REV. AS NOTED
CK RWR/MT	3	3-28-76	DELETED NOTE 2
APP. W.W.	2	7-2-76	REV. AS NOTED

ALABAMA POWER COMPANY

SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT
DETAIL TRAY & CONDUIT DETAILS & NOTES

DATE 11-13-74 SUPERSEDES _____ SCALE _____ SH. 18E OF 29 SHEETS A-177541 REV. 3

SPECIFICATION DATA - APPLICATION GUIDE

KAOWOOL BLANKET WRAP FOR FIRE PROTECTION

1.0 Scope

1.1 This specification guide covers the application of Kaowool Blanket wrap around electrical raceways for fire protection.

2.0 Materials and Equipment

2.1 The insulation material shall be manufactured by and supplied by the Babcock & Wilcox, Refractories Division, Augusta, Georgia 30903, or its authorized distributors. The materials shall include the following:

2.1.1 Kaowool Blanket, needled, 8# per cubic foot, 48" wide, 1" thick, standard length and 1/2" thick for inner wraps only.

2.1.2 High performance filament tape, 1" wide, such as that manufactured by JM Company, St. Paul, Minnesota, Tape Number 898 or its approved equivalent. One such approved equivalent would be Anchor Continental Tape type #780. 3

2.1.3 Regular carbon steel banding material, 3/4" wide, 0.015" thick, waxed.

2.1.3a Regular carbon steel banding - not waxed - 3/4" wide, .015" thick may be used in place of the waxed banding. However; installers should periodically check to ensure banding installation is not degrading the Kaowool or Zetex wrap.

2.1.4 Tensioning tool for banding material such as that manufactured by Signode Company, Chicago, Illinois, Model Number C-38-74, seals such as that manufactured by Signode Company Model Number 34SPC, and crimping tool such as that manufactured by Signode Corporation Model Number SRC 3423, or its equivalent.

3.0 Delivery and Storage

3.1 Materials should be delivered in the original, tightly sealed containers or unopened packages, all clearly labeled with the manufacturer's name, product identification and lot numbers where appropriate.

3.2 The Kaowool products shall be stored within shelter to prevent damage from weather.

ORIGINAL DRAWING, Rev. 005645
TRANSFERRED TO SCS

BECHTEL CORP. JOB 7597-03/20

SOUTHERN SERVICES INC.

DR	KML	NO.	DATE	REVISION	ALABAMA POWER COMPANY SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT DETAIL TRAY & CONDUIT DETAILS & NOTES
TR		0	4/17/80	ISS. FOR CONST.	
CR	<i>JR</i>	1	2-3-82	INC. BE-4515-3	
APP	<i>Wm/K</i>	2	8-10-82	INC. PCN B-81-1083-5	
DATE	4-17-80	3	1-30-81	INC. PCN B-82-1309-4	SCALE _____ SH. 18G A-177541 REV. 3

RT-REV. 0

4.0 Contractor

- 4.1 Kaowool Blanket wrap shall be applied by the field.
- 4.2 The field shall be responsible for selecting and supplying all labor as well as furnishing other materials required to complete the job satisfactorily in accordance with the written specifications.

5.0 Kaowool Blanket Installation

- 5.1 For cable trays with no cover and not completely full, Kaowool blanket shall be cut to the same width as the cable tray and laid on top of the cables to bring the level of the Kaowool to the same height as the top of the tray. For cable trays with covers or trays that are sufficiently full, no Kaowool filler blanket is required.
- 5.2 For the interior wrap, the Kaowool blanket shall be cut to a length sufficient to wrap completely around the perimeter of the cable tray, plus provide an overlap of blanket of not less than 3". (Two (2) wraps $\frac{1}{2}$ " in thickness may be substituted for 1" wrap for inner wraps only)
- 5.3 The interior wrap of blanket shall be held in place using 1" wide filament tape. The tape shall be spaced not less than 4" from the ends of each blanket and not more than 14" apart from each other.
- 5.4 The next adjacent interior wrap of blanket shall be cut to completely wrap around the perimeter of the cable tray with enough excess to provide an overlap of not less than 3". The adjacent blankets shall be placed tightly together to prevent any gaps in the butt joints between each blanket.
- 5.5 For the exterior blanket wrap, cut blanket to sufficient length to wrap completely around the perimeter of the interior wrap with sufficient excess to provide an overlap joint of not less than 3". The blankets to be installed on the exterior layer shall be cut if needed, and properly located to ensure that the butt joints on the exterior layer of blanket are not within 12" of any butt joints on the interior blanket wrap.
- 5.6 The exterior blanket shall be held in place using regular carbon steel banding material as specified. The bands shall be placed not more than 4" from any butt joint on the exterior blanket, nor more than 14" apart from each other. The tension on the banding material shall be sufficient to hold the blanket snugly in place, but not to cause any significant cutting or damage to the blanket material.
- 5.7 Along the length of the cable tray in areas where support members come in contact with the protected tray, such supports shall be wrapped using the same techniques to a distance not less than 6" from the protected cable tray.

005646

ORIGINAL DRAWING, Rev. 2
TRANSFERRED TO SCS

BECHTEL CORP. JOB 7597-03/20

SOUTHERN SERVICES INC.

DR KML	NO.	DATE	REVISION	ALABAMA POWER COMPANY	
TR	0	4/17/64	ISS. FOR CONST.	SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT	
CK <i>h.l. jar</i>	1	2-3-82	INC. BE-4515-3	DETAIL TRAY & CONDUIT DETAILS & NOTES	
	2	9-10-82	REF. PCN B-81-1090-8		
APP <i>W. J. J.</i>				SCALE	SH 18H
DATE 4-17-80	SUPERSEDES			A-177541	REV 2

5.8 In areas such as floors, walls, ceilings where the blanket wrap ends, fire protection seals shall be installed using mastic coatings as specified. (One type of sealant which may be used is a silicone rubber sealant - SF-60 - as made by BISCO). The sealant shall be trowel or sprayed completely around the wrapped cable tray at the floor, walls, or ceiling. The seals shall be not less than 1/2" thick and extend not less than 8" onto the Kaowool wrap, nor less than 8" onto the floor, wall or ceiling. Another type of sealant which may be used is Carboline Intermastic #285. In addition; at all kaowool terminations that are not at a 3 hour fire-rated wall, Flamemastic #71A or Flamemastic 77 Mastic as manufactured by Flamemaster Corporation may be used.

6

5.8a At locations where a curb is used to protect the conduit stub-ups from moisture, only the top surface area of the curb needs to be protected with the mastic coating.

5.9 For Kaowool installation of conduits and channels, follow the same procedure used for cable trays with the dimensions shown on Sheets 18M, 18N, 18P, 18R and 18S of this drawing.

- 5.10 For Mechanical protection of Kaowool Wrap, where required to
- (A) prevent exposure to heavy wear or mechanical damage, the field is directed to install Newtex Co. product #10801-2440, style 800 non-aluminized zetex cloth. This type of protection shall be used on power, control and instrumentation level raceways.
 - (B) If additional power raceways are required to be wrapped other than those shown on the dwgs./change notice, Bechtel Engineering must be given written notification before the wrapping is installed. This is required so that the "Watts/Ft." can be calculated and compared with the Prototype Test to ensure that no unusual heat build-up will cause the conductor temperature to exceed 90° C.
 - (C) If additional instrumentation or control raceways are required to be wrapped other than those shown on the drawings/change notices, Bechtel Engineering must be given written notification of the identity of all such raceways so they may be properly documented.

005647

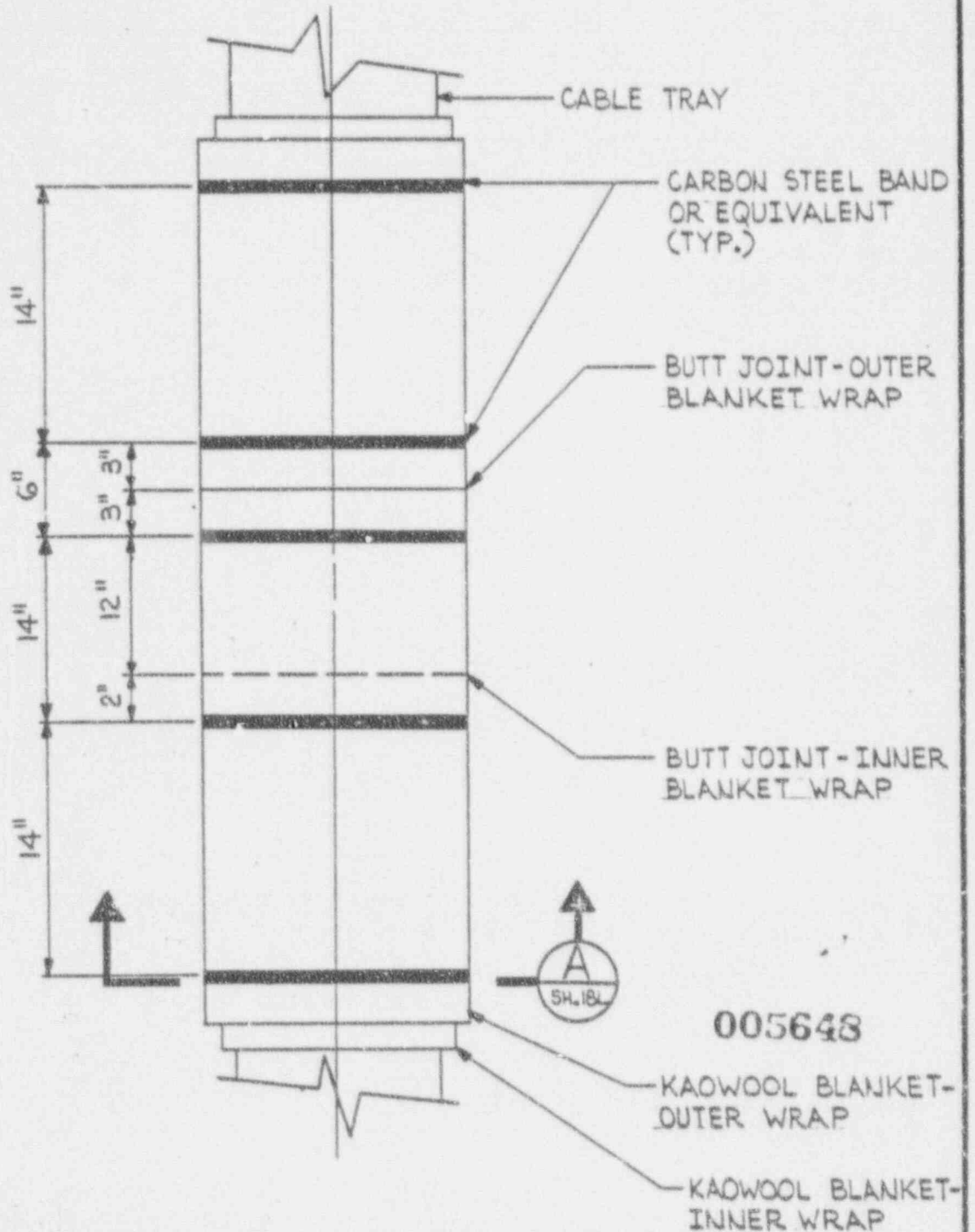
ORIGINAL DRAWING, Rev. 5
 TRANSFERRED TO SCS

BECHTEL CORP. JOB 7597-03/20

SOUTHERN SERVICES INC.

DR	KML	NO.	DATE	REVISION	ALABAMA POWER COMPANY	
TR		0	4/17/80	ISS. FOR CONST.	SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT	
CK	<i>R. J. J.</i>	4	9/10/82	INC. BE-4544	DETAIL TRAY & CONDUIT DETAILS & NOTES	
		5	1-30-84	INC PCN B-82-1309-4		
APP	<i>W. J. H.</i>	6	7/26/85	REV. PER PCN B-84-2-1 3013 REV. 0-4		
DATE	4-17-80	SUPERSEDES	SCALE	SH.	18J	A-177541
						REV 6

ORIGINAL DRAWING, Rev. 0
 TRANSFERRED TO SCS



KAOWOOL INSTALLATION FOR A CABLE TRAY

BECHTEL CORP. JOB 7597-03/20

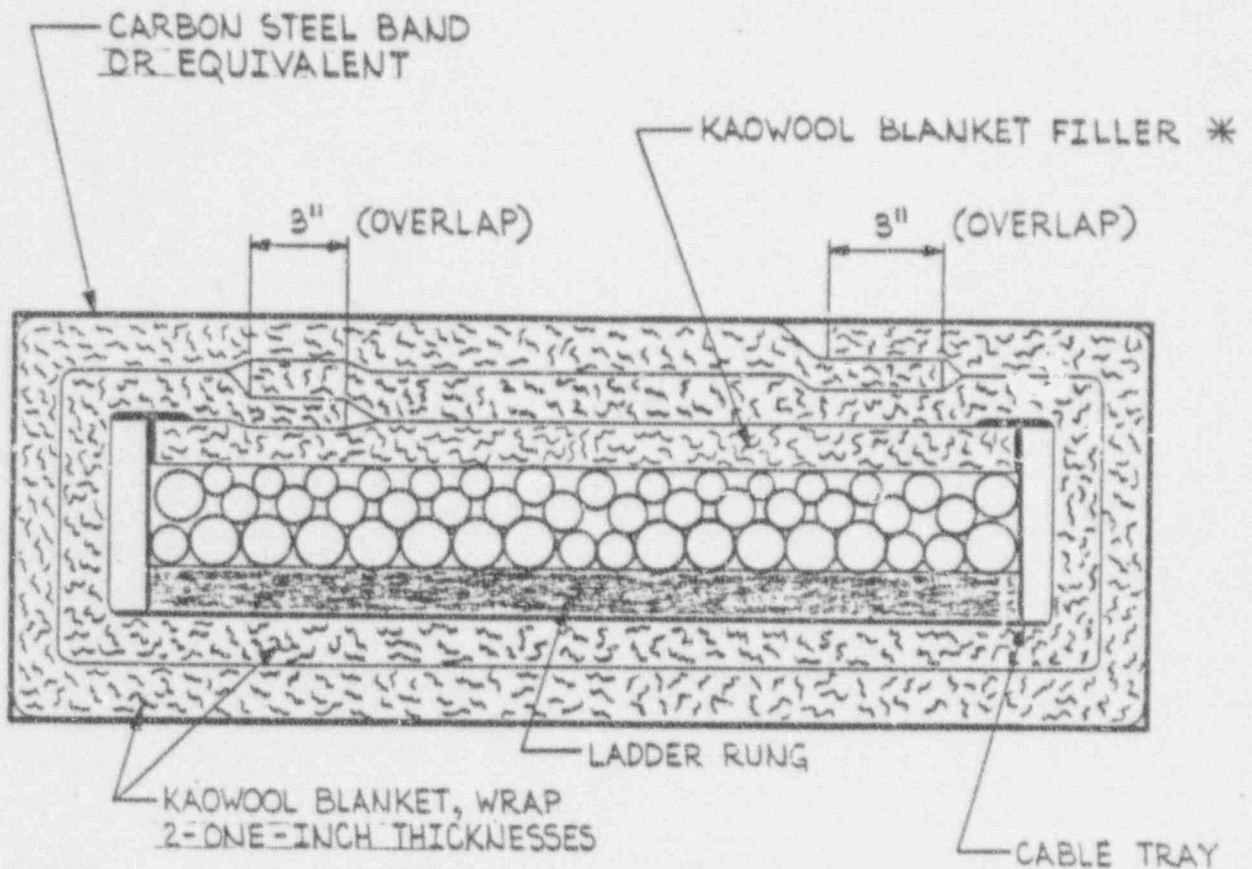
SOUTHERN SERVICES INC.

DR	KML	NO.	DATE	REVISION
TR		0	4/17/80	ISS. FOR CONST.
CK	<i>W. J. Yu</i>			
APP	<i>W. J. Yu</i>			
DATE	4-17-80			

ALABAMA POWER COMPANY

SUBJECT **JOSEPH M. FARLEY NUCLEAR PLANT**
 DETAIL **TRAY & CONDUIT DETAILS & NOTES**

DATE 4-17-80 SUPERSEDES _____ SCALE _____ SH. 18K **A-177541** REV 0



SECTION A
SH.1BK

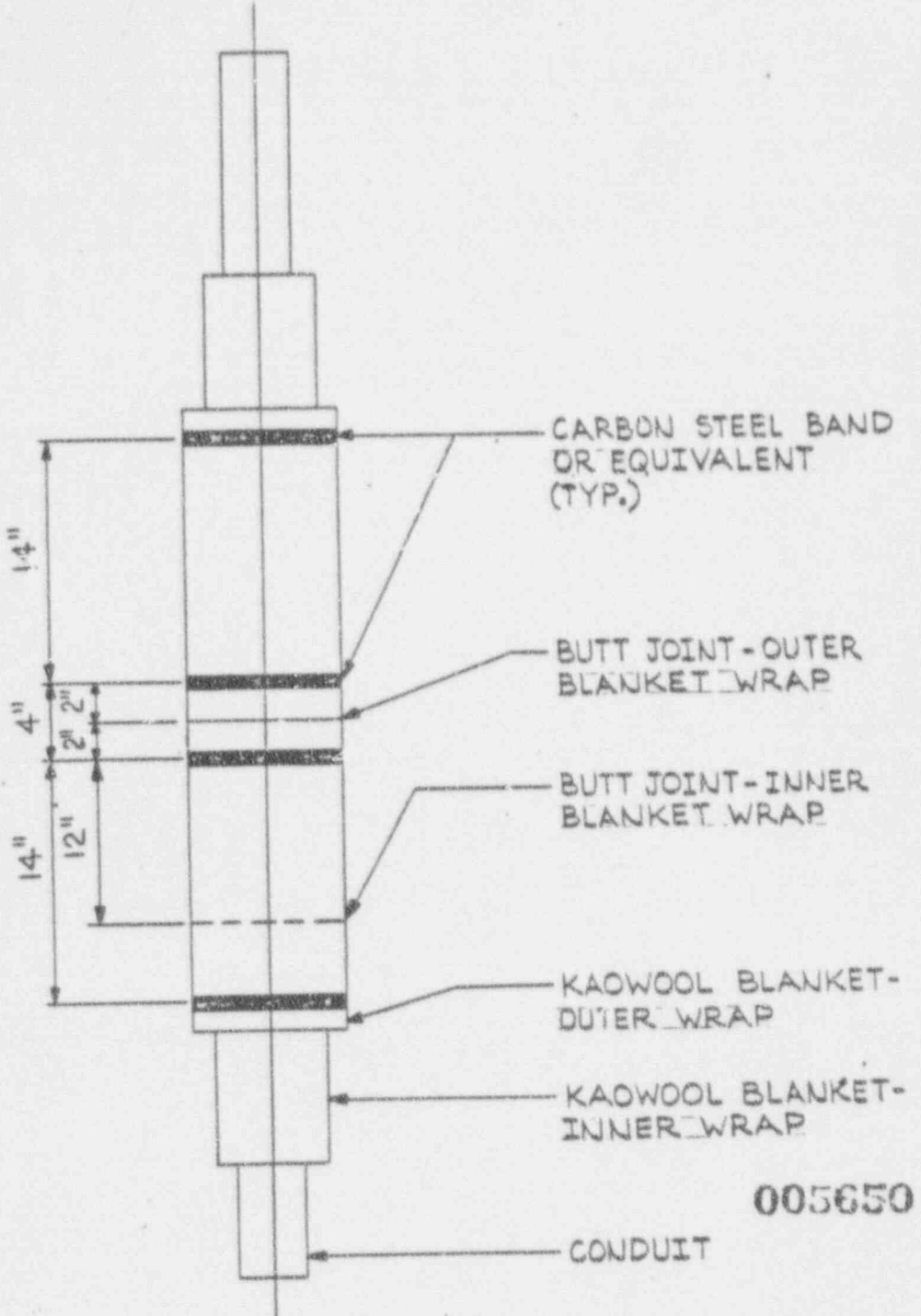
005649

* PARTIALLY FILLED TRAY REQUIRES FILLER PER SECTION 5.1.

ORIGINAL DRAWING, Rev. 0
TRANSFERRED TO SCS

BECHTEL CORP. JOB 7597 -03/20				SOUTHERN SERVICES INC.	
DR. KML	NO.	DATE	REVISION	ALABAMA POWER COMPANY	
	0	4/17/52	ISS. FOR CONST.	SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT	
CK. <i>RIP JER</i>				DETAIL TRAY & CONDUIT DETAILS & NOTES	
<i>W. Allen/A</i>					
DATE 9-17-52	SUPERSEDES		SCALE	—	SH.1BL
				A-177541	REV 0

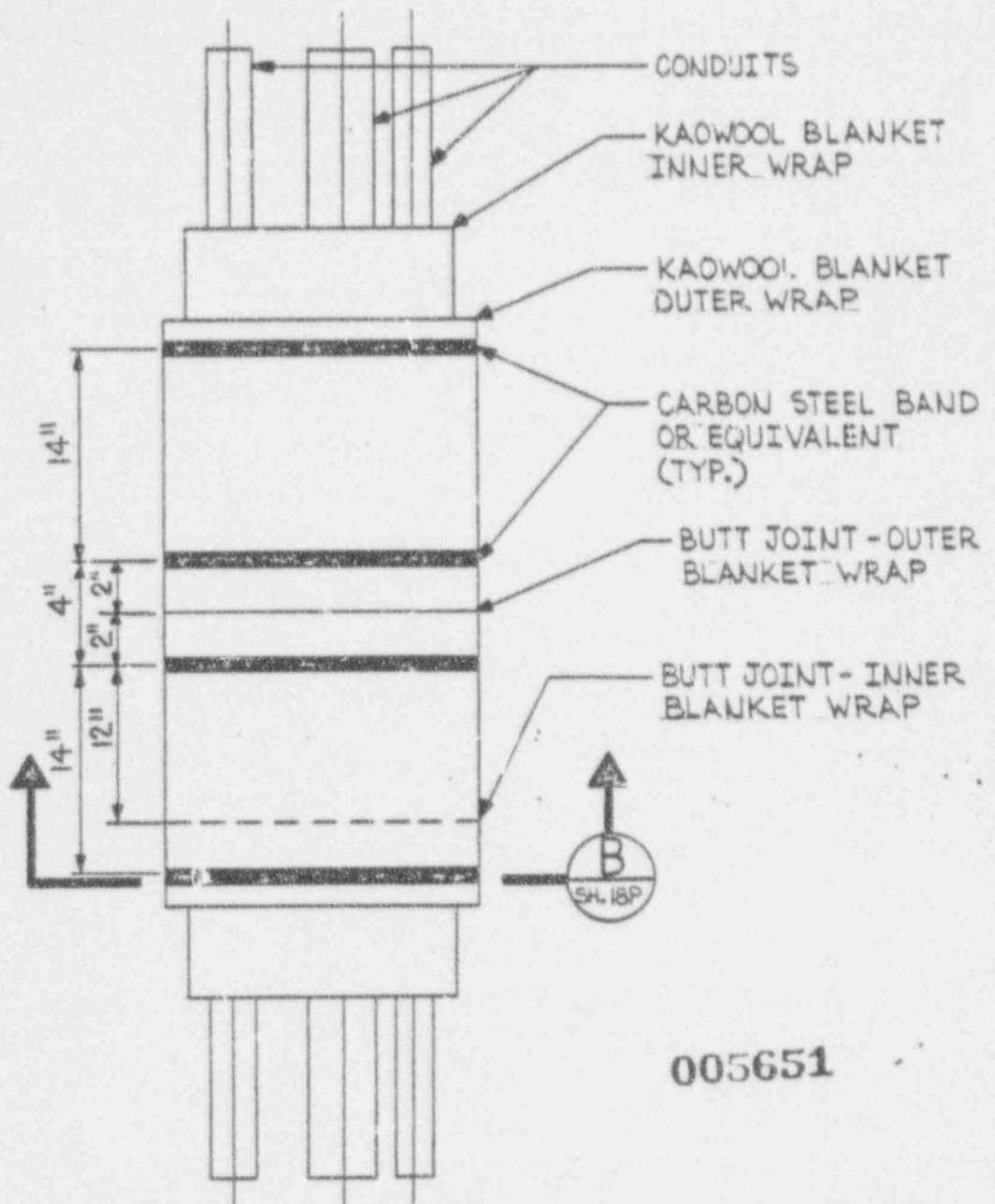
ORIGINAL DRAWING, Rev. 0
 TRANSFERRED TO SCS



KAOWOOL INSTALLATION FOR A SINGLE CONDUIT

BECHTEL CORP. JOB 7597-03/20			SOUTHERN SERVICES INC.		
DR	KML	NO.	DATE	REVISION	ALABAMA POWER COMPANY
TR		0	4/17/80	ISS. FOR CONST.	SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT
CK	<i>R. E. J.</i>				DETAIL TRAY & CONDUIT DETAILS & NOTES
APP	<i>W. M. P.</i>				SCALE SH 18M
DATE	9-11-80	SUPERSEDES			A-177541
					REV 0

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005651

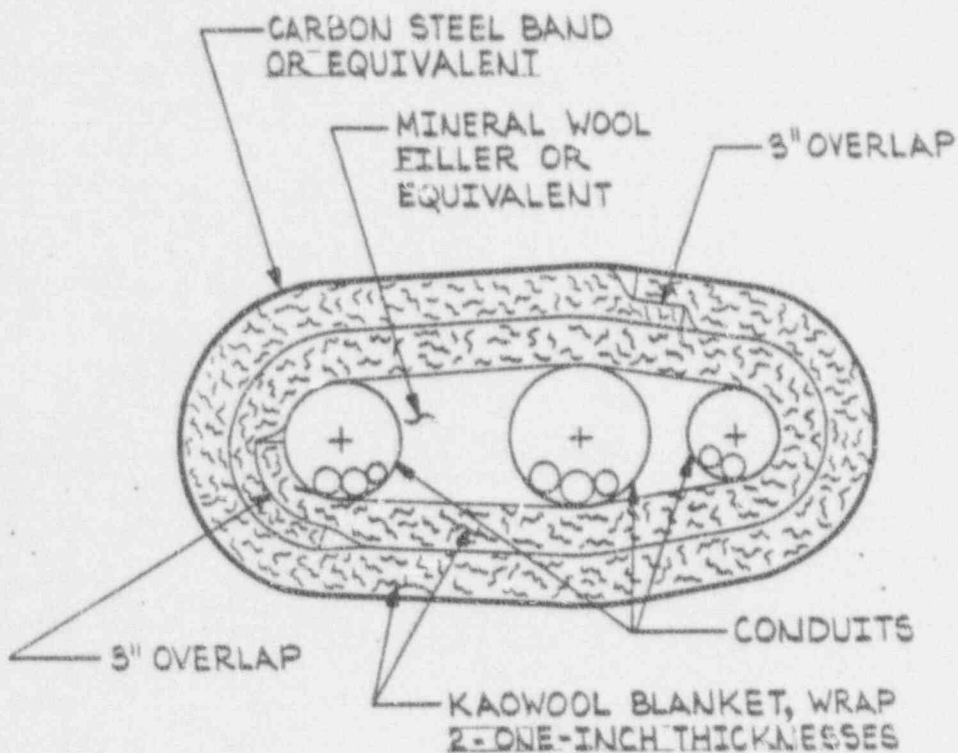
KAOWOOL INSTALLATION FOR A GROUP OF CONDUITS

ORIGINAL DRAWING, Rev. 0
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BECHTEL CORP. JOB 7597-03/20

SOUTHERN SERVICES INC.

DR KML	NO. DATE	REVISION	ALABAMA POWER COMPANY
TR	0 4/17/80	ISS. FOR CONST.	
CK R.L. Jr			SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT
APP <i>aw</i>			DETAIL TRAY & CONDUIT DETAILS & NOTES
DATE 4-17-80	SUPERSEDES	SCALE	SH. 18N
			A-177541
			REV 0



SECTION **B**
SH. 18A

005652

ORIGINAL DRAWING, Rev. 0
TRANSFERRED TO SCS

BECHTEL CORP. JOB 7597-03/20

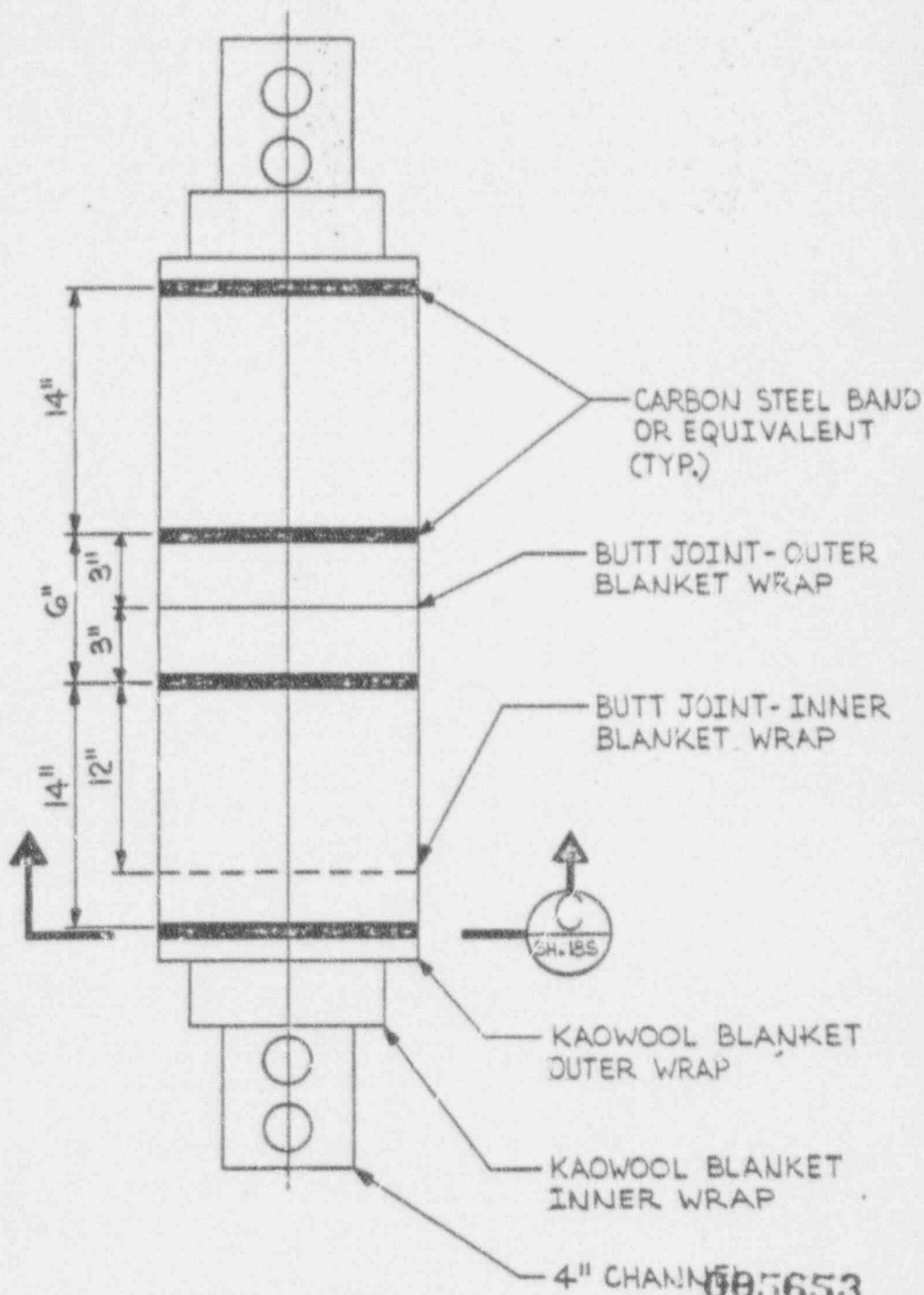
SOUTHERN SERVICES INC.

DR	NO.	DATE	REVISION
KML	0	8/17/62	ISS. FOR CONST.
TR			
CK			
APP			
DATE	SUPERSEDES _____ SCALE _____ SH. 18P		

ALABAMA POWER COMPANY
SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT
DETAIL TRAY & CONDUIT DETAILS & NOTES

A-177541 REV 0

ORIGINAL DRAWING, Rev. 0
 TRANSFERRED TO SCS



KAOWOOL INSTALLATION FOR A CHANNEL

BECHTEL CORP. JOB 7597-03/20

SOUTHERN SERVICES INC.

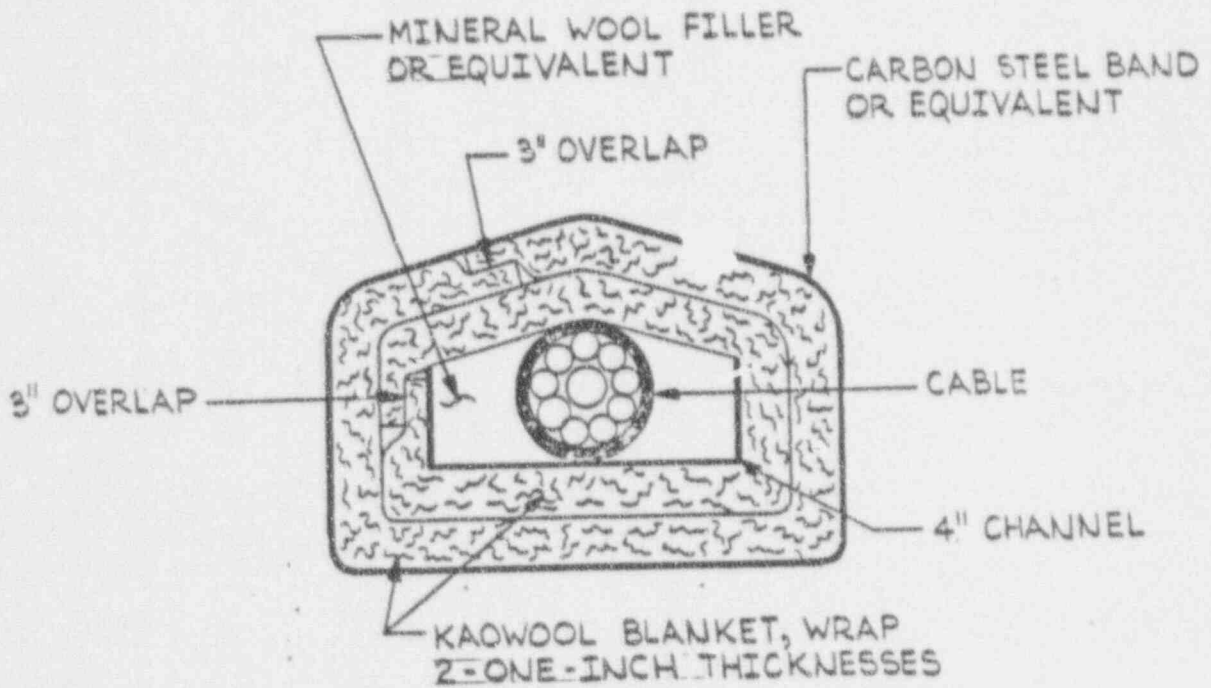
DR	NO.	DATE	REVISION
KML	0	4/17/80	ISS. FOR CONST.
TR			
CK			
APP			
DATE	SUPERSEDES _____ SCALE _____ SH. 18R		

ALABAMA POWER COMPANY

SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT
 DETAIL TRAY & CONDUIT DETAILS & NOTES

A-177541

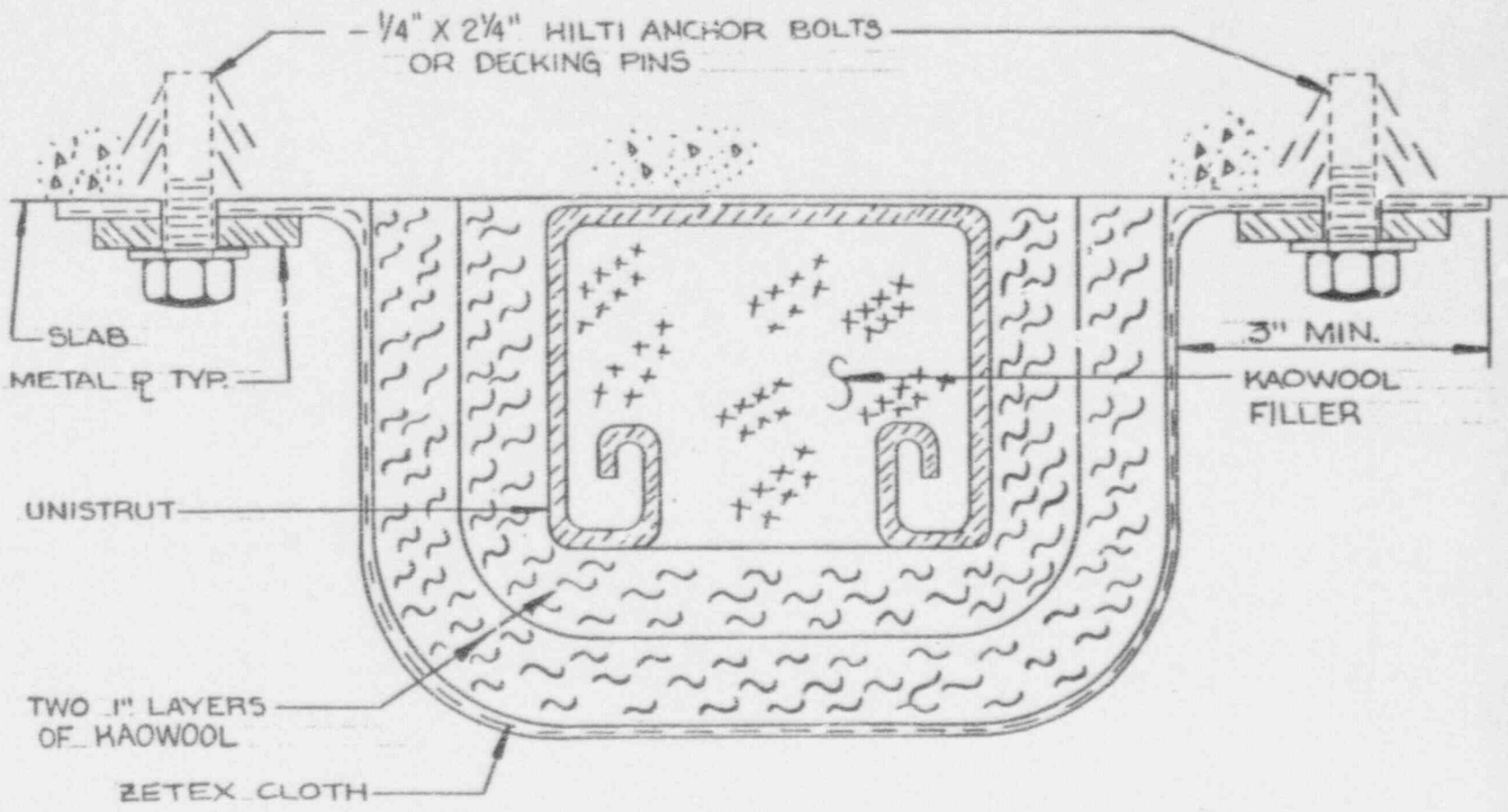
REV 0



SECTION **C**
SH. 18R

ORIGINAL DRAWING, Rev. 0
 TRANSFERRED TO SCS **005654**

BECHTEL CORP. JOB 7597-03/20			SOUTHERN SERVICES INC.		
DR <u>KML</u>	NO	DATE	REVISION	ALABAMA POWER COMPANY	
TR	0	7/1/80	ISS. FOR CONST.	SUBJECT <u>JOSEPH M. FARLEY NUCLEAR PLANT</u>	
CK <u>R.P. JR</u>				DETAIL <u>TRAY & CONDUIT DETAILS & NOTES</u>	
APP <u>Wjm/h</u>				SCALE <u>—</u>	SH <u>18S</u>
DATE <u>4-17-80</u>	SUPERSEDES <u>—</u>			A-177541	REV <u>0</u>



TYPICAL INSTALLATION OF KAOWOOL
ON CONDUIT SUPPORTS AGAINST FIRE-RATED
SLABS AROUND THE UNISTRUT

005655

ORIGINAL DRAWING, Rev. 0
TRANSFERRED TO SCS

BECHTEL CORP. JOB 7597-03/20

SOUTHERN SERVICES INC.

NO.	DATE	REVISION
0	8/10/88	ISSUED FOR CONST.

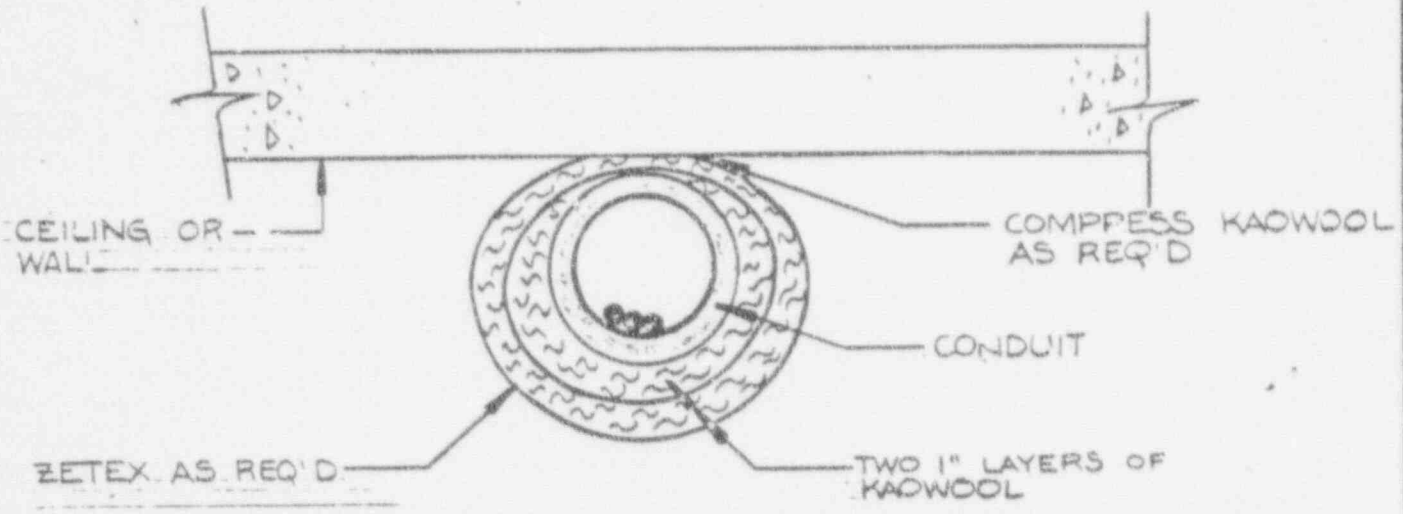
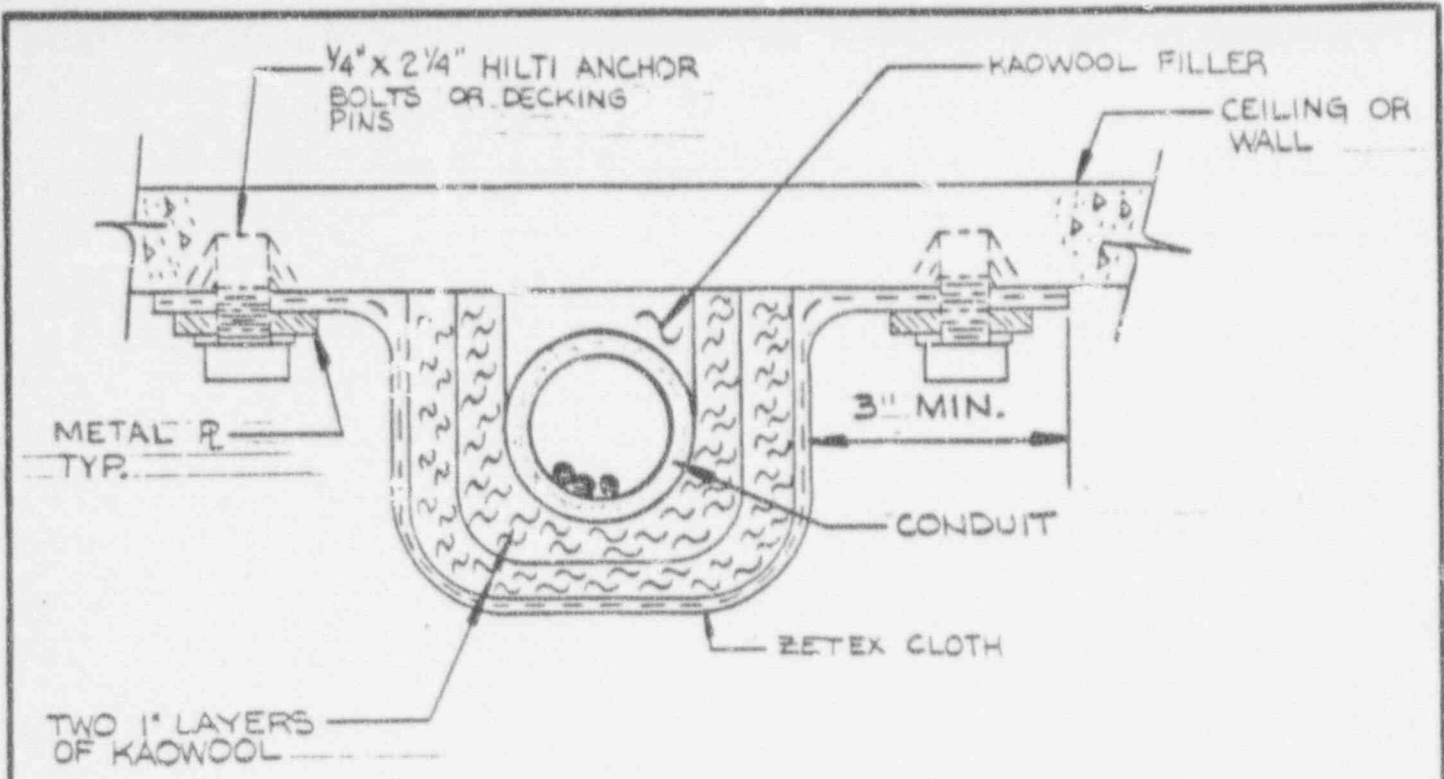
ALABAMA POWER COMPANY

SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT
TRAY & CONDUIT DETAILS & NOTES

DR NPB
 TR 8/10/88
 CR 8/10/88
 APP 08/11/88
 DATE 8-6-88

SCALE 1/8" = 1'-0" of 29
 SUPERSEDES
 REV 0

INC. P.O. # 81-1091-B
 81-1093-5



ALTERNATE KAOWOOL INSTALLATION
 (FOR CASES WHERE 2" CLEARANCE CANNOT BE
 MAINTAINED FROM FLOORS, WALLS AND CEILINGS)

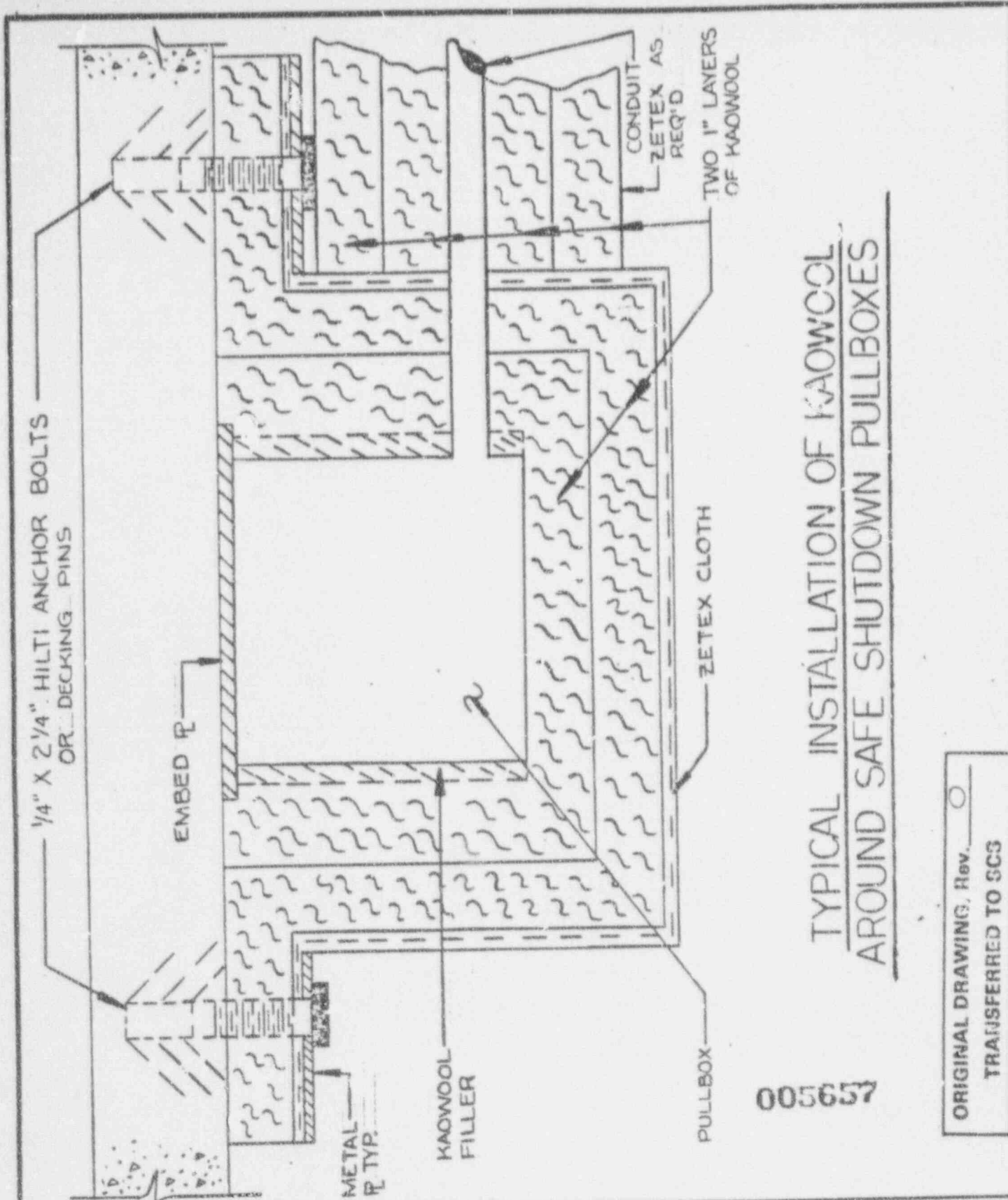
005656

ORIGINAL DRAWING, Rev. 0
 TRANSFERRED TO SCS

BECHTEL CORP. JOB 7597-03/20

SOUTHERN SERVICES INC.

DR njb	NO	DATE	REVISION	ALABAMA POWER COMPANY
TR	0	8/10/62	ISSUED FOR CONST. INC. PCN B-8-1090-7	
CK RJP			B-8-1091-B 88-B-1083-C	SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT
APP <i>gpc</i>				DETAIL TRAY & CONDUIT DETAILS & NOTES
DATE 8-6-62	SUPERSEDES		SCALE	SH 18U of 29
				A-177541 REV 0



**TYPICAL INSTALLATION OF KAOWOOL
AROUND SAFE SHUTDOWN PULLBOXES**

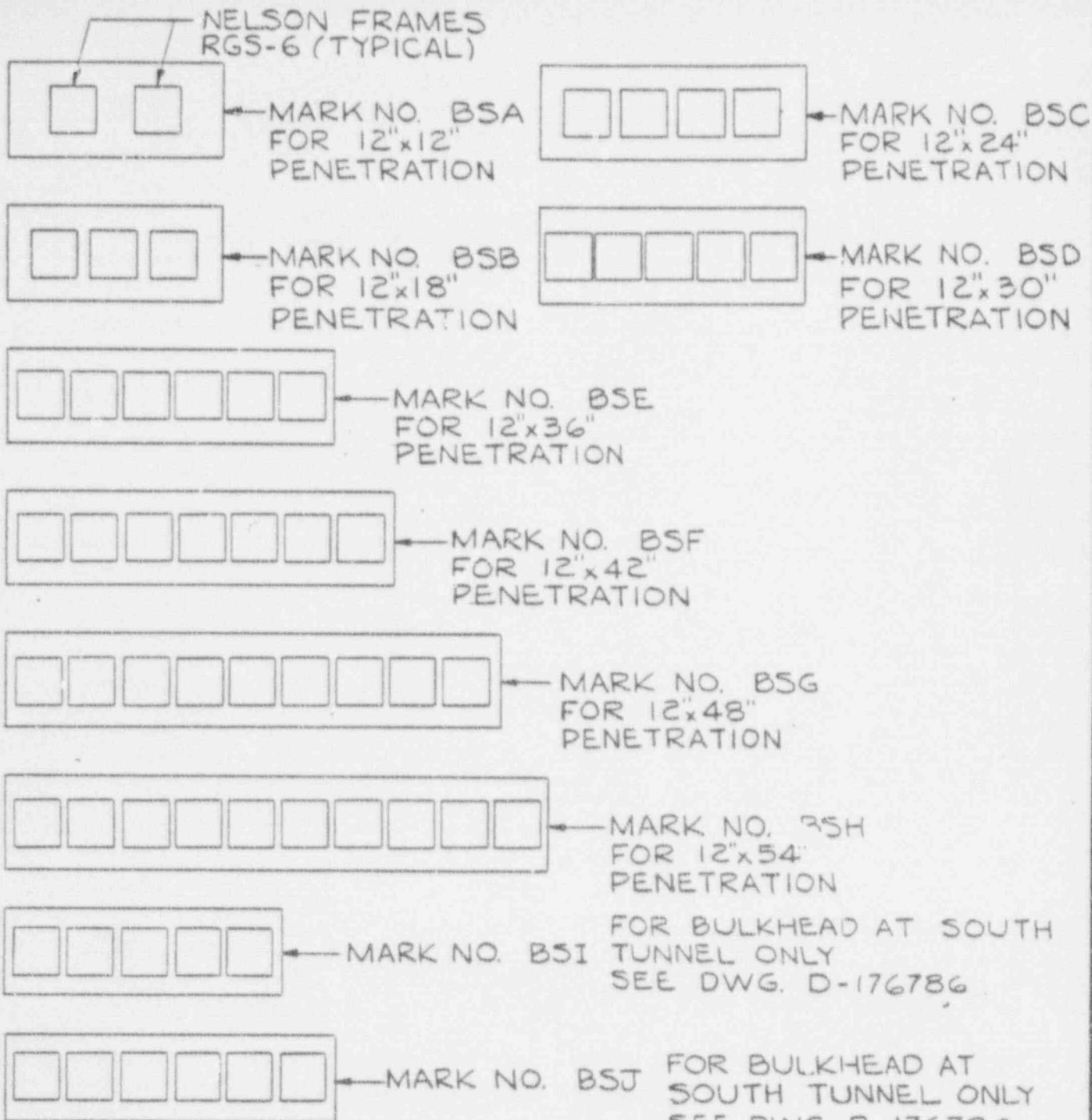
005657

ORIGINAL DRAWING, Rev. 0
TRANSFERRED TO SCCS

BECHTEL CORP. JOB 7597-03/20 SOUTHERN SERVICES INC.

DR njb	NO. 0	DATE 2/10/72	REVISION ISSUED FOR CONST. INC. PCN B-81-1091-B & B-81-1083-5	ALABAMA POWER COMPANY	
TR				SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT	
CK <i>R.P. Jen</i>				DETAIL TRAY & CONDUIT DETAILS & NOTES	
APP <i>aww/kcf</i>					
DATE 8-6-87	SUPERSEDES		SCALE	BK 184 of 29	A-177541 REV 0

ORIGINAL DRAWING, Rev. D
TRANSFERRED TO SCS



NOTE

- Plates may be cut in field to suit steel in penetration.
- For alternate method of sealing see note 2, sht. 19B

005658

**NUMBER OF NELSON FRAMES PER PLATE SIZE
BILL OF MATERIAL NUMBER AS INDICATED**

BECHTEL CORP. JOB 7597-03 SOUTHERN SERVICES INC.

DR.	NO.	DATE	REVISION
GAH	0	5-5-71	FOR APPROVAL
TR	1	9-29-73	REDRAWN
CK	2	2-4-81	REV. AS NOTED
APP			
DATE	5/5/71		

ALABAMA POWER COMPANY
SUBJECT: JOSEPH M. FARLEY NUCLEAR PLANT
DETAIL: TRAY & CONDUIT DETAILS & NOTES

RT
REV
1

WATER TIGHT OR AIR TIGHT & FIREPROOF AREA

APPLY "FLAMEMASTIC" 1/4" THICK (SEE NOTE 1)

CABLE TRAY, CONDUIT, AND CHANNEL.

CONDUIT GOING THRU NELSON PENETRATION.

EXTENDING TRAY, COND. AND CHANNELS INTO PENETRATIONS OPTIONAL

SEE SHT. 15

21" (WHERE POSSIBLE) FOR PLATE DETAIL REQ'D SEE A-177541 SHEET 19.

FIELD WELD

CABLE TRAY, CONDUIT, AND CHANNEL. EXPLOSION PROOF FITTING

CONDUIT GOING THRU NELSON PENETRATION (WHERE POSSIBLE) RGS-4 CABLE TRANSIT SHOP-WELDED TO PLATE TO FIT BLOCKOUT BY NELSON ELECTRIC CO.

SEE SHEET 19B, NOTES 5, 6, 7 & 8

ELECTRICAL PENETRATION.

NOTES

1. COAT CABLES INSIDE AND OUTSIDE PENETRATION WITH "FLAMEMASTIC" 71A

2. FOR ALTERNATE METHOD OF SEALING SEE NOTE 2, SH. 19B.

5

00565

WATER TIGHT PENETRATIONS

BECHTEL CORP. JOB 7597 - 03/20

SOUTHERN SERVICES INC.

DR	NO.	DATE	REVISION
RWP	0	11-6-72	FOR APPROVAL
TR	4	3-28-77	REV AS NOTED
CK RWR, H/m	5	2-4-81	REV AS NOTED
APP	3	7-2-76	REV AS NOTED

ALABAMA POWER COMPANY

SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT

DETAIL TRAY & CONDUIT DETAILS & NOTES

DATE 11-6-72 SUPERSEDES SCALE NONE SH. 19A OF 29 SHEETS A-177541-5

ORIGINAL DRAWING. Rev. 5
TRANSFERRED TO SCS

F
REV
4

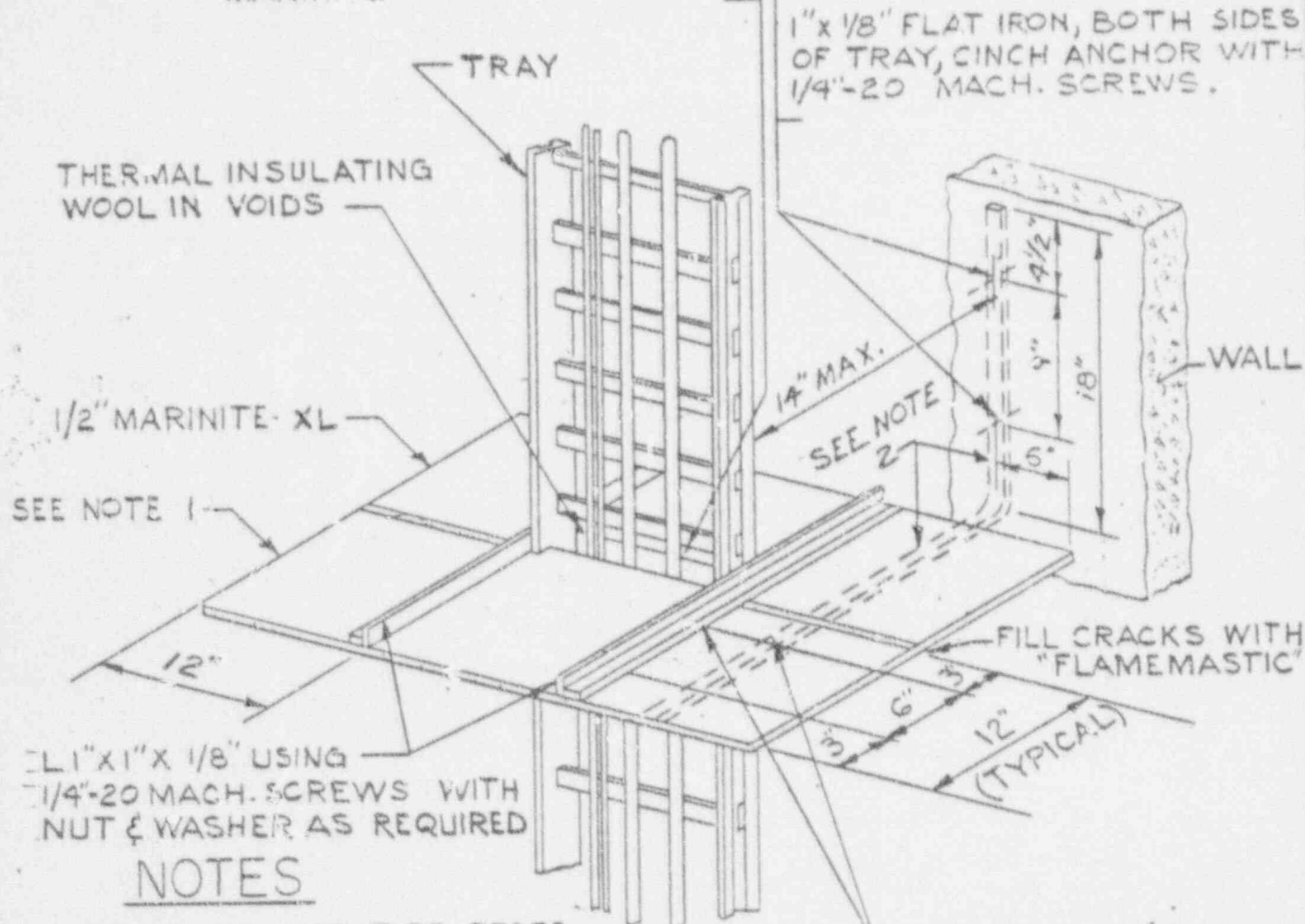
2. To expedite Unit 2 completion, the Field may use silicone foam elastomer and/or concrete and/or non-shrink grout per Inquiry No. SS-1102-6 to seal penetrations for fire, water or air tight rated walls. 5
Silicone foam and elastomer shall be installed in accordance with Inquiry No. SS-1102-132 and APCo Production Department Proc. FNP-0-MP-35.1. The Field shall be responsible for maintaining proper train and service level separation for all cables installed. When physical limitations make it impractical to maintain the 3 ft. horizontal and 5 ft. vertical separation of redundant circuits, these circuits shall be routed in rigid steel conduit thru the silicone foam.
3. When silicone foam and/or concrete and/or non-shrink grout is used, spare conduit sleeves are to be installed and capped. The field is to notify engineering of the number, size and location of these sleeves that are installed in each penetration by "as-built sketches."
4. When concrete and/or non-shrink grout is used, all cables shall be routed thru the penetration in galvanized steel conduits.
5. Wherever practical, all aluminum conduit that penetrate fire wall or pressure tight boundaries shall be fitted with explosion-proof or conduit fittings and be filled with silicone foam at the boundary. These boundary fire walls, & ceilings are delineated on architectural dwgs. D-176058 thru D-176063 for Unit #1 & D-206058 thru D-206063 for Unit #2. When it is not practical to seal the conduit in this manner, aluminum conduits shall be sealed at both ends with silicone foam. In this case, typical points of application would be at conduit fittings, pullboxes, & tray entrances.
6. All rigid steel conduits that penetrate fire walls or pressure tight boundaries are to be sealed as stated below:
 - a. If both ends of the conduit terminate further than 5 ft. from the wall, then only one end of the conduit needs to be sealed and the seal can be placed at either end.
 - b. If one end of the conduit terminates further than 5 ft. from the wall, and the other end terminates less than 5 ft. from the wall, a seal should be placed in the conduit end which terminates less than 5 ft. from the wall.
 - c. If both ends of the conduit terminate less than 5 ft. from the wall, a seal should be placed in both ends of the conduit unless the seal can be applied within the portion of the conduit that penetrates the wall.
7. Airtight and watertight floors, walls and ceilings are delineated on architectural drawings D-176065 thru D-176072.
8. For alternate watertight seals see sheets 18C and 18D.

005660

ORIGINAL DRAWING, Rev. 4
TRANSFERRED TO SCS

BECHTEL CORP. JOB 7597-03/20			SOUTHERN SERVICES INC.		
			ALABAMA POWER COMPANY		
DR. <u>BEN</u>	NO. <u>0</u>	DATE <u>3/28/77</u>	REVISION <u>FOR CONSTR</u>		
TR. <u>RIP</u>	<u>5</u>	<u>W/10/84</u>	<u>Rev. Per PCN S-</u>		
CK. <u>RIP</u>			<u>84-0-2892 Rev. 0</u>		
APP. <u>AV</u>			<u>JMR</u>		
DATE <u>3-25-77</u>	SUPERSEDES _____		SCALE _____	SH. <u>19B</u> OF <u>29</u> SHEETS	A-177541 <u>REV</u>

APPLY "FLAMEMASTIC" 71A TO FRONT AND BACK OF TRAY AND CABLE ON TOP AND BOTTOM OF MARINITE XL. CABLES SHALL BE COATED 12" ABOVE & BELOW THE MARINITE.



SEE NOTE 1

SEE NOTE 2

1" x 1" x 1/8" USING 1/4"-20 MACH. SCREWS WITH NUT & WASHER AS REQUIRED

NOTES

1. THIS DETAIL FOR FIRE STOPS FOR VERTICAL TRAYS IS NO LONGER REQUIRED FOR APPENDIX R.

COVER SCREW HEAD, WASHER & NUT WITH 1/8" THICK "FLAMEMASTIC" 71A MASTIC (TYPICAL)

0056E 1

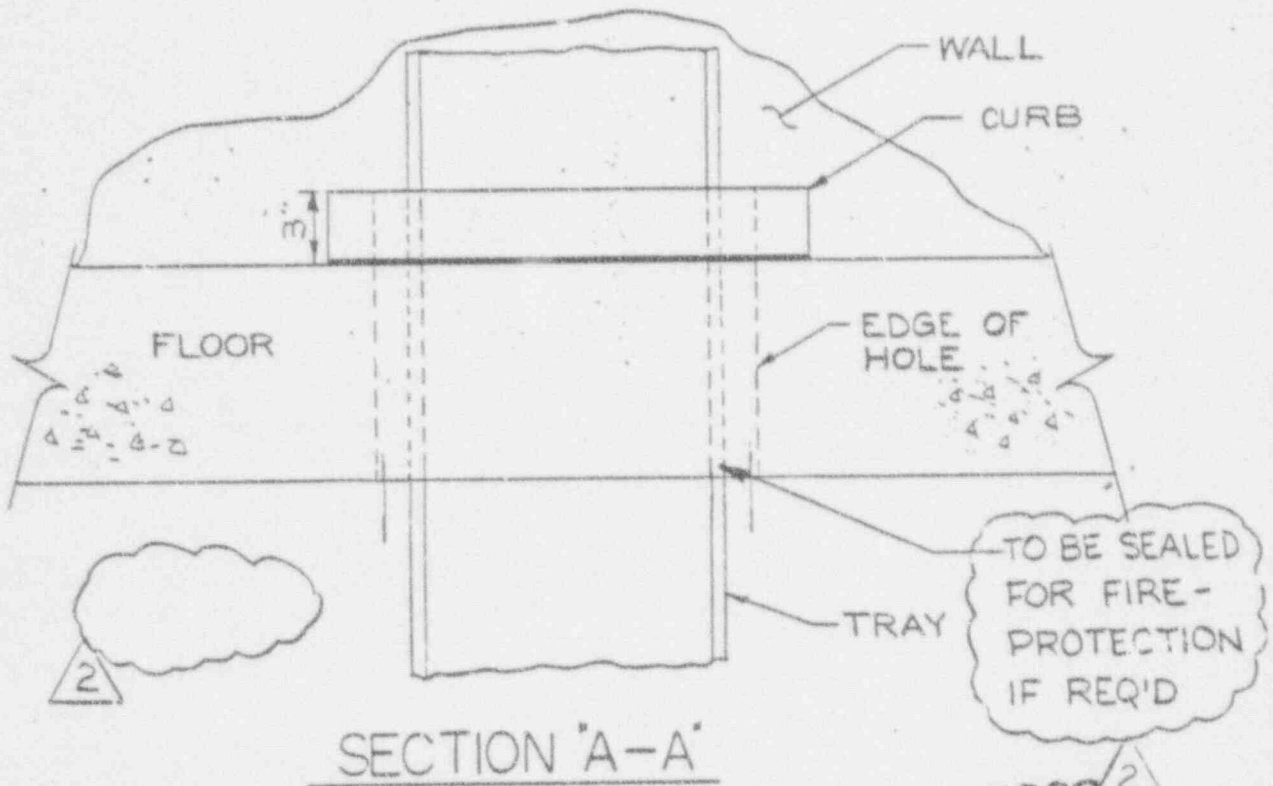
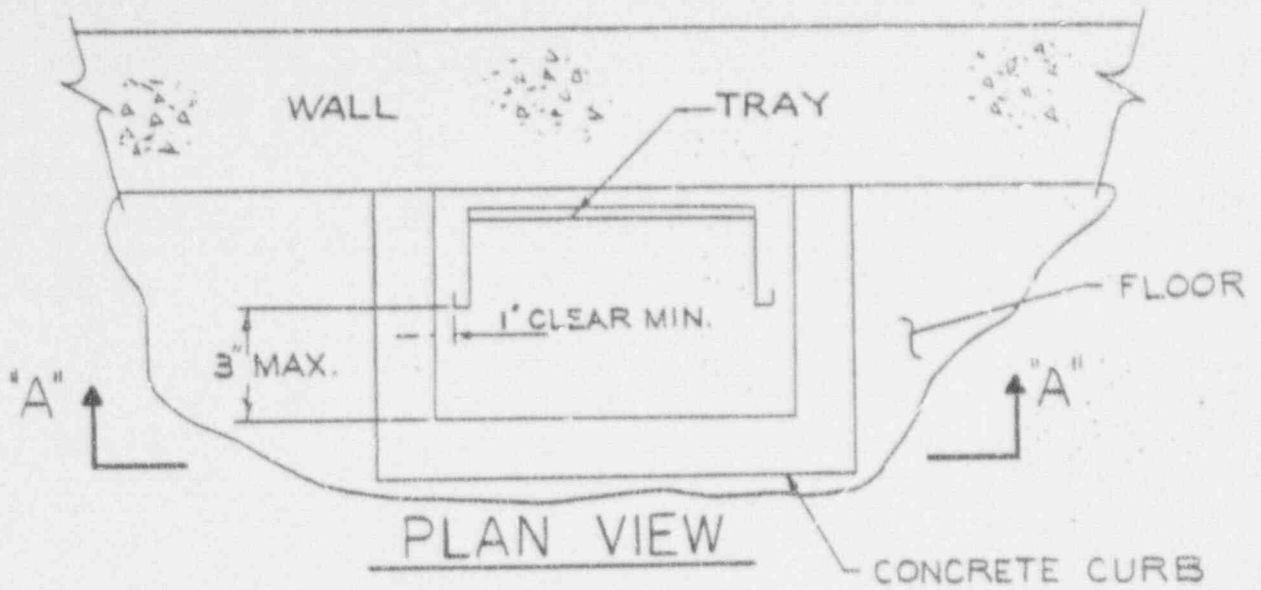
ALTERNATE FIRE STOP FOR VERTICAL CABLE TRAYS

BECHTEL CORP. JOB 7597-03/20

SOUTHERN SERVICES INC.

DR. M.A.	NO. 5	DATE 5/18/07	REVISION REMOVED VOID	SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT TRAY & CONDUIT DETAILS & NOTES
TR. 9/2 d/t			PER 'AS BUILT' INFO	
CK. [Signature]	6	9/26/08	REV. PER PCN B-89-0-6037 REV. 0	
APP. [Signature]				
DATE 1/11/71	SUPERJEDEV	SCALE	SH. 20 OF 20 SHEETS	A-1775416

ORIGINAL DRAWING, R4 4 TRANSFERRED TO SCS



005662 ²

VERTICAL FLOOR PENETRATION CURB

BECHTEL CORP. JOB 7597-03

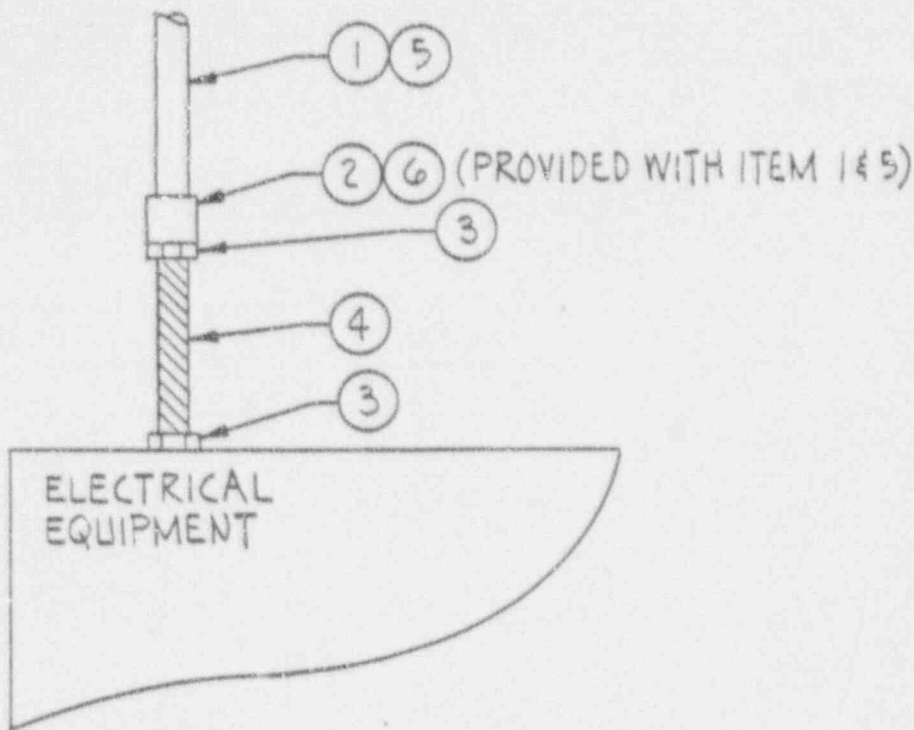
SOUTHERN SERVICES INC.

DR.	NO.	DATE	REVISION
M.A.	1	5-5-71	REV. PER S.S. LTR.
TR. <i>9/13 4/2</i>	2	2-4-81	REV. AS NOTED
CK. <i>W/W</i>			
APP. <i>W/W</i>			
DATE <i>11-4-71</i>			

ALABAMA POWER COMPANY
 SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT
 DETAIL TRAY & CONDUIT DETAILS & NOTES

ORIGINAL DRAWING, Rev. ²
 TRANSFERRED TO SCS

F REV 1



MIN. FLEXIBLE CONDUIT LENGTHS	
SIZE OF FLEX	TOTAL LENGTH OF FLEX.
3/4"	11"
1"	13"
1 1/4"	14"
1 1/2"	17"
2"	21"
2 1/2"	28"
3"	34"
4"	42"

CONDUIT SIZE	HARDWARE MARK NUMBER					
	①	②	③	④	⑤	⑥
3/4" - HAN	HAN	KBS	KAQ	HAB	HBB	
1" - HAP	HBO	KBC	KAR	HAC	HBC	
1 1/4" - HAQ	HBP	KBD	KAS	HAD	HBD	
1 1/2" - HAR	HBQ	KBE	KAT	HAE	HBE	
2" - HAS	HBR	KBF	KAU	HAF	HBF	
2 1/2" - HAT	HBS	KBG	KAV	HAG	HBG	
3" - HAU	HBT	KBH	KAW	HAH	HBH	
4" - HAW	HBV	KBI	KAX	HAT	HBJ	

TYPICAL FLEXIBLE CONNECTION TO TERM. HOUSING OF EQUIP. SUBJECT TO VIBRATION

005663

ORIGINAL DRAWING, Rev. 1
TRANSFERRED TO SCS

BECHTEL CORP. JOB 7597-03

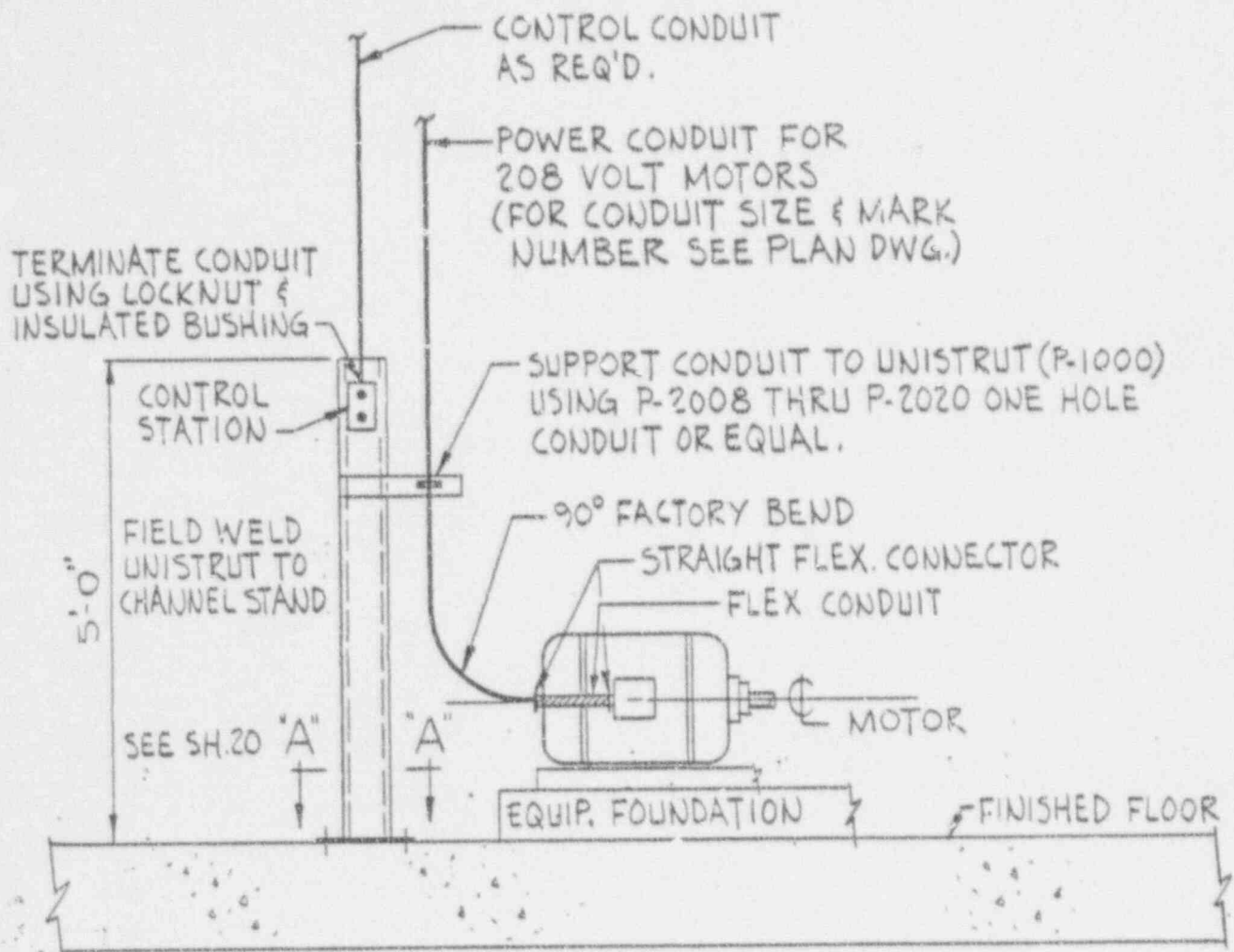
SOUTHERN SERVICES INC.

DR. RWB	NO.	DATE	REVISION
TR. RB/4/2	1	4-25-72	REDRAWN
CK. MM/4P			
APP. MM/4P			

ALABAMA POWER COMPANY

SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT
DETAIL TRAY & CONDUIT DETAILS & NOTES

RT



LOCAL CONTROL STATION & CONDUIT SUPPORT DETAIL

TYP FOR 208 V. MOTORS

005664

ORIGINAL DRAWING, Rev. 1
 TRANSFERRED TO SCS

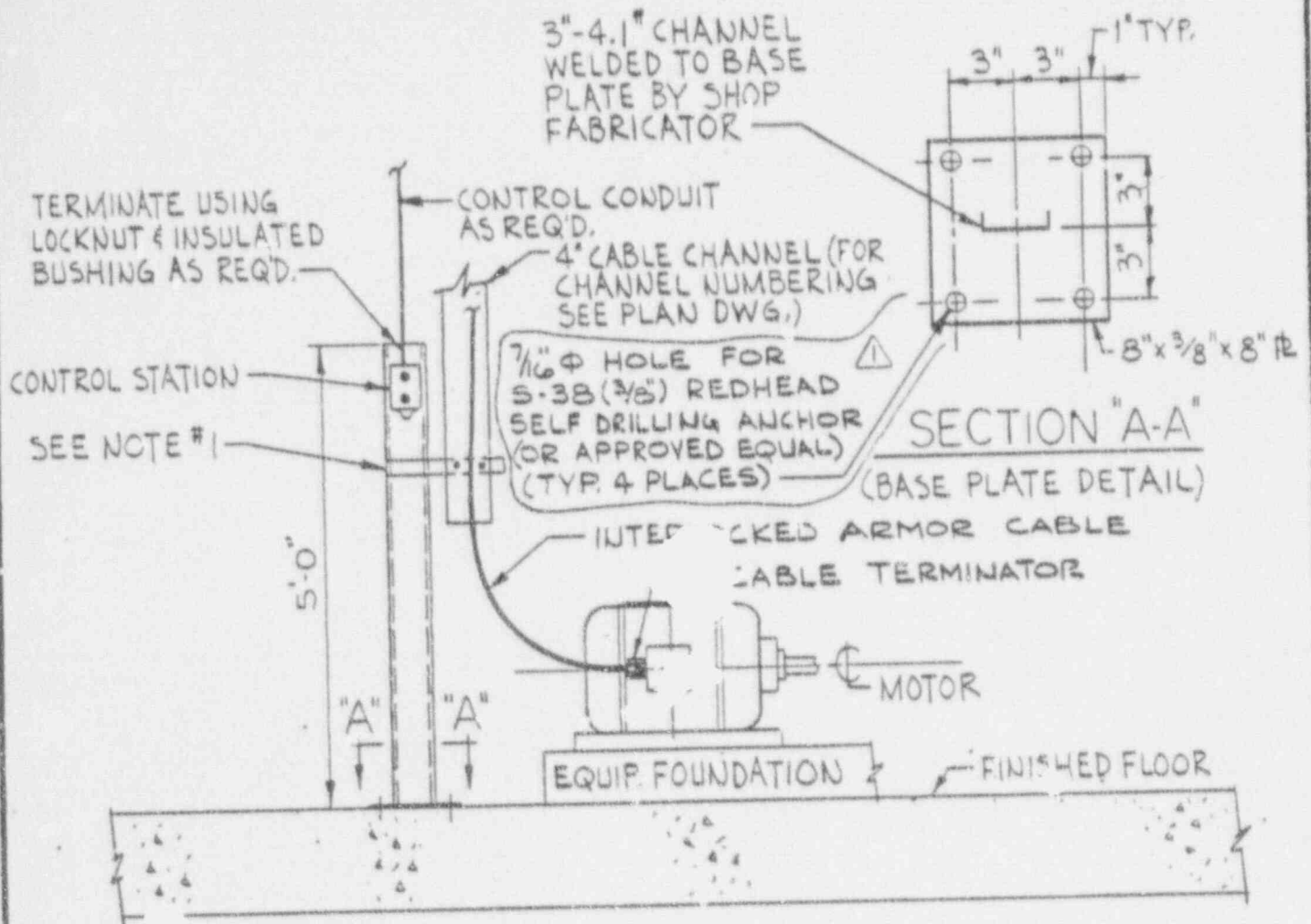
BECHTEL CORP. JOB 7597-03

SOUTHERN SERVICES INC.

DR	NO.	DATE	REVISION
RWB	1	4-25-72	REDRAWN
TR			
CK			

ALABAMA POWER COMPANY	
SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT	
DETAIL TRAY & CONDUIT DETAILS & NOTES	

APP. M.M./h/p
 DATE 5/10/72 SUPERSEDES _____ SCALE NONE SH 23 OF 29 SHEETS A-177541 1



NOTES

1. P1000 (NBC) UNISTRUT WELDED TO CHANNEL STAND. SUPPORT CABLE CHANNEL TO UNISTRUT USING (2) NCA, 2 MCA CHANNEL LOCKNUT

005665

LOCAL CONTROL STATION & CABLE CHANNEL SUPPORT
DETAIL - TYP. FOR 4.16 KV & 600V MOTORS

ORIGINAL DRAWING, Rev. /
 TRANSFERRED TO SCS

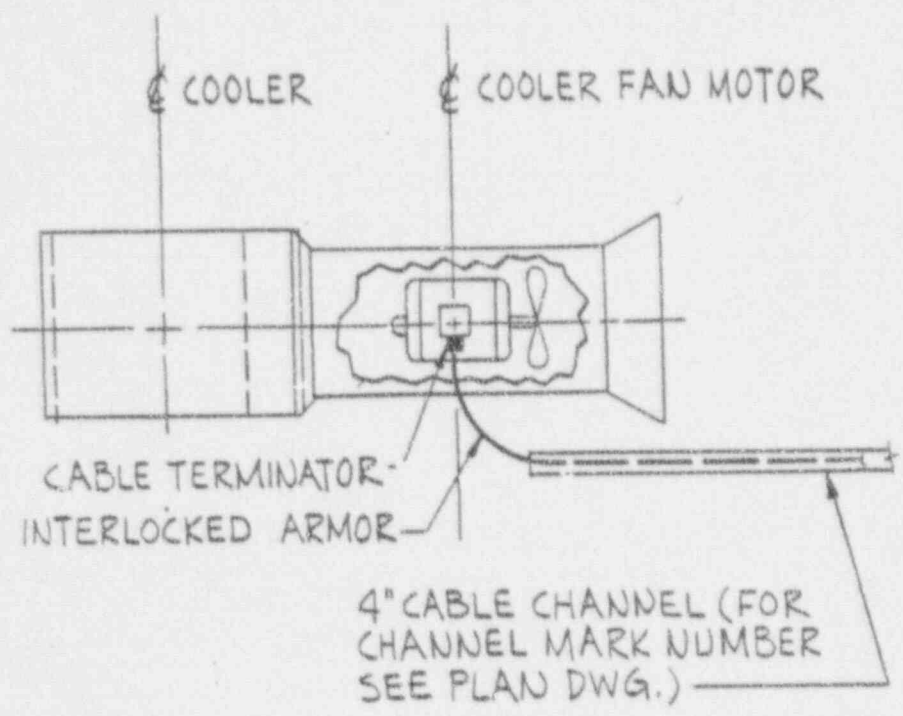
BECHTEL CORP. JOB 7597-03

SOUTHERN SERVICES INC.

DR	NO.	DATE	REVISION
RWB	0	4-25-72	FOR APPROVAL
TR	1	4-4-73	AS NOTED
CK			
APP			

ALABAMA POWER COMPANY
 SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT
 DETAIL TRAY & CONDUIT DETAILS & NOTES

(RT)

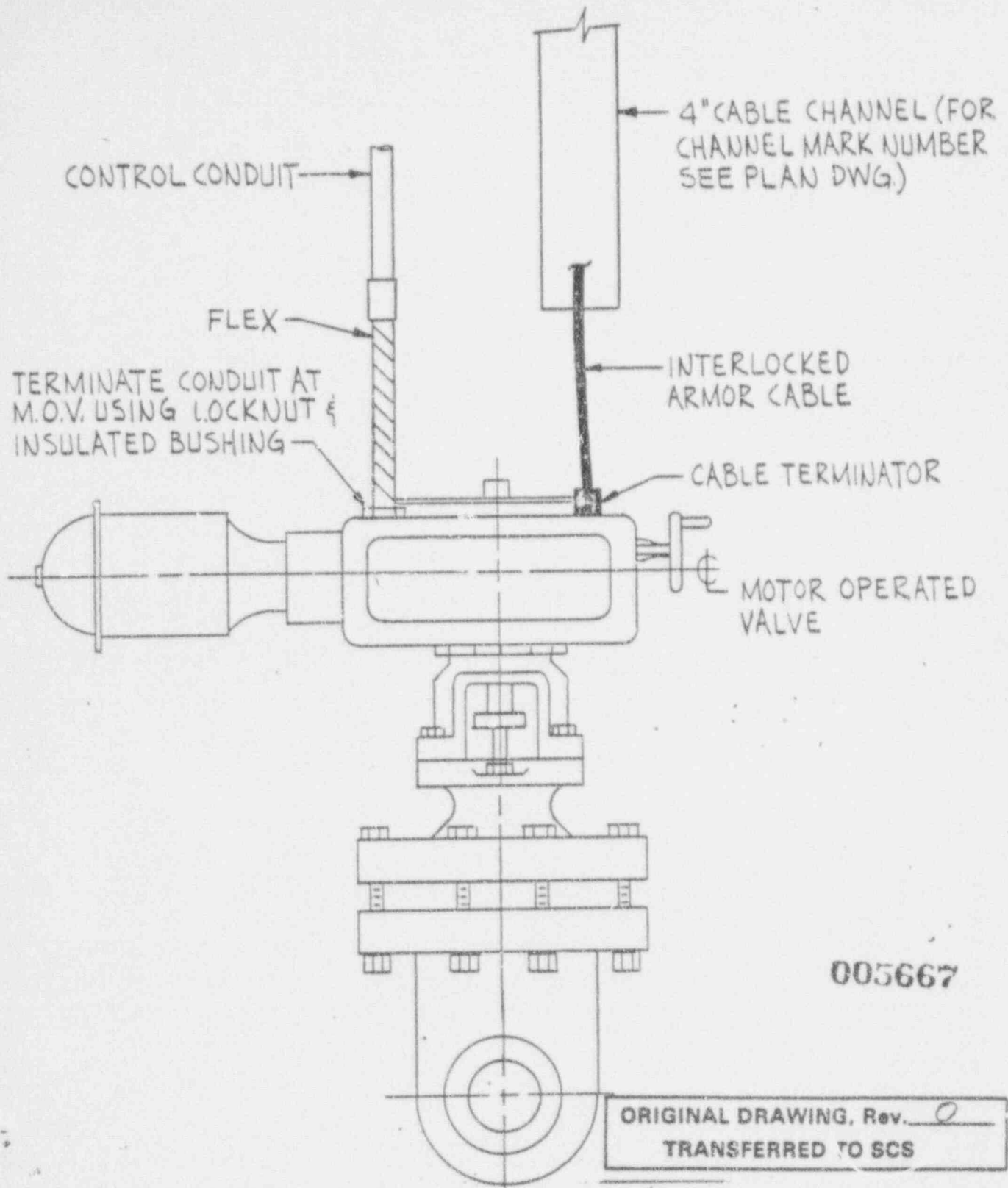


TYPICAL CONNECTION FOR COOLER MOTOR

005666

ORIGINAL DRAWING, Rev. 0
 TRANSFERRED TO SCS

BECHTEL CORP. JOB 7597-03				SOUTHERN SERVICES INC.	
DR. <u>KWB</u>	NO.	DATE	REVISION	ALABAMA POWER COMPANY	
TR. <u>9/12/72</u>	0	4-25-72	FOR APPROVAL	SUBJECT <u>JOSEPH M. FARLEY NUCLEAR PLANT</u>	
CK. <u>MM/SP</u>				DETAIL <u>TRAY & CONDUIT DETAILS & NOTES</u>	
APP. <u>MM/SP</u>	SUPERSEDES _____			SCALE <u>NONE</u>	SH. <u>23B</u> OF <u>29</u> SHEETS
DATE <u>5/10/72</u>				<u>A-177541</u>	<u>0</u>



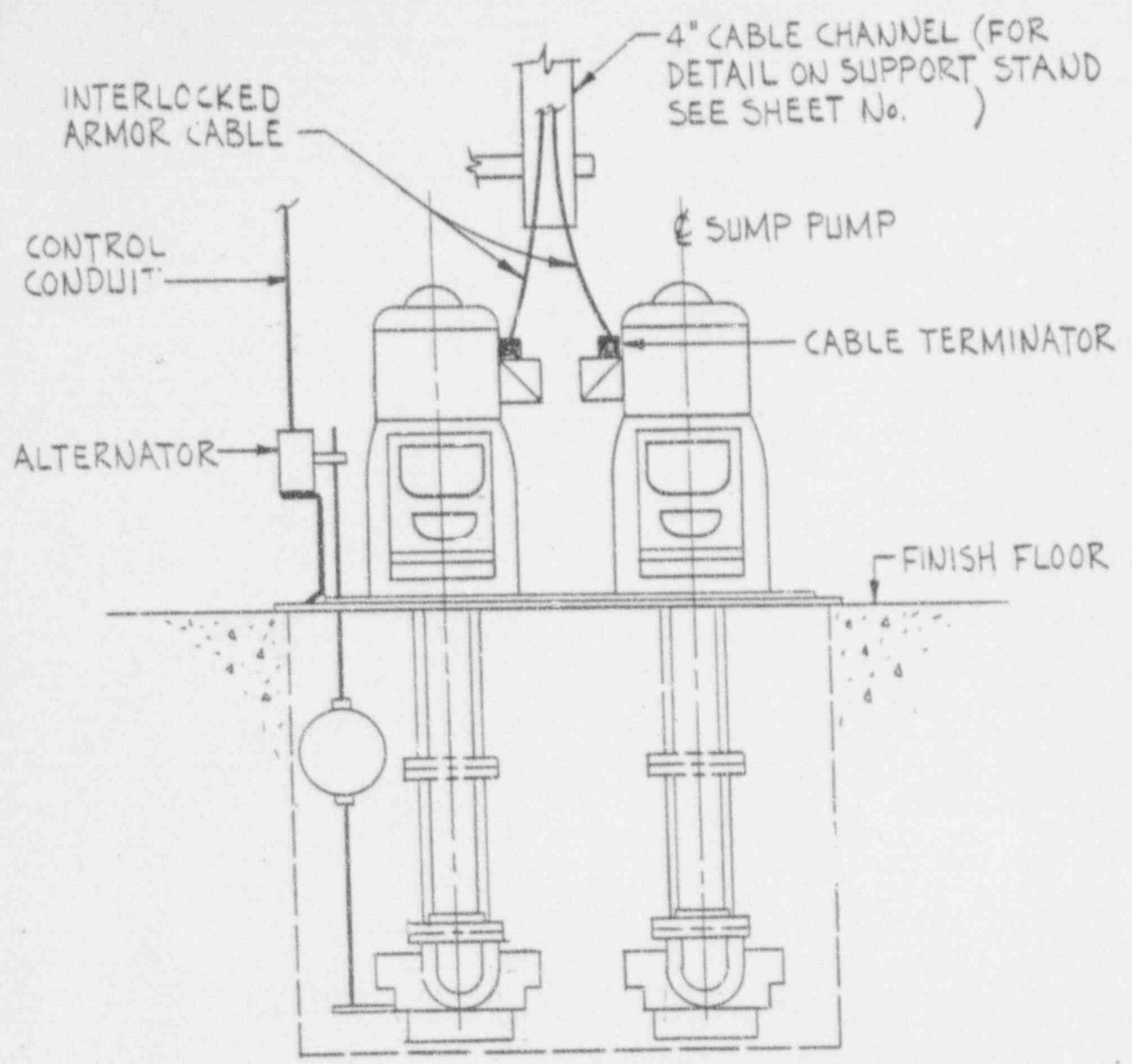
005667

ORIGINAL DRAWING, Rev. 0
 TRANSFERRED TO SCS

TYPICAL CONN. DETAIL FOR MOTOR OPERATED VALVE.

BECHTEL CORP. JOB 7597-03 SOUTHERN SERVICES INC.

DR. <i>RWB</i> TR. <i>9B-6/-</i> CK. <i>9B-6/-</i> APP. <i>HM/UP</i> DATE <i>5/10/72</i>	NO.	DATE	REVISION	ALABAMA POWER COMPANY SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT DETAIL TRAY & CONDUIT DETAILS & NOTES
		0	4-25-72	
SUPERSEDES _____				SCALE <i>NONE</i> SH 23C OF 29 SHEETS
				A-177541 0



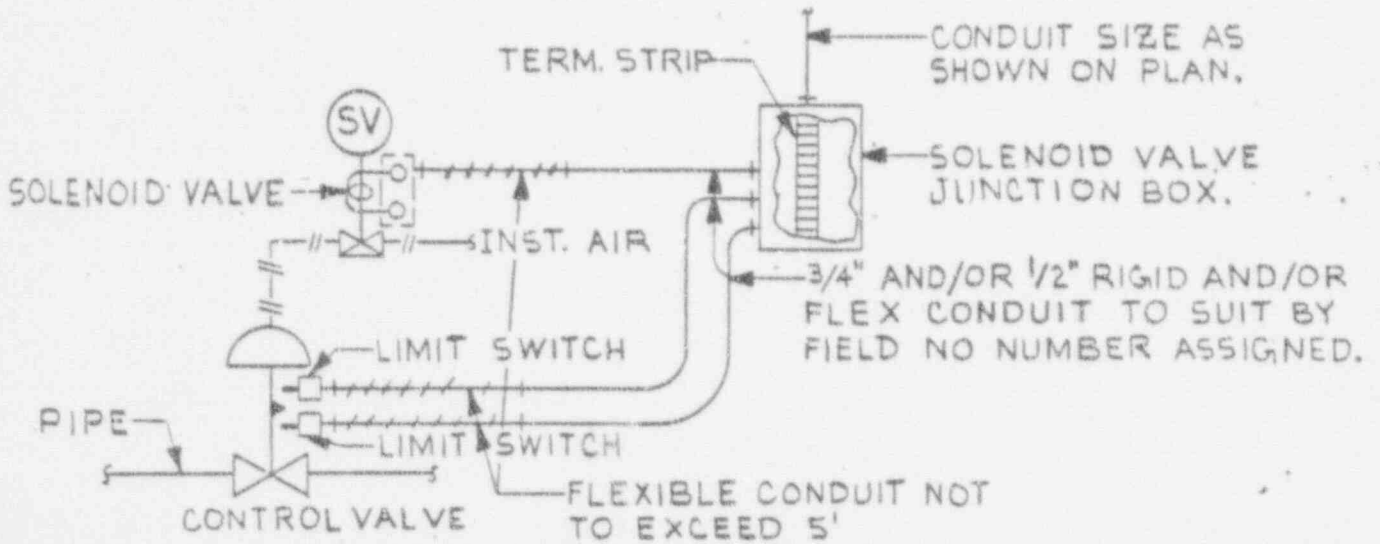
COMBINATION SUMP PUMP AND CONTROL
STATION INSTALLATION 005668

ORIGINAL DRAWING, Rev. 0
TRANSFERRED TO SCS

BECHTEL CORP. JOB 7597-03				SOUTHERN SERVICES INC.	
DR	KWB	NO.	DATE	REVISION	ALABAMA POWER COMPANY SUBJECT <u>JOSEPH M. FARLEY NUCLEAR PLANT</u> DETAIL <u>TRAY & CONDUIT DETAILS & NOTE</u>
TR		D	4-29-72	FOR APPROVAL	
CK	9/2 4/2				
APP	M.M./4.12				
DATE	5/2/73	SUPERSEDES		SCALE <u>NONE</u>	SH. 23D OF 29 SHEETS
					A-177541 0

NOTES:

1. FIELD TO CONNECT FROM J-BOX TO SOLENOID VALVE AND LIMIT SWITCHES AS PER CONNECTION DIAGRAM.
2. FLEXIBLE CONDUIT NOT EXCEEDING 5 FEET IN LENGTH MAY BE USED FROM THE ABOVE TYPES OF DEVICES TO CONNECT TO THE EXPOSED CONDUIT SYSTEM OR JUNCTION BOX.
3. IN CASES INVOLVING RTD'S OR EXCEPTIONS TO THE ABOVE CRITERIA, THE FIELD SHALL CONTACT ENGINEERING FOR SPECIFIC ANALYSIS AND APPROVAL.
4. ALL INTERNAL WIRING SHOULD BE DONE IN ACCORDANCE WITH THE APPROPRIATE CONNECTION DRAWING.
5. FOR JUNCTION BOX AND RACEWAY INSTALLATION REQUIREMENTS AT ENVIRONMENTALLY QUALIFIED VALVES, SEE DRAWINGS A-181900 SH.13 & D-181900 SH.18.



TYPICAL CONDUIT CONNECTIONS TO ELECTRICAL DEVICES ON SOLENOID OPERATED PNEUMATIC CONTROL VALVES TO BE INSTALLED BY FIELD

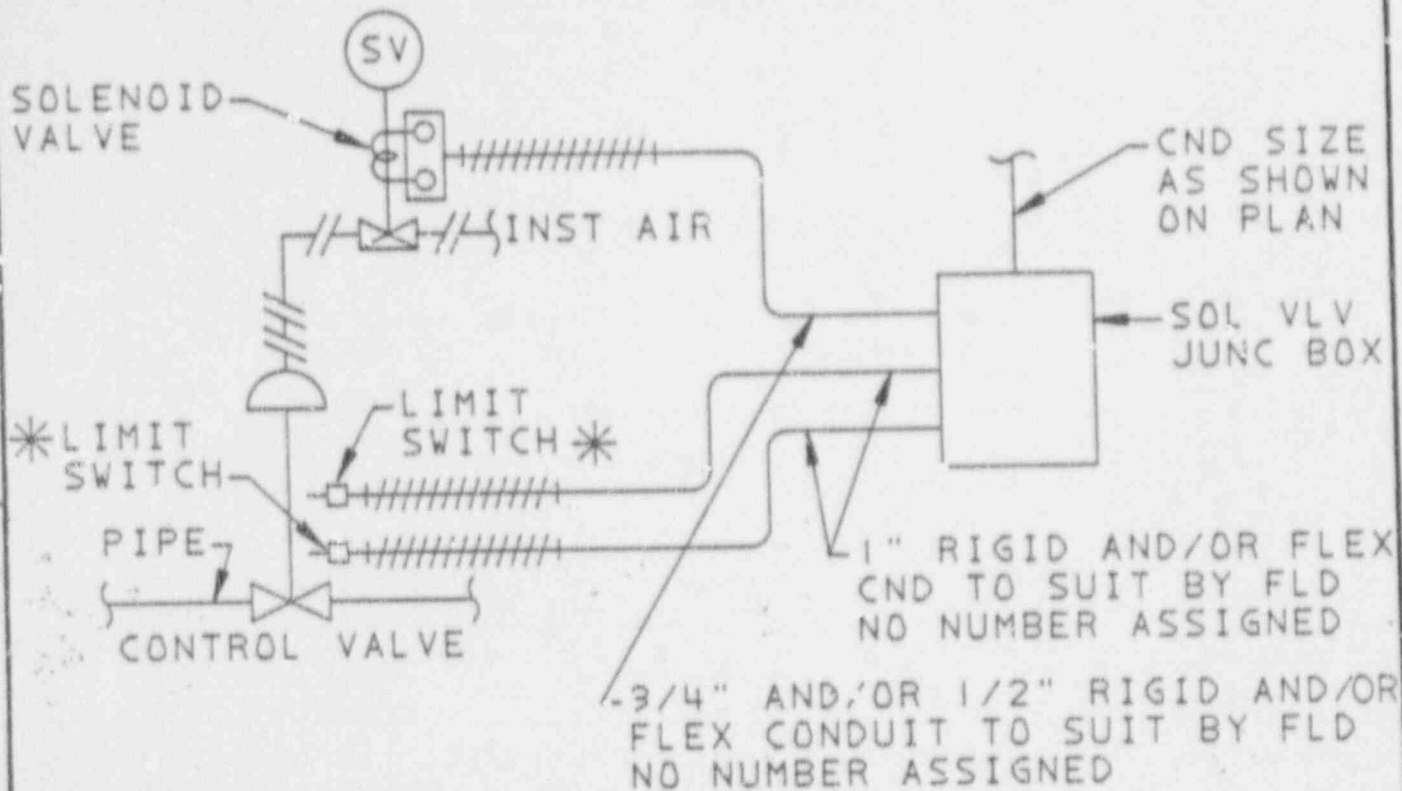
005669

ORIGINAL DRAWING, Rev. 1
TRANSFERRED TO SCS

BECHTEL CORP. JOB 7597-03

SOUTHERN SERVICES INC.

DR B.J. SELLERS		NO. DATE		REVISION		ALABAMA POWER COMPANY	
TR		0	2/2/74	ISSUED FOR CONST.		SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT	
CE RUP, BT		3	8/16/74	REV. PER PLN B-88-2-4985		DETAIL TRAY & CONDUIT DETAILS & NOTES.	
APP				REV. D-10. [unclear]			
DATE 12/11/74		SUPERSEDES		SCALE NONE		SH. 23E OF 29 SHEETS	
						A-177541 3	



NOTES:

1. NOTES ONE, THREE AND FIVE ON SHEET 29E APPLY TO THIS SOLENOID JUNCTION BOX ARRANGEMENT.
2. * SEE MANUFACTURERS CONNECTION INFORMATION FOR CONNECTOR COUPLING AND CABLE PURCHASED WITH NAMCO LIMIT SWITCH
3. FOR FLEX CONDUIT CONNECTION AT LIMIT SWITCH SEE DETAIL NO. 5 ON SHEET 29E-2

TYPICAL CONDUIT CONNECTION TO ELECTRICAL DEVICES ON SOLENOID VALVES LISTED BELOW

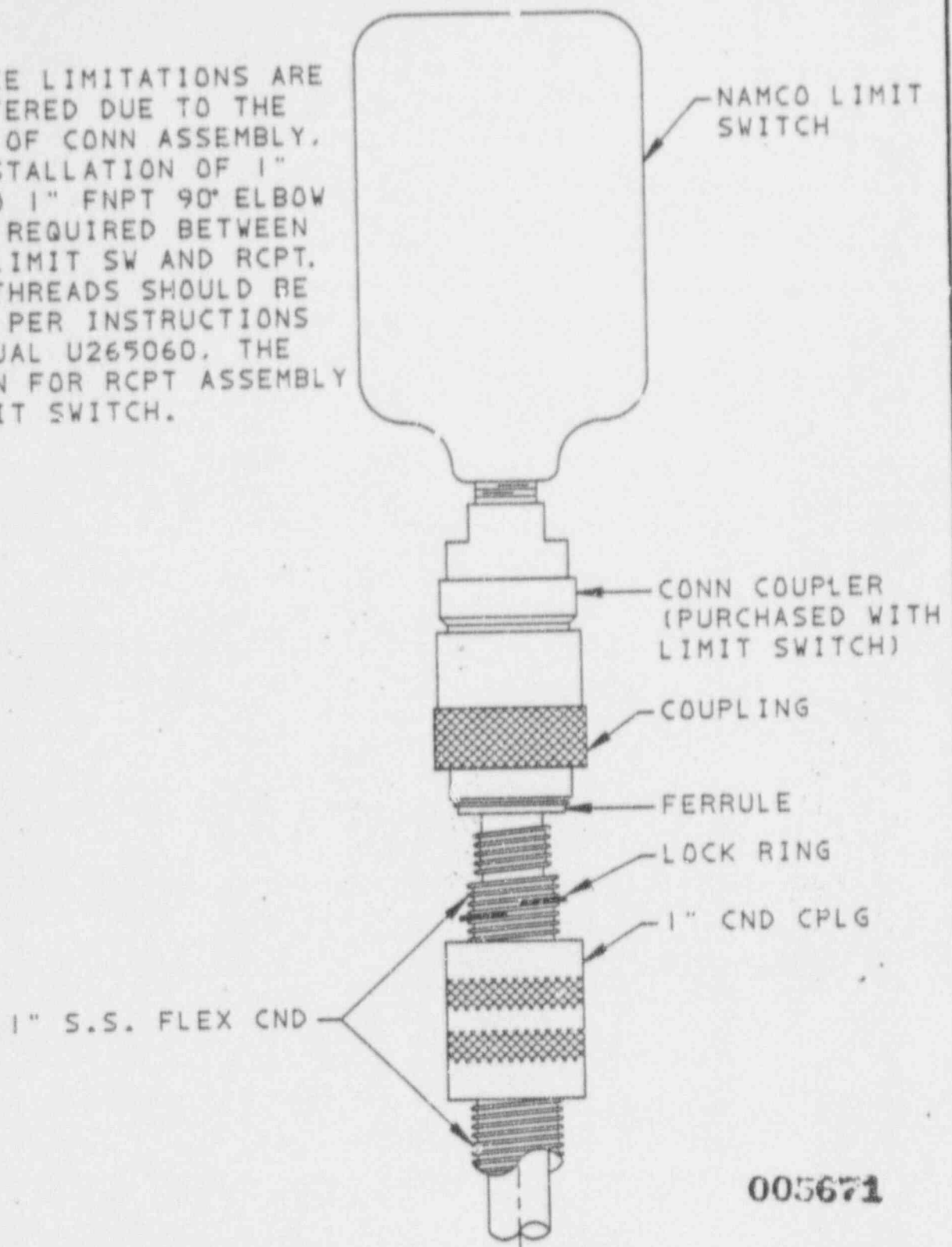
SV3103-A, SV3104-A, SV3331-B, SV3332-B, SV3333-B, SV3334-B, SV3765-A & SV3766-A

005670

0	9-23-85	BGT	JMR	APVD PER PCN B-84-1-2744 REV 0-13	NRA	CAB	DER	JLC	
REV.	DATE	BY	CHK'D	DESCRIPTION	APPR. 1	APPR. 2	APPR. 3	APPR. 4	APPR. 5
Southern Company Services, Inc. FOR ALABAMA POWER COMPANY					CONTINUED ON SHEET				
TRAY & CONDUIT DETAILS AND NOTES					PROJECT I. D.	DWG. NO.	SHEET	REV.	
DRAWN BGT TYPED					A-177541		29E-1	0	
CHK'D JMR									

NOTE:

IF SPACE LIMITATIONS ARE ENCOUNTERED DUE TO THE LENGTH OF CONN ASSEMBLY, THE INSTALLATION OF 1" MNPT TO 1" FNPT 90° ELBOW MAY BE REQUIRED BETWEEN NAMCO LIMIT SW AND RCPT. ELBOW THREADS SHOULD BE SEALED PER INSTRUCTIONS IN MANUAL U265060. THE SECTION FOR RCPT ASSEMBLY TO LIMIT SWITCH.

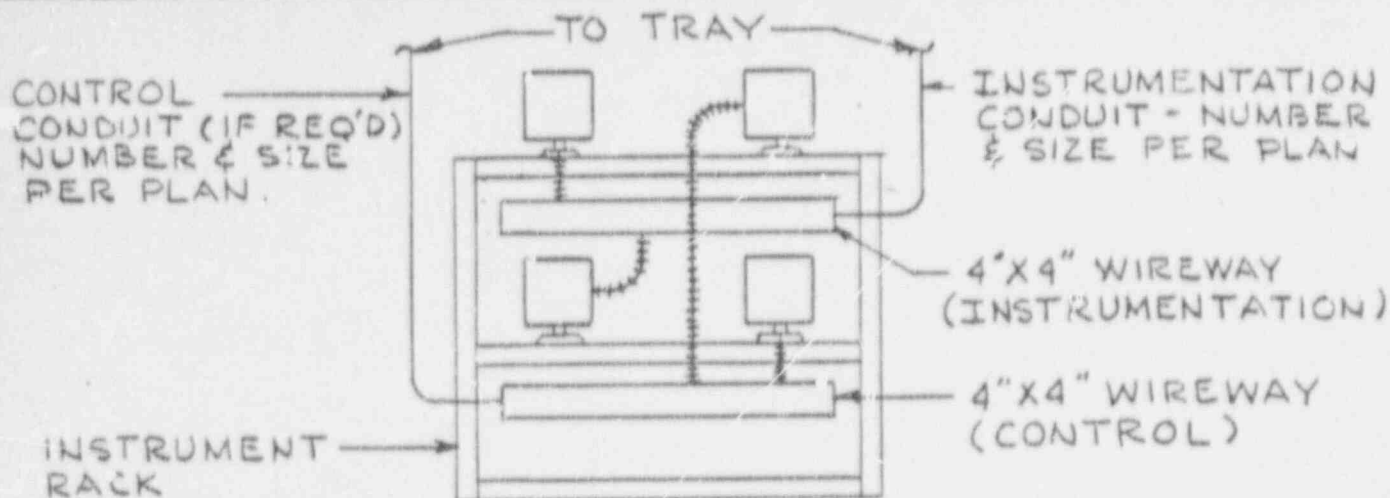


005671

DETAIL NO. 5

0	9-23-85	BGT	JMK	APVD PER PCN B-84-1-2744	NAB	CAB	DEL	RC	
REV.	DATE	BY	CHK'D	DESCRIPTION	APPR. 1	APPR. 2	APPR. 3	APPR. 4	APPR. 5

Southern Company Services, Inc. FOR ALABAMA POWER COMPANY			
TRAY & CONDUIT DETAILS AND NOTES		CONTINUED ON SHEET	
PROJECT I. D.	DWG. NO.	SHEET	REV.
	A-177541	23E-2	0



TYPICAL RACEWAY INSTALLATION AT INSTRUMENT RACKS OR GROUP OF INSTRUMENTS AT THE EQUIPMENT

NOTES:

1. INDIVIDUAL INSTRUMENTS ARE LISTED AND SHOWN ON THE TRAY & CONDUIT DRAWINGS.
2. FIELD SHALL RUN 3/4" RIGID &/OR FLEX CONDUIT FROM WIREWAYS TO EACH INSTRUMENT. THESE 2 CONDUITS SHALL NOT BE SHOWN ON THE DRAWINGS AND THEY SHALL NOT BE NUMBERED. THE CONDUIT LENGTH SHALL NOT EXCEED 15 FEET.
3. INSTRUMENT & CONTROL DEVICES (PRESS. SW'S, FOR ALARMS, ETC.) LOCATED IN THE SAME AREA & HAVING THE SAME TRAIN DESIGNATION WILL BE FED FROM DIFFERENT WIREWAYS, CONNECTED BY SEPARATE CONDUITS TO THE RESPECTIVE TRAYS.
4. WHEN INSTRUMENT TERMINALS WILL NOT ACCEPT SCHEDULED CABLES, A TERMINAL BOX MAY BE ADDED WITHIN SIGHT AND NOT MORE THAN 10 FEET OF THE INSTRUMENT. (USE ONLY QUALIFIED BOXES INSIDE THE CONTAINMENT.) NO BOX NUMBER SHALL BE ASSIGNED.

ORIGINAL DRAWING, Rev. 005672
 TRANSFERRED TO SCS

BECHTEL CORP. JOB 7597-03			SOUTHERN SERVICES INC.		
DR. MEC	NO.	DATE	REVISION	ALABAMA POWER COMPANY	
	0	2/2/74	ISSUED FOR CONST.	SUBJECT <u>JOSEPH M. FARLEY NUCLEAR PLANT</u>	
TR. <i>CK RWR BT</i>				DETAIL <u>TRAY & CONDUIT DETAILS & NOTES</u>	
DATE <u>12/11/74</u>			SUPERSEDES _____	SCALE <u>NONE</u>	SH. 23 F. OF 29 SHEETS
				A-177541	○

ELECTRICAL EQUIPMENT LOCATION CRITERIA

1. Electrical Floor Mounted Equipment will be dimensioned on Equipment Location Drawings for Electrical Floor Mounted Equipment. A 6-inch deviation will be permitted.
2. In the absence of any specific locating dimensions, the Field is to locate all wall mounted Electrical Equipment within the room boundaries as designated on the Electrical Tray and Conduit Drawings.

DESIGN CHANGES INVOLVING NEW OR RELOCATED EQUIPMENT SHALL CONTAIN DIMENSION TOLERANCES FOR ALL LOCATING DIMENSIONS INCLUDED WITHIN THE CHANGE. IN CASES WHERE THE FIELD DESIRES TO DEVIATE BEYOND THE DIMENSIONAL TOLERANCE, ENGINEERING APPROVAL SHOULD BE OBTAINED.



005673

ORIGINAL DRAWING, Rev. 0
TRANSFERRED TO SCS

BECHTEL CORP. JOB 7597-03/20

SOUTHERN SERVICES INC.

DR <u>beW</u>	NO.	DATE	REVISION	ALABAMA POWER COMPANY SUBJECT <u>JOSEPH M. FARLEY NUCLEAR PLANT</u> TRAY & CONUIT DETAILS & NOTES
YR	0	10/6/78	ISSUED FOR CONTR	
CK <u>R.P. / [unclear]</u>	1	1/3/90	INCORP. 2BE-145-4 REV. PER PCN B-88- 2-5280 REV. 0-27	
APP <u>[unclear]</u>				
DATE <u>10-6-78</u>	SUPERSEDES _____		SCALE <u>NONE</u>	SH. <u>236</u> OF <u>29</u> SHEETS
				A-177541 REV 1

1) In order to prevent moisture leakage through the stranded wire conductors, modifications are to be made to the Namco Limit Switches listed below:

Valve Location Number	Valve Location System or Piping
HV 3103*	Pressurizer Sample Lines (SEE NOTE 10 ON SH. 23J-2)
HV 3104*	Pressurizer Sample Lines (SEE NOTE 10 ON SH. 23J-2)
HV 3184*	CCW from RCP Thermal Barrier (SEE NOTE 11 ON SH. 23J-2)
HV 3376*	CTMT Sump Discharge (SEE NOTE 11 ON SH. 23J-2)
HV 3443*	CCW from Letdown Heat Exchanger (SEE NOTE 11 ON SH. 23J-2)
HV 3765*	Reactor Loop Sample Line (SEE NOTE 10 ON SH. 23J-2)
HV 3766*	Accumulator Sample Isolation (SEE NOTE 10 ON SH. 23J-2)
HV 3196*	CTMT Purge Isolation (SEE NOTE 11 ON SH. 23J-2)
HV 3197*	CTMT Purge Isolation (SEE NOTE 11 ON SH. 23J-2)
HV 3999A*	Reactor Cavity Cooling System (SEE NOTE 11 ON SH. 23J-2)
HV 3999B*	Reactor Cavity Cooling System (SEE NOTE 11 ON SH. 23J-2)
HV 3179A*	St. Gen. 1A Blwdn. Sample Isln. (SEE NOTE 11 ON SH. 23J-2)
HV 3179B*	St. Gen. 1A Blwdn. Sample Isln. (SEE NOTE 11 ON SH. 23J-2)
HV 3180A*	St. Gen. 1B Blwdn. Sample Isln. (SEE NOTE 11 ON SH. 23J-2)
HV 3180B*	St. Gen. 1B Blwdn. Sample Isln. (SEE NOTE 11 ON SH. 23J-2)
HV 3181A*	St. Gen. 1C Blwdn. Sample Isln. (SEE NOTE 11 ON SH. 23J-2)
HV 3181B*	St. Gen. 1C Blwdn. Sample Isln. (SEE NOTE 11 ON SH. 23J-2)
HV 3101*	Reactor Coolant Sample Valve (SEE NOTE 11 ON SH. 23J-2)
HV 3102*	Reactor Coolant Sample Valve (SEE NOTE 11 ON SH. 23J-2)

ORIGINAL DRAWING, Rev. 1/2
TRANSFERRED TO SCS

HV 3179C *

Steam Generator 1A Blowdown (SEE NOTE 11 ON SH. 23J-2)

005674

VOID

BECHTEL CORP. JOB 7597-03/20				SOUTHERN SERVICES INC.	
DR <i>bell</i>	NO.	DATE	REVISION	ALABAMA POWER COMPANY	
TR	0	2/25/80	ISSUED FOR CORUS INCORP. 2BE-5476 PCN. B-79-296-2	SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT	
CK <i>Rip/Ver</i>	6	2/14/89	VOIDED PER PCN B-88-2-4985 REV. 0-10	TRAY & CONDUIT DETAILS & NOTES	
APP <i>AW/mt</i>	DATE 2-23-82			SCALE	23H OF 29 SHEETS
SUPERSEDES				A-177541	
				REV 6	

Valve Location
Number

Valve Location
System or Piping

7126
8871

Steam Generator 1B Blowdown (SEE NOTE 11 ON SH. 23J-2)
Steam Generator 1C Blowdown (SEE NOTE 11 ON SH. 23J-2)

8047 *
8149A*
8149B*
8149C*
8871*
7126*

Pressurizer Relief Tank to Waste Processing System (SEE NOTE 11 ON SH. 23J-2)
Chemical and Volume Control System Letdown Heat Exchanger Line (SEE NOTE 11 ON SH. 23J-2)
Chemical and Volume Control System Letdown Heat Exchanger Line (SEE NOTE 11 ON SH. 23J-2)
Chemical and Volume Control System Letdown Heat Exchanger Line (SEE NOTE 11 ON SH. 23J-2)
Accumulator Tank Test Line (SEE NOTE 11 ON SH. 23J-2)
Reactor Coolant Drain Tank Heat Exchanger Line (SEE NOTE 11 ON SH. 23J-2)

ZS2034*
ZS2035*
ZS2036*
HV 3368A
HV 3368B
HV 3368C
HV 3369A
HV 3369B
HV 3369C
HV 3370A
HV 3370B
HV 3370C
HV 3976A
HV 3976B
HV 3976C
HV 3227A
HV 3227B
HV 3227C

Pressurizer PSV (SEE NOTE 11 ON SH. 23J-2)
Pressurizer PSV (SEE NOTE 11 ON SH. 23J-2)
Pressurizer PSV (SEE NOTE 11 ON SH. 23J-2)
Main Steam
Main Steam
Main Steam
Main Steam
Main Steam
Main Steam
Main Steam
Main Steam
Main Steam
Main Steam
Main Steam
Main Steam
Main Steam
Main Steam
Main Steam
Auxiliary Feedwater
Auxiliary Feedwater
Auxiliary Feedwater

ORIGINAL DRAWING, Rev. 2
TRANSFERRED TO SCS
005675

VOID

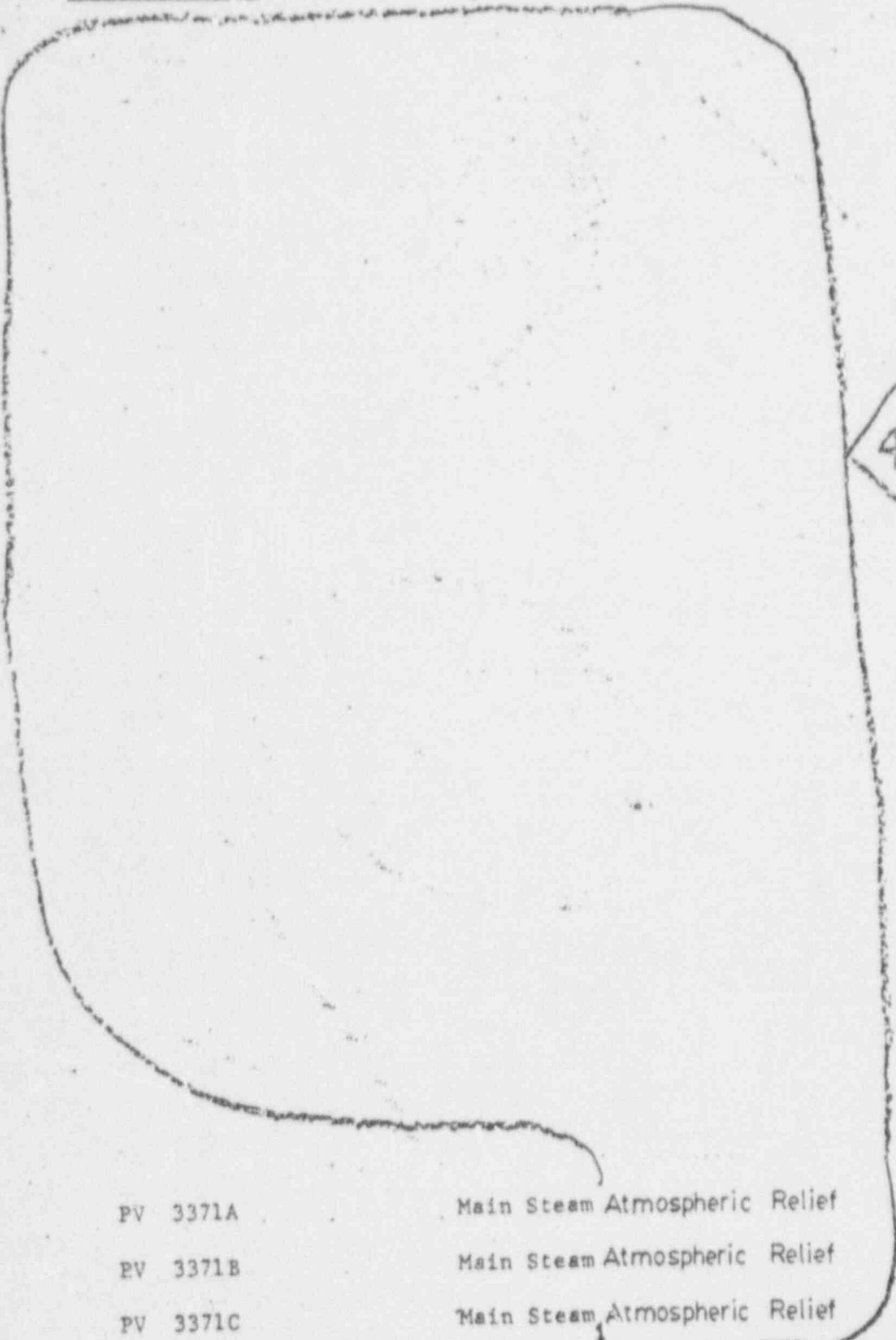
BECHTEL CORP. JOB 7597-03/20

SOUTHERN SERVICES INC.

DR <i>bew</i>		NO. DATE		REVISION		ALABAMA POWER COMPANY	
TR	0	2/28/82	ISSUED FOR COST INCORP 2BE-547E		SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT		
CR	4	1/16/84	VOIDED PER PCN'S B-BB-2-4925 REV. 0-10		TRAY & CONDUIT DETAILS & NOTES		
APP	<i>W. J. [Signature]</i>		B-BB-2-5005 REV. 0-10		DATE	SCALE	REV
DATE	2-27-84		SUPERSEDED		SH. 23J	OF 29 SHEETS	A-177541 4

Valve Location
Number

Valve Location
System or Piping



PV 3371A Main Steam Atmospheric Relief
 PV 3371B Main Steam Atmospheric Relief
 PV 3371C Main Steam Atmospheric Relief

005676

ORIGINAL DRAWING, Rev. 2
TRANSFERRED TO SCS

BECHTEL CORP. JOB 7597-03/20

SOUTHERN SERVICES INC.

DR njb		NO. DATE		REVISION		ALABAMA POWER COMPANY	
TR	0	1/10/82	ISSUED FOR CONST.			SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT	
CK	4	8/16/89	REF. ZBE-704-1, 728-2 2382-9, FCN B-79-531-3 B-74-524, B-80-755-4 B-82-418A-3			DETAIL TRAY & CONDUIT DETAILS & NOTES	
APP	4	8/16/89	REV. PER FCN'S B-88- 2-4585 REV. 0-10 E			DATE 8-6-89	
DATE	SUPERSEDES		SCALE		SH 23J-1 of 29 SH		REV 4
						A-177541	

- 2) For Namco Limit Switches with less than 4 conductors see Note 1 on Sheet 23M.
- 3) For Namco Limit Switches with 4 conductors see Sheet 23K & 23X.
- 4) For Namco Limit Switches with more than 4 conductors see Sheet 23M.

- 6) For the Bill of Materials required to make these modifications see Sheet 23P.
- 7) For sealing the conductor on solenoid valve junction box end, see Sheet 23L.

- 8) For procedure on how to install Raychem breakout kit on Limit Switches having conductor other than J02, see Sheet 23U-1.



005677

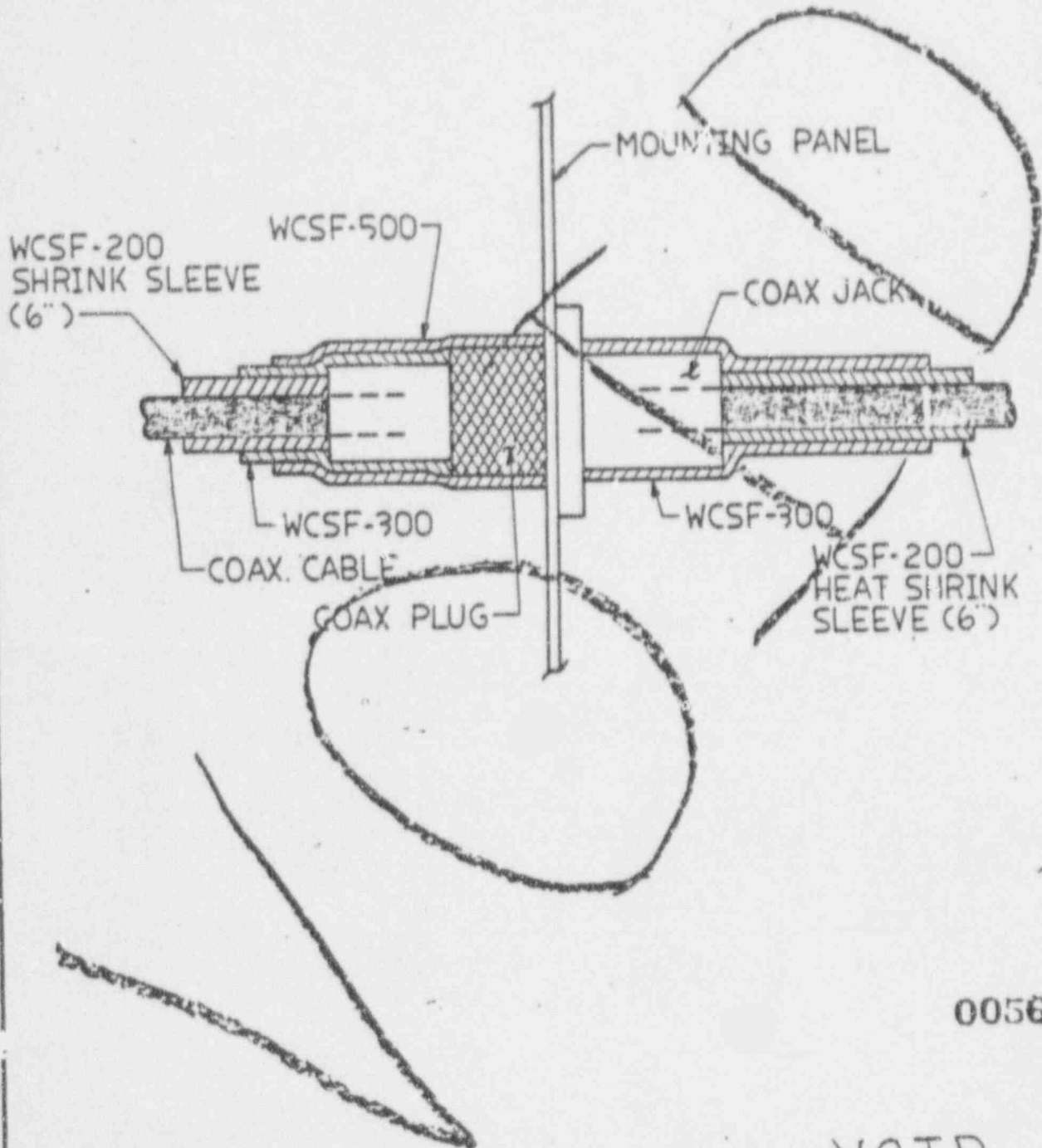
ORIGINAL DRAWING, Rev. 2
 TRANSFERRED TO SCS

BECHTEL CORP. JOB 7597-03/20

SOUTHERN SERVICES INC.

DR <u>njb</u>	NO.	DATE	REVISION	ALABAMA POWER COMPANY	
TR	0	8/1/82	ISSUED FOR CONST.	SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT	
CK <u>R.P. Joz</u>	4	7/16/89	REV. PER PCN'S	DETAIL TRAY & CONDUIT DETAILS & NOTES	
APP <u>advice</u>			B-88-2-499.5 REV. 0-10		
DATE <u>B.6.89</u>			B-88-2-500.5 REV. 0-18 <u>gmc nrb</u>	SH. 23J-2 of 29 SH. A-177541	
SUPERSEDES			SCALE	REV	4

METHOD OF SEALING COAX CONNECTORS FOR CABLE SCHEME NO'S
 2VAI5011E, 2VAI5011G, 2VBI5009E & 2VBI5009G AT THE ELECTRICAL
 PENETRATION INSIDE CTMT. (FOR Q2D2IRE0027A-A & RE0027B-B)



005685

VOID

REV.	DATE	BY	CHK'D	DESCRIPTION	APPR. 1	APPR. 2	APPR. 3	APPR. 4	APPR. 5
1	8-16-89	RJP	JMR	VOIDED PER E5 88-1132	NRAC				
0	4-15-88	RWK	JMR	APPV, PER PCN B-87-2-4684 REV.0	NRAC	CAB	DEK	JEC	

Southern Company Services, Inc. FOR Alabama Power Company

J. M. FARLEY NUCLEAR PLANT
 TRAY & CONDUIT DETAILS & NOTES

CONTINUED ON SHEET

PROJECT I. D.	DWG. NO.	SHEET	REV.
	A-177541	23R-1	1

DRAWN RWK TYPED — CHK'D JMR

QTY.

DESCRIPTION

80

RAYCHEM INSTALLATION KITS
NO. NCBK-04-04 WHICH INCLUDES
CABLE BREAKOUT NO. 502A823-52/144,
QUALIFIED FOR CLASS I E USE.

005686

ORIGINAL DRAWING, Rev. 0
TRANSFERRED TO SCS

BECHTEL CORP. JOB 7597-03/20

SOUTHERN SERVICES INC.

DR *njb*

NO	DATE	REVISION
0	5-5-82	ISSUED FOR CONST & INC. PCN. B-80-755-4

ALABAMA POWER COMPANY

TR

CR *B.P.*

APP *jer*

DATE *5-4-82*

SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT
DETAIL TRAY & CONDUIT DETAILS & NOTES

SUPERSEDES _____ SCALE  SH 235 of 29 SH. A-177541 REV 0

(AT)

**PROCEDURE FOR APPLYING CHICO-A4 COMPOUND
TO THE NIPPLE OF NAMCO'S EA-180 LIMIT SWITCH
WHERE RAYCHEM BREAK-OUT IS ATTACHED**

- A. For switches which are vertically mounted with wiring entering from the bottom:
1. Remove the six screws holding the front cover plate to the switch being careful not to loose the O-rings and Bellville washers under each screw.
 2. Carefully remove the cover plate and gasket.

NOTE

The following steps describe one method for applying the CHICO to the switch seal. The field has the option of using other methods if desired. However, it is important that no more than 1½ oz. of CHICO is applied to each switch, and that no CHICO finds its way to the switch internals.

3. Attach a short length of tygon tubing to the end of a veterinarian type syringe which has been calibrated in either ounces (oz.) or cubic centimeters (cc).
4. Mix a small quantity of CHICO A4 using mixing instructions printed on the container label.
5. Using syringe with tygon tubing attached, withdraw 2-3 oz. (35-50cc) of the liquid CHICO mixture into the syringe.
6. Through the open side of the switch, carefully insert the free end of the tygon tubing into the pipe nipple attached to the switch, until it bottoms on the Raychem breakout seal. Insure that the CHICO mixture does not get on the switch internals.
7. Inject 1½ oz. into the pipe nipple, then carefully withdraw tubing.
8. Dispose of the remainder of the CHICO in the syringe, and rinse syringe and tubing thoroughly.
9. Replace switch cover plate using gasket, screws, O-rings and Bellville washers previously removed.

ORIGINAL DRAWING, Rev. 0
TRANSFERRED TO SCS

VOID

005687

BECHTEL CORP. JOB 7597-03/20

SOUTHERN SERVICES INC.

DR <i>njb</i>	NO.	DATE	REVISION	ALABAMA POWER COMPANY	
TR	0	7/16/72	ISSUED FOR CONST. INCORP. PCN B-82-1184-3	JOSEPH M. FARLEY NUCLEAR PLANT	
CK <i>RIP</i>	1	5/11/72	VOIDED PER PLN'S	TRAY & CONDUIT DETAILS & NOTES	
APP <i>anv/128</i>			B-88-2-4985 REV. 0-10	DETAIL	
DATE 7/13/72			B-88-2-5005 REV. 0-18	SCALE	
SUPERSEDES				SH 235-1 of 29	A-177541 REV 1

B. For switches which are not vertically mounted or have wiring entering from the top.

1. Remove switch from its mounting, leaving flex conduit and seal undisturbed.
2. Support switch in a vertical position with wiring entering from the bottom.
3. Perform steps A.1 through 4.9 above.
4. Allow a minimum of six hours for CHICO to cure before moving switch.
5. After CHICO has cured reinstall switch in its original position.

NOTE

The working time for CHICO is about 15 minutes. All work required prior to applying CHICO should be performed before mixing.

005688

ORIGINAL DRAWING, Rev. 0
 TRANSFERRED TO SCS

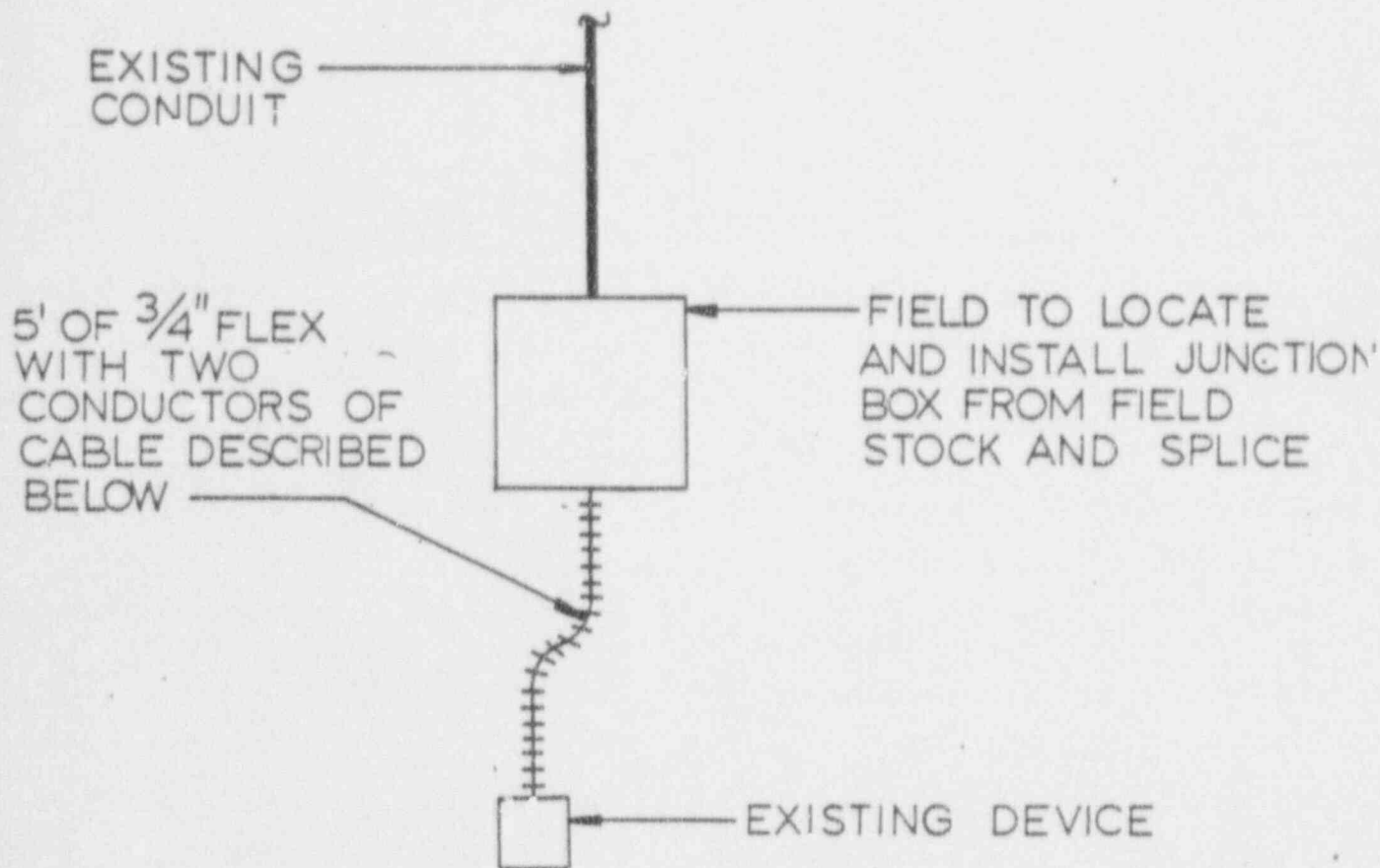
VOID

BECHTEL CORP. JOB 7597-03/20

SOUTHERN SERVICES INC.

DR njb	NO	DATE	REVISION	ALABAMA POWER COMPANY	
TR	0	7/16/52	ISSUED FOR CONST. INCORP. PCN B-82-1104-3	SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT	
CK <i>[Signature]</i>	1	8/16/52	VOIDED PER PCN'S B-82-2-4985 REV. 0-10	DETAIL TRAY & CONDUIT DETAILS & NOTES	
APP <i>[Signature]</i>			B-82-2-5005 REV. 0-18	SCALE	EN 235-2 of 29
DATE 7/13/52	SUPERSEDES				REV A-177541 1

TERMINATION METHOD FOR DEVICES SUBJECT TO HIGH TEMPERATURE

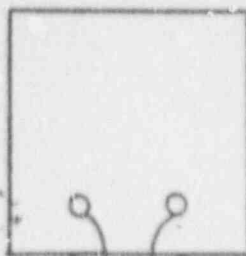


RECOMMENDED CABLE: ROCKTHERM TYPE SR-ML OR EQUAL RATED FOR 600V, 180°C. THE CONDUCTOR SIZE SHOULD MATCH THE EXISTING CABLE.

005689

ORIGINAL DRAWING, Rev. 0
TRANSFERRED TO SCG

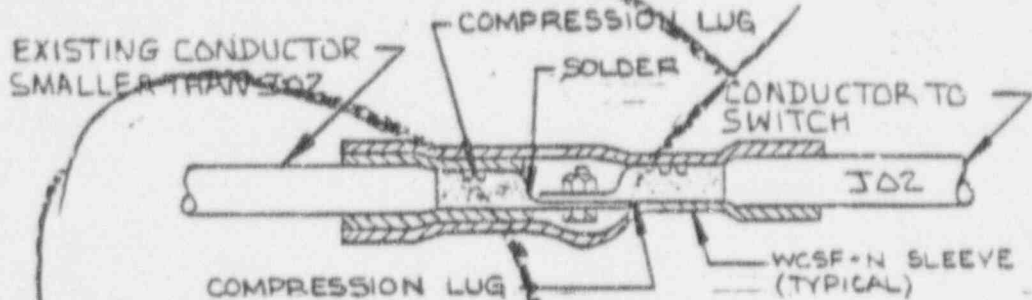
BECHTEL CORP. JOB 7597-03/20			SOUTHERN SERVICES INC.		
DR <u>njb</u>	NO. <u>0</u>	DATE <u>5-5-82</u>	REVISION	ALABAMA POWER COMPANY	
TR			ISSUED FOR CONST.	SUBJECT <u>JOSEPH M. FARLEY NUCLEAR PLANT</u>	
CR <u>R.P.</u>			INC. PCN SE-78-134-1, SE-80-727-1 & SE-81-928-1	DETAIL <u>TRAY & CONDUIT DETAILS & NOTES</u>	
APP <u>awilck</u>	SUPERSEDES			SH. <u>23T</u>	REV. <u>0</u>
DATE <u>5-4-82</u>	SCALE <u>~</u>			A-177541	



NAMCO LIMIT SWITCH
 NOTE: THIS DETAIL IS APPLICABLE TO STEM MOUNTED LIMIT SWITCHES ON MOV8808A, B & C ONLY.

1" NIPPLE (NIPPLE FILLED WITH APPROX. 1 1/2 OZ. CHICO A4 SEALING COMPOUND)

RAYCHEM (502AB25-52/144) CABLE BREAKOUT FITTING OVER 1" CONDUIT NIPPLE & 1/2" #12 (J02) CABLE TO BE CUT TO SUIT



DETAIL A

NOTE: A CONDULET IS TO BE INSTALLED IN EACH RIGID CONDUIT RUN TO HOUSE THIS CONNECTION.

SEE DETAIL "A" (TYPICAL FOR EACH CONDUCTOR)

NOTE: WHEN LESS THAN 4 CONDUCTORS ARE USED PER CABLE BREAKOUT, A SHORT PIECE OF J02 CABLE (LENGTH TO SUIT) IS TO BE INSERTED IN THE SPARE LEGS OF THE BREAKOUT AND HEAT SHRINK OVER TERMINAL LUG BARREL AS PER DETAIL # 2, SHEET 23U005690

ORIGINAL DRAWING, Rev. 0
 TRANSFERRED TO SC5

VOID

BECHTEL CORP. JOB 7597-03/20

SOUTHERN SERVICES INC.

DR njb	NO	DATE	REVISION
TR	0	7/16/82	ISSUED FOR CONST INC. PCN. B-82-1184-3
CK lhp	2	7/11/82	VOIDED PER PCN B-82-9985 REV. 10
APP jar			
DATE 7/11/82	SUPERSEDES _____ SCALE _____		

ALABAMA POWER COMPANY	
SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT	
TRAY & CONDUIT DETAILS & NOTES	
DETAIL	SH 23U of 29
A-177541	REV 2

PROCEDURE FOR INSTALLING RAYCHEM CABLE BREAKOUT
FITTINGS TO STEM MOUNTED LIMIT SWITCHES ON MOV8808A,
MOV8808B & MOV8808C

- 1.) Remove the existing conductors from each limit switch and lug each conductor.
- 2.) Terminate small lengths of J02 cable from each limit switch and install raychem CB4-2 cable breakout fitting as per Drawing A-177541/Sht. 23K&23L

NOTE

When less than 4 conductors are used per cable breakout, a short piece of J02 cable (length to suit) is to be inserted in the spare legs of the cable breakout and heat shrink over terminal lug barrel as shown on Drawing A-177541/Sht. 23L.

- 3.) Install a ring tongue terminal lug on each J02 conductor and solder as shown on Drawing A-177541/Sht. 23U.
- 4.) Bolt the existing conductor and J02 cable ring tongue terminal lugs together and apply a WCSF-N sleeve over the J02 conductor and heat shrink as shown on Drawing A-177541/Sht. 23V.
- 5.) Apply a WCSF-Y sleeve over the entire connection with approx. 1" of excess sleeve on each side of the connection and heat shrink.
- 6.) A conduit is to be installed in each affected rigid conduit run to house this connection.

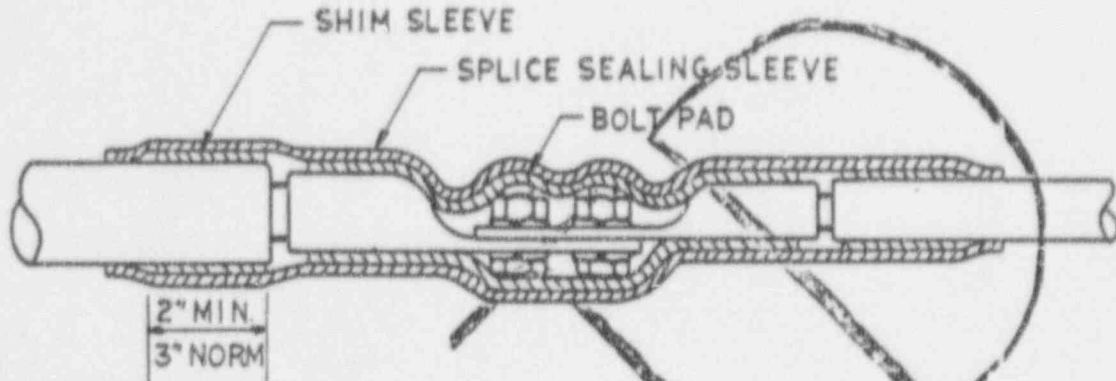
005691

ORIGINAL DRAWING, Rev. 0
TRANSFERRED TO SCS

VOID

BECHTEL CORP. JOB 7597-03/20			SOUTHERN SERVICES INC.		
DR njb	NO.	DATE	REVISION		
	0	1/11/83	ISSUED FOR CONSTRUCTION INC. PCN B-82-2188-2 REF. PCN B-82-1184-3		
	3	7/11/81	VOIDED PER PCN B-82-2-4985 REV. 0-1		
TR	DATE		SUBJECT		
CE <i>ec/ger</i>			ALABAMA POWER COMPANY JOSEPH M. FARLEY NUCLEAR PLANT		
APP <i>KU</i>			DETAIL TRAY & CONDUIT DETAILS & NOTES		
DATE 1-3-83	SUPERSEDES		SCALE	SH 23U-1	A-177541
					REV 3

INSULATION OF BOLTED CONNECTION



NOTES:

1. USE RAYCHEM TYPE WCSF-N TUBING ONLY.
2. APPLICATION SHALL BE IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS AS SUPPLIED WITH THE KIT.
3. ONLY A QUALIFIED KIT SHALL BE USED FOR CLASS IE APPLICATIONS.

LOW VOLTAGE (1000V. OR LESS) IN-LINE
SPLICE BOLTED CONNECTION FOR NUCLEAR
(LOCA) QUALIFIED APPLICATIONS 005692
(CLASS IE)

VOID

1	0-28-86	RWK	JMR	VOIDED PER PCN B-86-0-3658 REV.0	NCA/jll		
0	9-18-86	JLO	JMR	APPVD. DRAWN PER S-86-1-3730 REV.0	NCA/jll	CABs	LEICARL
REV.	DATE	BY	CHK'D	DESCRIPTION	APPR. 1	APPR. 2	APPR. 3

Southern Company Services, Inc. FOR Alabama Power Company

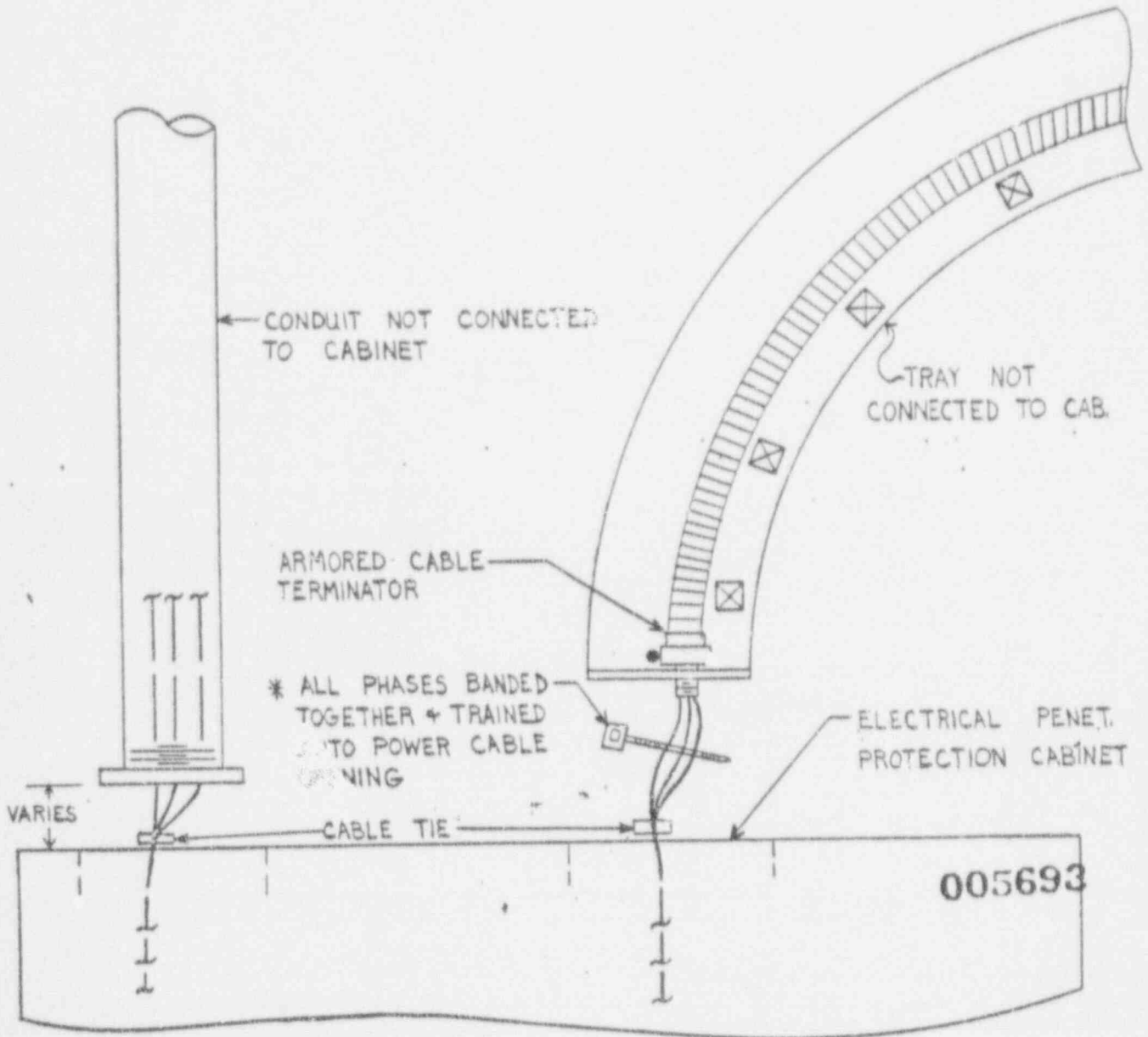
J.M. FARLEY NUCLEAR PLANT
TRAY & CONDUIT DETAILS & NOTES
 DRAWN JLO TYPED CHK'D JMR

CONTINUED ON SHEET			
PROJECT I. D.	DWG. NO.	SHEET	REV.
	A-177541	23U-2	1

RACEWAY TERMINATION DETAIL @ PENETRATION PROTECTION CABINET (TYPICAL OF ALL PLATES)

* ALL PHASES PER CABLE

- NOTES:
1. BLIND END PLATE (FOR CABLE TRAY) DRILLED TO ACCEPT BOX CONNECTOR END OF CABLE TERMINATOR.
 2. FOR LARGE NO. OF CABLES, A LARGER GALV. PLATE MAY BE SUPPLIED BY THE FIELD AS REQUIRED.



ORIGINAL DRAWING. Rev. Q
TRANSFERRED TO SCS

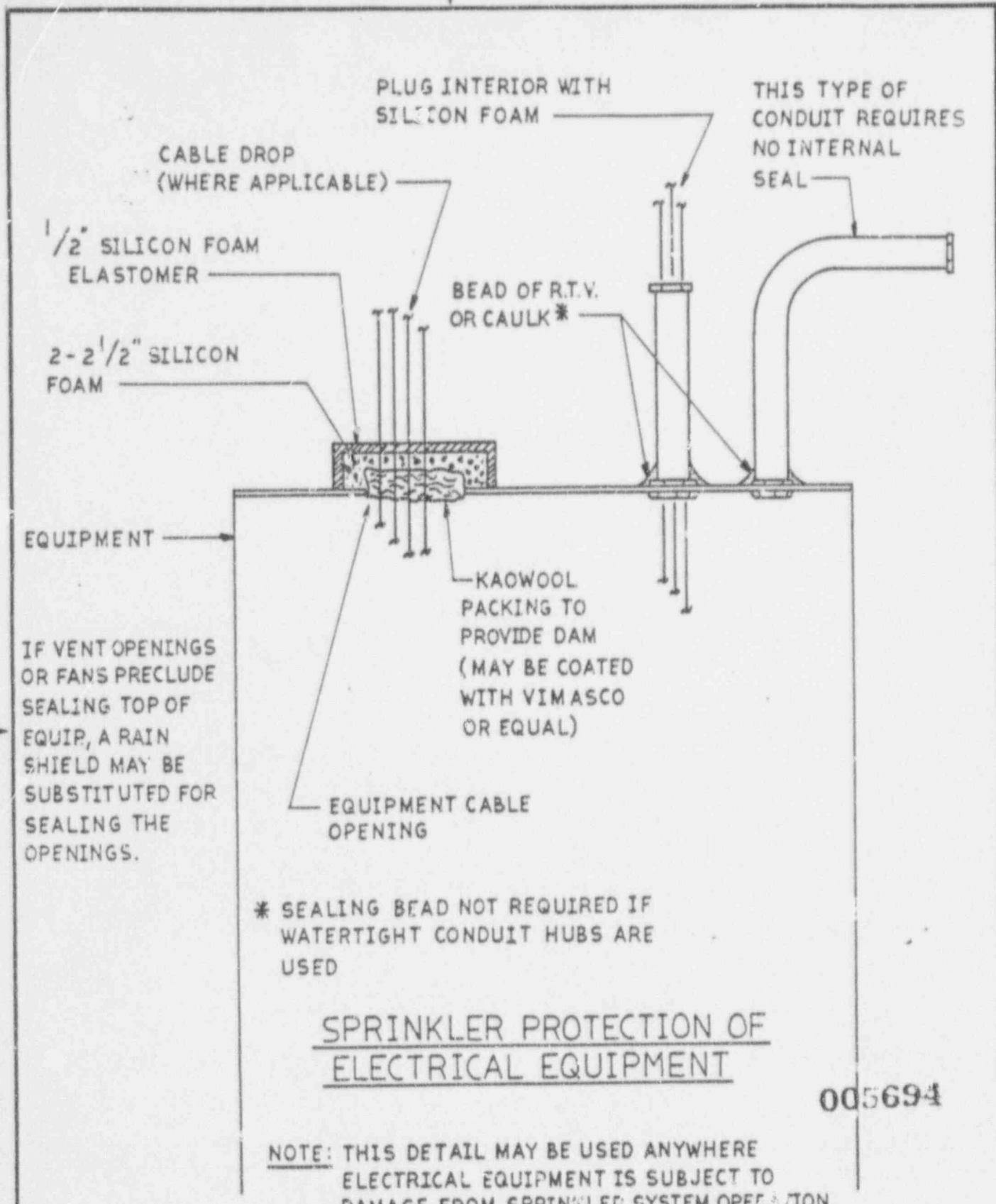
BECHTEL CORP. JOB 7597-03/20

SOUTHERN SERVICES INC.

DR JLS	NO.	DATE	REVISION
TR	0	11/2/82	ISSUED FOR CONST.
CK RJP/MS			INC. 2BE-1119-4
APP Kef			
DATE 11-9-82	SUPERSEDES		SCALE

ALABAMA POWER COMPANY	
SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT	
DETAIL TRAY & CONDUIT DETAILS & NOTE	
SH. 23V OF 29	A-177541 REV 0

(RT)



IF VENT OPENINGS OR FANS PRECLUDE SEALING TOP OF EQUIP, A RAIN SHIELD MAY BE SUBSTITUTED FOR SEALING THE OPENINGS.

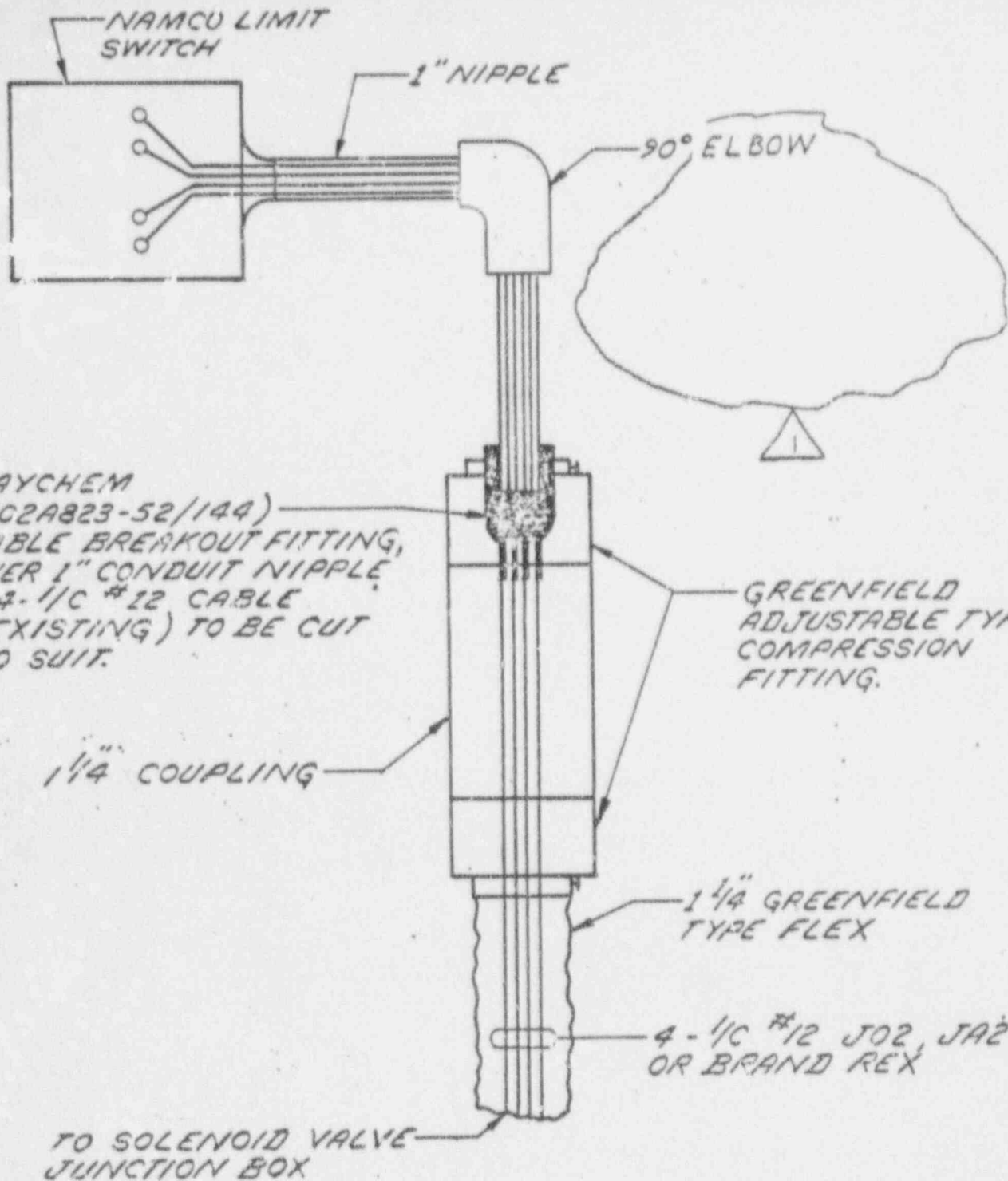
* SEALING BEAD NOT REQUIRED IF WATERTIGHT CONDUIT HUBS ARE USED

SPRINKLER PROTECTION OF ELECTRICAL EQUIPMENT

005694

NOTE: THIS DETAIL MAY BE USED ANYWHERE ELECTRICAL EQUIPMENT IS SUBJECT TO DAMAGE FROM SPRINKLER SYSTEM OPERATION.

0	5-2-88	RJP	JMR	APVD. DRAWN PER PCN B-85-2-3837 REV.0-12	APR	CNO	<i>[Signature]</i>		
REV.	DATE	BY	CHK'D	DESCRIPTION	APPR. 1	APPR. 2	APPR. 3	APPR. 4	APPR. 5
Southern Company Services, Inc. FOR					Alabama Power Company				
J.M. FARLEY NUCLEAR PLANT. TRAY & CONDUIT DETAILS & NOTES					CONTINUED ON SHEET				
DRAWN JOK TYPED — CHK'D JMR					PROJECT I. D.	DWG. NO.	SHEET	REV.	
						A-177541	23W	0	



DETAIL NO.1A

005695

BECHTEL CORP. JOB 7597-03/20			SOUTHERN SERVICES INC.		
DR. <i>CCD</i>	NO.	DATE	REVISION		
TR.	0	12/31/88	INC. PCN 2-87-0-4634, REV.0		
CK. <i>RAE/...</i>	1	5/16/89	REV. PER PCN'S B-88-2-4985 REV.0-10 & B-88-2-5005 REV.0-18		
APP. <i>[Signature]</i>			ALABAMA POWER COMPANY		
DATE 10/31/88			SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT		
SUPERSEDES			DETAIL TRAY & CONDUIT DETAILS & NOTES		
SCALE NONE			SH. 23X OF 29 SHEETS		REV. A-177541 1

POWER RECEPTACLE

1/4" STEEL PLATE

6"

9"

2"

5"

A

A

A-A

DRILL TO SUIT

WELL

HANDRAIL

GRATING

J. B.

POWER RECEPTACLE INSTALLATION ON HANDRAIL

006686

ORIGINAL DRAWING, Rev. 1
TRANSFERRED TO SCS

BECHTEL CORP. JOB 7597-03

SOUTHERN SERVICES INC.

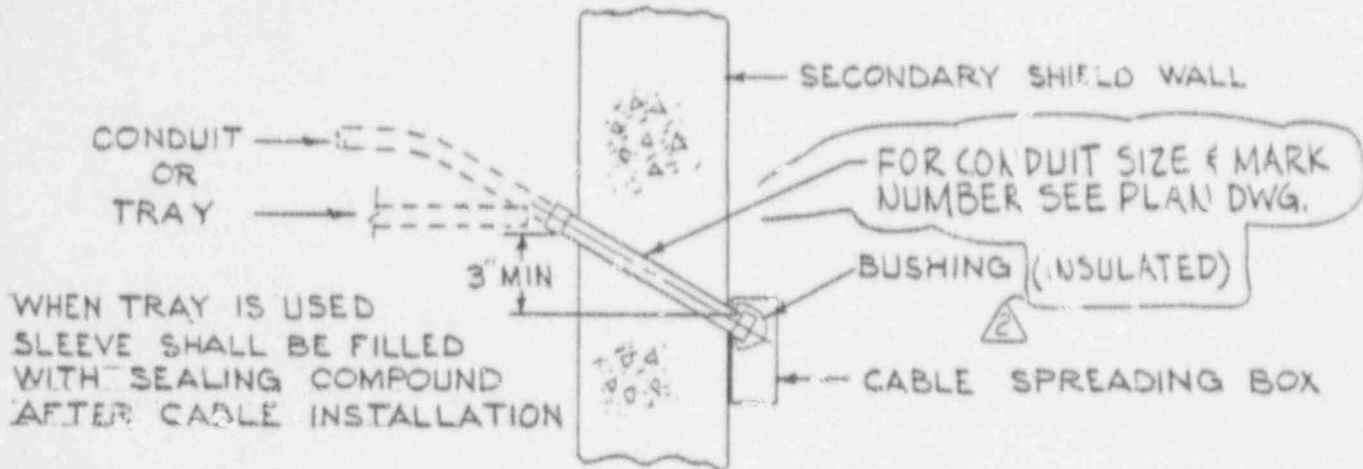
DR	NO.	DATE	REVISION
M.A.			
TR	1	5-5-71	REV. PER S.S.LTR.
CV			
APP			
DATE			

ALABAMA POWER COMPANY

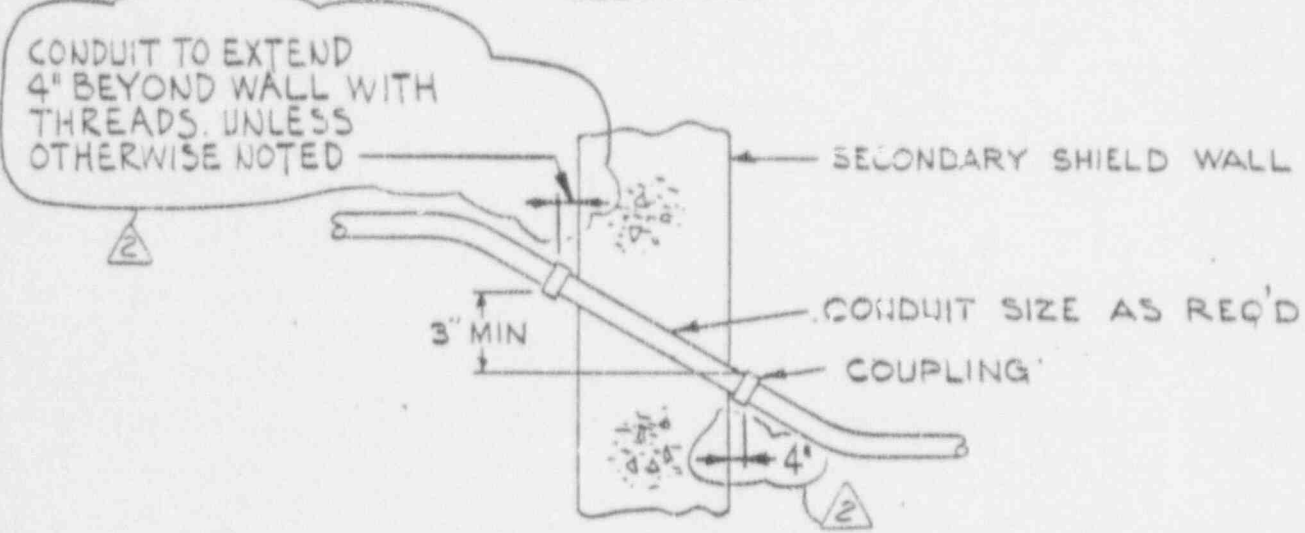
SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT
DETAIL TRAY & CONDUIT DETAIL & NOTES

SCALE NONE SH. 24 OF 29 SHEETS A-1775411

(14)



ELEVATION



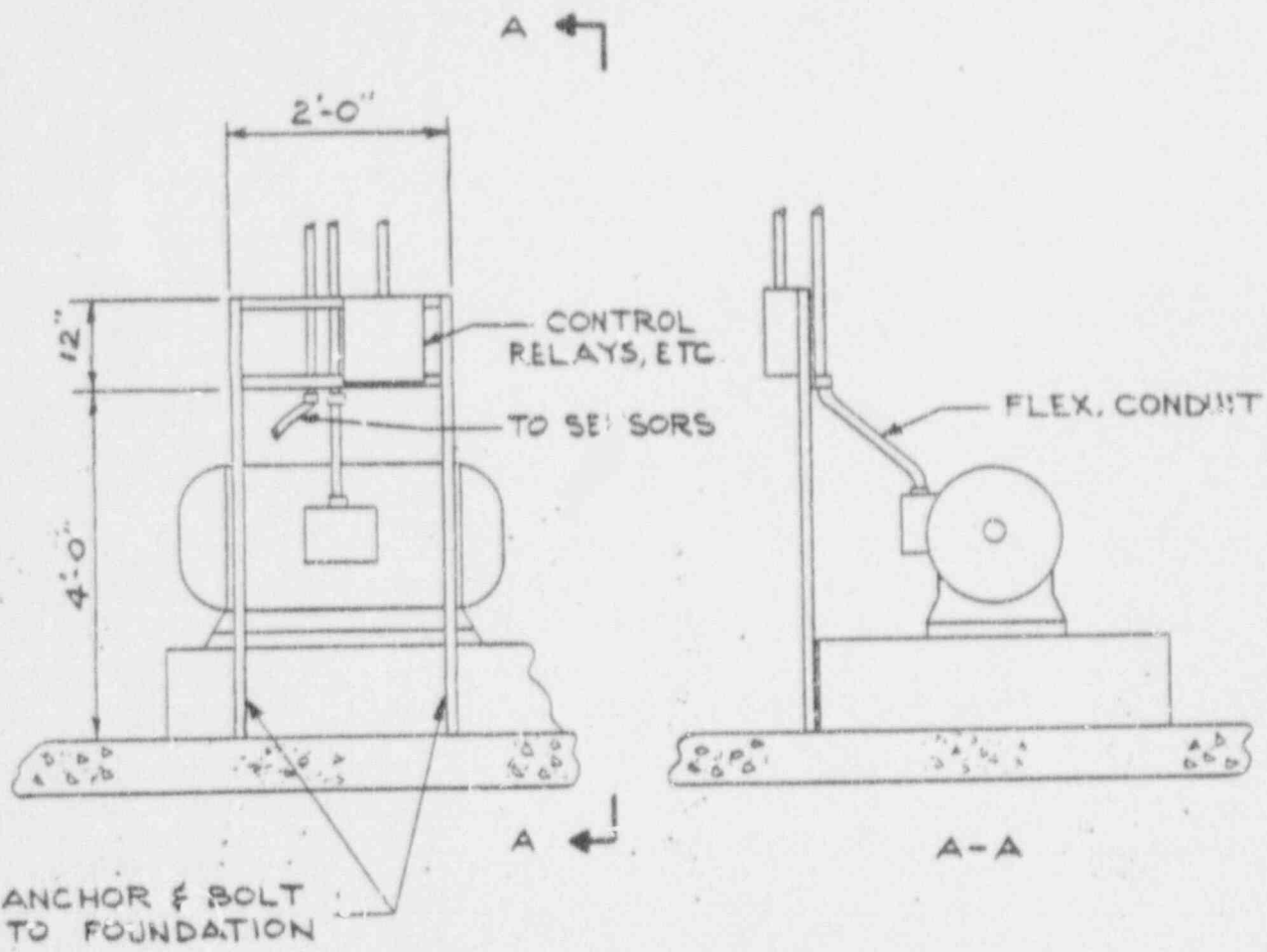
ELEVATION

SECONDARY SHIELD WALL PENETRATION
INSIDE CONTAINMENT

ORIGINAL DRAWING, Rev. 2
 TRANSFERRED TO SCS

BECHTEL CORP. JOB 7597-03 SOUTHERN SERVICES INC.

DR. M.A.	NO.	DATE	REVISION	ALABAMA POWER COMPANY
TR. 912-A/P	1	5-5-71	REV. PER S.S. LTR	
CK. [Signature]	2	4-25-72	REV AS NOTED	SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT
APP. [Signature]				DETAIL TRAY & CONDUIT DETAILS & NOTES
DATE 11/25/71	SUPERSEDES		SCALE	SH. 25 OF 29 SHEETS A-177541 2



NOTES

1. MATERIALS FOR SUPPORT UNISTRUT OR EQUIVALENT.

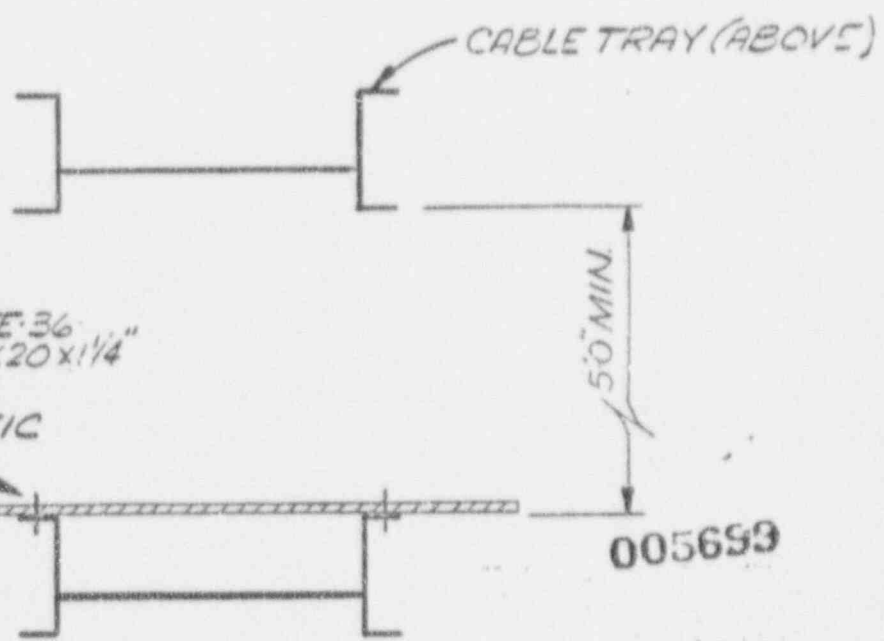
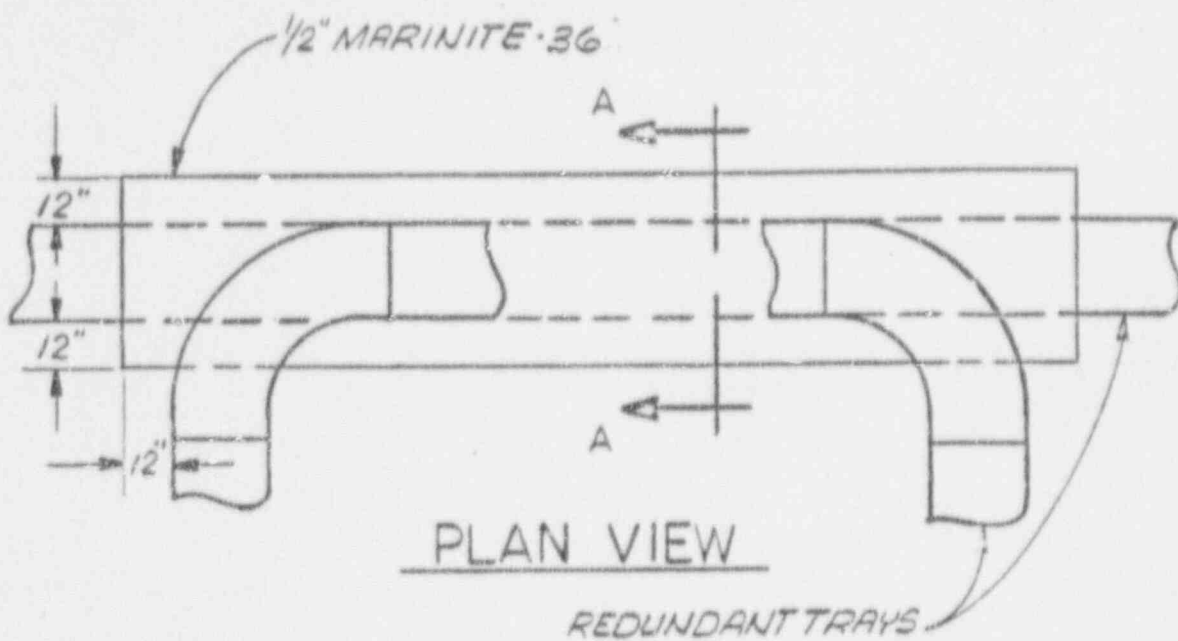
VOID
005698

TYPICAL Δ
SUPPORT FOR POWER & CONTROL
CONDUIT & EQUIPMENT

ORIGINAL DRAWING, Rev. 2
TRANSFERRED TO SCS

BECHTEL CORP. JOB 7597-03			SOUTHERN SERVICES INC.		
DR. M.A.	NO.	DATE	REVISION	ALABAMA POWER COMPANY	
TR.	1	5-5-71	REV. PER S.S.LTR	SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT	
CK. <i>[Signature]</i>	2	5-8-72	VOIDED	DETAIL TRAY & CONDUIT DETAILS & NOTES	
APP. <i>[Signature]</i>				SCALE NONE	SH. 26 OF SHEETS
DATE 1/25/71	SUPERSEDES			A-177541	

ORIGINAL DRAWING, Rev. 1
 TRANSFERRED TO SCS

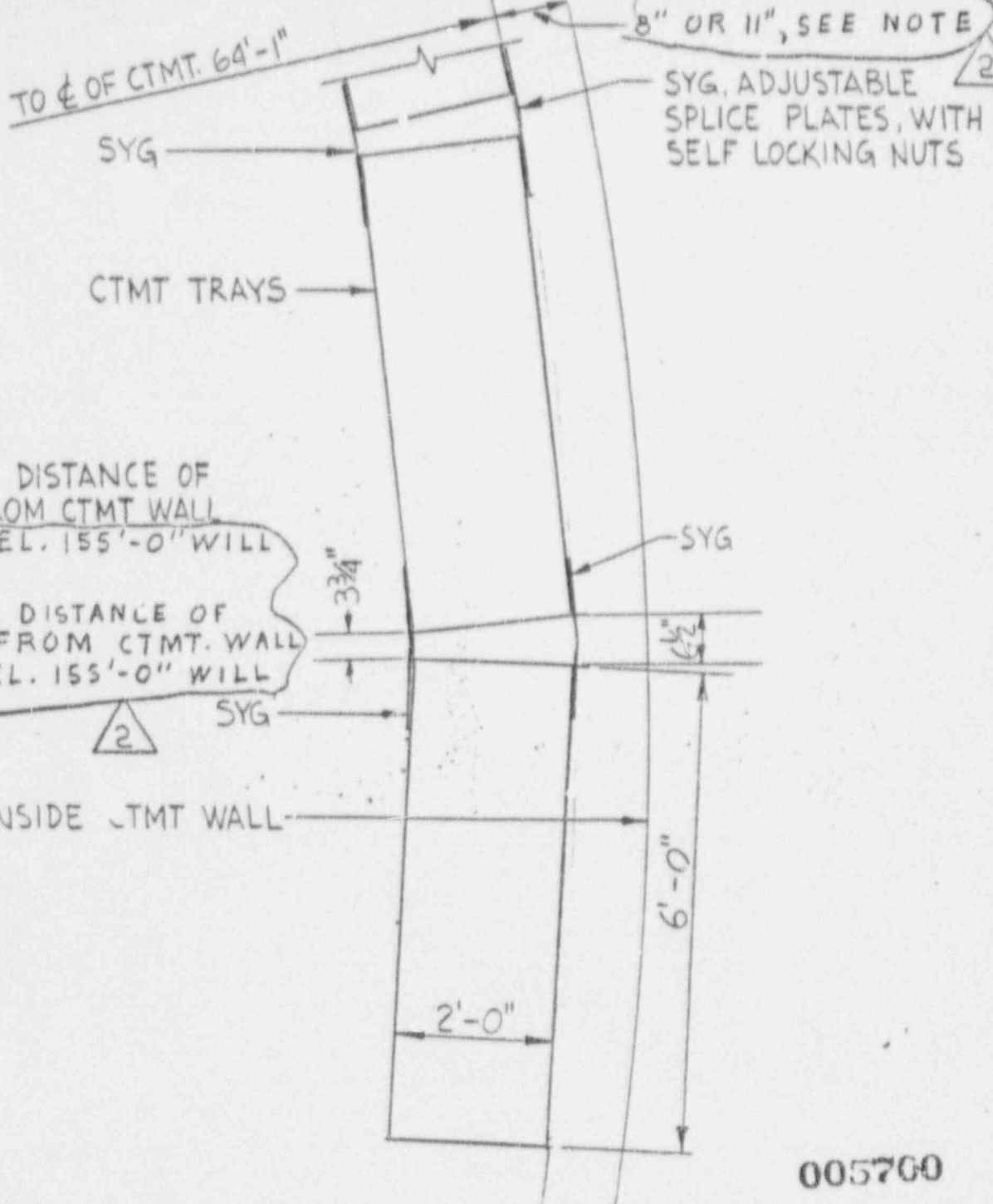


FIELD SUPPORT 1/2" MARINITE-36
 TO CABLE TRAY USING 1/4" X 20 X 1/4"
 BOLT EVERY 12" SPREAD
 "FLAMEMASTIC" 71A MASTIC
 1/8" THICK OVER
 SCREW HEADS
 (TYP)

SECTION 'A-A'
 (THIS DETAIL)

FIRE STOP BARRIER FOR VERTICAL REDUNDANT SYS.

BECHTEL CORP. JOB 7597-03				SOUTHERN SERVICES INC.	
DR. <i>RAF</i>	NO. <i>D</i>	DATE <i>4-25-72</i>	REVISION <i>FOR APPROVAL</i>	ALABAMA POWER COMPANY	
TR. <i>9/2 h/h</i>	NO. <i>1</i>	DATE <i>3/16/74</i>	REVISION <i>VOIDED</i>	SUBJECT <i>JOSEPH M. FARLEY NUCLEAR PLANT</i>	
APP. <i>MM/SP</i>				DETAIL <i>TRAY & CONDUIT DETAILS & NOTES</i>	
DATE <i>5/10/72</i>	SUPERSEDES		SCALE	SH 26A OF 20 SHEETS	A-177541 1



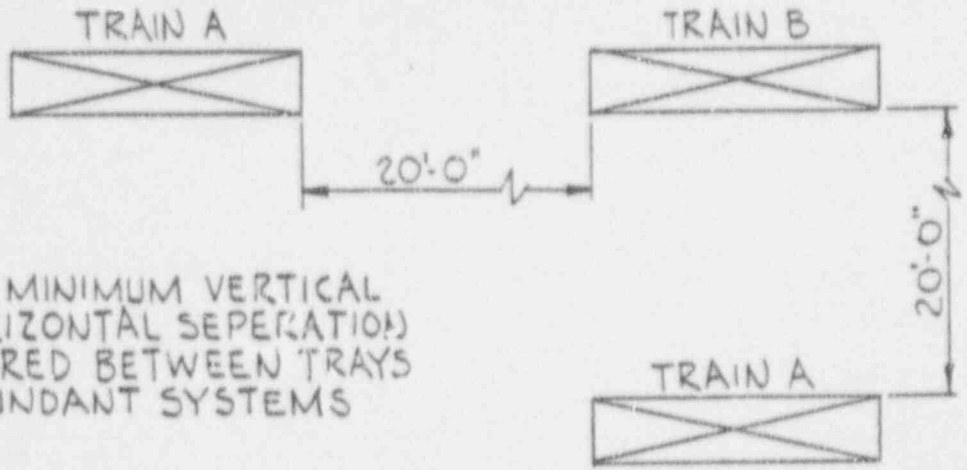
NOTE:
 MINIMUM DISTANCE OF TRAYS FROM CTMT WALL ABOVE EL. 155'-0" WILL BE 11".
 MINIMUM DISTANCE OF TRAYS FROM CTMT. WALL BELOW EL. 155'-0" WILL BE 8".

ORIGINAL DRAWING, Rev. 2
 TRANSFERRED TO SCS

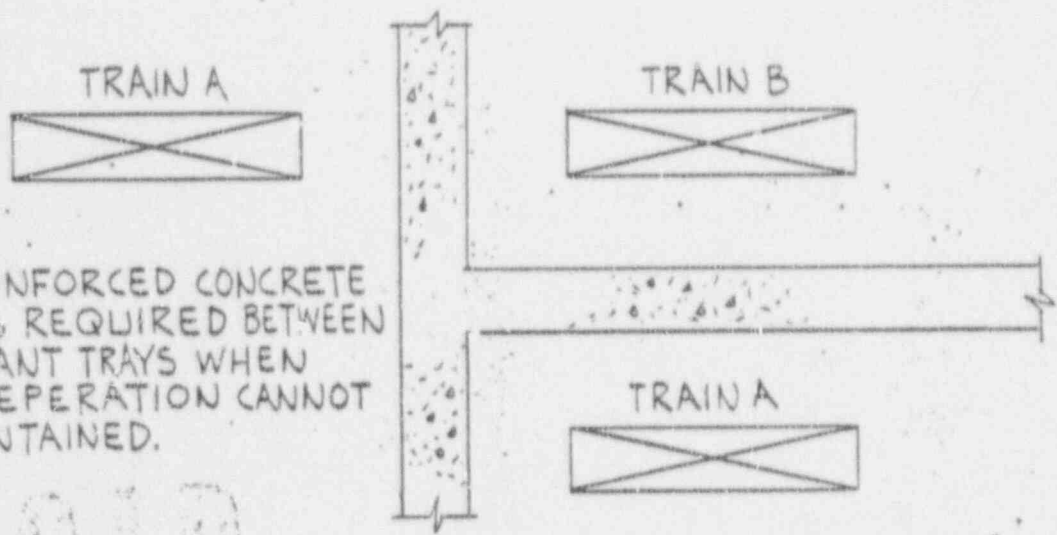
TYPICAL INSTALLATION
CABLE TRAY ALONG CONTAINMENT WALL

005700

BECHTEL CORP. JOB 7597-03				SOUTHERN SERVICES INC.	
DR	MEC	NO.	DATE	REVISION	ALABAMA POWER COMPANY
TR		0	4-25-72	FOR APPROVAL	
CK	<i>9/12/74</i>	1	3/26/74	PER BE-310	
		2	2/13/74	AS NOTED	SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT
APP	<i>MM/UP</i>				DETAIL TRAY & CONDUIT DETAILS & NOTES
DATE	5/10/77	BLP/SEDER		SCALE NONE	SH. 26B OF 29 SHEETS
					A-1775412



NOTE
 A 20'-0" MINIMUM VERTICAL AND HORIZONTAL SEPERATION IS REQUIRED BETWEEN TRAYS OF REDUNDANT SYSTEMS



NOTE
 A 6" REINFORCED CONCRETE WALL IS REQUIRED BETWEEN REDUNDANT TRAYS WHEN 20'-0" SEPERATION CANNOT BE MAINTAINED.

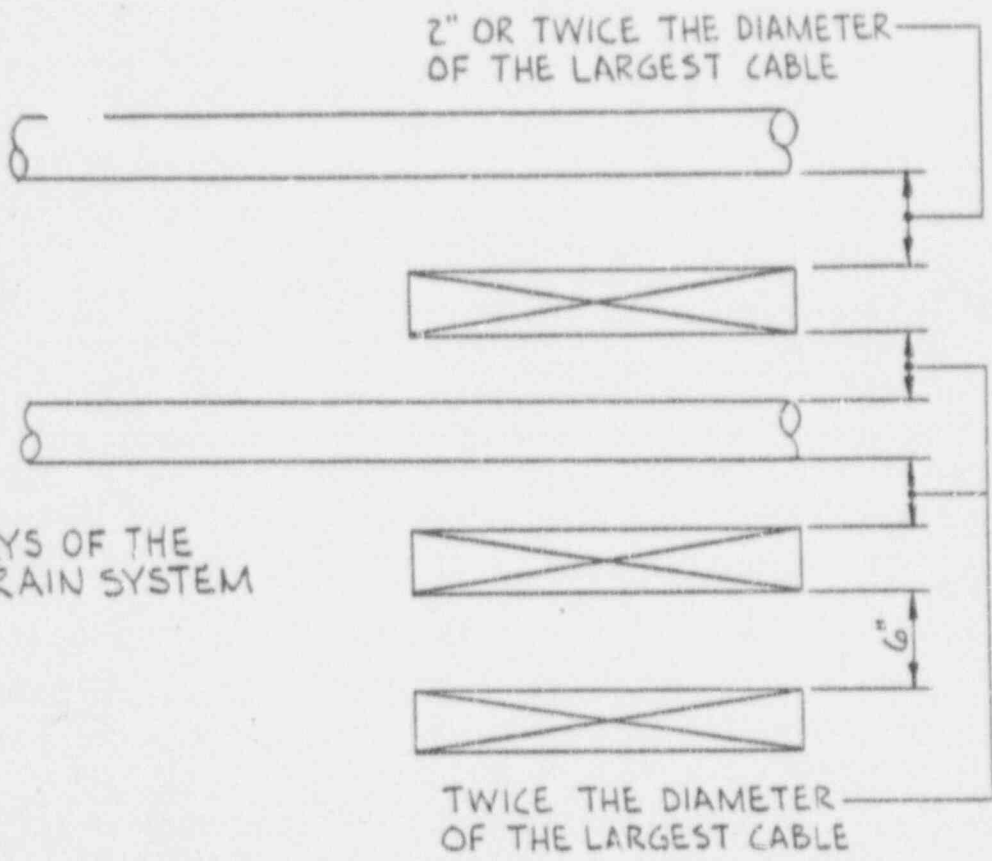
VOID

MINIMUM SEPERATION BETWEEN TRAYS AND CHANNELS IN A MISSLE ZONE

ORIGINAL DRAWING, Rev. 2
 TRANSFERRED TO SCS

BECHTEL CORP. JOB 7597-03 SOUTHERN SERVICES INC.

DR <u>RWB</u>	NO. <u>0</u>	DATE <u>4-6-73</u>	REVISION <u>FOR APPROVAL</u>	ALABAMA POWER COMPANY SUBJECT <u>JOSEPH M. FARLEY NUCLEAR PLANT</u> DETAIL <u>TRAY & CONDUIT DETAILS & NOTES</u>	
TR	<u>1</u>	<u>10-19-73</u>	<u>AS NOTED</u>		
CK <u>R.P.</u>	<u>2</u>	<u>3/26/74</u>	<u>VOIDED</u>		
APP. <u>[Signature]</u>	SUPERSEDES _____			SCALE <u>NONE</u>	SH. <u>27</u> OF <u>20</u> SHEETS
DATE <u>4/6/73</u>				<u>A-177541</u>	<u>2</u>



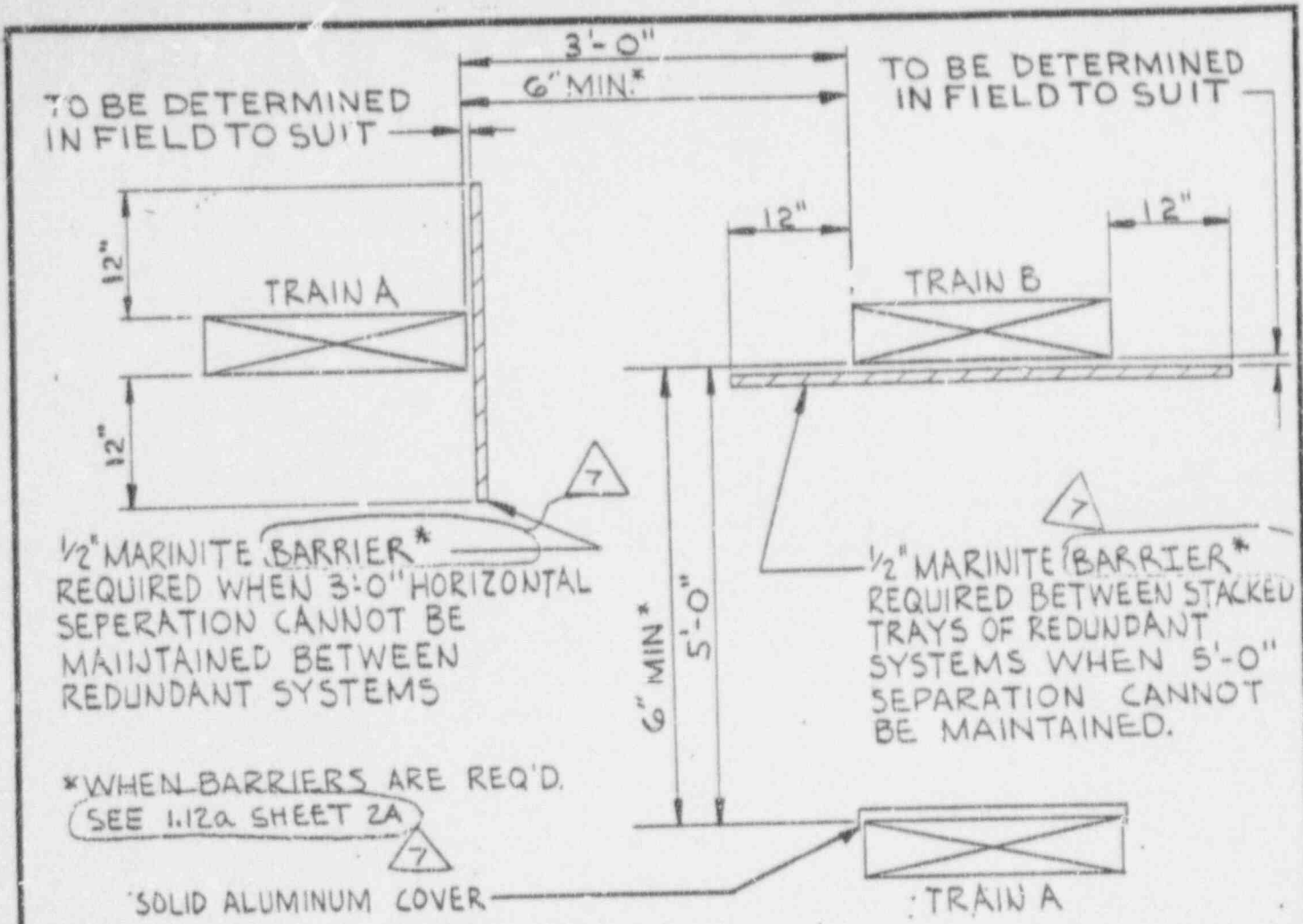
MINIMUM DISTANCE OF TRAYS BELOW INTERFERENCES WITHOUT BARRIERS

005702

ORIGINAL DRAWING, Rev. 3
TRANSFERRED TO SCS

BECHTEL CORP. JOB 7597-03			SOUTHERN SERVICES INC.	
DR <u>RWB</u>	NO. <u>0</u>	DATE <u>4-6-73</u>	ALABAMA POWER COMPANY	
TR	<u>1</u>	<u>10-19-73</u>	SUBJECT <u>JOSEPH M. FARLEY NUCLEAR PLANT</u>	
CK <u>RJP</u>	<u>2</u>	<u>11-6-73</u>	DETAIL <u>TRAY & CONDUIT DETAILS & NOTES</u>	
<u>1/5/73</u>	<u>3</u>	<u>3/2/74</u>		
APPROVED <u>[Signature]</u>	SUPERSEDES _____		SCALE <u>NONE</u>	SHEET <u>27A</u> OF <u>29</u> SHEETS
DATE <u>4/6/73</u>			<u>A-177541</u>	<u>3</u>

(TCT)



MINIMUM SEPERATION BETWEEN REDUNDANT TRAYS AND CHANNELS WITH REQUIRED BARRIERS IN CABLE SPREADING ROOM

005703

ORIGINAL DRAWING, Rev. 5
TRANSFERRED TO SCS

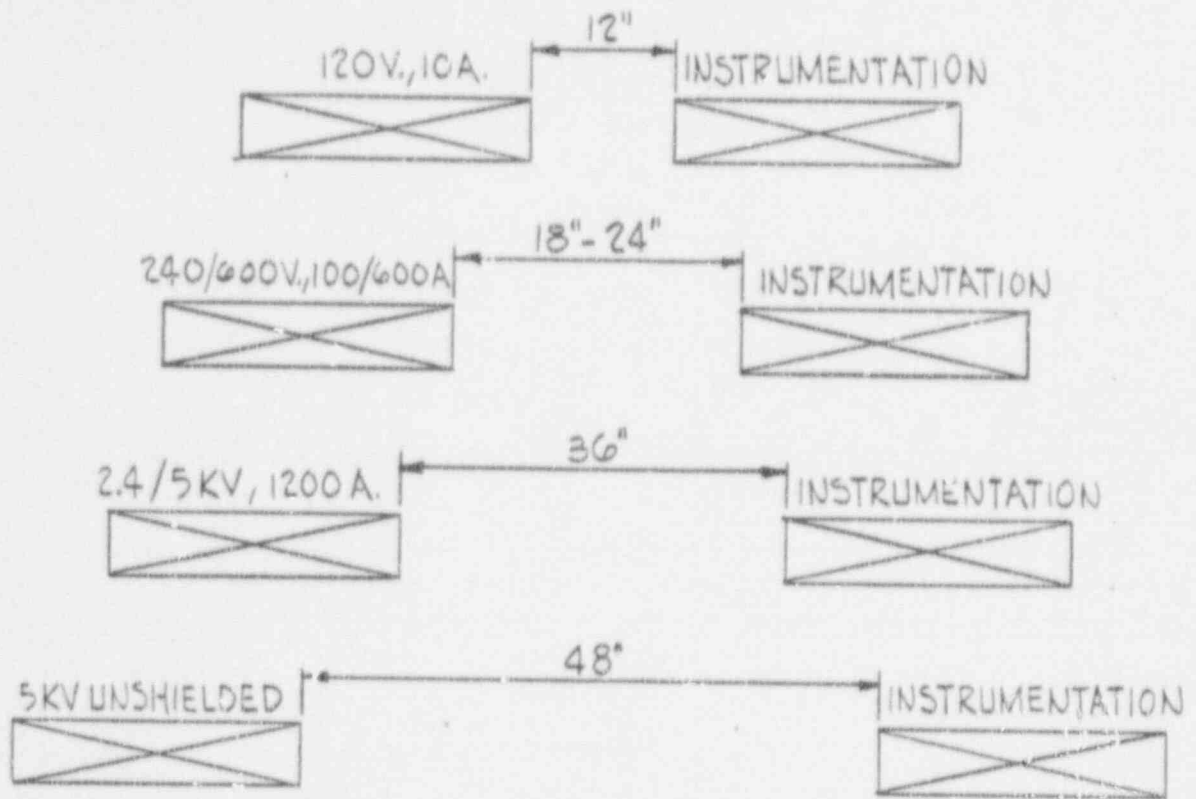
BECHTEL CORP. JOB 7597-03/20

SOUTHERN SERVICES INC.

DR	NO.	DATE	REVISION
RWB	0	4/16/73	FOR APPROVAL
	7	7/27/86	REV. PER PCN 5-B1-
			0-1058 REV. 0-10
			gmc NRls

DATE 4/16/73

ALABAMA POWER COMPANY	
SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT	
DETAIL TRAY & CONDUIT DETAILS & NOTES	
SCALE NONE	SH. 273 OF 29 SHEETS
A-177541 7	



MINIMUM HORIZONTAL SEPERATION BETWEEN INSTRUMENTATION TRAYS AND POWER AND CONTROL TRAYS

005704

ORIGINAL DRAWING, Rev. 1
TRANSFERRED TO SCS

VOID

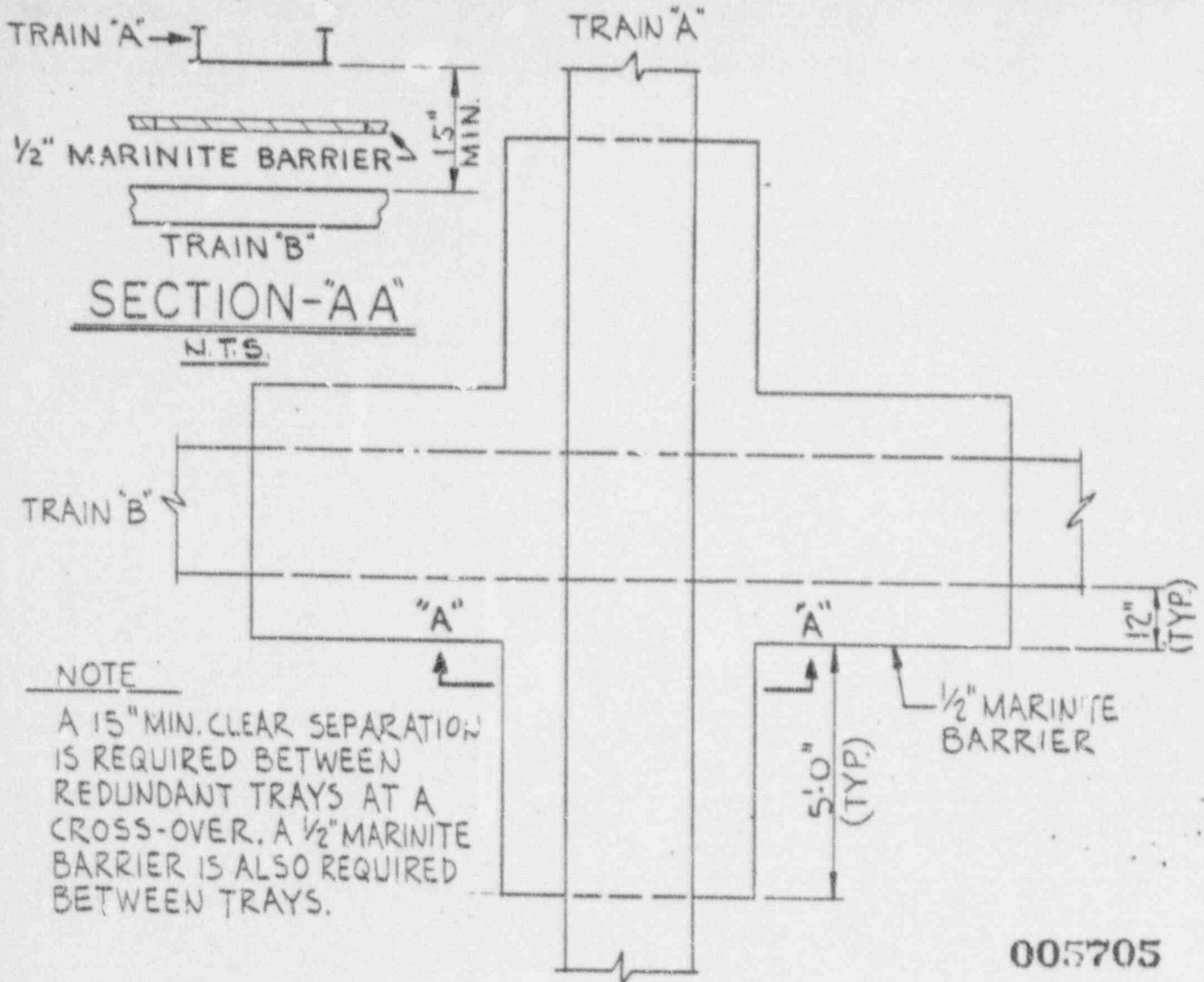
BECHTEL CORP. JOB 7597-03 SOUTHERN SERVICES INC.

DR	NO.	DATE	REVISION
RWB	0	4-6-73	FOR APPROVAL
RJP	1	9/26/74	VOIDED

ALABAMA POWER COMPANY
 SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT
 DETAIL TRAY & CONDUIT DETAIL & NOTES

DATE 4/6/73 SUPERSEDES _____ SCALE NONE SH 27C OF 30 SHEETS **A-177541** | 1

(12)



NOTE
 A 15" MIN. CLEAR SEPARATION IS REQUIRED BETWEEN REDUNDANT TRAYS AT A CROSS-OVER. A 1/2" MARINITE BARRIER IS ALSO REQUIRED BETWEEN TRAYS.

005705

MINIMUM SEPARATION BETWEEN TRAYS AND CHANNELS AT A CROSS-OVER IN AN ELECTRICAL FIRE ZONE WITH REQUIRED BARRIERS.

ORIGINAL DRAWING, Rev. 1
 TRANSFERRED TO SCS

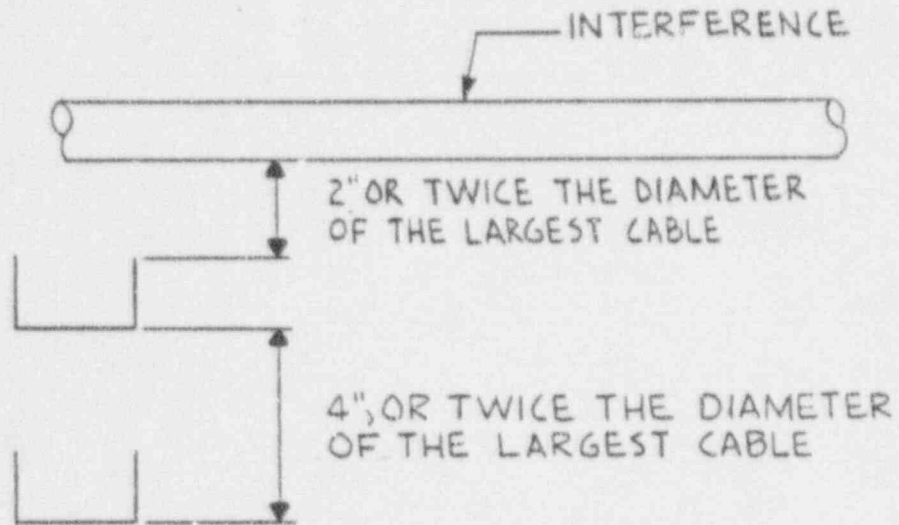
BECHTEL CORP. JOB 7597-03 SOUTHERN SERVICES INC.

DR	NO.	DATE	REVISION
RWB	0	4-6-73	FOR APPROVAL
TR	1	10-19-73	AS NOTED
CK			
APP			

ALABAMA POWER COMPANY
 SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT
 DETAIL TRAY & CONDUIT DETAILS & NOTES

DATE 9/6/73 SUPERSEDES _____ SCALE NONE SH. 27D OF 29 SHEETS **A-177541** | 1

(21)



NOTE
 FOR CHANNELS OF
 THE SAME TRAIN
 SYSTEM ONLY.

005706

MINIMUM DISTANCE BETWEEN
 CHANNELS WITHOUT BARRIERS

ORIGINAL DRAWING, Rev. 1
 TRANSFERRED TO SCS

BECHTEL CORP. JOB 7597-03

SOUTHERN SERVICES INC.

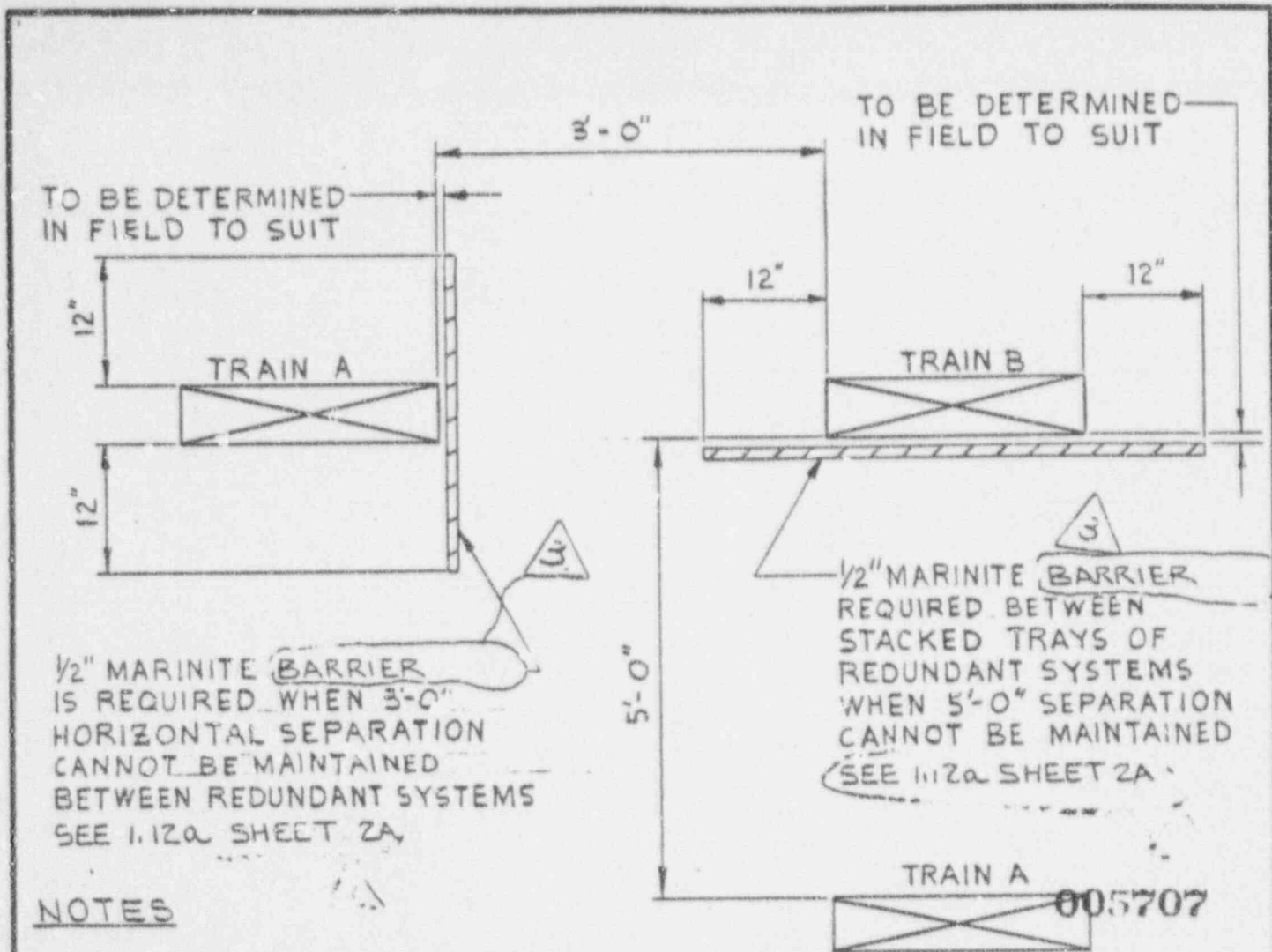
DR	NO.	DATE	REVISION
GAH	0	11/26/73	FOR APPROVAL
RWR, 12/1/73	1	3/2/74	VOIDED

ALABAMA POWER COMPANY

SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT
 DETAIL TRAY & CONDUIT DETAILS & NOTES

APP WJL
 DATE 1/29/74 SUPERSEDES _____ SCALE NONE SH. 27E OF 29 SHEETS **A-177541** | 1

(2)



TO BE DETERMINED
IN FIELD TO SUIT

TO BE DETERMINED
IN FIELD TO SUIT

1/2" MARINITE BARRIER
IS REQUIRED WHEN 5'-0"
HORIZONTAL SEPARATION
CANNOT BE MAINTAINED
BETWEEN REDUNDANT SYSTEMS
SEE 1.12a SHEET 2A

1/2" MARINITE BARRIER
REQUIRED BETWEEN
STACKED TRAYS OF
REDUNDANT SYSTEMS
WHEN 5'-0" SEPARATION
CANNOT BE MAINTAINED
SEE 1.12a SHEET 2A

NOTES

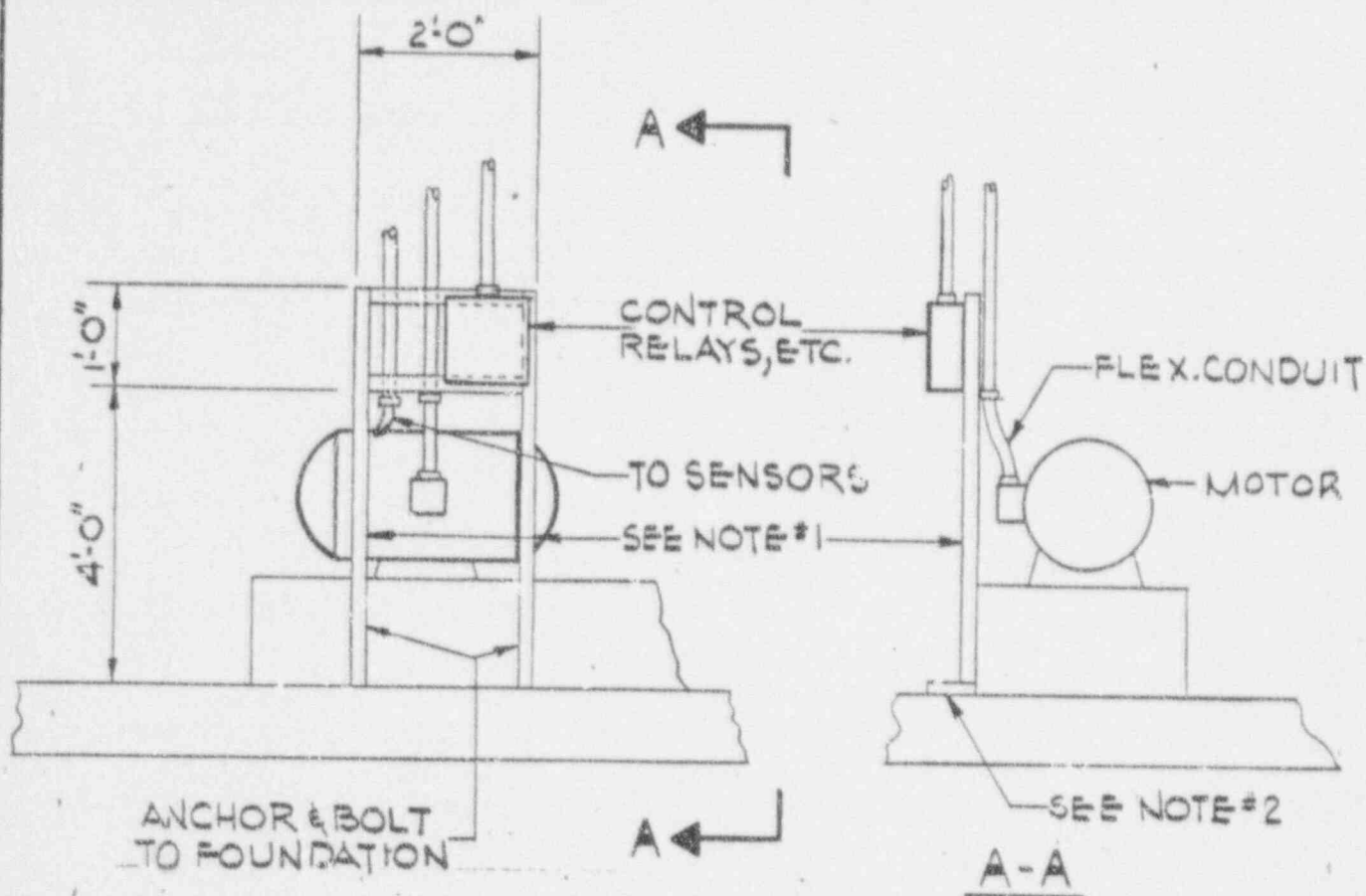
1. WHERE A SAFEGUARD CONDUIT IS TO BE INSTALLED, HORIZONTAL & VERTICAL SEPARATION SHALL BE MAINTAINED AS FAR AS PRACTICAL FROM ALL REDUNDANT SAFEGUARD TRAY OR CHANNEL
2. REDUNDANT SAFEGUARD CONDUIT SHALL BE INSTALLED TO MAINTAIN A MINIMUM OF 1" SEPARATION.
3. IN UNIT #2 ALL SUBSEQUENT SAFEGUARD CONDUIT SHALL BE GALVANIZED RIGID STEEL.

ORIGINAL DRAWING, Rev. /
TRANSFERRED TO SCS

MINIMUM SEPARATION BETWEEN REDUNDANT TRAYS, CHANNELS AND CONDUITS

BECHTEL CORP. JOB 7597-03/20 SOUTHERN SERVICES INC.

DR. BJS	NO.	DATE	REVISION	ALABAMA POWER COMPANY	
	0	7/21/75	ISSUED FOR CONSTR.	SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT	
TR. RWR	3	7/29/76	REV. PER PCN S-81-		
CK. <i>[Signature]</i>			0-1058 REV 0-10	DETAIL TRAY / CONDUIT DETAIL / NOTES	
APR. <i>[Signature]</i>			9/11/76 NLT		
DATE 7/16/77	SUPERSEDES		SCALE NONE	SH. 27F OF 29 SHEETS	A-177541 REV 3



007708

NOTES

- 1- MATERIALS FOR SUPPORT; UNISTRUT OR EQUIVALENT
- 2- ADDITIONAL UNISTRUT OR EQUIVALENT MATERIAL TO BE ANCHORED & BOLTED TO FLOOR IF UNABLE TO FASTEN SUPPORT TO FOUNDATION

ORIGINAL DRAWING, Rev. 0
 TRANSFERRED TO SCS

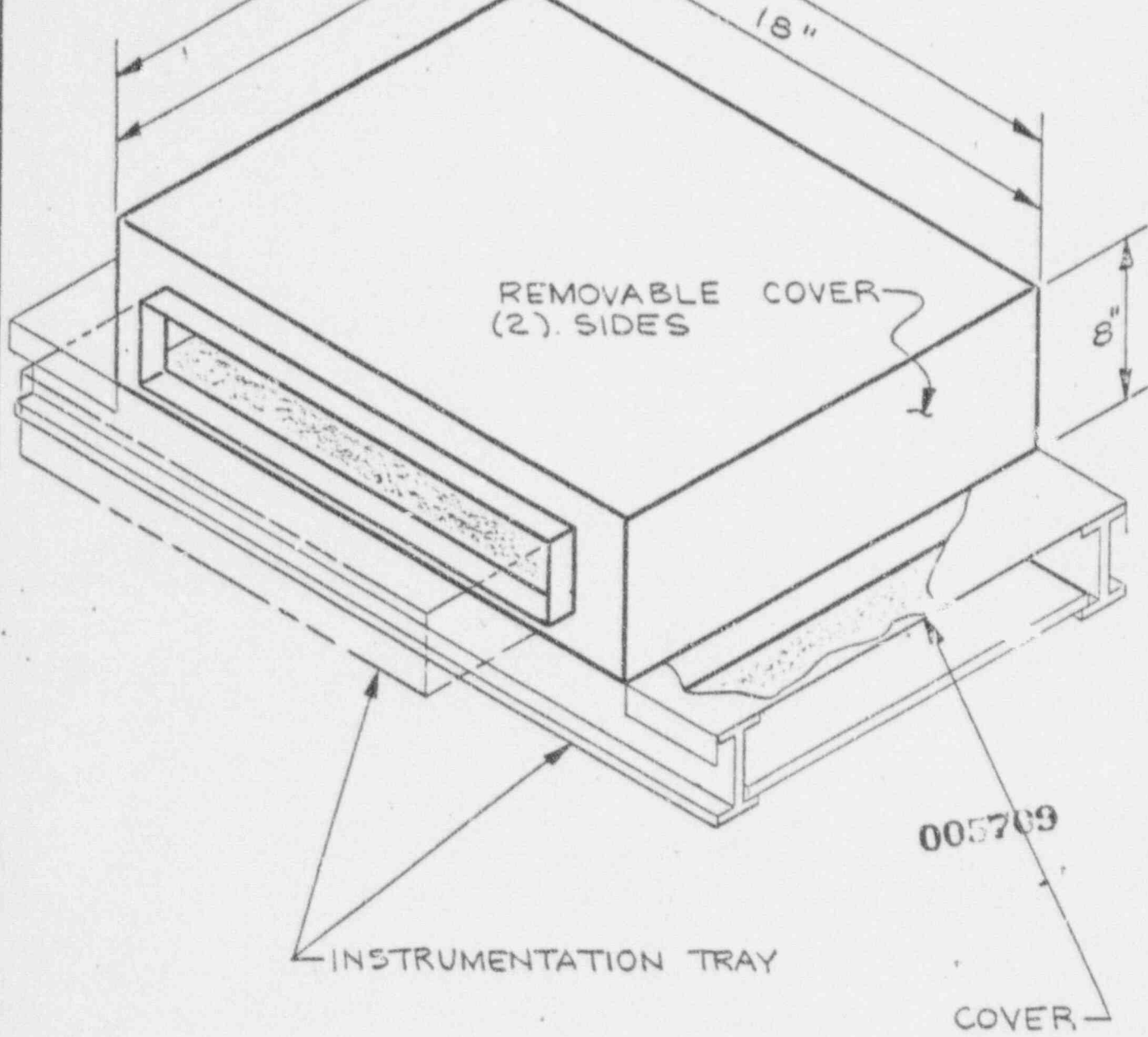
TYPICAL SUPPORT FOR POWER OR CONTROL CONDUIT TO EQUIPMENT

BECHTEL CORP. JOB 7597-03 SOUTHERN SERVICES INC.

DR. R. BRAMWELL TR CK. <i>R.J.P.</i> APP. <i>[Signature]</i> DATE 4/6/73	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>NO.</th> <th>DATE</th> <th>REVISION</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>4-6-73</td> <td>FOR APPROVAL</td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	NO.	DATE	REVISION	0	4-6-73	FOR APPROVAL							<p style="text-align: center;">ALABAMA POWER COMPANY</p> <p>SUBJECT <u>JOSEPH M. FARLEY NUCLEAR PLANT</u></p> <p>DETAIL <u>TRAY & CONDUIT DETAILS & NOTES</u></p>
NO.	DATE	REVISION												
0	4-6-73	FOR APPROVAL												
DATE 4/6/73 SUPERSEDES _____		SCALE <u>NT.S.</u> SH. 28 OF 29 SHEETS A-177541 0												

FOR 24" TRAY
FOR 12" TRAY

FOR 24" TRAY
FOR 12" TRAY



INSTRUMENTATION
CABLE TRAY CONNECTION BOX.

ORIGINAL DRAWING, Rev. 0
TRANSFERRED TO SCS

BECHTEL CORP. JOB 7597 - 03

SOUTHERN SERVICES INC.

DR	NO.	DATE	REVISION
<i>E</i>	0	4/6/73	FOR APPROVAL
TR			
CK			
APP			

ALABAMA POWER COMPANY
SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT
DETAIL TRAY & CONDUIT DETAILS & NOTES

DATE 4/6/73 SUPERSEDES _____ SCALE NONE SH. 29 OF 29 SHEETS A-177541 0

(12)

REPLY TO 22-1-42

REPLY TO 25-1-42 (continued)

in reply to book previously submitted.

QTY.

DESCRIPTION

80

RAYCHEM INSTALLATION KITS
NO. NCBK-04-04 WHICH INCLUDES
CABLE BREAKOUT NO. 502A823-52/144,
QUALIFIED FOR CLASS I E USE.

005710

CR	DATE	APPROVAL OR 'CN'	DATE
		 	

DELETE ALL PCN B-81537 (1)



BECHTEL CORP. JOB 7597-03/20

SOUTHERN SERVICES INC.

DR njb

TR

CK

DATE

NO	DATE	REVISION
0	5-17-82	ISSUED FOR COMST & INC. PCN. B-80-755-4

ALABAMA POWER COMPANY

SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT

DETAIL TRAYE CONDUIT DETAILS & NOTES

SUPERSEDES _____ SCALE 23S of 29 SH. A-177541 REV 0

PROCEDURE FOR APPLYING CHLOROFORM TO THE SWITCH OF NAMED EX-100-LIMIT SWITCH WHERE PSYCHEM BREAK-OUT IS ATTACHED

- A. For Bellows which are vertically mounted with the centering from the bottom:
1. Remove the six screws holding the front cover plate to the switch, being careful not to loose the O-rings and Bellville washers under each screw.
 2. Carefully remove the cover plate and gasket.

NOTE

The following steps describe one method for applying the CHLCO to the switch seal. The field use the option of using other methods if desired. However, it is important that no more than 1 1/2 oz. of CHLCO is applied to each switch, and that no CHLCO finds its way to the switch internals.

3. Attach a short length of tygon tubing to the end of a veterinarian type syringe which has been calibrated in either ounces (oz.) or cubic centimeters (cc).
4. Mix a small quantity of CHLCO A4 using mixing instructions printed on the container label.
5. Using syringe with tygon tubing attached, withdraw 2-3 oz. (35-50cc) of the liquid CHLCO mixture into the syringe.
6. Through the open side of the switch, carefully insert the free end of the tygon tubing into the pipe nipple attached to the switch, until it bottoms on the Psychem breakout seal. Insure that the CHLCO mixture does not get on the switch internals.
7. Inject 1/2 oz. into the pipe nipple, then carefully withdraw syringe.
8. Inject the remainder of the CHLCO in the syringe, and raise the syringe plunger, forcing through it.
9. Reattach cover plate using gasket, screws, O-rings and Bellville washers previously removed.

ALABAMA POWER COMPANY
 AUG 25 1989

SATELLITE DOCUMENT
 CONTROL DEPARTMENT

VOID

VOID

ORIGINAL DRAWING Rev. 2
 TRANSFERRED TO BCS

BECHTEL CORP. JOB 7587-03/20

SOUTHERN SERVICES INC.

NO. 010	REV. DATE	REVISION	ALABAMA POWER COMPANY
TO	0	ISSUED FOR	SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT
BY 210	7/11/89	CONST. WORK	
DATE 7/11/89	1	VOIDED PER PLN'S	TRAY & CONDUIT DETAILS & NOTES
		88-2-4985 REV 0-10	
		88-2-50-2 REV 0-10	
		235-1 of 29	A-177541

005711

- switch are not vertically located or being entered
 switch from its mounting, leaving flat conduct and so
 returned.
- Support switch in a vertical position with wings entering from the bottom.
 - Perform step 4.9 through 4.9 above.
 - Allow a minimum of six hours for CHICO to cure before moving switch.
 - After CHICO has cured reinstall switch in its original position.

The work line for CHICO is 1000
 All work required on or to
 CHICO should be performed
 mixing.

ALABAMA POWER COMPANY
 RECEIVED

AUG 25 1989

SATELLITE DOCUMENT
 CONTROL DEPARTMENT

VOID

ORIGINAL DRAWING. Rev. 0
 TRANSFERRED TO SCB

VOID

BECHTEL CORP. JOB 7587-03/20

SOUTHERN SERVICES INC.

DR njb TR CR 1/10 AND 30-11/16 DATE 7/13/82	NO.	DATE	REVISION	ALABAMA POWER COMPANY SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT DETAIL TRAY & CONDUIT DETAILS & NOTES 235-2 of 29 A-177541 KEY 1
	0	7/14/82	ISSUED FOR CONST. INCORP. PLS. B. B2-1184-3	
	1	8/16/82	VOIDED PER PCN'S 15-28-2-4965 REV. 0-10	
			15-28-2-5005 REV. 0-18	

#22

NAMCO LIMIT SW

4 - 1/2 #12

1" NIPPLE

RAYCHEM

(502AB23-52/144)

CABLE BREAKOUT FITTING,
OVER 1" CONDUIT NIPPLE
& 4-1/2 #12, CABLE
(EXISTING) TO BE CUT
TO SUIT,

GREENFIELD
ADJUSTABLE TYPE
COMPRESSION
FITTING

1 1/4" COUPLING

1 1/4" GREENFIELD
TYPE FLEX

4 - 1/2 #12 (JO?)

005678

CONTINUE TO SOLENOID
VALVE JUNCTION BOX

DETAIL NO. 1

ORIGINAL DRAWING, Rev. 2
TRANSFERRED TO SCS

BECHTEL CORP. JOB 7597-03/20

SOUTHERN SERVICES INC.

DR	NO.	DATE	REVISION
bew	0	2/28/82	ISSUED FOR CONSTRUCTION
TR			INCORP 28E-547 &
CK	3	8/16/89	PCN B-75-396-2
APP			REV. PER PCN'S B-
DATE			88-2-4985 REV. 0-10E
			13-88-2-5005 REV. 0-1B

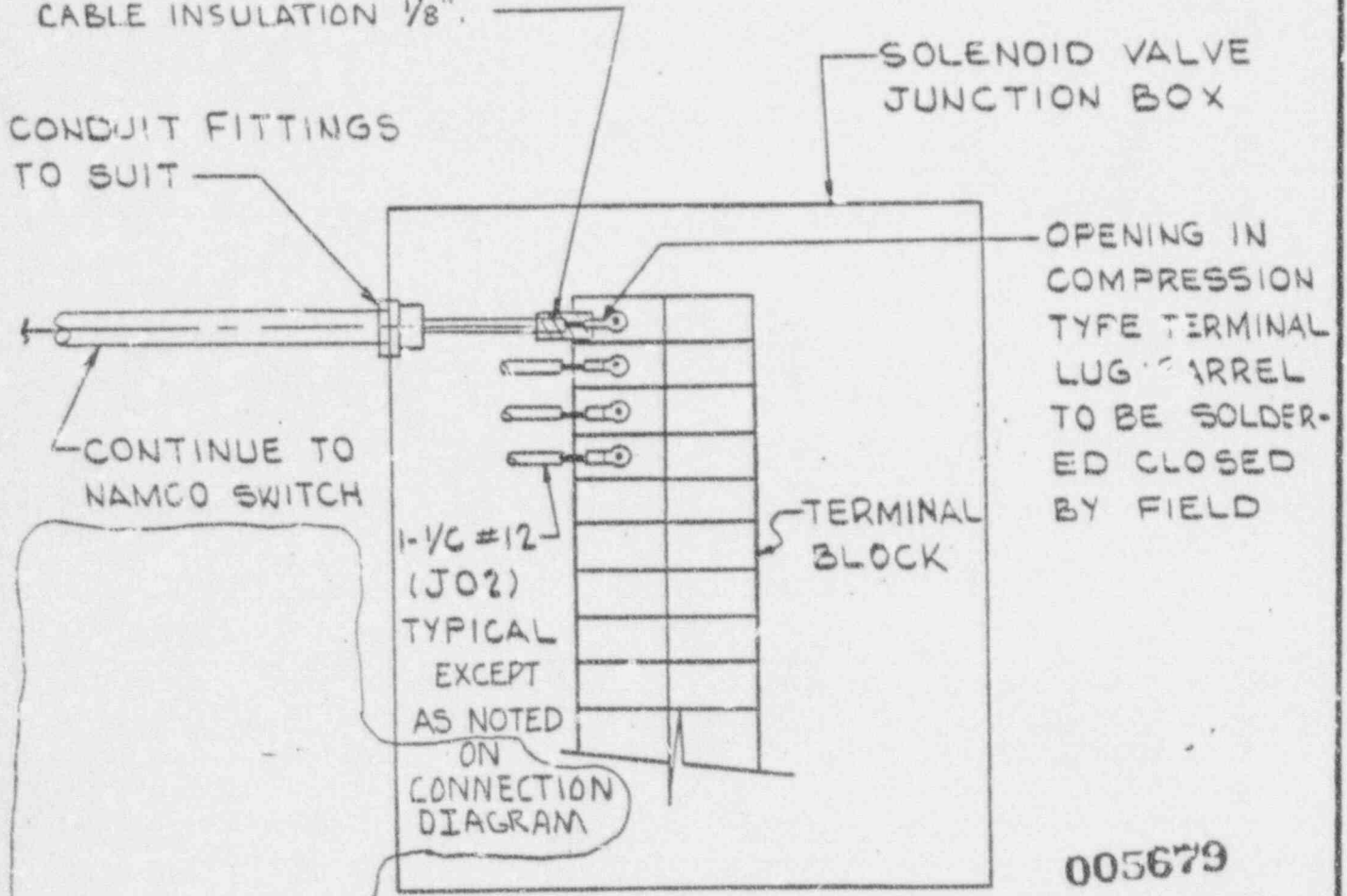
ALABAMA POWER COMPANY

SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT
DETAIL TRAY & CONDUIT DETAILS & NOTES

23K OF 29 SHEETS

A-177541 REV 3

FIELD TO USE RAYCHEM HEAT SHRINK TUBING CAT. NO. WCSF-115-G-N TO SEAL OVER INSULATION, CONDUCTOR STRANDING, AND COMPRESSION LUG BARREL. HEAT SHRINK TUBING SHOULD OVERLAP THE CABLE INSULATION 1/8".

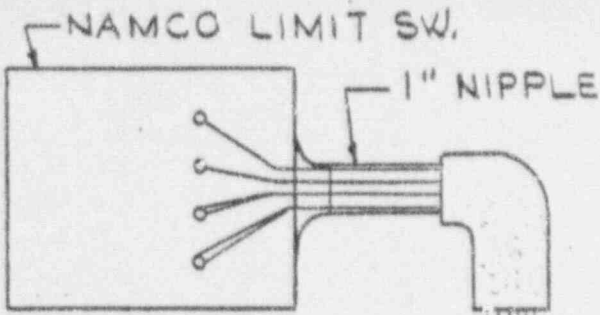


005679

DETAIL NO. 2

ORIGINAL DRAWING, Rev. _____
 TRANSFERRED TO SCS

BECHTEL CORP. JOB 7597-03/20				SOUTHERN SERVICES INC.			
DR	NO.	DATE	REVISION	ALABAMA POWER COMPANY			
bew	0	2/28/80	ISSUED FOR CONST INCORP. 2BE-5476 PCN B-79-396-2	JOSEPH M. FARLEY NUCLEAR PLANT			
TR	3	7/6/8	REV. PER PCN'S B-87-2-4106 REV. 0-4 B-86-1-3873 REV. 3-4	TRAY & CONDUIT DETAILS & NOTES			
CK				DETAIL			
DATE	SUPERSEDED	SCALE	BY	23L	OF	29	SHEETS
8-21-81				A-177541		REV	3



NOTE

1. WHEN LESS THAN 4 CONDUCTORS ARE USED PER CABLE BREAKOUT, INSERT A SHORT PIECE OF CABLE (LENGTH TO SUIT) IN SPARE LEGS OF CABLE BREAKOUT AND HEAT SHRINK OVER TERMINAL LUG BARREL AS SHOWN IN DETAIL #2.

CROUSE-HINDS EYS-3 (1" "Y" FITTING) OR 1" SCHEDULE 40 PIPE T-FITTING

RAYCHEM (502AB23-52/144) CABLE BREAKOUT FITTING, OVER 1" CONDUIT NIPPLE & 4-1/C #12 CABLE TO BE CUT TO SUIT.

GREENFIELD ADJ. TYPE COMPRESSION FITTING

4-1/C #12 (J02)

CONT. TO SOLENOID JUNCTION BOX



1/4" COUPLING

005680

SEE NOTE 1

CONT. TO SOLENOID VALVE JUNCTION BOX

1/4" GREENFIELD TYPE FLEX

DETAIL NO. 4

ORIGINAL DRAWING, Rev. 1
TRANSFERRED TO SCS

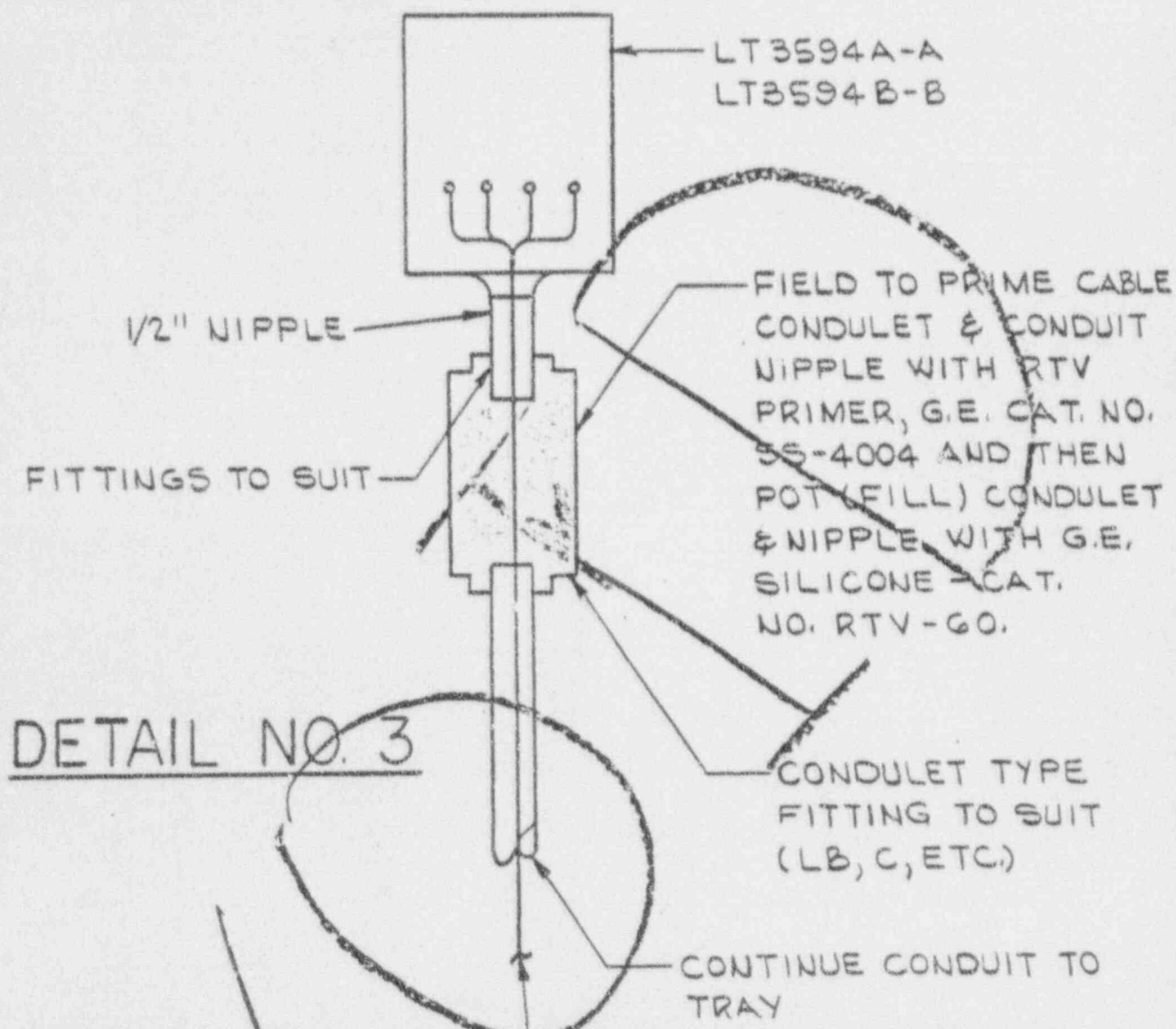
BECHTEL CORP. JOB 7597 -03/ 20

SOUTHERN SERVICES INC.

DR	NO.	DATE	REVISION
bell	0	2/28/80	ISSUED FOR CONST INCORP 2BE-547 & PCN B-79-396-2
RIP/jsc	3	7/16/81	REV. PER PCN'S B-88-2-4985 REV. 0-40 & B-88-2-5605 REV. 0-18
APP			
DATE			

ALABAMA POWER COMPANY	
SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT	
DETAIL TRAY & CONDUIT DETAILS & NOTES	
SCALE	23M OF 29 SHEETS
A-177541	REV 3

ORIGINAL DRAWING, Rev. 0
 TRANSFERRED TO SCS



DETAIL NO. 3

CONTINUE CABLE 1-4/C #16 (RO) TO CONTAINMENT PENETRATION JUNCTION BOX QTS2B020-B FOR LT3594B-B AND QTS2B006-A FOR LT3594A-A. AT CTMT JUNCTION BOX, USE RAYCHEM HEAT SHRINK TUBING WCSF-070-G-11 SIMILAR TO DETAIL NO. 2 FOR SCHEME CABLES 1VB15008C AND 1VA15009F.

005661

VOID

BECHTEL CORP. JOB 7597-03/20 SOUTHERN SERVICES INC.

DR <u>bew</u>	NO.	DATE	REVISION	ALABAMA POWER COMPANY	
TR <u>R. J. Jar</u>	0	2/28/80	ISSUED FOR CONST. INCORP. 2BE-5474 PCN. B-79-396-2	SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT	
APP <u>W. J. Jar</u>	1	2/24/80	VOIDED PER PCN	TRAY & CONDUIT DETAILS & NOTES	
DATE 2-22-82			1B-87-2-4583 REV. D-1	23N	REV 1
SUPERSEDES			SCALE	OF 29	A-177541

BILL OF MATERIAL

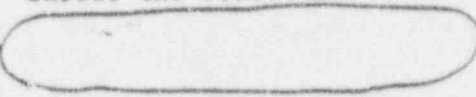
QUANTITY

DESCRIPTION

250

RAYCHEM CAT # (502A823-52/144, NCBK-04-04)
able breakout kits with installation
instructions, qualified for Class 1E use
inside the containment.

3

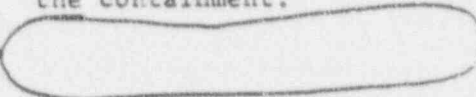


10 kits are required for Unit 1.
Remaining 140 kits for Unit 2
including spares will be delivered
in 6 to 8 weeks after placement of
order.

200

RAYCHEM WCSF-115-6-N, cable sleeves,
with installation instructions,
qualified for Class 1E use inside
the containment.

3



These kits are required to replace
field stock which is being used for
the Unit 1 modification.

Determined
by Field

RTV Primer, G.E. Cat. No. SS-4004.

Determined
by Field

G.E. Silicone, Cat. No. RTV-60.

3

RAYCHEM Heat Shrink Tubing WCSF-070-6-N.

Determined
by Field

Crowder's sealing compound CHICO A4.

005682

ORIGINAL DRAWING, Rev. 2
TRANSFERRED TO SCS

BECHTEL CORP. JOB 7597-03/20

SOUTHERN SERVICES INC.

DR <u>bew</u>	NO.	DATE	REVISION	ALABAMA POWER COMPANY	
TR	0	2/29/80	ISSUED FOR CONST. INCOMP 2BE-5474 PCN B-79-336-2		
CEL <u>lee/ger</u>	3	10/8/84	REV. PER PCN S-84 -0-2892 REV. 0		
APP <u>AW</u>				23P	29
DATE <u>2-27-87</u>	SUPERSEDES			SCALE	SH. OF SHEETS
				A-177541	REV 3

ROUTE TO JUNCTION BOX
 1/4" GREENFIELD TYPE FLEX

GREENFIELD ADJ. TYPE
 COMPRESSION FITTING

1/4" COUPLING
 RAYCHEM CB4-2 CABLE BREAKOUT
 FITTING OVER 1" CONDUIT NIPPLE
 & CONDUIT

DISCONNECT HERE
 FOR MISSILE SHIELD
 REMOVAL

1" 'Y' FITTING (CROUSE-HINDS
 EYS-3)

1" NIPPLE (TYP.)

NOTE: ALL HARDWARE
 SUPPLIED BY FIELD.

HEAD VENT VALVE

00568?

REACTOR VESSEL HEAD VENT VALVE
 CONDUIT CONNECTION

VOID

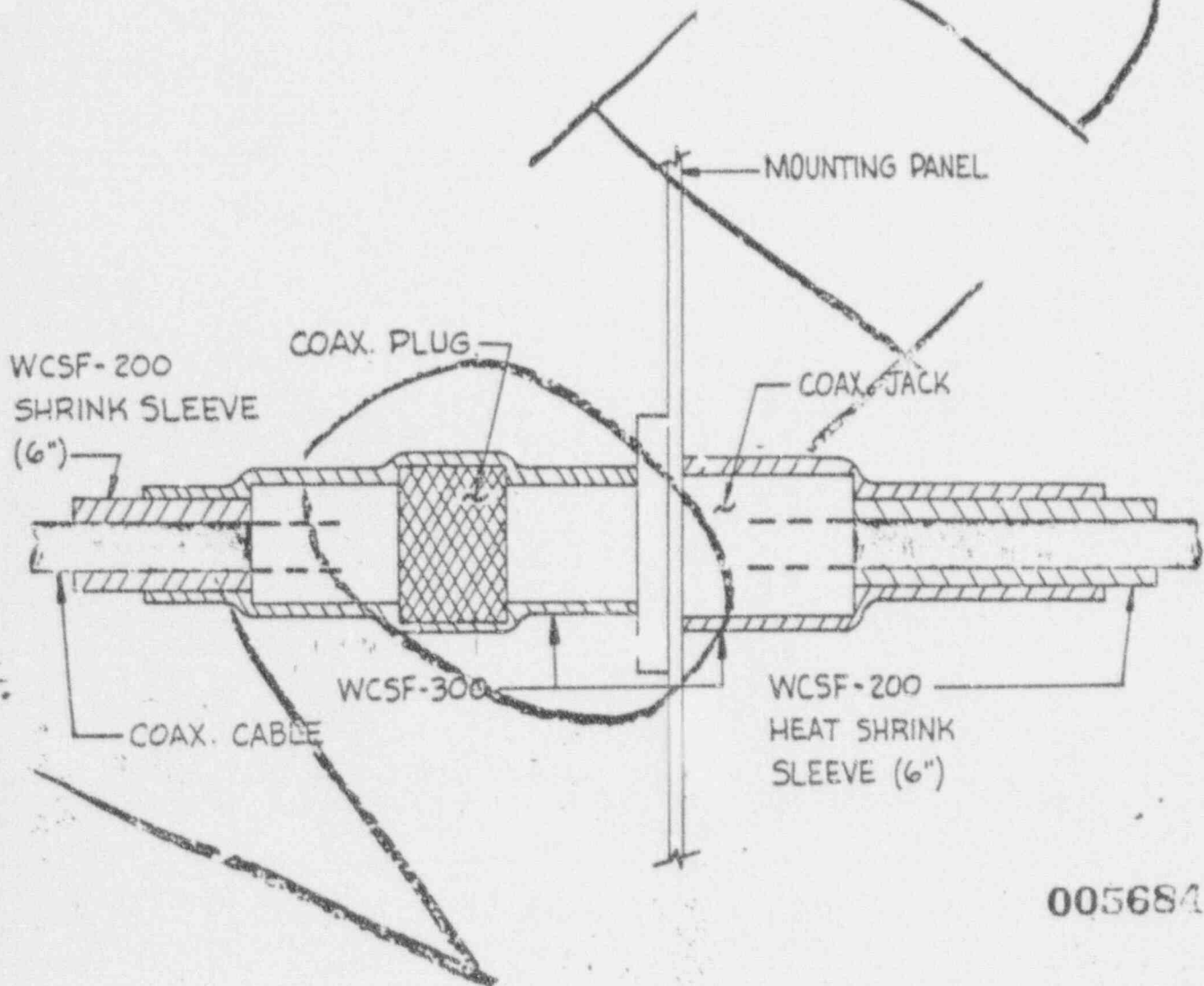
BECHTEL CORP JOB 7597-03/20

SOUTHERN SERVICES INC.

DR NJB	NO.	DATE	REVISION	ALABAMA POWER COMPANY	
TR	0	2/4/81	ISSUED FOR CONST. INCL. 2BE-833 & PCN B-1 79-463-6	SUBJECT JOSEPH M. FARLEY NUCLEAR PLANT	
CK <i>E.P. Farley</i>	2	7/6/88	VOIDED PER PCN'S B-86-1-3373 REV. 3-4 B-87-2-410B REV. 0-4	DETAIL TRAY & CONDUIT DETAILS & NOTES	
APP <i>HS</i>	DATE 1-30-81			SCALE	SH. 23Q
SUPERSEDES				A-177541 REV 2	

ORIGINAL DRAWING, Rev. _____
 TRANSFERRED TO SCS

METHOD OF SEALING COAX. CONNECTORS INSIDE CONTAINMENT



005684

VOID

ORIGINAL DRAWING, Rev. 0
TRANSFERRED TO SCS

BECHTEL CORP. JOB 7597-03/20

SOUTHERN SERVICES INC.

DR NJB	NO.	DATE	REVISION	ALABAMA POWER COMPANY	
TR	0	2/4/81	ISSUED FOR CONST. INC. 2BE-868.		
CK <i>R. J. [Signature]</i>	1	9/16/89	VOIDED PER	DETAIL TRAY & CONDUIT DETAILS & NOTES	
APP <i>TR</i>			E5 88-1132 9027		
DATE 1-30-81	SUPERSEDES	SCALE N.T.S.	SH 23R	A-177541	REV 1

Alabama Power Company
600 North 18th Street
Post Office Box 2641
Birmingham, Alabama 35201
Telephone 205-323-6341

A-5
50-348/364-CIVP
2/19/92

APCo Exhibit 05

Handwritten signature
USNRC

F. L. CLAYTON, JR.
Senior Vice President

92 MAR 13 1955



OFFICE OF SECRETARY
DOCKETING & SERVICE BRANCH
Alabama Power
the southern electric system

October 11, 1978

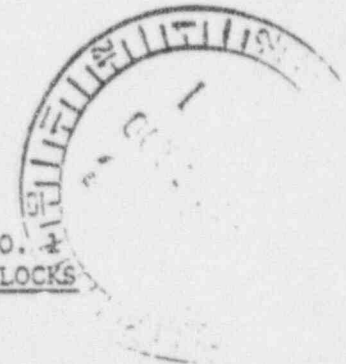
Docket No. 50-348

R18.01
FNI

IEB 79-01B

U. S. Nuclear Regulatory Commission
Region II Director
101 Marietta Street, N.W.
Suite 3100
Atlanta, Georgia
ATTN: Mr. James P. O'Reilly

F1



JOSEPH M. FARLEY NUCLEAR PLANT-UNIT NO. 2
QUALIFICATION OF ELECTRICAL TERMINAL BLOCKS

Gentlemen:

As requested in the NRC IE Circular 78-08, a study of environmental qualifications of electrical equipment in the Farley-Unit 1 has been conducted. The study revealed that a full test report was not available for certain terminal blocks inside the containment associated with containment isolation valves, wide-range and narrow-range temperature monitoring, and power-operated relief valves.

The terminal blocks are Type ZWM, Series M-25000, manufactured by States Company, a division of Multi-Amp Corporation. They are twelve, fifteen and sixteen pole front connected terminal blocks with white marker strips. The blocks are mounted inside terminal boxes, one terminal block per terminal box.

The molded base is fabricated from general purpose Durey #791, a brand name of Hooker Chemical and Plastics Corporation for a two-stage asbestos-free phenolic. The barrier strip is fabricated from Allied Chemical Grade FP-1080 polypropylene. Both materials are highly resistant to heat and moisture.

The following is a summary of available information pertaining to the environmental qualification of the terminal blocks:

(a) States Company terminal blocks were used on the motor control center which was tested for environmental conditions simulating the effects of a high energy line break in E. I. Hatch Nuclear Plant. The terminal blocks were tested to a maximum of 250°F, 29 psig, and 100 percent humidity with no detrimental effects.

7811070229

NUCLEAR REGULATORY COMMISSION

Docket No. SD-34864 V.P. Office Ex. No. 5
In the matter of Alabama Power Company
Staff _____ SENT TO 3:14 p.m. 2/19/92
Applicant _____ TO 3:15 p.m. 2/19/92
Intervenor _____
Con'g Off'r _____
Contractor _____ DATE 2/19/92
Other _____
Reporter A. E. Stop

(b) Test results compiled by Battelle Memorial Institute indicate that the wood flour-filled phenol formaldehyde retained useful properties beyond the exposure dose of 8.3×10^9 RAD. This material also showed good radiation stability above 500°F .

(c) Polypropylene has been tested by Epstein of Westinghouse and the data compiled by Battelle. It was reported that there is a slight increase in stiffness and some loss of impact strength up to 10^7 RAD. At that dose, the changes in electrical properties are minimal.

(d) The States Company terminal blocks with enclosure were exposed to 1×10^7 RADs (at Georgia Tech) with no significant change to their resistance or dielectric strength.

The above noted tests indicate that the States terminal blocks are very high quality products which should easily withstand the Farley post-accident environments. However, Alabama Power Company has initiated a testing program to further verify the performance of the blocks in the post-accident environment. This program will be completed by the end of the first refueling outage.

The following justification summarizes the detailed investigation of the safety-related equipment associated with these terminal blocks:

(a) Fifty-six terminal blocks are used to connect field wiring to valves which are used for the purpose of containment isolation. The majority of these valves are closed during normal operation and remain closed during post-accident conditions. All containment isolation valves close on loss of power and are not required to reopen following containment isolation signal. The power interruption required to effect a post-accident valve closure will occur even if the terminal block failed.

(b) Two terminal blocks serve the pressurizer power-operated relief valves which are normally closed. These valves close on loss of power and are not required to open after an accident.

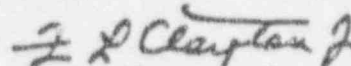
(c) Twelve terminal blocks are used in the RCS temperature wide-range monitoring and narrow-range trip circuits. The RCS temperature T_c/T_h wide-range monitoring is only required for monitoring emergency plant cooldown rate during later stages of plant life. The RCS temperature T_c/T_h narrow-range instrumentation only provides a trip function for a narrow class of low probability steam line break accidents (0.3 sq. ft. to 0.7 sq. ft. break area). This trip function occurs within the first 100 seconds of the accident.

0062724

U. S. Nuclear Regulatory Commission
Page 3
October 11, 1978

This subject was reviewed by the Plant Operations Review Committee and the Nuclear Operations Review Board. Based on the above they determined that the Farley Nuclear Plant can continue operation without affecting the health and safety of the public.

Yours truly,


F. L. Clayton, Jr.

ELCJr:bhj

cc: Mr. R. A. Thomas
Mr. G. F. Trowbridge

bc: Mr. J. T. Young
Mr. H. C. Thrast
Mr. O. L. Kingsley
Mr. W. G. Hairston
Mr. T. N. Epps
Mr. C. Biddinger
Mr. Ozen Batum
Mr. D. M. Crowe
Mr. A. A. Vizzi
Mr. H. A. Sindt
Mr. R. S. Longdon
Mr. R. P. McDonald ✓

A-6 50-348/364-CIVP 2/19/92

APCo Exhibit 06



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30303

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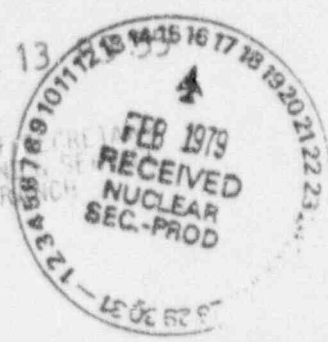
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FEB 8 1979

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In Reply Refer To:
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50-348

- in process
- sent to SCS I
for draft
response

91A2

Alabama Power Company
Attn: Mr. F. L. Clayton, Jr.
Senior Vice President
Post Office Box 2641
Birmingham, Alabama 35291

IEB 79-01 B

Gentlemen:

Enclosed is IE Bulletin 79-01. It requires action by you with regard to power reactor facilities with an operating license except for the 11 SEP plants which are listed in Enclosure 3.

This Bulletin is also being sent for information to the 11 SEP plants and all power reactor facilities with a construction permit. No action or written response is required for construction permit facilities or the 11 SEP plants.

Should you have questions regarding this Bulletin or the actions required of you, please contact this office.

Sincerely,

James P. O'Reilly
Director

Enclosures:

1. IE Bulletin No. 79-01
2. List of IE Bulletins
Issued in the past
12 months
3. List of SEP Plants (11)

Mr. J. T.	✓
Mr. [unclear]	OK
Mr. [unclear]	S
Mr. [unclear]	✓
Mr. [unclear]	✓
Mr. [unclear]	✓
W. E. [unclear]	✓

7902210770

NUCLEAR REGULATORY COMMISSION

Docket No. 90-318/344-CivR C.R. No. 1a
In the matter of Alabama Power Company
Staff _____ IDENTIFIED 3:14 p.m. 2/19/92
Applicant RECEIVED 3:15 p.m. 2/19/92
Intervenor _____ REJECTED _____
Cont'g Off'r _____
Contractor _____ DATE 2/19/92
Other _____
Reports L. Estep

0051372



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
181 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30303

FEB 8 1979

Enclosed is IE Bulletin 79-01. It requires action by you with regard to power reactor facilities with an operating license except for the 11 SEP plants which are listed in Enclosure 3.

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12 months
3. List of SEP Plants (11)

FEB 8 1979

Alabama Power Company

-2-

0051373

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0051371

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

February 8, 1979

IE Bulletin No. 79-01

ENVIRONMENTAL QUALIFICATION OF CLASS IE EQUIPMENT

Description of Circumstances:

The intent of IE Circular 78-08 was to highlight to all licensees important lessons learned from environmental qualification deficiencies reported by individual licensees. In this regard, licensees were requested to examine installed safety-related electrical equipment and determine that proper documentation existed which provided assurance that this equipment would function under postulated accident conditions. The scope of IE Circular 78-08 was much broader than other previously issued Bulletins and Circulars (such as IEB 78-04 and IEB 78-02) which addressed specific component failures. The intent of this Bulletin is to raise the threshold of IE Circular 78-08 to the level of a Bulletin; i.e., action requiring a licensee response.

Inspections conducted to date by the NRC of licensees' activities in response to IE Circular 78-08 have identified one component which licensees have found to be unqualified for service within the LOCA environment. Specifically, unqualified stem mounted limit switches (SMLS), other than those identified in previously issued IE Bulletin 78-04, were found to be installed on safety-related valves inside containment at both Duane Arnold and Quad Cities 1 and 2 Nuclear Generating Stations. The unqualified switches are identified as NAMCO Models SL2-C-11, S3CML, SA1-31, SA1-32, D1200, EA-700 and EA-770 switches. According to the manufacturer, these switches are designed only for general purpose applications and are not considered suitable devices for service in the LOCA environment. Consequently, switches are being replaced at the above power plants with qualified components.

Also, NRC inspection of component qualification has identified equipment which does not have documentation indicating it is qualified for the LOCA environment. The inspections have also identified that the licensees' re-review and resolution of problem areas are not receiving the level of attention from all licensees which the NRC believes is warranted. Because of the protracted schedule for completion of the re-review, we are now requesting the power reactor facilities with operating licenses to expedite completion of their re-review program originally requested by IE Circular 78-08 dated May 31, 1978.

7902120225

IE Bulletin No. 79-01

February 8, 1979

Action to Be Taken By Licensees of All Power Reactor Facilities
(Except Those 11 SEP Plants Listed on Enclosure 3) With An Operating
License:

1. Complete the re-review program described in IE Circular 78-08 within 120 days of receipt of this Bulletin.
2. Determine if the types of stem mounted limit switches described above are being used or planned for use on safety-related valves which are located inside containment at your facility. If so, provide a written report to the NRC within the time frame specified and to the address specified in Item 4 below.
3. Provide written evidence of the qualification of electrical equipment required to function under accident conditions.* For those items not having complete qualification data available for review, identify your plans for determining qualification, either by testing or engineering analysis, or combination of these, or by replacement with qualified equipment. Include your schedule for completing these actions and your justification for continuing operation.

Submit this information to the Director, Division of Reactor Operations Inspection, Office of Inspection and Enforcement, Nuclear Regulatory Commission, Washington, D.C. 20555 with a copy to the appropriate NRC Regional Office within 120 days of receipt of this Bulletin.

4. Report any items which are identified as not meeting qualification requirements for service intended to the Director, Division of Operating Reactors, Office of Nuclear Reactor Regulation, Nuclear Regulatory Commission, Washington, D.C. 20555 with a copy to the appropriate NRC Regional Office within 24 hours of identification. If plant operation is to continue following identification, provide justification for such operation. Provide a detailed written report within 14 days of identification to NRR, with a copy to the appropriate NRC Regional Office.

* This written evidence should include: 1) component description; 2) description of the accident environment; 3) the environment to which the component or equipment is qualified; 4) the manner of qualification which should include test methods such as sequential, synergistic, etc., and 5) identification of the specific supporting qualification documentation.

IE Bulletin No. 79-01

February 8, 1979

No additional written response to this IE Bulletin is required other than those responses described above. NRC inspectors will continue to monitor the licensees' progress in completing the requested action described above. If additional information is required, contact the Director of the appropriate NRC Regional Office.

Approved by GAO B180225 (ROC72); clearance expires 7/31/80. Approval was given under a blanket clearance specifically for identified generic problems.

Enclosure No. 3

SEP Plants

Plant	Region
Dresden 1	III
Yankee Rowe	I
Big Rock Point	III
San Onofre 1	V
Haddam Neck	I
LaCrosse	III
Oyster Creek	I
R. E. Ginna	I
Dresden 2	III
Millstone	I
Palisades	III
?	

IE Bulletin No. 79-01
February 8, 1979

LISTING OF IE BULLETINS
ISSUED IN LAST TWELVE MONTHS

Bulletin No.	Subject	Date Issued	Issued To
78-09	BWR Drywell Leakage Paths Associated with Inadequate Drywell Closures	6/14/78	All BWR Power Reactor Facilities with an OL or CP
78-10	Bergen-Paterson Hydraulic Shock Suppressor Accumulator Spring Coils	6/27/78	All BWR Power Reactor Facilities with an OL or CP
78-11	Examination of Mark I Containment Torus Welds	7/21/78	BWR Power Reactor Facilities for action: Peach Bottom 2 and 3, Quad Cities 1 and 2, Hatch 1, Monticello and Vermont Yankee
78-12	Atypical Weld Material in Reactor Pressure Vessel Welds	8/29/78	All Power Reactor Facilities with an OL or CP
78-12A	Atypical Weld Material in Reactor Pressure Vessel Welds	11/24/78	All Power Reactor Facilities with an OL or CP
78-13	Failures In Source Needs of Kay-Ray, Inc., Gauges Models 7050, 7050B, 7051, 7051B, 7060, 7060B, 7061 and 7061B	10/27/78	All general and specific licenses with the subject Kay-Ray, Inc. gauges
78-14	Deterioration of Buna-N Components In ASCO Solenoids	12/19/78	All GE BWR facilities with an OL or CP

Enclosure 2
Page 2 of 2

IE Bulletin No. 79-01
February 8, 1979

LISTING OF IE BULLETINS
ISSUED IN LAST TWELVE MONTHS

Bulletin No.	Subject	Date Issued	Issued To
78-03	Potential Explosive Gas Mixture Accumulations Associated with BWR Offgas System Operations	2/8/78	All BWR Power Reactor Facilities with an OL or CP
78-04	Environmental Qualification of Certain Stem Mounted Limit Switches Inside Reactor Containment	2/21/78	All Power Reactor Facilities with an OL or CP
78-05	Malfunctioning of Circuit Breaker Auxiliary Contact Mechanism-General Model CR105X	4/14/78	All Power Reactor Facilities with an OL or CP
78-06	Defective Cutler-Hammer, Type M Relays With DC Coils	5/31/78	All Power Reactor Facilities with an OL or CP
78-07	Protection afforded by Air-Line Respirators and Supplied-Air Hoods	6/12/78	All Power Reactor Facilities with an OL, all class E and F Research Reactors with an OL, all Fuel Cycle Facilities with an OL, and all Priority 1 Material Licensees
78-08	Radiation Levels from Fuel Element Transfer Tubes	6/12/78	All Power and Research Reactor Facilities with a Fuel Element transfer tube and an OL. Enclosure 2 Page 1 of 2

S-24
50-348/364-CIVP
2/12/92

Staff Exh. 24

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

DOCKETED
SSA No.: 0020
Accessions No.:
7910250528
'92 MAR 13 P12:00

January 14, 1980

OFFICE OF SECRETARY
DOCKETING & SERVICE
IE Bulletin No. 79-01B

ENVIRONMENTAL QUALIFICATION OF CLASS IE EQUIPMENT

Description of Circumstances:

IE Bulletin No. 79-01 required the licensee to perform a detailed review of the environmental qualification of Class IE electrical equipment to ensure that the equipment will function under (i.e. during and following) postulated accident conditions.

The NRC staff has completed the initial review of licensees' responses to Bulletin No. 79-01. Based on this review, additional information is needed to facilitate completion of the NRC evaluation of the adequacy of environmental qualification of Class IE electrical equipment in the operating facilities. In addition to requesting more detailed information, the scope of this Bulletin is expanded to resolve safety concerns relating to design basis environments and current qualification criteria not addressed in the facilities' FSARS. These include high energy line breaks (HELB) inside and outside primary containment, aging, and submergence.

Enclosure 4, "GUIDELINES FOR EVALUATING ENVIRONMENTAL QUALIFICATION OF CLASS IE ELECTRICAL EQUIPMENT IN OPERATING REACTORS", provides the guidelines and criteria the staff will use in evaluating the adequacy of the licensee's Class IE equipment evaluation in response to this Bulletin.

In general, the reporting problems encountered in the original responses and the additional information needed can be grouped into the following areas:

1. All Class IE electrical equipment required to function under the postulated accident conditions, both inside and outside primary containment, was not included in the responses.
2. In many cases, the specific information requested by the Bulletin for each component of Class IE equipment was not reported.
3. Different methods and/or formats were used in providing the written evidence of Class IE electrical equipment qualifications. Some licensees used the System Analysis Method which proved to be the most effective approach. This method includes the following information:
 - a. Identification of the protective plant systems required to function under postulated accident conditions. The postulated accident conditions are defined as those environmental conditions resulting from both LOCA and/or HELB inside primary containment and HELB outside the primary containment.

7910250528

NUCLEAR REGULATORY COMMISSION

Docket No. _____ Official Ex. No. 24
In the matter of ALABAMA POWER CO.
Staff IDENTIFIED 2/18/92
_____ RECEIVED 2/15/92
_____ REJECTED _____
Deal e Off's _____
Contractor _____ DATE 1-14-80
Other _____ Witness _____
Reported J. Estep

- b. Identification of the Class IE electrical equipment items within each of the systems identified in Item a, that are required to function under the postulated accident conditions.
 - c. The correlation between the environmental data requirements specified in the FSAR and the environmental qualification test data for each Class IE electrical equipment item identified in Item b above.
4. Additional data not previously addressed in IE Bulletin No. 79-01 are needed to determine the adequacy of the environmental qualification of Class IE electrical equipment. These data address component aging and operability in a submerged condition.

Action To Be Taken By Licensees Of All Power Reactor Facilities With An Operating License (Except those 11 SEP Plants Listed on Enclosure 1)

1. Provide a "master list" of all Engineered Safety Feature Systems (Plant Protection Systems) required to function under postulated accident conditions. Accident conditions are defined as the LOCA/HELB inside containment, and HELB outside containment. For each system within (including cables, EPA's terminal blocks, etc.) the master list identify each Class IE electrical equipment item that is required to function under accident conditions. Pages 1 and 2 of Enclosure 2 are standard formats to be used for the "master list" with typical information included.

Electrical equipment items, which are components of systems listed in Appendix A of Enclosure 4, which are assumed to operate in the FSAR safety analysis and are relied on to mitigate design basis events are considered within the scope of this Bulletin, regardless whether or not they were classified as part of the engineered safety features when the plant was originally licensed to operate. The necessity for further up grading of nonsafety-related plant systems will be dependent on the outcome of the licensees and the NRC reviews subsequent to TMI/2.

2. For each class IE electrical equipment item identified in Item 1, provide written evidence of its environmental qualification to support the capability of the item to function under postulated accident conditions. For those class IE electrical equipment items not having adequate qualification data available, identify your plans for determining qualifications of these items and your schedule for completing this action. Provide this in the format of Enclosure 3.
3. For equipment identified in Items 1 and 2 provide service condition profiles (i.e., temperature, pressure, etc., as a function of time). These data should be provided for design basis accident conditions and qualification tests performed. This data may be provided in profile or tabular form.

4. Evaluate the qualification of your Class IE electrical equipment against the guidelines provided in Enclosure 4. Enclosure 5, "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment," provides supplemental information to be used with these guidelines. For the equipment identified as having "Outstanding Items" by Enclosure 3, provide a detailed "Equipment Qualification Plan." Include in this plan specific actions which will be taken to determine equipment qualification and the schedule for completing the actions.
5. Identify the maximum expected flood level inside the primary containment resulting from postulated accidents. Specify this flood level by elevation such as the 620 foot elevation. Provide this information in the format of Enclosure 3.
6. Submit a "Licensee Event Report" (LER) for any Class IE electrical equipment item which has been determined as not being capable of meeting environmental qualification requirements for service intended. Send the LER to the appropriate NRC Regional Office within 24 hours of identification. If plant operation is to continue following identification, provide justification for such operation in the LER. Provide a detailed written report within 14 days of identification to the appropriate NRC Regional Office. Those items which were previously reported to the NRC as not being qualified per IEB-79-01 do not require an LER.
7. Complete the actions specified by this bulletin in accordance with the following schedule:
 - (a) Submit a written report required by Items 1, 2, and 3 within 45 days from receipt of this Bulletin.
 - (b) Submit a written report required by Items 4 and 5 within 90 days from receipt of this Bulletin.

This information is requested under the provisions of 10 CFR 50.54(f). Accordingly, you are requested to provide within the time periods specified in Items 7.a and 7.b above, written statements of the above information, signed under oath or affirmation.

Submit the reports to the Director of the appropriate NRC Regional Office. Send a copy of your report to the U.S. Nuclear Regulatory Commission, Office of Inspection and Enforcement, Division of Reactor Operations Inspection, Washington, D.C. 20555.

Approved by GAO, B180225 (R0072); clearance expires 7/31/80. Approval was given under a blanket clearance specifically for identified generic problems.

IE Bulletin No. 79-018
January 14, 1980

Enclosure

RECENTLY ISSUED
IE BULLETINS

Bulletin No.	Subject	Date Issued	Issued To
79-28	Possible Malfunction of Namco Model EA 180 Limit Switches at Elevated Temperatures	12/7/79	All power reactor facilities with an OL or a CP
79-27	Loss Of Non-Class-1-E Instrumentation and Control Power System Bus During Operation	11/30/79	All power reactor facilities holding OLs and to those nearing licensing
79-26	Boron Loss From BWR Control Blades	11/20/79	All BWR power reactor facilities with an OL
79-25	Failures of Westinghouse BFD Relays In Safety-Related Systems	11/2/79	All power reactor facilities with an OL or CP
79-17 (Rev. 1)	Pipe Cracks In Stagnant Borated Water System At PWR Plants	10/29/79	All PWR's with an OL and for information to other power reactors
79-24	Frozen Lines	9/27/79	All power reactor facilities which have either OLs or CPs and are in the late stage of construction
79-23	Potential Failure of Emergency Diesel Generator Field Exciter Transformer	9/12/79	All Power Reactor Facilities with an Operating License or a construction permit
79-14 (Supplement 2)	Seismic Analyses For As-Built Safety-Related Piping Systems	9/7/79	All Power Reactor Facilities with an OL or a CP
79-22	Possible Leakage of Tubes of Tritium Gas in Time-pieces for Luminosity	9/5/79	To Each Licensee who Receives Tubes of Tritium Gas Used in Timepieces for Luminosity

SEP Plants

<u>Plant</u>	<u>Region</u>
Dresden 1	III
Yankee Rowe	I
Big Rock Point	III
San Onofre 1	V
Haddam Neck	I
LaCrosse	III
Oyster Creek	I
R. E. Ginna	I
Dresden 2	III
Millstone	I
Palisades	III

MASTER LIST
 (Typical)

(Class IE Electrical Equipment Required to Function
 Under Postulated Accident Conditions)

I. SYSTEM: RESIDUAL HEAT REMOVAL (RHR)

COMPONENTS			
Plant Identification Number	Generic Name	Location	
		Inside Primary Containment	Outside Primary Containment
1PT 456	PRESSURE TRANSMITTER	x	
1LT 594	LEVEL TRANSMITTER	x	
1LS 210	LIMIT SWITCH	x	

II. SYSTEM: AUTOMATIC DEPRESSURIZATION SYSTEM (ADS)

COMPONENTS			
Plant Identification Number	Generic Name	Location	
		Inside Primary Containment	Outside Primary Containment
B21-R001	VALVE MOTOR OPERATOR	x	
B21-F003	SOLENOID VALVE		x
B21-F010	PRESSURE SWITCH		x

III. SYSTEM: RHR EQUIPMENT/COMPONENTS (Typical)

**COMPONENTS			
Plant Identification Number*	Generic Name	Location	
		Inside Primary Containment	Outside Primary Containment
16xP455	O-RING GASKET	x	
EPA, Class E, Westinghouse, 100C	ELECTRICAL PENETRATION ASSEMBLY	x	
KULKA No. ET35	TERMINAL BOARD	x	
ONKONITE, 1000V, 3C, Black	POWER CABLE	x	x
X BRAND 10W-40	LUBRICATE OIL		x
15 KB69 (Boston Wire & Cable)	INSTRUMENTATION CABLE	x	x
Cutler Hammer TB No. 6	TERMINAL BOX		x
RAYCHEM XYZ	CABLE SPLICE	x	x
Scotch No. 54	INSULATING TAPE		x
T&B No. 10 INSULATED	TERMINAL LUG		x
Y Brand Epoxy No. 111	SEALANT	x	x

* When a component is not identified by plant identification number, use the manufacturer, model number, serial number, etc.

** Like components may be referenced.

SYSTEM COMPONENT EVALUATION WORK SHEET
INSTRUCTIONS

1. Equipment Description: Provide the specific information requested for each Class IE electrical component. Provide component location, specific information such as the building, access floor elevations, and whether the component is above the flood level elevation. In addition, provide the specified and demonstrated accuracies of all instruments for their trip functions and/or post accident monitoring requirements. Cables, EPA's, terminal blocks, and other items shall be identified as part of the engineered safety features systems.

2. Environment: List values for each environmental parameter indicated. List the "specification values" obtained from postulated accident analysis in the "SPEC" column. List the "qualification values" obtained from test rep: engineering analysis data, etc. in the "Qual" column. Temperature, pressure, etc., as a function of time shall be provided in profile or tabular form. Specify the time period that the component or equipment is required to function and identify the document which provides the basis for this time interval.

It is expected that some listed parameters were not requested of the licensee at the time of their license issuance. Address each parameter condition during this review. If it is determined that a parameter such as submergence or a service condition such as aging was not previously considered, identify it as an "Outstanding Item."

3. Documentation Reference: Reference the documents from which information was obtained in the "Spec" column. Identify the document, paragraph, etc., that contains the postulated accident environmental specification data. In the "Qual" column identify the document, paragraph, etc., that contains the environmental qualification data.

4. Qualification Method: Identify the method of qualification. To describe the qualification method use words such as simultaneous test, comparison test, sequential test, and/or engineering/mathematical analysis. Words such as "test" and/or "analysis" when used alone do not adequately identify the qualification method.

5. Outstanding Items: Identify parameters for which no qualification data is presently available. Also, identify parameters, service conditions, or environments not previously addressed during FSAR environmental qualification analysis such as submergence, qualified life (aging), or HELB. Identify in the "Notes" section on page 1 of this enclosure the actions planned for determining qualification and the schedule for completing these actions.

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SYSTEM COMPONENT EVALUATION WORK SHEET
(Typ)

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF*		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: RHR Plant ID No. IPT456 Component: PRESSURE TRANSMITTER Manufacturer: Fisher-Porter Co. Model Number: -EN-1071-BCXN-NS Location: Reactor Monitoring Accuracy: Spec: 5% Demon: 4% Service: RHR Pump 1A Charge Pressure /N107 Location: Containment Flood Level Elev: 620' Flood Level: Yes No 'x'	Operating Time	15 min.	300 min.	1	5	Simultaneous Test	None
	Temperature (°F)	SEE ACCIDENT AND TEST PROFILES PROVIDED		1	5	Simultaneous Test	None
	Pressure (PSIA)			1	5	Simultaneous Test	None
	Relative Humidity(%)	100%	100%	1	5	Simultaneous Test	None
	Chemical Spray	N ₃ BO ₃ / NAOH		1			See Note 1
	Radiation	4x10 ⁶ rads	1.2x10 ⁸ rads	2	6	Sequential Test	None
	Aging	40 yrs	40 yrs	3	7, 8	1. Sequential Test 2. Eng. Analysis	None
Submergence	Not Required	Not Required				None See Note 2	

Documentation References:

- FSAR Chapter 3, Paragraph 3.11
- FSAR Chapter 14, Paragraph 14.2.3.1
- Technical Specification 3.4.1, Paragraph A
- Technical Specification 4.6.5, Paragraph B
- FIRL Test Report No. 3660 dated November 2, 1972
- Fisher and Porter Co. Test Report No. 2500-1
- A. b. DOD Engineering Evaluation Data Report No. 6932
- Wylie Laboratory Report No. 467

Notes:

1. XYZ Letter No. 237-1, dated November 2, 1979, has been sent to MFG. requesting the qualification information. If qualification not determined acceptable by December 15, 1979, component will be replaced during refueling outage March 1980.
2. In the FSAR submergence was not considered an environmental parameter. ABC Laboratory is to perform submergence test in April 1980.

GUIDELINES FOR EVALUATING ENVIRONMENTAL QUALIFICATION
OF CLASS IE ELECTRICAL EQUIPMENT
IN OPERATING REACTORS

- 1.0 Introduction
- 2.0 Discussion
- 3.0 Identification of Class IE Equipment
- 4.0 Service Conditions
 - 4.1 Service Conditions Inside Containment for a Loss of Coolant Accident (LOCA)
 - 1. Temperature and Pressure Steam Conditions
 - 2. Radiation
 - 3. Submergence
 - 4. Chemical Sprays
 - 4.2 Service Conditions for a PWR Main Steam Line Break (MSLB) Inside Containment
 - 1. Temperature and Pressure Steam Conditions
 - 2. Radiation
 - 3. Submergence
 - 4. Chemical Sprays
 - 4.3 Service Conditions Outside Containment
 - 4.3.1 Areas Subject to a Severe Environment as a Result of a High Energy Line Break (HEL B)
 - 4.3.2 Areas Where Fluids are Recirculated From Inside Containment to Accomplish Long-Term Emergency Core Cooling Following a LOCA
 - 1. Temperature, Pressure and Relative Humidity
 - 2. Radiation
 - 3. Submergence
 - 4. Chemical Sprays

4.3.3 Areas Normally Maintained at Room Conditions

5.0 Qualification Methods

5.1 Selection of Qualification Method

5.2 Qualification by Type Testing

1. Simulated Service Conditions and Test Duration
2. Test Specimen
3. Test Sequence
4. Test Specimen Aging
5. Functional Testing and Failure Criteria
6. Installation Interfaces

5.3 Qualification by a Combination of Methods (Test, Evaluation, Analysis)

6.0 Margin

7.0 Aging

8.0 Documentation

Appendix A - Typical Equipment/Functions Needed for Mitigation of a LOCA or MSLB Accident

Appendix B - Guidelines for Evaluating Radiation Service Conditions Inside Containment for a LOCA and MSLB Accident

Appendix C - Thermal and Radiation Aging Degradation of Selected Materials

GUIDELINES FOR EVALUATING ENVIRONMENTAL QUALIFICATION
OF CLASS IE ELECTRICAL EQUIPMENT
IN OPERATING REACTORS

1.0 INTRODUCTION

On February 8, 1979, the NRC Office of Inspection and Enforcement issued IE Bulletin 79-01, entitled, "Environmental Qualification of Class IE Equipment." This bulletin requested that licensees for operating power reactors complete within 120 days their reviews of equipment qualification begun earlier in connection with IE Circular 78-08. The objective of IE Circular 78-08 was to initiate a review by the licensees to determine whether proper documentation existed to verify that all Class IE electrical equipment would function as required in the hostile environment which could result from design basis events.

The licensees' reviews are now essentially complete and the NRC staff has begun to evaluate the results. This document sets forth guidelines for the NRC staff to use in its evaluations of the licensees' responses to IE Bulletin 79-01 and selected associated qualification documentation. The objective of the evaluations using these guidelines is to identify Class IE equipment whose documentation does not provide reasonable assurance of environmental qualification. All such equipment identified will then be subjected to a plant application specific evaluation to determine whether it should be requalified or replaced with a component whose qualification has been adequately verified.

These guidelines are intended to be used by the NRC staff to evaluate the qualification methods used for existing equipment in a particular class of plants, i.e., currently operating reactors including SEP plants.

Equipment in other classes of plants not yet licensed to operate, or replacement equipment for operating reactors, may be subject to different requirements such as those set forth in NUREG-0588, Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment.

In addition to its reviews in connection with IE Bulletin 79-01 the staff is engaged in other generic reviews that include aspects of the equipment qualification issue. TMI-2 lessons learned and the effects of failures of non-Class IE control and indication equipment are examples of these generic reviews. In some cases these guidelines may be applicable, however, this determination will be made as part of that related generic review.

2.0 DISCUSSION

IEEE Std. 323-1974¹ is the current industry standard for environmental qualification of safety-related electrical equipment. This standard was first issued as a trial use standard, IEEE Std. 323-1971, in 1971 and later after substantial revision, the current version was issued in 1974. Both versions of the standard set forth generic requirements for equipment qualification but the 1974 standard includes specific requirements for aging, margins, and maintaining documentation records that were not included in the 1971 trial use standard.

The intent of this document is not to provide guidelines for implementing either version of IEEE Std. 323 for operating reactors. In fact most of the operating reactors are not committed to comply with any particular industry standard for electrical equipment qualification. However, all of the operating reactors are required to comply with the General Design Criteria

¹ IEEE Std. 323-1974, "IEEE Standard for Qualifying Class IE Equipment for Nuclear Power Generating Stations."

specified in Appendix A of 10 CFR 50. General Design Criterion 4 states in part that "structures, systems and components important to safety shall be designed to accommodate the effects of and to be compatible with the environmental conditions associated with normal operation, maintenance, testing and postulated accidents, including loss-of-coolant accidents." The intent of these guidelines is to provide a basis for judgments required to confirm that operating reactors are in compliance with General Design Criterion 4.

3.0 IDENTIFICATION OF CLASS IE EQUIPMENT

Class IE equipment includes all electrical equipment needed to achieve emergency reactor shutdown, containment isolation, reactor core cooling, containment and reactor heat removal, and prevention of significant release of radioactive material to the environment. Typical systems included in pressurized and boiling water reactor designs to perform these functions for the most severe postulated loss of coolant accident (LOCA) and main steamline break accident (MSLB) are listed in Appendix A.

More detailed descriptions of the Class IE equipment installed at specific plants can be obtained from FSARs, Technical specifications, and emergency procedures. Although variation in nomenclature may exist at the various plants, environmental qualification of those systems which perform the functions identified in Appendix A should be evaluated against the appropriate service conditions (Section 4.0).

The guidelines in this document are applicable to all components necessary for operation of the systems listed in Appendix A including but not limited to valves, motors, cables, connectors, relays, switches, transmitters and valve position indicators.

4.0 SERVICE CONDITIONS

In order to determine the adequacy of the qualification of equipment it is necessary to specify the environment the equipment is exposed to during normal and accident conditions with a requirement to remain functional. These environments are referred to as the "service conditions."

The approved service conditions specified in the FSAR or other licensee submittals are acceptable, unless otherwise noted in the guidelines discussed below.

4.1 Service Conditions Inside Containment for a Loss of Coolant Accident (LOCA)

1. Temperature and Pressure Steam Conditions - In general, the containment temperature and pressure conditions as a function of time should be based on the analyses in the FSAR. In the specific case of pressure suppression type containments, the following minimum high temperature conditions should be used: (1) BWR Drywells - 340°F for 6 hours; and (2) PWR Ice Condenser Lower Compartments - 340°F for 3 hours.
2. Radiation - When specifying radiation service conditions for equipment exposed to radiation during normal operating and accident conditions, the normal operating dose should be added to the dose received during the course of an accident. Guidelines for evaluating beta and gamma radiation service conditions for general areas inside containment are provided below. Radiation service conditions for equipment located directly above the containment sump, in the vicinity of filters, or submerged in contaminated liquids must be evaluated on a case by case basis. Guidelines for these evaluations are not provided in this document.

Gamma Radiation Doses - A total gamma dose radiation service condition of 2×10^7 RADS is acceptable for Class IE equipment located in general areas inside containment for PWRs with dry type containments. Where a dose less than this value has been specified, an application specific evaluation must be performed to determine if the dose specified is acceptable. Procedures for evaluating radiation service conditions in such cases are provided in Appendix B. The procedures in Appendix B are based on the calculation for a typical PWR reported in Appendix D of NUREG-0588¹.

Gamma dose radiation service conditions for BWRs and PWRs with ice condenser containments must be evaluated on a case by case basis. Since the procedures in Appendix B are based on a calculation for a typical PWR with a dry type containment, they are not directly applicable to BWRs and other containment types. However, doses for these other plant configurations may be evaluated using similar procedures with conservative dose assumptions and adjustment factors developed on a case by case basis.

Beta Radiation Doses - Beta radiation doses generally are less significant than gamma radiation doses for equipment qualification. This is due to the low penetrating power of beta particles in comparison to gamma rays of equivalent energy. Of the general classes of electrical equipment in a plant (e.g., cables, instrument transmitters, valve operators, containment penetrations), electrical cable is considered the most

¹NUREG-0588, Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment.

vulnerable to damage from beta radiation. Assuming a TID 14844 source term, the average maximum beta energy and isotopic abundance will vary as a function of time following an accident. If these parameters are considered in a detailed calculation, the conservative beta surface dose of 1.40×10^8 RADS reported in Appendix D of NUREG 0588 would be reduced by approximately a factor of ten within 30 mils of the surface of electrical cable insulation of unit density. An additional 40 mils of insulation (total of 70 mils) results in another factor of 10 reduction in dose. Any structures or other equipment in the vicinity of the equipment of interest would act as shielding to further reduce beta doses. If it can be shown, by assuming a conservative unshielded surface beta dose of 2.0×10^8 RADS and considering the shielding factors discussed here, that the beta dose to radiation sensitive equipment internals would be less than or equal to 10% of the total gamma dose to which an item of equipment has been qualified, then that equipment may be considered qualified for the total radiation environment (gamma plus beta). If this criterion is not satisfied the radiation service condition should be determined by the sum of the gamma and beta doses.

3. Submergence - The preferred method of protection against the effects of submergency is to locate equipment above the water flooding level. Specifying saturated steam as a service condition during type testing of equipment that will become flooded in service is not an acceptable alternative for actually flooding the equipment during the test.

4. Containment Sprays - Equipment exposed to chemical sprays should be qualified for the most severe chemical environment (acidic or basic) which could exist. Demineralized water sprays should not be exempt from consideration as a potentially adverse service condition.

4.2 Service Conditions for a PWR Main Steam Line Break (MSLB) Inside Containment

Equipment required to function in a steam line break environment must be qualified for the high temperature and pressure that could result. In some cases the environmental stress on exposed equipment may be higher than that resulting from a LOCA, in others it may be no more severe than for a LOCA due to the automatic operation of a containment spray system.

1. Temperature and Pressure Steam Conditions - Equipment qualified for a LOCA environment is considered qualified for a MSLB accident environment in plants with automatic spray systems not subject to disabling single component failures. This position is based on the "Best Estimate" calculation of a typical plant peak temperature and pressure and a thermal analysis of typical components inside containment.^{1/} The final acceptability of this approach, i.e., use of the "Best Estimate", is pending the completion of Task Action Plan A-21, Main Steamline Break Inside Containment.

Class IE equipment installed in plants without automatic spray systems or plants with spray systems subject to disabling single failures or delayed initiation should be qualified for a MSLB accident environment determined by a plant specific analysis. Acceptable methods

^{1/} See NUREG Q458, Short Term Safety Assessment on the Environmental Qualification of Safety-Related Electrical Equipment of SEP Operating Reactors, for a more detailed discussion of the best estimate calculation.

for performing such an analysis for operating reactors are provided in Section 1.2 for Category II plants in NUREG-0588, Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment.

2. Radiation - Same as Section 4.1 above except that a conservative gamma dose of 2×10^6 RADS is acceptable.
3. Submergence - Same as Section 4.1 above.
4. Chemical Sprays - Same as Section 4.1 above.

4.3 Service Conditions Outside of Containment

4.3.1 Areas Subject to a Severe Environment as a Result of a High Energy Line Break (HELB)

Service conditions for areas outside containment exposed to a HELB were evaluated on a plant by plant basis as part of a program initiated by the staff in December, 1972 to evaluate the effects of a HELB. The equipment required to mitigate the event was also identified. This equipment should be qualified for the service conditions reviewed and approved in the HELB Safety Evaluation Report for each specific plant.

4.3.2 Areas Where Fluids are Recirculated from Inside Containment to Accomplish Long-Term Core Cooling Following a LOCA

1. Temperature and Relative Humidity - One hundred percent relative humidity shall be established as a service condition in confined spaces. The temperature and pressure as a function of time should be based on the plant unique analysis reported in the FSAR.

2. Radiation - Due to differences in equipment arrangement within these areas and the significant effect of this factor on doses, radiation service conditions must be evaluated on a case by case basis. In general, a dose of at least 4×10^6 RADS would be expected.

3. Submergence - Not applicable.

4. Chemical Sprays - Not applicable.

4.3.3 Areas Normally Maintained at Room Conditions

Class IE equipment located in these areas does not experience significant stress due to a change in service conditions during a design basis event. This equipment was designed and installed using standard engineering practices and industry codes and standards (e.g., ANSI, NEMA, National Electric Code). Based on these factors, failures of equipment in these areas during a design basis event are expected to be random except to the extent that they may be due to aging or failures of air conditioning or ventilation systems. Therefore, no special consideration need be given to the environmental qualification of Class IE equipment in these areas provided the aging requirements discussed in Section 7.0 below are satisfied and the areas are maintained at room conditions by redundant air conditioning or ventilation systems served by the onsite emergency electrical power system. Equipment located in areas not served by redundant systems powered from onsite emergency sources should be qualified for the environmental extremes which could result from a failure of the systems as determined from a plant specific analysis.

5.0 QUALIFICATION METHODS

5.1 Selection of Qualification Method

The choice of qualification method employed for a particular application of equipment is largely a matter of technical judgement based on such factors as: (1) the severity of the service conditions; (2) the structural and material complexity of the equipment; and (3) the degree of certainty required in the qualification procedure (i.e., the safety importance of the equipment function). Based on these considerations, type testing is the preferred method of qualification for electrical equipment located inside containment required to mitigate the consequences of design basis events, i.e., Class IE equipment (see Section 3.0 above). As a minimum, the qualification for severe temperature, pressure, and steam service conditions for Class IE equipment should be based on type testing.

Qualification for other service conditions such as radiation and chemical sprays may be by analysis (evaluation) supported by test data (see Section 5.3 below). Exceptions to these general guidelines must be justified on a case by case basis.

5.2 Qualification by Type Testing

The evaluation of test plans and results should include consideration of the following factors:

1. Simulated Service Conditions and Test Duration - The environment in the test chamber should be established and maintained so that it envelopes the service conditions defined in accordance with Section 4.0 above. The time duration of the test should be at least as long as the period from the initiation of the accident until the temperature and pressure service conditions return to essentially the same levels that existed before the postulated accident. A shorter test duration may be acceptable

if specific analyses are provided to demonstrate that the materials involved will not experience significant accelerated thermal aging during the period not tested.

2. Test Specimen - The test specimen should be the same model as the equipment being qualified. The type test should only be considered valid for equipment identical in design and material construction to the test specimen. Any deviations should be evaluated as part of the qualification documentation (see also Section 8.0 below).
3. Test Sequence - The component being tested should be exposed to a steam/air environment at elevated temperature, and pressure in the sequence defined for its service conditions. Where radiation is a service condition which is to be considered as part of a type test, it may be applied at any time during the test sequence provided the component does not contain any materials which are known to be susceptible to significant radiation damage at the service condition levels or materials whose susceptibility to radiation damage is not known (see Appendix C). If the component contains any such materials, the radiation dose should be applied prior to or concurrent with exposure to the elevated temperature and pressure steam/air environment. The same test specimen should be used throughout the test sequence for all service conditions the equipment is to be qualified for by type testing. The type test should only be considered valid for the service conditions applied to the same test specimen in the appropriate sequence.
4. Test Specimen Aging - Tests which were successful using test specimens which had not been preaged may be considered acceptable provided the component does not contain materials which are known to be susceptible

to significant degradation due to thermal and radiation aging (see Section 7.0). If the component contains such materials a qualified life for the component must be established on a case by case basis. Arrhenius techniques are generally considered acceptable for thermal aging.

5. Functional Testing and Failure Criteria - Operational modes tested should be representative of the actual application requirements (e.g., components which operate normally energized in the plant should be normally energized during the tests, motor and electrical cable loading during the test should be representative of actual operating conditions). Failure criteria should include instrument accuracy requirements based on the maximum error assumed in the plant safety analyses. If a component fails at any time during the test, even in a so called "fail safe" mode, the test should be considered inconclusive with regard to demonstrating the ability of the component to function for the entire period prior to the failure.
6. Installation Interfaces - The equipment mounting and electrical or mechanical seals used during the type test should be representative of the actual installation for the test to be considered conclusive. The equipment qualification program should include an as-built inspection in the field to verify that equipment was installed as it was tested. Particular emphasis should be placed on common problems such as protective enclosures installed upside down with drain holes at the top and penetrations in equipment housings for electrical connections being left unsealed or susceptible to moisture incursion through stranded conductors.

5.3 Qualification by a Combination of Methods (Test, Evaluation, Analysis)

As discussed in Section 5.1 above, an item of Class IE equipment may be shown to be qualified for a complete spectrum of service conditions even though it was only type tested for high temperature, pressure and steam. The qualification for service conditions such as radiation and chemical sprays may be demonstrated by analysis (evaluation). In such cases the overall qualification is said to be by a combination of methods. Following are two specific examples of procedures that are considered acceptable. Other similar procedures may also be reviewed and found acceptable on a case by case basis.

1. Radiation Qualification - Some of the earlier type tests performed for operating reactors did not include radiation as a service condition. In these cases the equipment may be shown to be radiation qualified by performing a calculation of the dose expected, taking into account the time the equipment is required to remain functional and its location using the methods described in Appendix B, and analyzing the effect of the calculated dose on the materials used in the equipment (see Appendix C). As a general rule, the time required to remain functional assumed for dose calculations should be at least 1 hour.
2. Chemical Spray Qualification - Components enclosed entirely in corrosion resistant cases (e.g., stainless steel) may be shown to be qualified for a chemical environment by an analysis of the effects of the particular chemicals on the particular enclosure materials. The effects of chemical sprays on the pressure integrity of any gaskets or seals present should be considered in the analysis.

6.0 Margin

IEEE Std. 323-1974 defines margin as the difference between the most severe specified service conditions of the plant and the conditions used in type testing to account for normal variations in commercial production of equipment and reasonable errors in defining satisfactory performance. Section 6.3.1.5 of the standard provides suggested factors to be applied to the service conditions to assure adequate margins. The factor applied to the time equipment is required to remain functional is the most significant in terms of the additional confidence in qualification that is achieved by adding margins to service conditions when establishing test environments. For this reason, special consideration was given to the time required to remain functional when the guidelines for Functional Testing and Failure Criteria in Section 5.2 above were established. In addition, all of the guidelines in Section 4.0 for establishing service conditions include conservatisms which assure margins between the service conditions specified and the actual conditions which could realistically be expected in a design basis event. Therefore, if the guidelines in Section 4.0 and 5.2 are satisfied, no separate margin factors are required to be added to the service conditions when specifying test conditions.

7.0 Aging

Implicit in the staff position in Regulatory Guide 1.89 with regard to backfitting IEEE Std. 323-1974 is the staff's conclusion that the incremental improvement in safety from arbitrarily requiring that a specific qualified life be demonstrated for all Class IE equipment is not sufficient to justify the expense for plants already constructed and operating. This position does not, however, exclude equipment

using materials that have been identified as being susceptible to significant degradation due to thermal and radiation aging. Component maintenance or replacement schedules should include considerations of the specific aging characteristics of the component materials. Ongoing programs should exist at the plant to review surveillance and maintenance records to assure that equipment which is exhibiting age related degradation will be identified and replaced as necessary. Appendix C contains a listing of materials which may be found in nuclear power plants along with an indication of the material susceptibility to thermal and radiation aging.

8.0 Documentation

Complete and auditable records must be available for qualification by any of the methods described in Section 5.0 above to be considered valid. These records should describe the qualification method in sufficient detail to verify that all of the guidelines have been satisfied. A simple vendor certification of compliance with a design specification should not be considered adequate.

APPENDIX A

TYPICAL EQUIPMENT/FUNCTIONS NEEDED FOR
MITIGATION OF A LOCA OR MSLB ACCIDENT

Engineered Safeguards Actuation

Reactor Protection

Containment Isolation

Steamline Isolation

Main Feedwater Shutdown and Isolation

Emergency Power

Emergency Core Cooling¹

Containment Heat Removal

Containment Fission Product Removal

Containment Combustible Gas Control

Auxiliary Feedwater

Containment Ventilation

Containment Radiation Monitoring

Control Room Habitability Systems (e.g., HVAC, Radiation Filters)

Ventilation for Areas Containing Safety Equipment

Component Cooling

Service Water

Emergency Shutdown²

Post Accident Sampling and Monitoring³

Radiation Monitoring³

Safety Related Display Instrumentation³

- ¹ These systems will differ for PWRs and BWRs, and for older and newer plants. In each case the system features which allow for transfer to recirculation cooling mode and establishment of long term cooling with boron precipitation control are to be considered as part of the system to be evaluated.
- ² Emergency shutdown systems include those systems used to bring the plant to a cold shutdown condition following accidents which do not result in a breach of the reactor coolant pressure boundary together with a rapid depressurization of the reactor coolant system. Examples of such systems and equipment are the RHR system, PORVs, RCIC, pressurizer sprays, chemical and volume control system, and steam dump systems.
- ³ More specific identification of these types of equipment can be found in the plant emergency procedures.

APPENDIX B

PROCEDURES FOR EVALUATING GAMMA RADIATION SERVICE CONDITIONS

Introduction and Discussion

The adequacy of gamma radiation service conditions specified for inside containment during a LOCA or MSLB accident can be verified by assuming a conservative dose at the containment centerline and adjusting the dose according to the plant specific parameters. The purpose of this appendix is to identify those parameters whose effect on the total gamma dose is easy to quantify with a high degree of confidence and describe procedures which may be used to take these effects into consideration.

The bases for the procedures and restrictions for their use are as follows:

- (1) A conservative dose at the containment centerline of 2×10^7 RADS for a LOCA and 2×10^6 RADS for a MSLB accident has been assumed. This assumption and all the dose rates used in the procedure outlined below are based on the methods and sample calculation described in Appendix D of NUREG-0588, "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment." Therefore, all the limitations listed in Appendix D of NUREG-0588 apply to these procedures.
- (2) The sample calculation in Appendix D of NUREG-0588 is for a 4,000 MWth pressurized water reactor housed in a 2.52×10^6 ft³ containment with an iodine scrubbing spray system. A similar calculation without iodine scrubbing sprays would increase the dose to equipment approximately 15%. The conservative dose of 2×10^7 RADS assumed

in the procedure below includes sufficient conservatism to account for this factor. Therefore, the procedure is also applicable to plants without an iodine scrubbing spray system.

- (3) Shielding calculations are based on an average gamma energy of 1 MEV derived from TID 14844.
- (4) These procedures are not applicable to equipment located directly above the containment sump, submerged in contaminated liquids, or near filters. Doses specified for equipment located in these areas must be evaluated on a case by case basis.
- (5) Since the dose adjustment factors used in these procedures are based on a calculation for a typical pressurized water reactor with a dry type containment, they are not directly applicable to boiling water reactors or other containment types. However, doses for these other plant configurations may be evaluated using similar procedures with conservative dose assumptions and adjustment factors developed on a case by case basis.

Procedure

Figures 1 through 4 provide factors to be applied to the conservative dose to correct the dose for the following plant specific parameters:

- (1) reactor power level;
- (2) containment volume;
- (3) shielding;
- (4) compartment volume; and
- (5) time equipment is required to remain functional.

The procedure for using the figures is best illustrated by an example. Consider the following case. The radiation service condition for a particular item of equipment has been specified as 2×10^6 RADS. The application specific parameters are:

Reactor power level - 3,000 MWth

Containment volume - 2.5×10^6 ft³

Compartment Volume - 8,000 ft³

Thickness of compartment shield wall (concrete) - 24"

Time equipment is required to remain functional - 1 hr.

The problem is to make a reasonable estimate of the dose that the equipment could be expected to receive in order to evaluate the adequacy of the radiation service condition specification.

Step 1

Enter the nomogram in Figure 1 at 3,000 MWth reactor power level and 2.5×10^6 ft³ containment volume and read a 30-day integrated dose of 1.5×10^7 RADS.

Step 2

Enter Figure 2 at a dose of 1.5×10^7 RADS and 24" of concrete shielding for the compartment the equipment is located in and read 4.5×10^4 RADS. This is the dose the equipment receives from sources outside the compartment. To this must be added the dose from sources inside the compartment (Step 3).

Step 3

Enter Figure 3 at 8,000 ft³ and read a correction factor of 0.13. The dose due to sources inside the compartment would then be $0.13 (1.5 \times 10^7)$

= 1.95×10^6 RADS. The sums of the doses from steps 2 and 3 equals:

$$4.5 \times 10^4 \text{ RADS} + 0.13 (1.5 \times 10^7) \text{ RADS} = 2.0 \times 10^6 \text{ RADS}$$

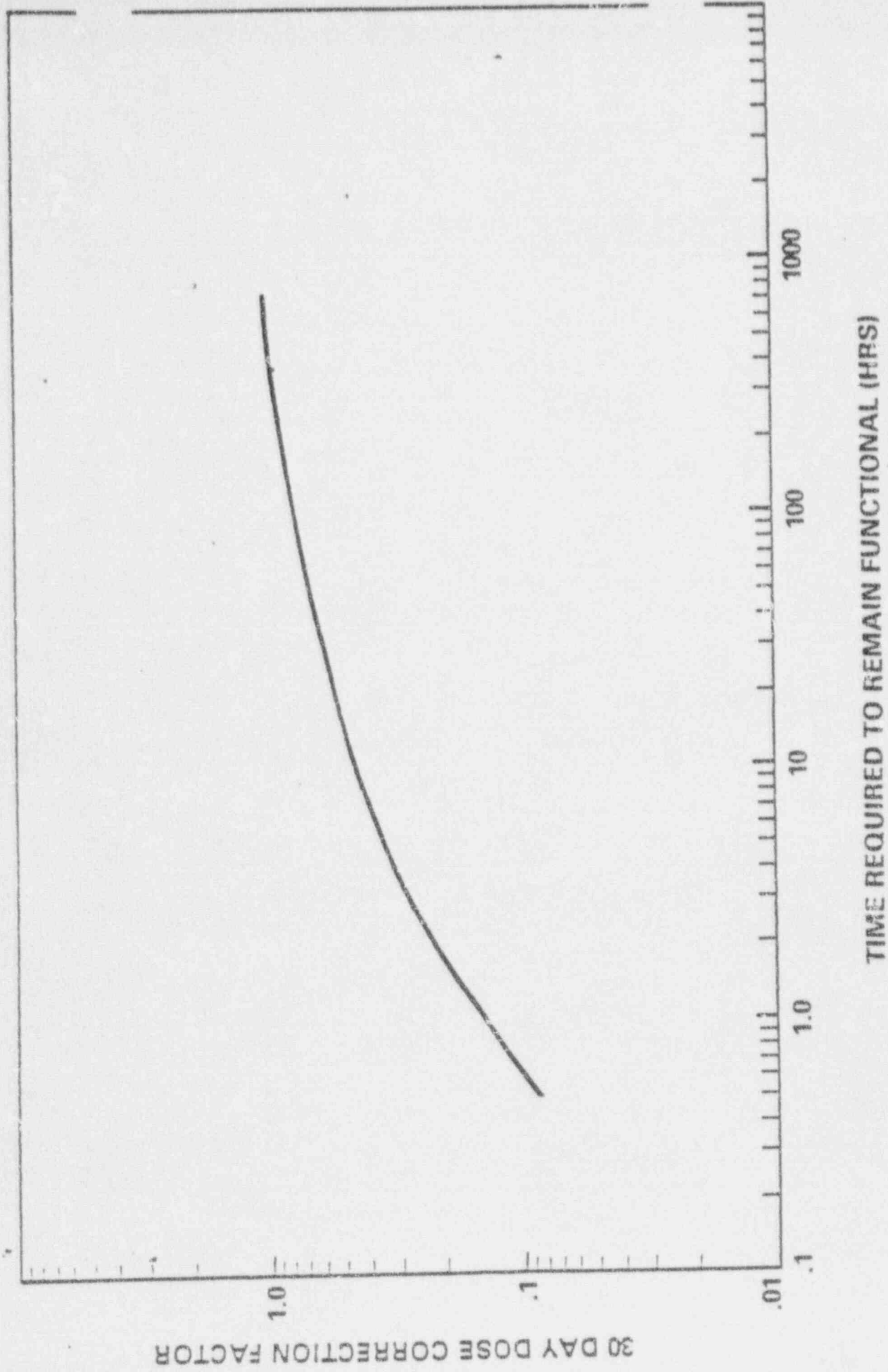
Step 4

Enter Figure 4 at 1 hour and read a correction factor of 0.15. Apply this factor to the sum of the doses determined from steps 2 and 3 to correct the 30 day total dose to the equipment inside the compartment to 1 hour.

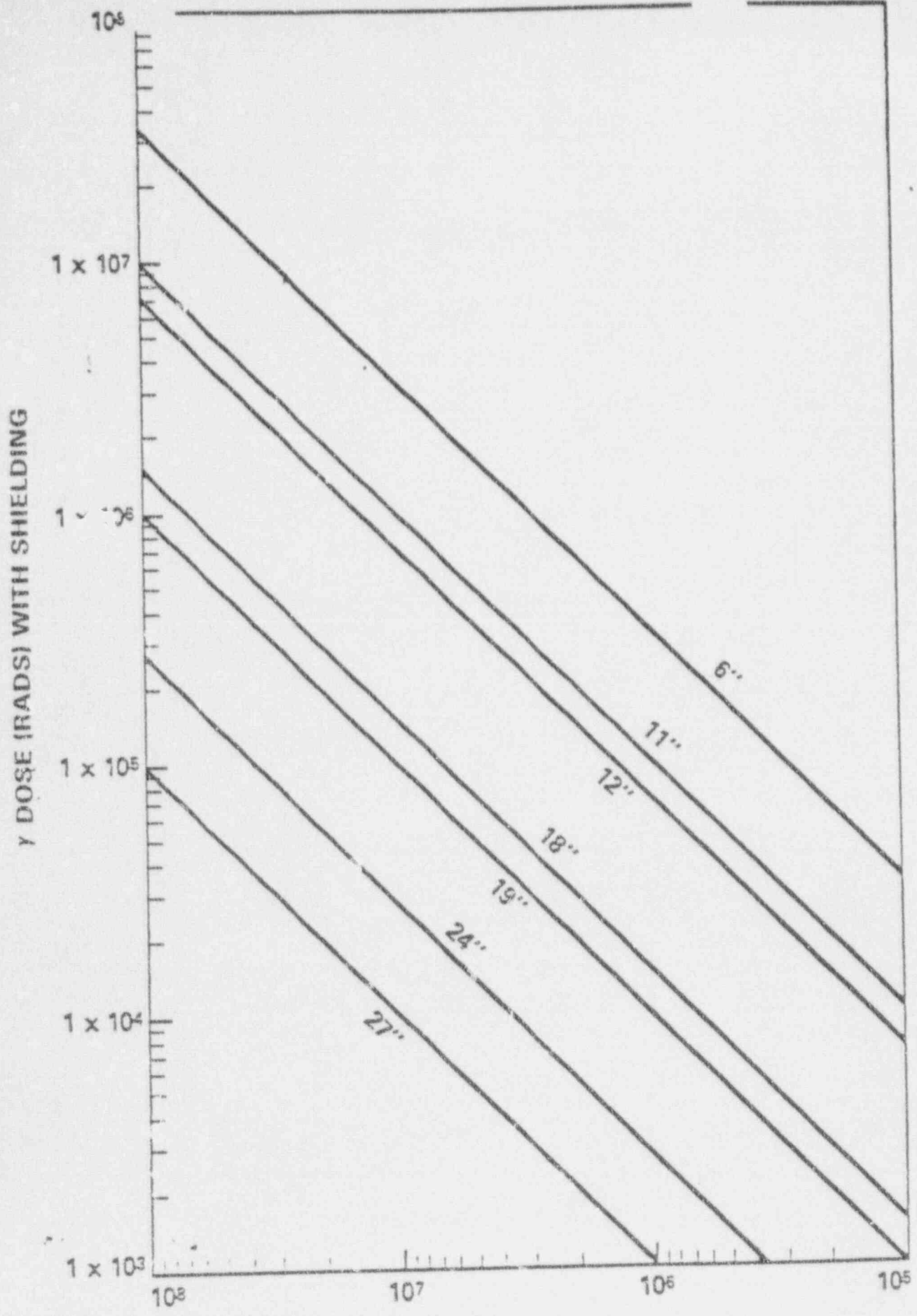
$$0.15 (2.0 \times 10^6) = 3 \times 10^5 \text{ RADS}$$

In this particular example the service condition of 2×10^6 RADS specified is conservative with respect to the estimated dose of 3×10^5 RADS calculated in steps 1 through 4 and is, therefore, acceptable.

FIGURE 4
DOSE CORRECTION FOR TIME REQUIRED TO REMAIN FUNCTIONAL



DOSE CORRECTION FACTOR FOR CONCRETE SHIELDING
(γ ONLY)



Y DOSE (RADS) WITHOUT SHIELDING (FROM FIGURE 1)

FIGURE 3
USE CORRECTION FACTOR FOR COMPARTMENT VOLUME

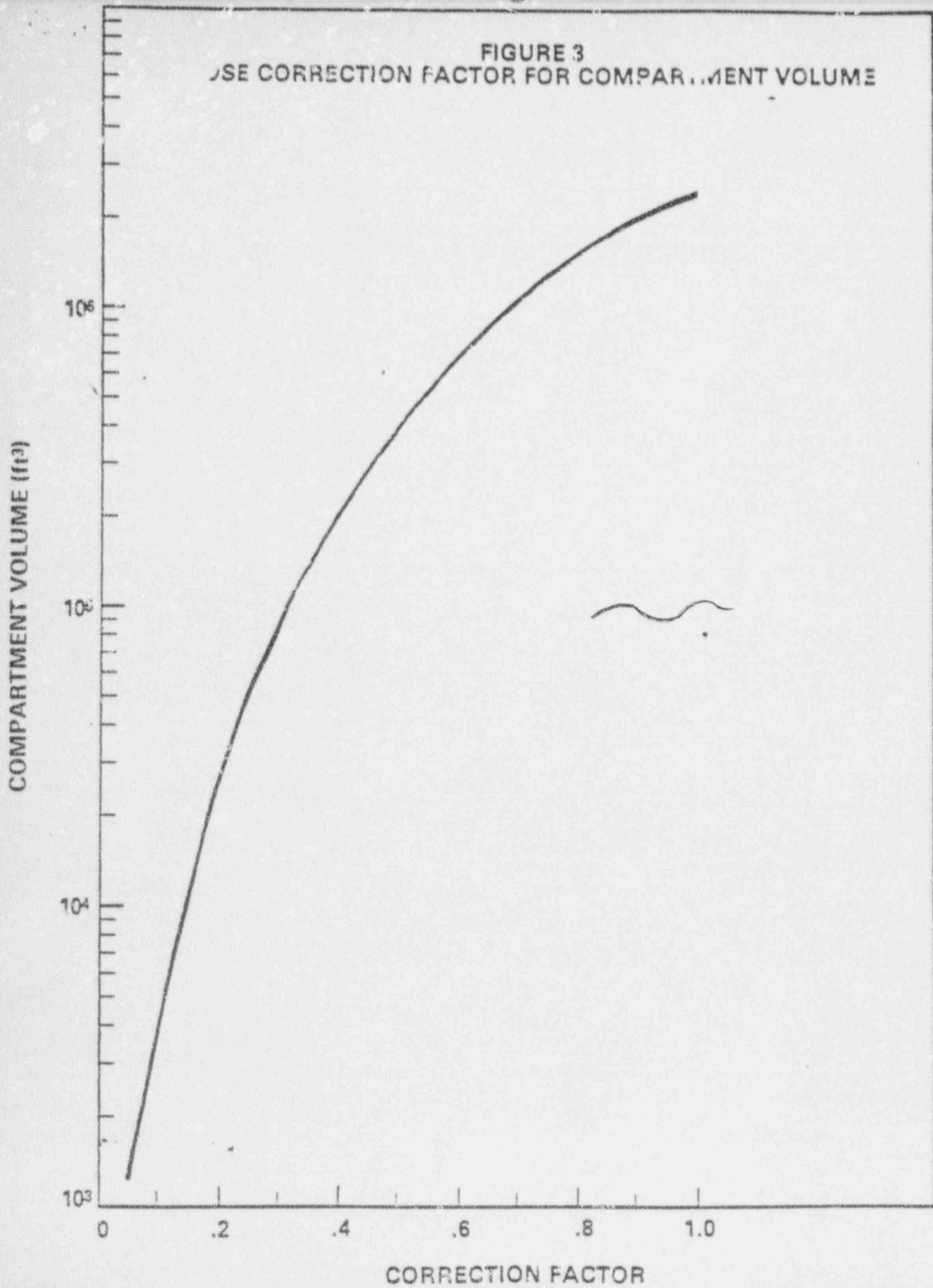
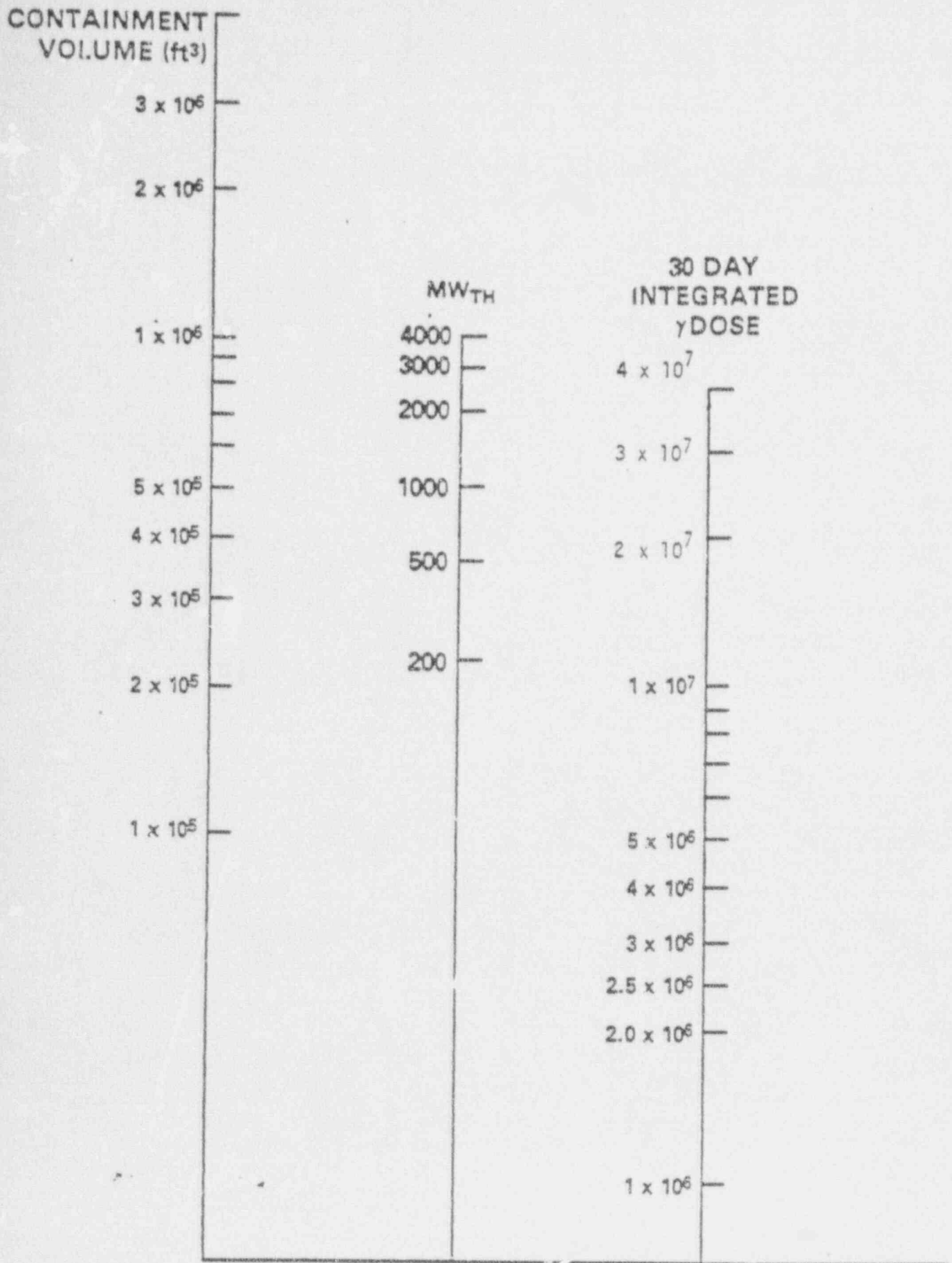


FIGURE 1
NOMOGRAM FOR CONTAINMENT VOLUME AND REACTOR POWER
LOCA DOSE CORRECTIONS*



*MSLB ACCIDENT DOSES SHOULD BE READ AS A FACTOR OF 10 LESS

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

SSINS: 6820
ACCESSIONS NO:
7912190696

February 29, 1980

IE Bulletin No. 79-01B
Supplement Information

ENVIRONMENTAL QUALIFICATION OF CLASS IE EQUIPMENT

Enclosed are the generic questions and answers which resulted from NRC Task Group/Licensee "workshop" meetings held recently in NRC Regional Offices regarding IE Bulletin No. 79-01B. This information is intended to further the understanding of the qualification review process and reporting requirements of the Bulletin.

The further intent of this information is to assist the licensees in providing a method of approach acceptable to the assigned NRC Task Review Group in determining adequacy of the environmental qualification of Class IE Electrical Equipment installed at their respective facilities.

It should be recognized that the review of the licensee's responses may generate additional need for guidance of finalized resolution of the environmental qualification issue.

Enclosure:
Generic Questions and Answers
to IE Bulletin No. 79-01B

GENERIC QUESTIONS AND ANSWERS TO IE BULLETIN No. 79-01B

- Question 1 IEB 79-01B indicates the scope of the task is only that equipment exposed to a harsh environment. Enclosure 4, Section 4.3.3 identified areas outside of containment not exposed to harsh environmental conditions as the results of an accident. Should these areas be included in our evaluations?
- Answer 1 No. Although the guidelines encompass all safety-related electrical equipment and components, the scope of IEB 79-01B is limited to only that electrical equipment which is exposed to the harsh environments identified in action item 1, including where fluids are recirculated from inside containment to accomplish long-term cooling following a LOCA. All equipment and components identified in action item 1 shall be included in the subsequent actions required by IEB 79-01B.
- Question 2 IEB 79-01B action item 1 and Enclosure 4 indicate that emergency procedures be used to identify equipment to be included in the master list. Should all the equipment identified in the emergency procedures be included in the master list?
- Answer 2 All the equipment the licensee relies upon in the emergency procedures to mitigate design basis events that may be exposed to a harsh environment must be identified in response to Question 1. It is not the intent of this task to change the existing procedures by removing references to equipment or components that are considered nonessential and not environmentally qualified. This master list identifies all equipment and components that must be evaluated in response to action item 4. A determination should be made that sufficient equipment is environmentally qualified to permit accident mitigation. A tabulation of other equipment or components which are referenced in the Emergency Procedures but are not relied upon should be available for NRC review. Justification should also be available so that this non-qualified equipment will not be misleading to the operator.
- Question 3 Is note 2 of Appendix A to Enclosure 4 within the scope of this task?
- Answer 3 Only those emergency shutdown systems that could be used for mitigation of a LOCA or HELB and are exposed to a harsh environment identified in response to Question 1. Licensee review should: (1) identify equipment that could be used to achieve cold shutdown following LOCA or HELB; and (2) determine if environmental qualification exists. For equipment that is not environmentally qualified the licensee should either provide plans to qualify this equipment or provide justification that qualification is not needed to achieve safe shutdown to meet licensing requirements applicable to your facility.

Question 4 What is the basis for the 340 Degrees F for 6 hours requirement identified in Enclosure 4 and NUREG 0588, Figure C 1?

Answer 4 For minimum high temperature conditions in pressure suppression type containments, we do not require that 340 Degrees F for 6 hours be used for BWR drywells or that 340 Degrees F for 3 hours be used for PWR ice condenser lower compartments. These values are from a bounding high temperature profile (see Section 1.1 and 1.2 of NUREG 0588) that can be used in lieu of a plant specific profile, provided that expected pressure and humidity conditions as a function of time are accounted for.

In general, the containment temperature and pressure conditions as a function of time should be based on analyses in the FSAR. However, these conditions should bound that expected for coolant and steam line breaks inside the containment. The steam line break conditions should include superheated conditions: the peak temperature, and subsequent temperature/pressure profile as a function of time. If containment spray is to be used, the impact of the spray on required equipment should be accounted for.

Question 5 Should equipment or systems which are presently planned to be modified as a result of actions, such as lessons learned, to be included in the response to IEB 79-01B?

Answer 5 No.

Question 6 Will there be any other actions required when the NRC completes its evaluation of the responses to IEB 79-01B and any related corrective actions deemed necessary are complete?

Answer 6 The NRC staff does not foresee any additional actions for the electrical equipment and components which are included in the scope of IEB 79-01B; however, if new problems or concerns are identified, appropriate action will be taken.

Question 7 Are Spare Parts required to meet 79-01B?

Answer 7 Yes. The Spare Parts are required to meet the same criteria as the installed electrical equipment or component resulting from the evaluation of IEB 79-01B.

Question 8 The instruction sheet for Enclosure 3 "System Component Evaluation" indicates that outstanding items be identified. What is the definition of outstanding items?

- Answer 8 An outstanding item is defined as that item that does not meet the environmental qualification guidelines and requirements of IEB 79-01.
- Question 9 Are the requirements and positions in NUREG 0588 the same as those in NUREG 0578 in relation to environmental qualification of electrical equipment and components?
- Answer 9 Yes.
- Question 10 NUREG 0588 is out for comment. Does the staff expect any significant changes which may impact this effort?
- Answer 10 No.
- Question 11 When it is determined, as a result of the efforts required by IEB 79-01B, that specific equipment be upgraded, are the guidelines in Enclosure 4 to be used?
- Answer 11 As a minimum the same requirements that were used to determine the acceptability of the electrical equipment and components within the scope of IEB 79-01B may be used; however, if equipment is available which meets the requirements of IEEE 323-1974 it should be used.
- Question 12 Does the Licensee Event Report (LER) requirements of IEB 79-01B supercede or change the reporting requirements already defined?
- Answer 12 No. The requirement for reporting in IEB 70-01B does not change the reporting requirements defined in the license conditions.
- Question 13 Are only those items known to be unqualified immediately reportable whereas items for which there is no data or insufficient data are open items to be resolved, but are not immediately reportable?
- Answer 13 When a determination has been made that the existing data is inadequate or no data exists to have reasonable assurance that the Class IE electrical equipment components can perform their safety-related function required in the specified FSAR environments, that is reportable per IEB 79-01B. The time and technical judgments required to make the determination should be based on the significance of the specific equipment, components and the discrepancies.

- Question 14 Are the results of an evaluation using the materials identified in Enclosure 4, Appendix C, of an acceptable method of addressing the effects of aging within the scope of Bulletin 79-01B?
- Answer 14 Yes, for those materials on the list, however, Appendix C indicates this is a partial list. Your evaluation in response to IEB 79-01B may identify other materials that are susceptible to significant degradation.
- Question 15 What are the sources Appendix C-1 used to identify the materials in Table C-1 and establish the failure levels?
- Answer 15 Typical sources for the information are given in Appendix C. Your information of materials not on this table should identify the source for your evaluation.
- Question 16 Is additional effort or calculations required for radiation service conditions if previous efforts did not utilize the methodology or assumptions identified in NUREG 0588?
- Answer 16 Yes, the extent of the effort required will be dependent on the significance of the difference in methodology and assumptions.
- Question 17 Will extension of time be granted for schedules if identified in IEB 79-01B action item 7.
- Answer 17 The schedule was based on the significance of the safety concerns relating to the adequacy of environmental qualification of electrical equipment or components. Any projected deviations from these schedules should be identified to the Regional Office by a written request. The NRC staff will make a determination on a case-by-case basis.

RECENTLY ISSUED
IE BULLETINS

Bulletin No.	Subject	Date Issued	Issued To
80-04	Analysis of a PWR Main Steam Line Break With Continued Feedwater Addition	2/8/80	All PWR reactor facilities holding OLs and to those nearing licensing
80-03	Loss of Charcoal From Standard Type II, 2 Inch, Tray Adsorber Cells	2/6/80	All holders of Power Reactor OLs and CPs
80-02	Inadequate Quality Assurance for Nuclear	1/21/80	All BWR licenses with a CP or OL
80-01	Operability of ADS Valve Pneumatic Supply	1/11/80	All BWR power reactor facilities with and OL
79-01B	Environmental Qualification of Class IE Equipment	1/14/80	All power reactor facilities with an OL
79-28	Possible Malfunction of Namco Model EA 180 Limit Switches at Elevated Temperatures	12/7/79	All power reactor facilities with an OL or a CP
79-27	Loss Of Non-Class-1-E Instrumentation and Control Power System Bus During Operation	11/30/79	All power reactor facilities holding OLs and to those nearing licensing
79-26	Boron Loss From BWR Control Blades	11/20/79	All BWR power reactor facilities with an OL
79-25	Failures of Westinghouse BFD Relays In Safety-Related Systems	11/2/79	All power reactor facilities with an OL or CP
79-17 (Rev. 1)	Pipe Cracks In Stagnant Borated Water System At PWR Plants	10/29/79	All PWR's with an OL and for information to other power reactors

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

September 29, 1980

IE Supplement No. 2 to Bulletin 79-01B: ENVIRONMENTAL QUALIFICATION OF CLASS
1E EQUIPMENT

Enclosed are the generic questions and answers which resulted from NRC/Licensee meetings in NRC Regional Offices during the week of July 14, 1980 regarding environmental qualification of Class 1E equipment in use at power reactor facilities. These answers address specific questions asked during the meetings. Due to the generic nature of some of these questions, the staff is issuing them as a bulletin supplement. The regional meetings highlighted the fact that in some cases, the scope and depth of the 79-01B review was not clear to licensees. Therefore, these answers may affect your 79-01B submittal. These submittals are required by a separate order to be completed by November 1, 1980.

Some answers given in Supplement No. 1 to IEB-79-01B are superseded by these answers. For example, in Bulletin Supplement No. 1, issued on February 29, 1980, the answer to question No. 5 specified that TMI lessons learned equipment was not included in the review. However, due to the extension of the response date from April 14, 1980 to November 1, 1980, this equipment is now being addressed since its installation is either complete or required before the issuance of the February 1, 1981 SER. (See Question No. 21 of this Supplement.)

No specific response is requested by this Supplement; however, all answers contained in the enclosure to this Supplement should be carefully reviewed and considered for applicability in your response to IEB 79-01B.

IE Bulletin No. 79-01B was issued under a blanket GAO clearance (B180225 (R0072); clearance expired July 31, 1980) specifically for identified generic problems. Supplement No. 2 to Bulletin 79-01B is for information, hence no GAO clearance is required.

Enclosures:

1. Generic Questions and Answers
to IEB-79-01B and Memorandum
and Order (CLI-80-21) dated
May 23, 1980

in the way 28th order

Q.1 Define the scope of review with respect to the June 1982 deadline. What is required beyond the June 1982 date for qualification?

By June 30, 1982, all safety-related electrical equipment potentially exposed to a harsh environment in nuclear generating stations, licensed to operate on or before June 30, 1982, shall be qualified to either the DOR guidelines or NUREG-0588 (as applicable). Safety-related electrical equipment are those required in bringing the plant to a cold shutdown condition and to mitigate the consequences of the accident. The qualification of safety-related electrical equipment to function in environmental extremes, not associated with accident conditions, is the responsibility of the licensee to evaluate and document in a form that will be available for the NRC to audit. Qualification to assure functioning in mild environments must be completed by June 30, 1982.

The qualification schedules for consideration of the dynamic loading of safety-related equipment (electrical and mechanical) and the environmental qualification review of mechanical equipment are being developed. It is the intention of the staff to initiate this effort as soon as possible.

Q.2 Clarify the required submittal dates for ORs, NTOLs, and CPs. What about OLs whose 100% license is not expected by June 1982?

A.2 The required schedule for submitting information in response to the Commission Order and Memorandum (CLI-80-21) is provided below. Plants who have received an operating license, either for full or limited power operation, are required to meet the schedule for operating reactors. Plants who have committed, to the NRC, to meet schedules in advance of those provided below are required to meet that commitment. In all cases, plants are required to have their equipment fully qualified to the applicable standards either by June 30, 1980, or by the time the operating license is granted, whichever comes later.

Operating Reactors and NTOL (operating license expected by February 1, 1981)

- Submittal to be received no later than November 1, 1980

OLs (operating license expected by June 30, 1982)

- Submittal to be received no later than 4 months prior to issuance of operating license

OLs and CPs (operating license expected after June 30, 1982)

- Submittal to be received no later than 6 months prior to issuance of operating license.

- Q.3 Define the requirements and applicable criteria for ORs, NTOLs, and OLs. Specifically address the NTOLs whose CP SER is prior to July 1974 and after July 1974. Can a CP whose SER is prior to 1974 use the DOR guidelines?
- A.3 Table 1 describes the application of each document. All operating reactors as of May 23, 1980, will be evaluated against the DOR guidelines. In cases where the DOR guidelines do not provide sufficient detail, but NUREG-0588 Category II does, NUREG-0588 will be used.

TABLE 1
REQUIREMENTS

<u>ORs</u>	<u>OLs</u>		<u>CPs</u>
DOR GUIDELINES	CP SER <u>Before 7/1/74</u>	CP SER <u>After 7/1/74</u>	
USE NUREG-0588 AS NECESSARY	NUREG-0588(CAT. II)	NUREG-0588(CAT. I)	NUREG-0588(CAT. I)
			OR
REPLACEMENT COMPONENTS USE NUREG-0588 (CAT. I)			NEW RULE WHEN IN EFFECT

All plants licensed after May 23, 1980, shall conform to NUREG-0588. In accordance with Regulatory Guide 1.89, all such operating licenses for facilities whose construction permit SER is dated July 1, 1974 or later, are to be reviewed against IEEE Std. 323-1974. Thus, for these licensees, the operating license applicant is to qualify equipment to the Category I column in NUREG-0588. For operating licenses issued after May 23, 1980, whose construction permit SER is dated before July 1, 1974, the operating license applicant is to qualify equipment to at least Category II column of NUREG-0588; unless the licensee made commitment in the construction permit record to use the 1974 standard, or unless the operating licensee application record indicates that the 1974 standard is to be used, in such cases Column I of NUREG-0588 is to be used.

While there are differences between the Category II column of NUREG-0588 and the DOR guidelines, the differences are in details and in the optional part of the documents. The minimum requirements set forth by these documents are general and compatible. Thus, the minimum standards set by either of the two documents are equally applicable to ORs and NTOLs.

- Q.4 Clarify the reporting requirements for LERs with respect to Part 50.55e vs 79-01B.

Are only those items, known to be unqualified, immediately reportable?
Are items, for which there are no data or for which there are insufficient data, open items to be resolved, but are not immediately reportable?

- A.4 The requirement for reporting in IEB 79-01B does not change the reporting requirements defined in the license conditions. In general, CPs should report via 50.55e. Operating plants should use the LER.

When a determination has been made that reasonable assurance does not exist to ensure that the Class IE electrical equipment component(s) can perform their safety-related function, that is reportable. Inadequate or no data are factors in this determination. The time and technical judgements required to make the determination should be based on the significance of this specific equipment, components, and the discrepancies.

- Q.5 How does the "Q" list review interface with the EQB effort? Can the NRC provide more specific guidance on how to pick out the required safety-related equipment?

- A.5 The "Q" list provides a source from which the required equipment may be selected. The information required to be submitted by November 1, 1980, is for safety-related electrical equipment potentially exposed to a harsh environment resulting from an accident. Safety-related equipment are those required to help bring the plant to cold shutdown and to mitigate the accident (LOCA, HELB inside or outside containment). "Mitigate" includes safety-related functions such as containment isolation, and prevention of significant release of radioactive material.

In order to "pick out" the safety-related equipment, the licensee should generate a list of safety functions typically performed by plant safety systems. Examples are listed in Table II. For each safety function identified in Table II, list the systems, subsystems, or components assumed available in the plant FSAR or emergency procedures to perform that function during a LOCA or any HELB inside or outside containment. If a plant specific safety function not listed in Table II is identified, that function and the corresponding systems or equipment to perform the function should be added to the licensee's list.

The systems and equipment identified above should be included regardless of the original classification when the plant received its operating license; i.e., some control grade equipment will probably be named in emergency procedures. However, if plant emergency procedures specify a preferred mode of accident mitigation involving equipment recognized by the licensee as unlikely to meet environmental qualification criteria, an alternate mode of performing the safety function and qualifiable equipment may be identified. In such cases, the emergency procedures must clearly indicate how the

operator is to use environmentally qualified safety-related display instrumentation to diagnose failure to perform such safety functions.

Plant emergency procedures typically include provisions for the operator to sample or monitor radioactivity levels or combustible gas levels, to confirm that valves are in the correct position, to monitor flow or temperature, etc. Some of these functions are essential for correct operator action, to mitigate accidents, and prevent radioactive releases. When this is the case, the radiation sensors, valve position indicators, pressure transmitters, thermocouples, etc., should be qualified to function in the relevant accident environment.

Licensees should, therefore, review their emergency procedures to determine the electrical components needed to perform the functions of Safety-Related Display Information, Post Accident Sampling and Monitoring, and Radiation Monitoring. When equipment implied by the emergency procedures is not listed, justification must be provided that failure of such equipment would not prevent accident mitigation or release of radioactivity.

Equipment now indicated in emergency procedures in response to TMI-2 Lessons Learned should be listed. Equipment which is or will be installed due to TMI Lessons Learned should be addressed similar to other existing safety-related equipment (e.g., saturation meter, sump level indicators, torus water volume, etc.).

The licensee should document anticipated service conditions in every portion of the plant where the environment could be influenced by the accident or its consequences. These service conditions should also be correlated with the safety-related systems and subsystems identified above. Whenever an item of safety-related equipment may be located in an environment outside the range of normal conditions, due to the harsh environment resulting from the accident, and the equipment is needed to mitigate the consequences of the accident, place it on the list of equipment in a potentially hostile environment. Conclusions which show that equipment is unqualified should include a basis for continued plant operation.

TABLE II

TYPICAL EQUIPMENT/FUNCTIONS NEEDED FOR
MITIGATION OF A LOCA OR MSLB ACCIDENT

Engineered Safeguards Actuation
Reactor Protection
Containment Isolation
Steamline Isolation
Main Feedwater Shutdown and Isolation
Emergency Power

Emergency Core Cooling
Containment Heat Removal
Containment Fission Product Removal
Containment Combustible Gas Control
Auxiliary Feedwater
Containment Ventilation
Containment Radiation Monitoring
Control Room Habitability Systems (e.g., HVAC, Radiation Filters)
Ventilation for Areas Containing Safety Equipment
Component Cooling
Service Water
Emergency Shutdown
Post Accident Sampling and Monitoring
Radiation Monitoring
Safety Related Display Instrumentation

- (1) These systems will differ for PWRs and BWRs and for older and newer plants. In each case, the system features which allow for transfer to recirculation cooling mode and establishment of long-term cooling with boron precipitation control are to be considered as part of the system to be evaluated.
 - (2) Emergency shutdown systems include those systems used to bring the plant to a cold shutdown condition following accidents which do not result in a breach of the reactor coolant pressure boundary together with a rapid depressurization of the reactor coolant system. Examples of such systems and equipment are the RHR system, PORVs, RCIC, pressurizer sprays, chemical and volume control system, and steam dump systems.
 - (3) More specific identification of these types of equipment can be found in the plant emergency procedures.
- Q.6 NUREG-0588 was issued for comment. Will any changes impact the requirements established by the Commission memorandum and order? Will the daughter standards referenced be corrected/changed?
- A.6 The requirement established by the Commission memorandum and order will not change as a result of comments on NUREG-0588. No substantive changes are anticipated in NUREG-0588 or in referenced daughter standards. A revision is anticipated, making corrections.
- Q.7 Can IEEE Std. 650 (Standards for Qualification of Class IE static battery chargers and invertors for nuclear power generating stations) be used for qualifying the balance of plant components which are not exposed to harsh environments?
- A.7 The methods and procedures relating to design stress analysis, aging of electrical/electronic components and the stress test identified in this standard are acceptable for qualifying the balance of plant components which are not exposed to harsh environments.

Q.8 Provide the staff's definition of "central location" for qualification documentation. What documentation is expected to be maintained? Will it be acceptable to maintain summary test reports at the utility central file and provide a reference to the NSSS Vendor's file for the actual test reports? Does NRC require test reports to be submitted to support qualification?

A.8 The central location should be at the utilities corporate headquarters or plant site. Both the DOR guidelines and NUREG-0588 specify that sufficient information must be available to verify that the safety-related electrical equipment has been qualified in accordance with the guidance and requirements. Details for the information and documentation required for type tests, operating experience, analysis, and extrapolation of test data from operating experience are provided in Section 5 of NUREG-0588 and Section 8 of IEEE Std. 323-74.

The staff will accept summary test reports maintained at the utility's central file which reference the actual test reports and data available in a single location at the NSSS vendor's facility. The Licensee/ Applicant must make the determination that necessary information and documentation, to support qualification of equipment, is in conformance with DOR guidelines and NUREG-0588. This vendor information file must be maintained current, auditable and available throughout the life of the referencing plant.

Test reports are not required to be submitted. Test report references must be included in the plant submittals and these reports must be available for staff review on demand.

Q.9 The staff was directed to codify, by Technical Specification, some of the requirements of the Order. Can you give some of the details of this requirement, how the staff expects to meet this directive and when?

A.9 The staff has proposed to the Commission changes to the Technical Specifications (e.g., Appendix A Section 6.10 of the license) which require the establishment and maintenance of a centrally located file which will contain the information necessary to verify the qualification adequacy of all safety-related electrical equipment.

Q.10 With respect to the NRC data base, how will utilities address and obtain information from it?

A.10 The industry access method for the data base will be addressed in the final stages of system development. This information should be available by mid-1981. Licensees will be informed at that time.

Q.11 How should submittals containing data and qualification information be submitted? What format should we use if we have several facilities at different stages (OR, NTOL, CP)?

Q.11 The qualification information and data should be submitted with the appropriate officer's notarized sworn statements. The format for the data should be in accordance with the format provided in I&E Bulletin 79-01B or the letters provided to the plants in the SEP program. Either format is acceptable.

Q.12 Is testing required of equipment which completes its safety-related function within the first minute(s) of a LOCA or HELB? (E.g., nuclear instrumentation or other instruments providing RPS inputs, isolation valves, etc.)

A.12 The staff does not require that the nuclear instrumentation and its associated components be environmentally qualified for a LOCA or HELB. The nuclear instrumentation system is used for transient conditions but is not required for a LOCA or HELB.

The staff does require that equipment designed to perform its safety-related function within a short time into an event be qualified for a period of at least 1 hour in excess of the time assumed in the accident analysis. The staff has indicated that time is the most significant factor in terms of the margins required to provide an acceptable confidence level that a safety-related function will be completed. Our judgment of at least 1 hour is based on the acceptance of a type test for a single unit and the spectrum of accidents (small and large breaks) bounded by the single test. Also see answer to question 21.

Q.13 Testing is currently being performed on some equipment, and contracts have been issued for testing additional equipment specifying conformance to IEEE Std 323-1971. For sequential testing, how do we factor in aging? If early test failure occurs due to "non E-Q" mechanisms, can the test be extrapolated using analytical methods?

A.13 Sequential testing requirements are specified in NUREG-0588 and the DOR guidelines. Licensees must follow the test requirements of the applicable document.

1. If the test has been completed without aging in sequence, justification for such a deviation must be submitted.
2. If testing of a given component has been scheduled but not initiated, the test sequence/program should be modified to include aging.
3. Test programs in progress should be evaluated regarding the ability to comply by incorporating aging in the proper sequence. These would then fall in the first or second category.

When a failure occurs due to a non-EQ related mechanism, acceptability of analysis to extrapolate the test data would be dependent on several considerations (e.g., the specific function being demonstrated, the

failure mechanism, when the failure occurred, etc.), may be very difficult to achieve. If such a failure occurs it may be more prudent to correct the failure and continue with the test.

Q.14 What is the definition of harsh environment? How are the environmental profiles defined outside containment?

A.14 Harsh environment is defined by the limiting conditions, as specified in IE Bulletin 79-01B, resulting from the entire spectrum of LOCAs and HELBs. Specifically, the harsh environment from a LOCA considers the worst parameters resulting over the spectrum of postulated break sizes, break locations and single failures. Similarly, the HELBs inside and outside of containment consider the spectrum of breaks including main steam and feedwater line breaks. The parameters to be considered are: temperature, pressure, humidity, caustic spray, radiation, duration of exposure, aging and submergence. Mechanical and flow-induced vibrations and seismic effects will be considered separately.

Environmental profiles for HELB outside of containment have not been generically established due to the uniqueness of each facility. Service conditions for areas outside containment exposed to a HELB must be evaluated on a plant-by-plant basis. Each of the parameters listed above must be considered. Acceptable engineering methods should be used for this calculation. Temperature and pressure history may be available from earlier HELB evaluations. The radiation source terms are discussed under Question 18 below. Further guidance for selecting the piping systems and conducting the review are delineated in Regulatory Guide 1.46 and Standard Review Plans 3.6.1 and 3.6.2.

Q.15 The DOR Guidelines and NUREG-0588 give time and temperature parameters. Can we use different values of these parameters? Will plant-specific profiles still be with the guidance provided?

Q.15 For minimum high temperature conditions in pressure-suppression-type containments, we do not require that 340 F for 6 hours be used for BWR drywells or that 340 F for 3 hours be used for PWR ice condenser lower compartments. These values are a screening device, per the Guidelines, and can be used in lieu of a plant-specific profile, provided that expected pressure and humidity conditions as a function of time are accounted for.

In general, the containment temperature and pressure conditions as a function of time should be based on analyses in the FSAR. However, these conditions should bound those expected for coolant and steam line breaks inside the containment with due consideration of analytical uncertainties. The steam line break condition should include superheated conditions: the peak temperature, and subsequent temperature/pressure profile as a function of time. If containment spray is to be used, the impact of the spray on required equipment should be accounted for.

The adequacy of a plant-specific profile is dependent on the assumption and design considerations at the time the profiles were developed. The DOR guidelines and NUREG-0588 provide guidance and considerations required to determine if the plant-specific profiles encompass the LOCA and HELB inside containment.

Q.16 Could you elaborate on what the staff expects with regard to quality assurance?

If parts or subcomponents are purchased from a vendor who does not have a quality assurance program, can it be qualified to meet IEEE Std. 323-74 requirements?

A.16 The QA programs should accommodate any increased scope due to the new environmental qualification documentation requirements. Procedures incorporated by the licensee for data acquisition should be documented and available for staff review upon request. Requirements for QA programs are provided in Part 50, Appendix B, of the Code of Federal Regulations.

Part 50, Appendix B of the Code of Federal Regulations states that the applicant/licensee shall be responsible for the establishment and execution of quality assurance programs. Specifically in purchasing parts or components, it is the responsibility of the licensee/applicant to ensure that the applicable quality assurance procedures for their plant are met.

In determining the qualification status of existing equipment purchased from a vendor, where a QA program did not exist, the utility should consider the following:

1. The complexity of design, complexity of manufacturing process, and end use.
2. Past performance of vendor.
3. Past operating history of products, especially similar products, made by vendor.
4. Procedures, equipment, and results of environmental qualification testing relative to those for other equipment for which a QA program was applied.

Q.17 Define the requirements for "replacement parts." Are they the same for "spare" parts? Clearly discuss the alternatives for existing inventories of parts/components. If equipment is ordered to meet IEEE Std. 323-1974 standard but lead time exceeds June 1982, can we use IEEE Std. 323-1971 qualified components in the interim?

A.17 The requirements for "replacement" and "spare" parts are the same for the purposes of complying with the Commission order and

memorandum. After May 1980, all parts used to replace presently installed parts shall be qualified to Category I of NUREG-0588 "unless there are sound reasons to the contrary." Nonavailability and/or the fact that the part to be used as a replacement is a spare part purchased prior to May 23, 1980, and is in stock are among the factors to be considered in weighing whether there are "sound reasons to the contrary." All replacement parts shall as a minimum conform to the requirements described in the answer to question 3. Justification for deviation from Category I or NUREG-0588 shall be documented by the licensee and records shall be available for audit, upon request by the NRC.

Q.18 DOR Guidelines, NUREG-0588 and NUREG-0578, define or give guidance for calculating radiation source terms. However, since one is more restrictive than the other, which do we use?

A.18 Both the DOR guidelines and NUREG-0588 are similar in that they provide the methods for determining the radiation source term when considering LOCA events inside containment (100% noble gases/50% iodine/1% particulates). These methods consider the radiation source term resulting from an event which completely depressurizes the primary system and releases the source term inventory to the containment.

NUREG-0578 provides the radiation source term to be used for determining the qualification doses for equipment in close proximity to recirculating fluid systems inside and outside of containment as a result of LOCA. This method considers a LOCA event in which the primary system may not depressurize and the source term inventory remains in the coolant.

NUREG-0588 also provides the radiation source term to be used for qualifying equipment following non-LOCA events both inside and outside containment (10% noble gases/10% iodine/0% particulates).

When developing radiation source terms for equipment qualification, the licensee must ensure consideration is given to those events which provide the most bounding conditions. The following table summarizes these considerations:

	<u>LOCA</u>	<u>NON-LOCA HELB</u>
Outside Containment	NUREG-0578 (100/50/1 in RCS)	NUREG-0588 (10/10/0 in RCS)

Inside Containment

Larger of

NUREG-0588
(100/50/1
in containment)

NUREG-0588
(10/10/0
in RCS)

or

NUREG-0578
(100/50/1
in RCS)

- Q.19 Can gamma equivalents be used rather than beta exposure for radiation qualification?
- A.19 Yes. Gamma equivalents may be used when consideration of the contributions of beta exposure have been included in accordance with the guidance given in the DOR guidelines and NUREG-0588. Cobalt 60 is one acceptable gamma radiation source for environmental qualification of safety-related equipment. Cesium 137 may also be used.
- Q.20 If a piece of equipment will become submerged after completing its required action, must it be qualified for submergence?
- A.20 If the equipment (1) meets the guidance and requirements of the DOR guidelines or NUREG-0588 for the LOCA and HELB (small and large breaks) accidents and (2) licensees demonstrate that its failure will not adversely affect any safety-related function or mislead the operator after submergence, the equipment could be considered exempt from that portion (submergence) of qualification.
- Q.21 What qualification is required of Reactor Pressure Vessel internal instrumentation (e.g., thermocouples) and new instruments required as the result of TMI Lessons Learned?
- A.21 TMI Lessons Learned instrumentation will be considered in the February 1, 1981 SER. This equipment is subject to the same requirements as other safety-related electrical equipment. The guidance and requirements of NUREG-0588 referenced daughter standards, and Reg Guides will be used by the staff in assessing the adequacy of the qualification information. The in-core environment should consider the worst source term for radiation effects, the worst humidity for the corresponding temperature, and high temperatures consistent with that of a damaged core.
- Q.22 Is qualification "by use" an acceptable method (e.g., CRDM's in BWRs)?
- A.22 Qualification by use has limited application. Often the equipment has never seen the harsh environment and no conclusions can be drawn as to its operability in a harsh environment. Some qualification

based on operating experience is a recognized method subject to the requirements of NUREG-0588 and the Guidelines. Credit can be taken for the natural aging of the equipment and for the location of the equipment or other portions of the overall qualification information.

Q.23 How long should "long term" equipment be qualified for environmental qualification?

A.23 "Long term" for the purpose of qualifying equipment for a harsh environment is variable. A determination of "long term" for qualification of equipment should be based on the considerations listed below for each postulated accident scenario. Justification for the value used should be provided with the equipment qualification documentation.

1. The time period over which the equipment is required to bring the plant to cold shutdown and to mitigate the consequences of the accident.
2. The ability to change, modify or add equipment during the course of the accident or in mitigating its effects which will provide the same safety-related function.

Q.24 Why do we want component surface temperature rather than the bulk environment temperature?

A.24 Temperature measurements are required during the qualification testing to establish that the component was subjected to the most severe temperature environment postulated to occur. These temperature measurements are required to be made as close to the component surface as practicable to ensure that they are representative of the environment in which the component is tested. The surface temperature of the component, although not specifically required, is considered to be a conservative measurement of the test temperature environment.

RECENTLY ISSUED
IE BULLETINS

Bulletin No.	Subject	Date Issued	Issued To
80-22	Automation Industries, Model 200-520-008 sealed-source connectors	9/11/80	All radiography licensees
79-26 Revision 1	Boron loss from BWR control blades	8/29/80	All BWR power facilities with an OL
80-20	Failures of Westinghouse Type W-2 Spring Return to Neutral Control Switches	7/31/80	To each nuclear power facility in your region having an OL or a CP
80-19	Failures of Mercury-Wetted Matrix Relays in Reactor Protective Systems of Operating Nuclear Power Plants Designed by Combustion Engineering	7/31/80	All nuclear power facilities having either an OL or a CP
80-18	Maintenance of Adequate Minimum Flow Thru Centrifugal Charging Pumps Following Secondary Side High Energy Line Rupture	7/24/80	All PWR power reactor facilities holding OLs and to those PWRs nearing licensing
Supplement 2 to 80-17	Failures Revealed by Testing Subsequent to Failure of Control Rods to Insert During a Scram at a BWR	7/22/80	All BWR power reactor facilities holding OLs
Supplement 1 to 80-17	Failure of Control Rods to Insert During a Scram at a BWR	7/18/80	All BWR power reactor facilities holding OLs
80-17	Failure of Control Rods to Insert During a Scram at a BWR	7/3/80	All BWR power reactor facilities holding OLs
80-16	Potential Misapplication of Rosemount Inc., Models 1151 and 1152 Pressure Transmitters with Either "A" or "D" Output Codes	6/27/80	All Power Reactor Facilities with an OL or a CP

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

October 24, 1980

IE Bulletin No.: 79-01B Supplement No. 3: ENVIRONMENTAL QUALIFICATION OF CLASS
IE EQUIPMENT

Description of Circumstances:

Two issues were raised by Supplement No. 2 which require clarification. They are: (1) the dates required for submittal of qualification information for TMI related equipment, and (2) whether the equipment required to achieve a Cold Shutdown condition must be environmentally qualified if the licensing basis for the plant was a Hot Safe Shutdown condition.

- (1) Supplement No. 2 (Q.1, Q.5) addressed the minimum cold shutdown requirements. The staff position on this issue is that the licensee must identify and environmentally qualify the equipment needed to complete one method (path) of achieving and maintaining a cold shutdown condition. The equipment of other paths must be reviewed to assure that its failure will not aggravate or contribute to the accident (ref. Q.5 Supp. No. 2).

Due to an inconsistency between Supplement No. 1 and Supplement No. 2, the staff position on this issue was unclear. Therefore, the following will apply:

- a. The qualification information for equipment needed to achieve and maintain a Hot Safe Shutdown condition must be submitted not later than November 1, 1980.
 - b. The qualification information for equipment required to achieve and maintain a Cold Shutdown condition (ref. Q.1 and Q.5 of Supplement No. 2) must be submitted not later than February 1, 1981.
- (2) IEB 79-01B required a 90 day response which was due in mid-April 1980. Supplement 1 (Feb. 1980) informed licensees that equipment which was "planned" to be installed as a result of lessons learned need not be addressed in that response. Some of this equipment has since been installed. Supplement No. 2 (Q.5, Q.21) identified that the staff position was that equipment which is installed should be treated in a manner similar to all other safety-related electrical equipment and be addressed in the November 1, 1980 submittal. This position represents no change in staff position regarding the scope of the review. However, since the staff position on this issue was unclear the following will apply:
 - a. Qualification information for installed TMI Action Plan equipment must be submitted by February 1, 1981.
 - b. Qualification information for future TMI Action Plan equipment (ref. NUREG-0737, when issued), which requires NRC pre-implementation review, must be submitted with the pre-implementation review data.

- c. Qualification information for TMI Action Plan equipment currently under NRC review should be submitted as soon as possible.
- d. Qualification information for TMI Action Plan equipment not yet installed which does not require pre-implementation review should be submitted to NRC for review by the implementation date.

The above items 1 and 2 represent no change in staff position regarding the scope of the 79-01B Supplement 2 review.

IE Bulletin No. 79-01B was issued under a blanket GAO clearance (B180225 (R0072), clearance expired July 31, 1980) specifically for identified generic problems. Supplement No. 3 to Bulletin 79-01B is for information, hence no GAO clearance is required.

RECENTLY ISSUED
IE BULLETINS

Bulletin No.	Subject	Date Issued	Issued To
Supplement 2 to 79-01B	Environmental Qualification of Class 1E Equipment	9/30/80	All power reactor facilities with an OL
80-22	Automation Industries, Model 200-520-008 Sealed-source Connectors	9/11/80	All radiography licensees
79-26 Revision 1	Boron Loss from BWR Control Blades	8/29/80	All BWR power facilities with an OL
80-20	Failures of Westinghouse Type W-2 Spring Return to Neutral Control Switches	7/31/80	To each nuclear power facility in your region having an OL or a CP
80-19	Failures of Mercury-Wetted Matrix Relays in Reactor Protective Systems of Operating Nuclear Power Plants Designed by Combustion Engineering	7/22/80	All nuclear power facilities having either an OL or a CP
80-18	Maintenance of Adequate Minimum Flow Thru Centrifugal Charging Pumps Following Secondary Side High Energy Line Rupture	7/24/80	All PWR power reactor facilities holding OLs and to those PWRs nearing licensing
Supplement 2 to 80-17	Failures Revealed by Testing Subsequent to Failure of Control Rods to Insert During a Scram at a BWR	7/22/80	All BWR power reactor facilities holding OLs
Supplement 1 to 80-17	Failure of Control Rods to Insert During a Scram at a BWR	7/18/80	All BWR power reactor facilities holding OLs
80-17	Failure of Control Rods to Insert During a Scram at a BWR	7/3/80	All BWR power reactor facilities holding OLs
80-16	Potential Misapplication of Rosemount Inc., Models 1151 and 1152 Pressure Transmitters with Either "A" or "D" Output Codes	6/27/80	All Power Reactor Facilities with an OL or a CP

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2/14/92

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NUCLEAR POWER STATION
QUALIFICATION TYPE TEST REPORT
LIMITORQUE VALVE ACTUATORS
FOR PWR SERVICE
PROJECT #600456

070516

Tested

Tested per IEEE Standard 382-1972

Test Performed 7 June 1974 to 22 November 1974

Prepared by Limitorque Corporation
Test Laboratory

Prepared by

Walter L. Sykes

Walter L. Sykes
Test Engineer

Date

12/9/75

Approved

W. J. Denkowski

W. J. Denkowski
Chief Engineer

Date

Dec 9, 75

~~2903150370~~ RA

NUCLEAR REGULATORY COMMISSION

Docket No. 50-348/364 Official Ech. No. 53
in the matter of ALABAMA POWER CO.
Staff ✓ IDENTIFIED 2/14/72
Applicant _____ RECEIVED 2/14/72
Intervenor _____ REJECTED _____
Cont'g Off'r _____
Contractor _____ DATE 12-9-75
Other _____ Witness _____
Reporter [Signature] _____

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1.0 Introduction

A typical Limitorque Valve Actuator, SMB-0 with a 40 ft-lb motor (SMB-0-40) was submitted for qualification to the type test specified by IEEE std. 382- '72' for service in a Pres-surized Water Reactor (PWR) containment chamber in Nuclear Power Station application.

The SMB-0-40 Valve Actuator was subjected to mechanical aging simulation to approximate 40 years service life, radiation exposure (Both Normal Life levels plus accumulative doses) and other environmental conditions all as indicated in IEEE Std. 382-'72'. Additional load cycling was performed after LOCA environmental conditions to determine the post accident abilities of the valve actuator.

2.0 Identification of Sample Valve Actuator

TEST UNIT

A limitorque SMB-0 Nuclear Valve Actuator with a 40 ft-lb nuclear containment motor (RH Insulation Class) was constructed per standard nuclear bill of materials and standard nuclear motor specifications. The following information was taken from the identification tags:

As an added test margin, the test actuator was submitted to additional load cycling after completion of all the required environmental conditions and prior to final inspection. This additional load cycling is not a requirement of IEEE Std. 382-'72'. A base test motor was processed with the Test Unit for additional engineering information.

3.1 Aging Simulation (IEEE Std. 382 para. 4.2)

3.1.1 Thermal Aging

Thermal aging was performed on the motor stators by the motor manufacturer (Reliance Electric Company) in cooperation with Limitorque Corporation.

The motor stator was heat aged for 100 hours at 180^o C. A certificate of compliance was supplied by Reliance Electric Company verifying the thermal aging of the stator (see Appendix A.)

3.1.2 Mechanical Aging

Mechanical Aging was performed on the Test Unit by the Limitorque Test Laboratory. Data on the Aging & Post test Cycling is presented in Appendix B. Although IEEE Std. 382-'72' requires 500 cycles, the unit was cycled thru 1208 cycles.

each cycle consisting of one close stroke and one open stroke at room ambient conditions. The Limit-torque Valve Actuator was seated at the end of the close stroke and the seating thrust monitored. The thrust applied was equivalent to the thrust & torque ratings of the SMS-0 actuator. A typical stroke time of 40 sec. was chosen for the actuator operating time.

3.1.3 Radiation Aging (IEEE Std. 382-'72' Part II Section 1)

The Aging dose of 4 Megarads was combined with the accident dose (200 Megarad) per IEEE Std. 382-'72' part III and is discussed in the following section 3.3 of this report.

3.2 Seismic Qualification (IEEE Std. 382 Para. 4.3)

The Seismic Qualification was performed by Lockheed Electronics, Inc. Environmental Laboratory on a Reaction Vibration machine. The Test Unit with motor, was scanned in each of the three major axis over a frequency range of 5 to 35 Hz to search for resonance. No resonance was found.

The Valve Actuator was mounted on a test fixture to provide simulated valve seating loads, during the dwell portions of the seismic qualifications. The load imposed was equal to the rating of the test actuator.

The vibration machine was adjusted to a displacement (0.050" D. A.) equivalent to 3 g's acceleration at a frequency of 35 Hz. The test sample was then vibrated for a period of ten (10) seconds at each even integer of frequency from 6 Hz to 34 Hz. The unit was operated during the dwell through one cycle from open limit-to-torque switch seated position and back to original point. The vibration machine was adjusted to a displacement (0.100" D. A.) equivalent to 6 g's acceleration at a frequency of 35 Hz. The test sample was then vibrated for a period of ten (10) seconds at 35 Hz and operated during the dwell.

The dwell tests above were performed in each of the three major axis. A report on the Seismic Qualification was prepared by Lockheed Electronics Corporations Environmental Laboratory (Report No.3521-4811 and is presented in Appendix D.) The duration of each stroke was 40 seconds.

3.3 Radiation Exposure (IEEE Std. 382 Part II Section 1)

The Limitorque Actuator and motor were subjected to a Gamma Ray Irradiation of 204 Megarads per IEEE Std. 382-'72' requirements.

The Test Unit was placed in a Cobalt-60 and Cesium-137 field of 1 Mrad/hour at an air equivalent dose.

A total radiation dose of 204 Megarads was applied after thermal aging, mechanical aging and seismic qualification.

The radiation exposure was performed by Isomedix Corporation. A Test Certification was supplied by Isomedix Corporation and is presented in Appendix C.

3.4 Accident Simulation (IEEE Std. 382-'72')

3.4.1 Test Description

The test was performed at Limitorques' Environmental Test Facility, see figures 1, 2 and 3 in Appendix E. A schematic of the instrumentation system and a summary of instruments used during the test are presented in Figure 4 and Table I located in Appendix F. The limitorque Actuator was mounted on a thrust tube attached to the side of the test chamber with the stem thrusting against the load cell mounted

externally to the test chamber. (see Figure 1, Appendix E)

Control and power lead connections were made through flexible pressure tight conduit connections run between the units and the access ports of the test chamber. The external wire harness was run to a junction box, where terminal strips provided access to each lead for monitoring insulation resistance. The terminal strips were wired to a control system (see Figure 4, Appendix F). The control panel illustrated in Figure 3, (Appendix E) contains a power monitoring system to monitor line voltage, current in each of the three (3) motor legs and the power consumption of the motor.

Pressure and temperature were monitored on the multipoint temperature recorder and strip chart recorder mounted on the test console (Figure 3, Appendix E). In addition to the automatic monitoring system, the temperature and pressure was monitored by a pressure gauge and two thermometers mounted in the side wall of the test chamber (see Figures 1 and 4.)

During the rapid temperature and pressure transients, the chamber ambient and limit switch compartment internal temperature and pressure were monitored continuously on the strip chart recorder.

Cooling coils mounted inside the chamber provided cooling capacity to reduce the temperature in the chamber to the various temperature plateaus.

A double spray system provided a reliable source of chemical spray during the test profile. Flow meters mounted on the panel near the test chamber (see Figure 1, Appendix E) monitored the chemical fluid flow. Spray nozzles mounted on two sets of manifolds (3 nozzles per manifold) with the ability to switch manifold provided the proper spray pattern. The pressure in each active manifold set was monitored to indicate any restriction of the spray nozzle orifice. A back flush system was provided to back flush the spray manifold.

3.4.2 Test Procedure for LOCA Test

The Limitorque Valve Actuator was exposed to steam and chemical spray in accordance with the

criteria listed in Table 1 in the "IEEE Guide for Type Test of Class 1 Electric Valve Operators for Nuclear Power Generating Stations" IEEE Std. 382-'72'. The temperature/pressure profile is illustrated in Figure 5, which also shows the schedule for measuring the insulation resistance of the power and control leads and cycling of the Limiting Torque Valve Actuators.

During the first four days of the test, the specified temperature and pressures were maintained by the controlled injection of steam into the test chamber. During the remainder of the test, the 200 F/10 psig state was maintained by filling the test chamber with air controlled to the proper pressure and using electrical heaters. The atmosphere was kept saturated with water vapor by maintaining condensate in the bottom of the tank and by daily injections of steam.

3.5 Post Test Inspection

A visual inspection of the limit switch compartment and the limit and torque switches was performed at the conclusion of the accident simulation.

Specified Accident Profile

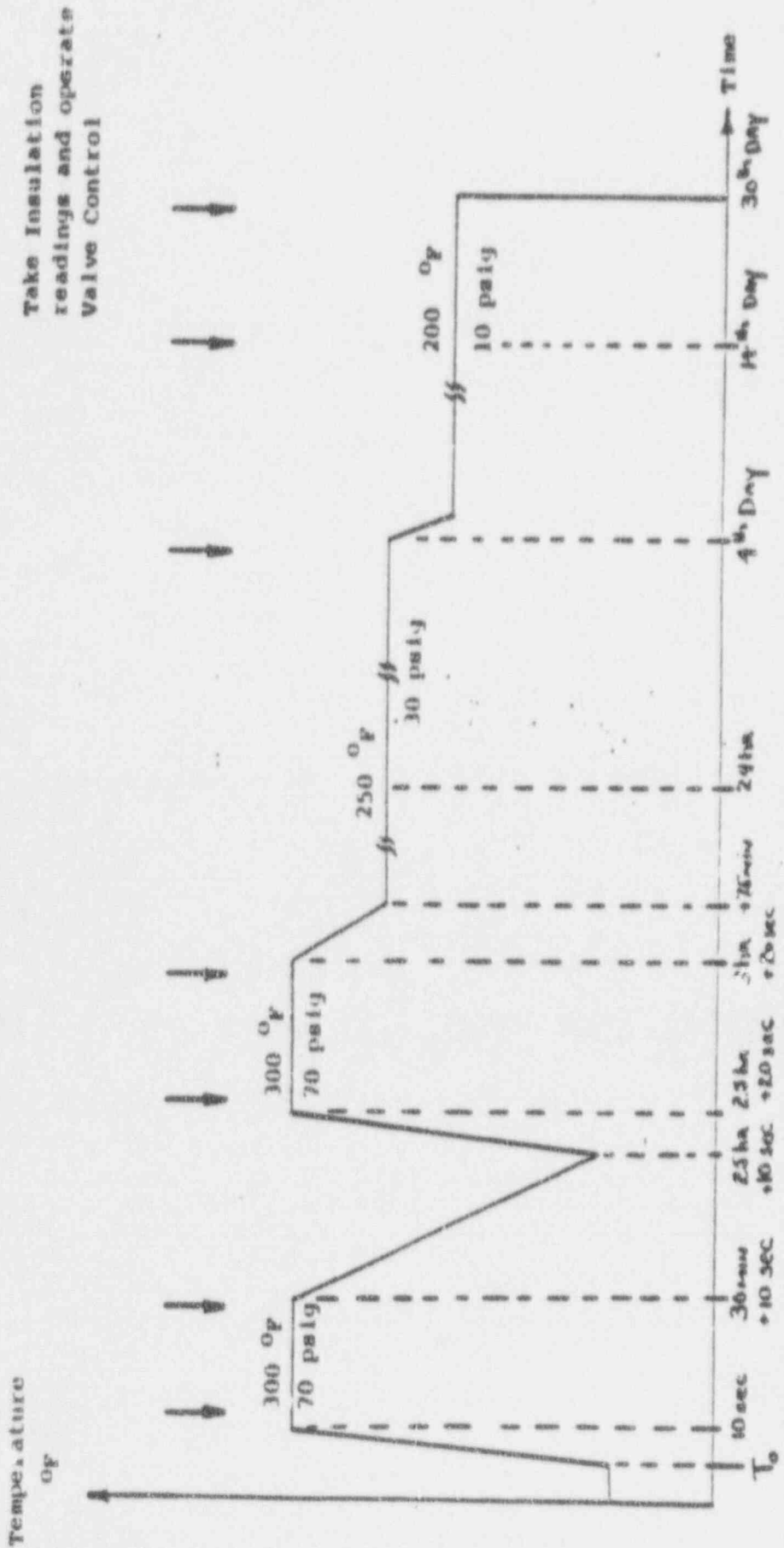


Figure 5

3.6 Post LOCA Load Cycling Test

Similar to that performed at pre-test mechanical aging, the unit was cycled for a total of 794 cycles (one close & one open stroke per cycle) at room ambient conditions (data supplied in Appendix B).

3.7 Final Inspection

A complete physical inspection of the test samples was made after the completion of the Post LOCA Load Cycling to observe the conditions of the actuator.

4.0 Test Results

4.1 Mechanical Aging

The unit was initially tested on 7 June 1974 and a thrust output of 20,162 lbs. was obtained at a torque switch setting of 1-3/4. (This value is an average of 24 readings.) The unit remained on the test stand and was automatically cycled at room ambient conditions.

The cycling test was performed from 7 June 1974 to 10 June 1974 for a total of 1208 cycles consisting of one torque switch closure in each cycle.

The load was measured after the completion of the mechanical aging and an average of 10 readings produced a thrust output of 19,920 lbs.

The test data obtained is presented in Appendix C.

4.2 Seismic Qualification

The Seismic Qualification was performed at Lockheed Electronics Environmental Laboratory on 12 June 1974. The data recorded is presented in Lockheed test Report No. 3521-4811. (Appendix D.) The thrust load was not monitored during seismic testing; however, thrust readings taken after seismic and radiation, 19,350, average of three readings, was within three (3) percent of the post mechanical aging value. The output characteristics did not change during seismic testing or irradiation. The valve actuator and its limit and torque switch functioned during seismic testing.

4.3 Radiation Aging & Accident Exposure

The exposure to radiation of the Test Unit was performed on 18 July 1974 at Isomedix Corporation. A total dose of 204 Megarads was used. A Test Certification may be found in Appendix C.

4.4 Accident Environmental Simulation Test Results

The LOCA Test was performed at Limitorques' Environmental Test Facility. The environmental test was started 22 August 1974 and completed 21 September 1974.

4.4.1 Temperature and Pressure Profile

The profile specified in paragraph 3.2.5 of this report was closely followed as evidenced in Figure 6. The transient data was obtained by means of the strip chart recorder. At the transient time of ten (10) seconds, the temperature was a temperature within 91% of the specified temperature (300^o F.) A temperature of 300^o F was reached in 15.2 seconds. The second transient closely approximated the first reaching a temperature of 300^o F in 13.8 seconds. Copies of the actual strip chart data are presented in Figures 7 & 8.

After the transient and a dwell of 30 minutes at 300^o F, the test ambient was brought to a stable condition of 250^o F and 30 psig. The actual temperature conditions were within minus 2% and plus 6% of specified temperature and the pressure conditions were within plus or minus 3.5%. These conditions were maintained for the balance of four (4) days.

At a test time of 96.1 hours (approx. 4 days) the test ambient was lowered to 200^o F and 10 psig. The chamber was maintained at these conditions by means

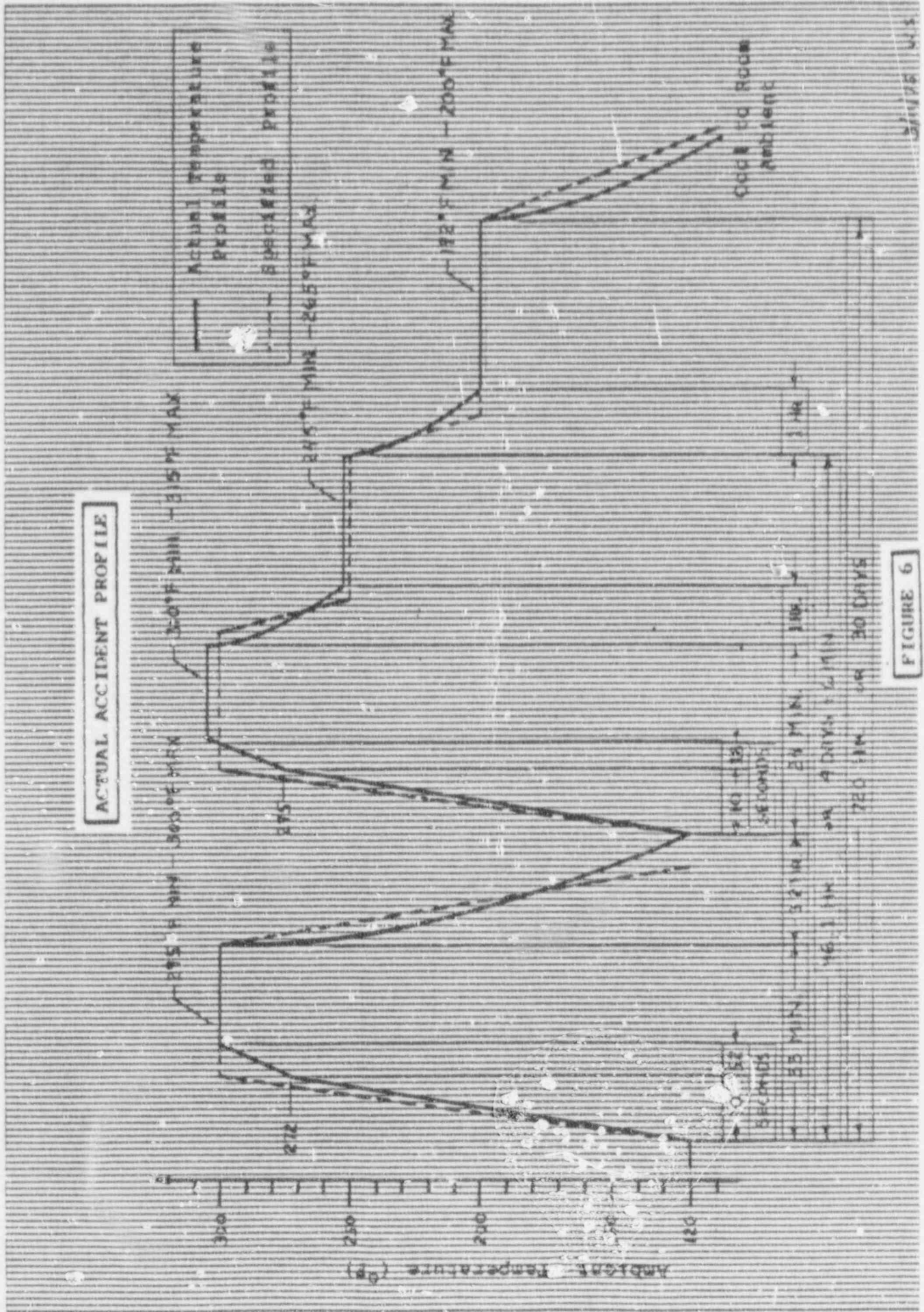


FIGURE 6

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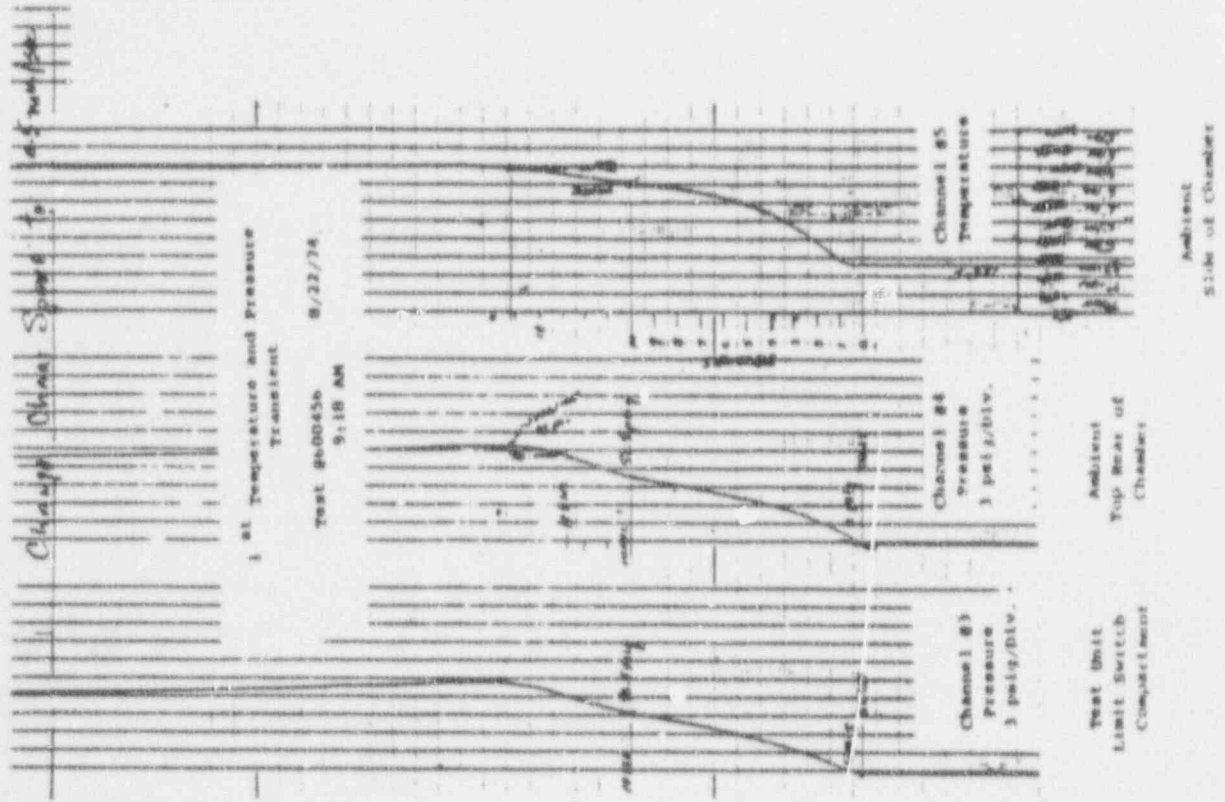
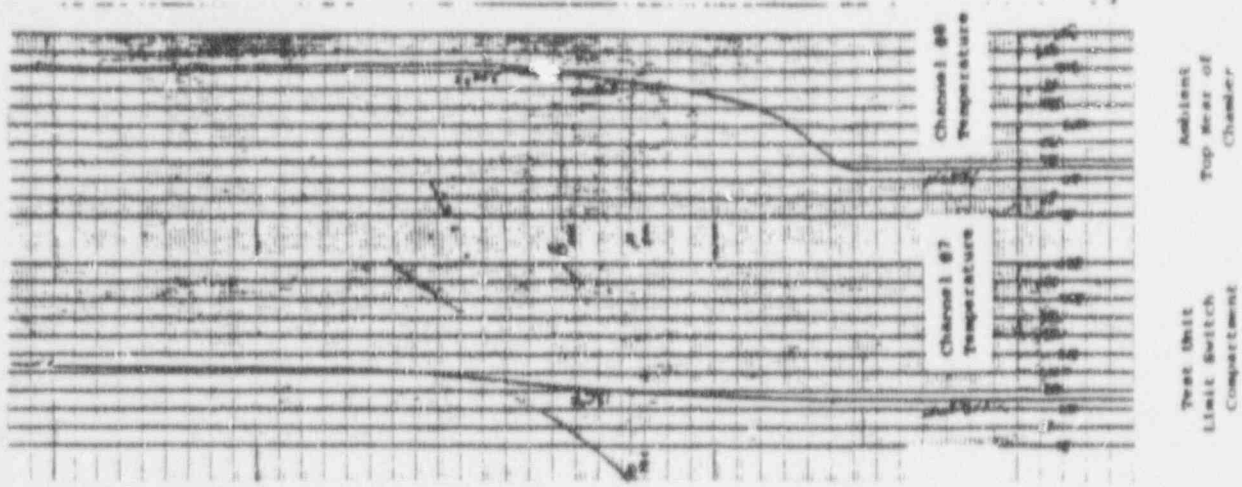
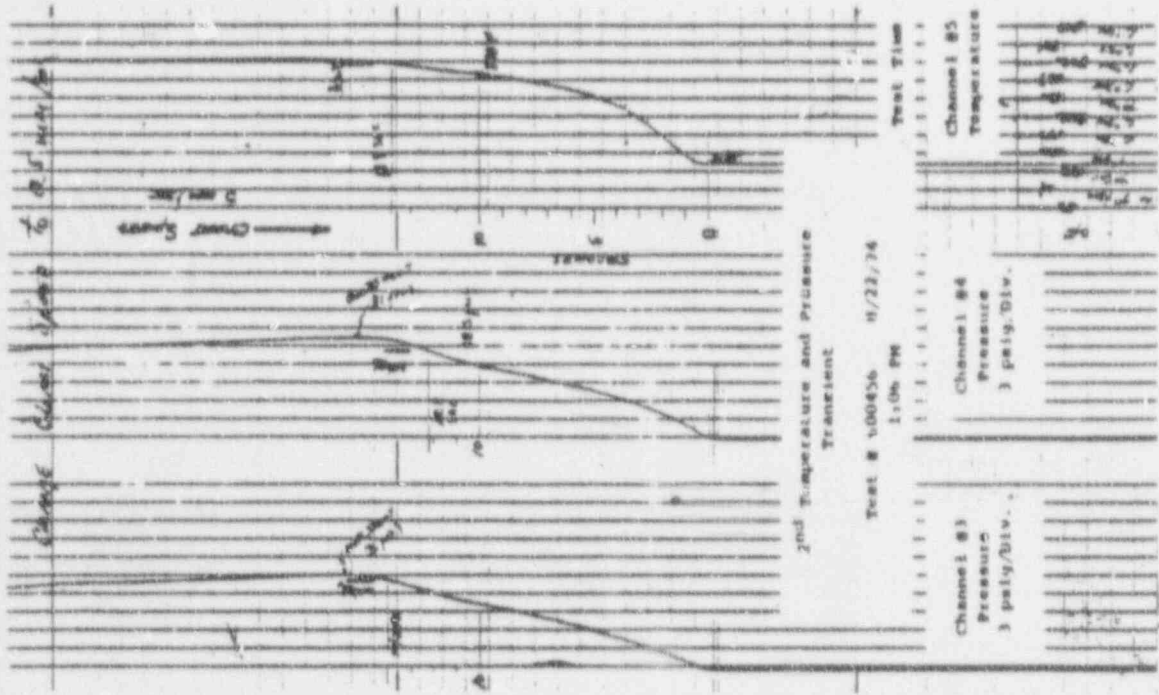


Figure 87



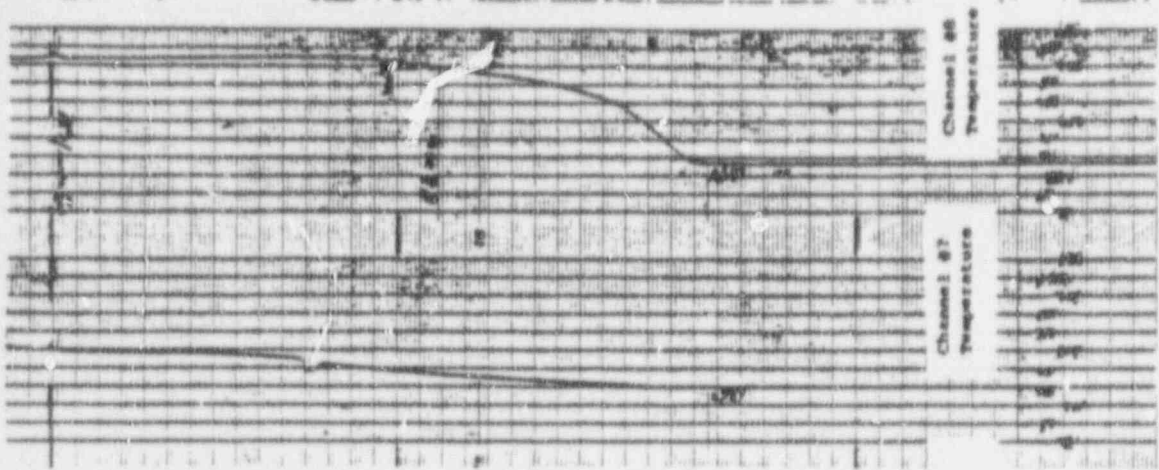
Ambient
Side of Chamber



Test Unit
Limit Switch
Compass Control

Ambient
Top Rear of
Chamber C

Ambient
Side of Chamber



Test Unit
Limit Switch
Compartment

Ambient
Center Line
near Rear

of strip heaters and air injection through a pressure controlled solenoid valve. Once stability was reached, the ambient was maintained within plus 0% and minus 4% of specified temperature and plus 10% and minus 0% of specified pressure.

4.4.2 Chemical Spray Delivery

The chemical mixture (per Table 1 of IEEE Std. 382-page 12) was prepared prior to start of the LOCA test and pH values measured. Tank No. 1 had a pH of 10.9 after initial mixing. Tank No. 2 had a pH of 10.5 after initial mixing. The pH was monitored on a sample taken from Tank No. 1 at a test time of 0.1 hours (pH=11.1) and after 4.4 hours (pH=11.1). A sample of Tank No. 2 taken at 24 hours had a pH reading of 10.5.

The chemical flow was maintained at 0.6 gal/min in each spray field or an overall flow rate of 1.2 gal/min. A check was made of the average flow rate by recording the total amount of chemical solution used in a given period of time. These average flow rates agreed with the recorded instantaneous flow rates.

4.4.3 Chamber Humidity

The relative humidity of the chamber was maintained at 100 percent by the periodic injection of steam and by maintaining the vapor condensate at the bottom of the chamber at the same temperature as the air/vapor mixture. The content of air in the air vapor mixture was minimized by venting the chamber during the thermal transients.

4.4.4 Insulation Resistance Measurements

Insulation resistance measurements to ground were made periodically on the power and control leads of the Test Unit prior to operating the valve actuator (see Table II.)

4.4.5 Operator Cycling Data

The test unit functioned without problems throughout the entire test. It is worthy to mention that during the final operational cycle (719.1 hours) the close indicating light exhibited a very dim glow when it should have been extinguished. This phenomena was noticed only on the "close" light circuit and no other indicating lights or circuits

TABLE II

Insulation Resistance of Power and Control Leads

(All resistances are in Megohms except where a K indicates Kilo-ohms)

(all measurements made to ground)

Time After Start Test (hr.)	MOTOR LEADS			CONTROL CIRCUIT LEADS															
	T-1	T-2	T-3	CL-1	61	71	41	43A	43B	43C	45A	45B	51	53A	53B	53C	55A	55B	
*0	400	400	400	180	180	180	2000	180	180	180	180	180	180	190	180	180	180	180	
0.15	160K	160K	160K	300K	400K	400K	40.0	400K	400K	400K	400K	400K	400K	400K	400K	400K	400K	400K	
0.5	120K	120K	120K	280K	280K	280K	5.0	280K	280K	280K	280K	280K	280K	280K	260K	280K	280K	280K	
3.9	100K	100K	100K	2.0	2.0	2.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
4.2	50K	50K	50K	400K	400K	400K	2.4	400K	400K	400K	400K	400K	400K	400K	400K	400K	400K	400K	
95.5	80K	80K	80K	2.0K	2.0K	3.0K	40K	2.0K	2.0K	2.0K	2.0K	2.0K	2.0K	2.0K	2.0K	2.0K	2.0K	2.0K	
334.9	60K	60K	60K	1.5K	1.5K	2.0K	5.0K	1.5K	1.5K	1.5K	1.5K	1.5K	1.5K	1.5K	1.5K	1.5K	1.5K	1.5K	
719.1	60K	60K	60K	2.0K	2.0K	3.0K	5.0K	1.7K	1.7K	1.7K	1.7K	1.7K	1.7K	1.7K	1.7K	1.7K	1.7K	1.7K	

*Check prior to start of test.

CROSS

exhibited these characteristics. Subsequent investigation concluded that the current flow through this light to duplicate the dim glow was insignificant and coupled with its occurrence in the final hour of a 30 day test did not constitute a malfunction.

The megger readings diminished during the environmental test and the current & power requirements did increase slightly as the test in the environmental chamber continued; however, this had no effect on the actuator performance. The stroke time remained constant throughout the test.

Also a slight variation in the measured output thrust was noted and was attributed to a change in stem efficiency rather than actuator output torque change. It was noted that during periods of non-operation, the thrust tended to become lower, whereas during periods of frequent operations, the thrust increased. Probably, the ambient temperature & moisture effected the lubricity of the lubricant used on the stem.

A summary of the cycling data is presented in Table III.

TABLE
VALVE ACTUATOR CYCLING DATA

Time After Start of Test (hr.)	Potential (volts)			OPEN STROKE					CLOSE STROKE					Stroke Time (Secs)	Seating Thrust (lbs)	
				Run Current (Amps)			Power (Watts)	Time (Secs)	Run Current (Amps)			Peak Current * (Amps) (T-3)	Power (Watts)			
	T-1 T-3	T-1 T-2	T-2 T-3	T-1	T-2	T-3			T-1	T-2	T-3		Run			*Peak
** 0	490	495	490	4.6	4.8	4.6	620	42	4.6	4.8	4.4	5.0	620	1350	42	19,375
.3	475	480	480	4.5	4.6	4.5	620	42	4.3	4.3	4.2	5.1	600	1300	43	19,425
.6	485	490	485	4.7	4.8	4.6	680	42	4.8	4.9	4.5	5.1	680	1320	43	20,825
4.1	485	490	485	4.8	4.9	4.6	620	42	4.8	5.0	4.6	5.1	610	1300	43	21,600
4.3	490	490	480	4.8	5.0	4.7	650	42	4.8	5.0	4.6	5.1	640	1350	43	22,150
95.5	495	500	495	5.1	5.2	5.0	725	42	5.2	5.3	4.9	5.3	750	1500	43	22,650
335.4	485	490	485	4.8	4.9	4.6	650	41	4.9	5.0	4.6	5.0	650	1400	42	21,600
719.1	495	500	490	4.9	5.2	4.9	675	42	5.0	5.2	4.7	5.0	675	1500	42	18,550
719.5	495	500	490	5.0	5.2	4.9	700	42	5.0	5.2	4.7	5.6	675	1900	42	21,350

* Due to rapid rise of current and power, considering the slow meter response times, these values to be considered as approximation of actual peak.

** Check prior to start of test.

4.5 Post LOCA Inspection

The post LOCA Inspection was performed 21 September 1974 after opening the test chamber. Photographs were taken of the test unit with the limit switch compartment cover in place (see Figure 9). Externally, the Test Unit was clean looking with no unusual deposits. The limit switch compartment had approximately one-eighth (1/8) of an inch of condensate in the bottom of the compartment.

Both the limit and torque switches were clean and functioned without mechanical difficulties. The motor lead protective sleeving was split in several areas; however, no damage was noted to the motor lead insulation.

4.6 Post LOCA Load Cycling

The post LOCA Load Cycling was performed by the Limitorque Test Laboratory from 30 September 1974 to 4 October 1974.

The thrust output of the Test Unit was measured prior to the start of the load cycling. The thrust output was found to be 16,392 (an average of 6 readings). This was accomplished at the same torque

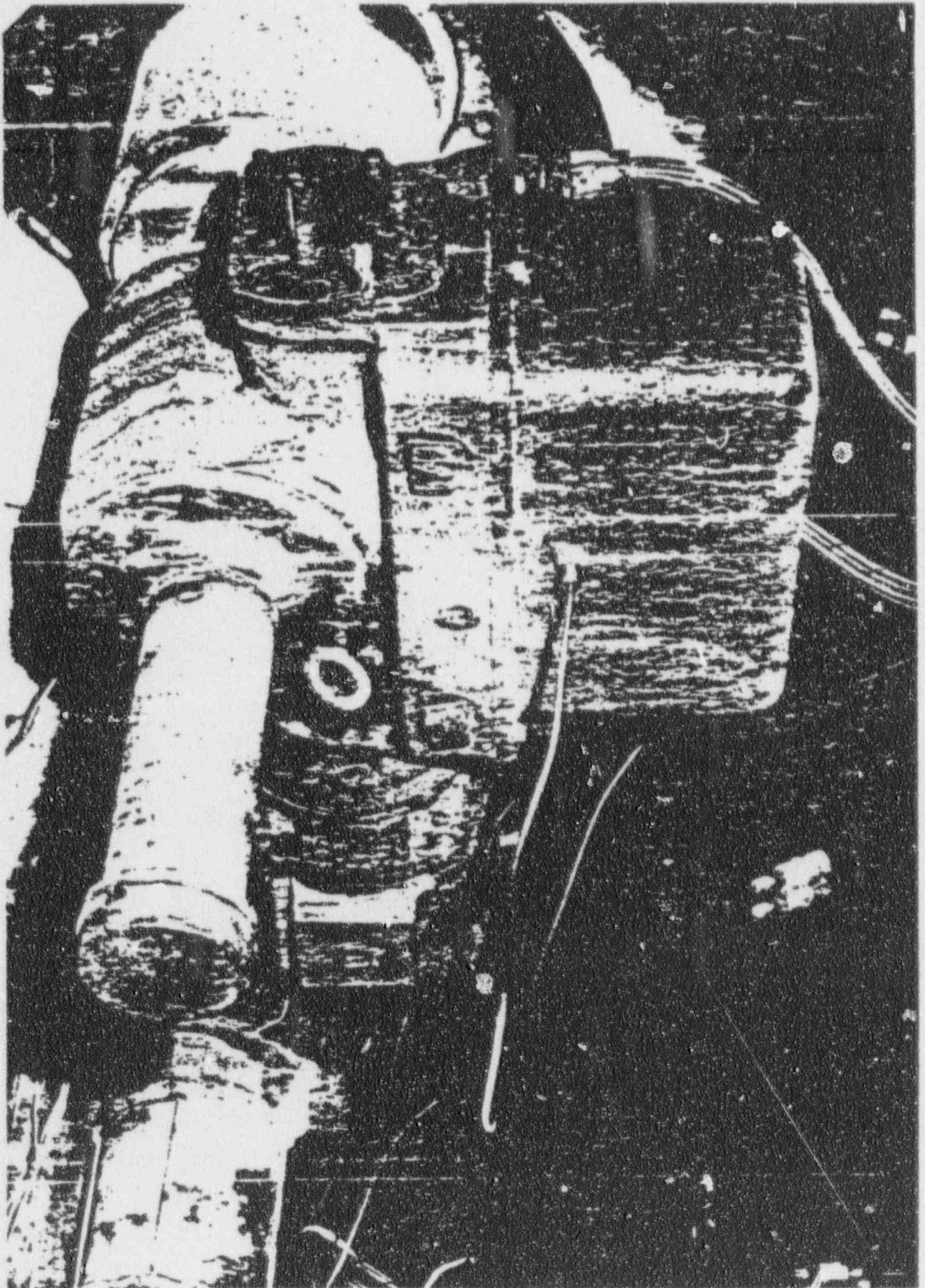


Figure 9 Post LOCA Conditions

PWR Qualification

switch setting (1-3/4) as that used throughout the test.

The torque output of the actuator as controlled by the torque switch remains constant with the same torque switch setting, however, the thrust monitor in the test stem depends upon several factors including the efficiency of the acme threads. The lower thrust output monitored after the unit was brought to room temperature was attributed to a degradation of stem efficiency as a result of corrosion of the steel stem and deposition of foreign materials from the exposure to the steam and chemical spray and not attributable to changes in the torque switch operating train or reduction in the torque output of the actuator.

The effect of the corrosion was most noticeable after the stem was exposed to room ambient conditions for several hours. After the completion of the 794 cycles, the thrust monitored returned to its original value indicating the repeated cycling had removed the corrosive deposits in the stem thread area. The cycling data and thrust reading are presented in Appendix B.

A Base Test motor which experienced all the environmental conditions was installed on the test actuator after the planned post LOCA cycling to obtain cyclic information on the base motor and provide additional load cycling on the test unit. The SMB-0 Actuator (with the base test motor) was cycled for an additional 2184 cycles.

The SMB-0 Actuator functioned without difficulty throughout the additional 2184 cycles.

A summary of the load cycles accumulated on the test unit is as follows:

PreTest Mechanical Aging	1208 cycles
LOCA Testing cycles	9 cycles
Post LOCA Load cycling	794 cycles
Base Test motor cycling	<u>2184</u> cycles
TOTAL	4195 cycles

4.7 Final Inspection and Dismantling

4.7.1 Motor Inspection and Dismantling

The motor (used with the test unit during LOCA test) mounted on the Test Unit was removed from the SMB valve actuator and dismantled for inspection. The inspection was performed on 21 November 1974 with representatives from Reliance Electric Company in attendance.

The rotor turned freely prior to dismantling the motor. The stator and rotor showed little evidence of corrosive build-up and no evidence of physical damage. The end bell was particularly clean with little evidence of water. The bearing lubricant was moist and the bearing turned freely.

4.7.2 Valve Control Inspection and Dismantling

The SMB-0-40 Valve Actuator was completely dismantled for inspection on 22 November 1974. Photographs of the valve actuator components are presented in Figure 10.

The torque switch and limit switch were removed from the SMB-0 Valve Actuator and the

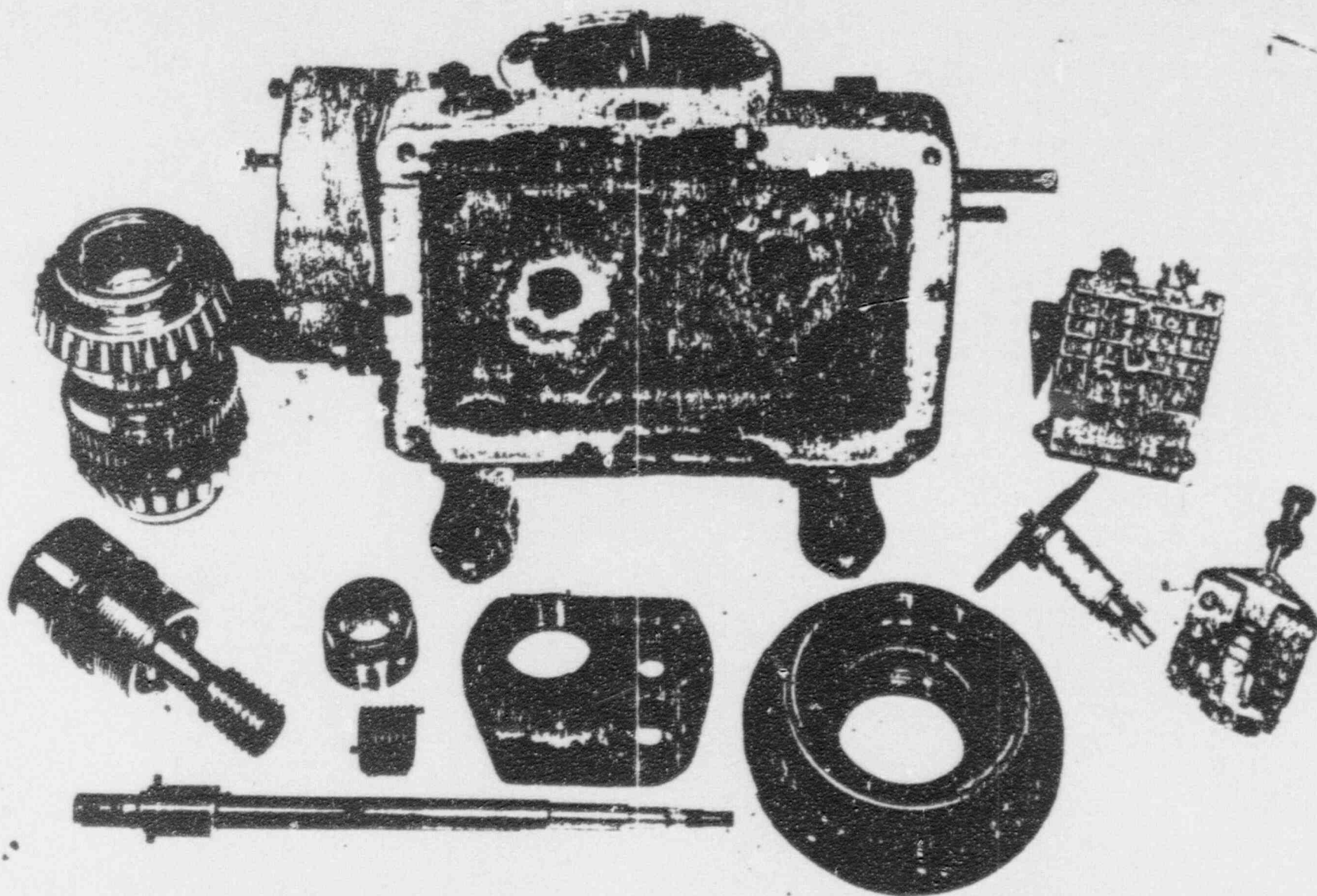


Figure 10
Test Unit Final Inspection

CONFIDENTIAL

following observations were made:

- a.) The torque switch and limit switches worked freely.
- b.) The torque switch and limit switch pinions both showed signs of lubrication.

The grease in the main housing and the handwheel clutch compartment was dark in color but maintained its lubricity. A slight amount of separation of the grease was noted. The O-Ring and bearings seemed in good condition with no wear noted.

5.0 Conclusion

The Limitorque Valve Actuator SMB-0-40 was subjected to a qualification test consisting of a 30-day exposure to a steam chemical environment, including two temperature & pressure transients from 120 degrees F to 300 degrees F in approximately 10 seconds. Prior to environmental testing, the motor was heat aged, the unit was mechanically tested and subjected to gamma ray irradiation. The unit was cycled with simulated valve seating loads during environmental testing at elevated temperatures and pressures and after environmental test was additionally cycled with a simulated valve seating load.

Since the unit performed satisfactorily, throughout the test, it is concluded this test qualifies similar Limitorque Valve Actuators for use in a PWR containment chamber where environmental conditions depicted by Table I in IEEE Std. 382-'72' are encountered.

PWR Qualification

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APPENDIX A

Reliance Electric Company - Certificate
of Compliance

C30580



RELIANCE ELECTRIC COMPANY
CERTIFICATE OF COMPLIANCE

[Limitorque Corporation
5114 Woodall Road
Lynchburg, Virginia 24502]

RECEIVED
JUN 7 1974
PHILA GEAR

EQUIPMENT: Electric Motor
REFERENCE: Purchase Order No. 600426-C
FILE: Sales Order No. 2Y-267074A1

We certify that the equipment identified above has been designed, manufactured, inspected, and/or tested in accordance with the requirements established by the following specifications: RCP-242, Limitorque D/S 21-49-001-1
We further certify that the stator was heat aged 100 hours at 180°C.

B. L. Hashemi

Quality Control Department

HE 354B Printed in USA

APPENDIX B

INITIAL TORQUE SWITCH SETTING

MECHANICAL AGING

POST MECHANICAL AGING THRUST MEASUREMENT

POST SEISMIC QUALIFICATION AND RADIATION THRUST MEASUREMENT

POST ENVIRONMENTAL THRUST MEASUREMENT

POST ENVIRONMENTAL LOAD CYCLING

POST LOAD CYCLING THRUST MEASUREMENT

SUMMARY OF LOAD CYCLING DATA

050592

Specimen: TEST UNIT

Limtorque Valve Actuator
Type: SMB
Size: O
Serial No. 189335
Motor size 40 ft-lb
I. D. #2Y267074A1EZ

Instrumentation.

Load Cell: Capacity 20,000 pounds
Manufacturer BLH
Serial No. 2512

Strain Indicator:

Manufacturer BLH
Type N
Serial No. 443604

INITIAL TORQUE SWITCH SETTING

Date: 6/7/74

No. of Readings	Torque Switch Setting	Thrust Output *
5	"1"	(pounds) 11,070
5	"1 1/2"	16,010
24	"1 3/4"	20,162

*Average of all readings

MECHANICAL AGING

Date: 6/7/74 to 6/10/74

Definition: One (1) cycle
Open Limit actuation to close torque
Switch actuation to open limit
actuation. Two (2) strokes per cycle.

Stroke Time: 54 sec *
Cycle Time: 1 min. 53 sec
Duty Cycle: 'RUN' 7 cycles - 'OFF' 10 min.
Load (Thrust): 20,162 pounds
Total No. of Cycles: 1208

SUMMARY OF LOAD CYCLING DATA (continued)

- * The unit was cycled for mechanical aging on a different load stand than was used in the test and since the stroke was longer in this stand, a longer stroke time was obtained.

POST MECHANICAL AGING THRUST MEASUREMENT

Date: 6/10/74

No. of Readings	Torque Switch Setting	Thrust Output * (pounds)
10	"1 3/4"	19,920

POST SEISMIC QUALIFICATION AND RADIATION THRUST MEASUREMENT Date: 8/19/74

No. of Readings	Torque Switch Setting	Thrust Output * (pounds)
3	"1 3/4"	19,250

* Average of all readings

POST ENVIRONMENTAL TEST THRUST MEASUREMENT

Date: 9/30/74

No. of Readings	Torque Switch Setting	Thrust Output * (pounds)
6	"1 3/4"	16,392

Note: The low output thrust readings are a result of poor stem efficiency as a result of accumulated deposits on the acme threads of the stem. The thrust measured during the last test point of the environmental test was 21,350 pounds.

SUMMARY OF LOAD CYCLING DATA (continued)

POST ENVIRONMENTAL LOAD CYCLING

Date: 9/30/74 - 10/4/74

Definition: One (1) cycle
 Open limit to close torque switch
 actuation to open limit. Two (2)
 strokes per cycle.

Stroke Time: 40 sec

Duty Cycle: 'RUN' 7 cycles - 'OFF' 10 minutes

Load (Thrust): 16,392 at start
 19,667 at finish

Total No. of Cycles: 794

Note: The increase in thrust output is due to improved stem efficiency. The repeated cycling removed the corrosion in the threaded area of the stem.

The load cycling was discontinued during the night and ran during the first shift.

POST LOAD CYCLING THRUST MEASUREMENT

Date: 10/4/74

No. of Readings	Torque Switch Setting	Thrust Output (pounds)
3	"1 3/4"	19,667

Note: The output thrust returned to the value recorded after the pre-test mechanical aging.

APPENDIX C

Radiation Exposure - Isomedix Certificate of Performance



030586

July 19, 1974

Mr. W. J. Denkowski
Chief Engineer
Limitorque Corporation
181 South Gulph Road
King of Prussia, Pa. 19406

Dear Mr. Denkowski:

This will summarize the perimeters pertinent to the irradiation of one valve operator and motor assembly. Identification on the valve operator and motor assembly was:

SMB O Valve Control
s/n 189835
Reliance 40 lb-ft motor
I.D. 2Y267074ALEZ

Units were placed in a $co-60$ field of 1×10^6 rad per hour, at an air equivalent dose. They were rotated several times during the exposure to achieve a more uniform dose distribution. Total dose received to the centerline of the unit was 204 mrad (air equivalent) with an overdose factor on the edges of the units of 1.2. Irradiation was in air and ambient temperature in a slight negative pressure. The temperature of the samples during irradiation did not exceed $100^\circ F$.

Dosimetry was performed using a Victoreen Model 555 Integrating Dose Rate Meter and Probe. The unit was calibrated on January 15, 1974 by the Victoreen Instrument Company, using Cobalt-60 and Cesium-137 sources whose calibrations are traceable to the U.S. National Bureau of Standards. A copy of the calibration certificate is available.

Confirming dosimetry utilizing a Red Perspex system was also completed.

Mr. W. J. Denkowski

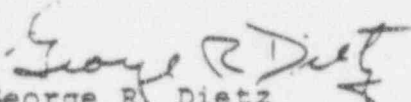
- 2 -

July 19, 1974

C30587

Irradiation was completed July 18, 1974 and the units returned to you under separate cover.

Very truly yours,


George R. Dietz
Manager, Radiation Services

GRD:km

PWR Qualification

C70588

APPENDIX D

Seismic Qualification - Lockheed Test Report

070599

TEST REPORT NO. 3521-4811

REPORT OF TEST

ON

LIMITORQUE CORPORATION
SMBO OPERATOR W/MOTOR (40 FT. LB.)
AND
MOTOR (25 FT. LB.)

REPORT WRITER: *R. F. Soltis*
R. F. Soltis

TEST ENGINEER: *W. A. Black*
W. A. Black

Test

LOCKHEED ELECTRONICS COMPANY, INC.
PLAINFIELD, NEW JERSEY

DATE: June 17, 1974

APPROVED BY: *Nat Johnson*
N. Johnson, Manager
Environmental Laboratory

~~8009060150~~





PURPOSE OF TEST:

To subject the test specimens to the Seismic Test referenced in Limatorque Corporation Purchase Order Number 600456 dated June 11, 1974.

MANUFACTURER:

Limatorque Corporation
5114 Woodall Road
Lynchburg, Virginia 24502

SPECIMENS TESTED:

(a) SM80 Operator with 40 Ft. lb. motor. S/N 189835

(b) Reliance 25 Ft. lb. motor
ID NO. 2Y267074 A IEZ

APPLICABLE DOCUMENTS:

Limatorque Corporation Purchase Order Number 600456 dated June 11, 1974.

PROJECT NUMBER:

24-8041-3811

QUANTITY OF
SPECIMENS TESTED:

One (1) each

SECURITY CLASSIFICATION
OF SPECIMENS TESTED:

Unclassified

DATE TEST COMPLETED:

June 12, 1974

TEST CONDUCTED BY:

LOCKHEED ELECTRONICS COMPANY, INC.
ENVIRONMENTAL LABORATORY

DISPOSITION OF
SPECIMENS TESTED:

Returned to Limatorque Corporation per Lockheed Electronics Company, Incorporated Packing Slip Number 97449 dated June 12, 1974.

ABSTRACT:

The test specimens were subjected to the Seismic Test referenced in Limatorque Corporation Purchase Order Number 600456 dated June 11, 1974.

This test was completed with no visible evidence of external damage or resonances.

TEST APPARATUS:

Reaction-Type Vibration Machine, LAB Company Model RVH-72-5000, S/N 51401.



TEST APPARATUS:
(Continued)

Vibration Pickups, MB Company Type 124, S/N 14074 and Type 126, S/N 14006.

Vibration Meter, MB Company Model M-6, S/N 539.

Dial-A-Gain Amplifiers, Unholtz-Dickie Model 610M, E. L. Number 463 and Model 610RM-3G, E. L. Number 464.

Accelerometers, Endevco Model 22210, S/N NA94 and FC55.

TEST PROCEDURE:

The test specimens were secured to the test machine, as shown in Figures 1 through 3, and subjected to the following Seismic Test in accordance with Limatorque Corporation Purchase Order Number 600456 dated June 11, 1974.

1. To determine resonant frequencies, an exploratory scan was performed in each of the three (3) major axes over the frequency range of 5 to 35 Hz with a maximum input acceleration of 1.0 g's.
- 2a. With no resonant frequencies present, the test specimen was subjected to 10 second dwells at the frequencies specified by the Limatorque Corporation representative (see data sheets) in each axis. The vibration amplitude was maintained at the maximum controllable displacement from 5 Hz to the frequency at which 3 g's was attained. The input was then maintained at 3 g's from that frequency up to 34 Hz.
- 2b. The test specimen was vibrated at 35 Hz at an input level of 8 ± 4 g's for a ten (10) second dwell.

The test specimens were actuated during Part 2, and all performance monitoring was performed by and the data retained by Philadelphia Gear Corporation personnel.



TEST RESULTS:

The Vibration Test was completed with no visible evidence of external damage noted to either test specimen.

There were no resonances detected in the three (3) axes of vibration.

RECOMMENDATIONS:

None. Data merely submitted.

Test Engineer:

W. A. Black
W. A. Black

FIGURE 1
TEST SETUP - X AXIS

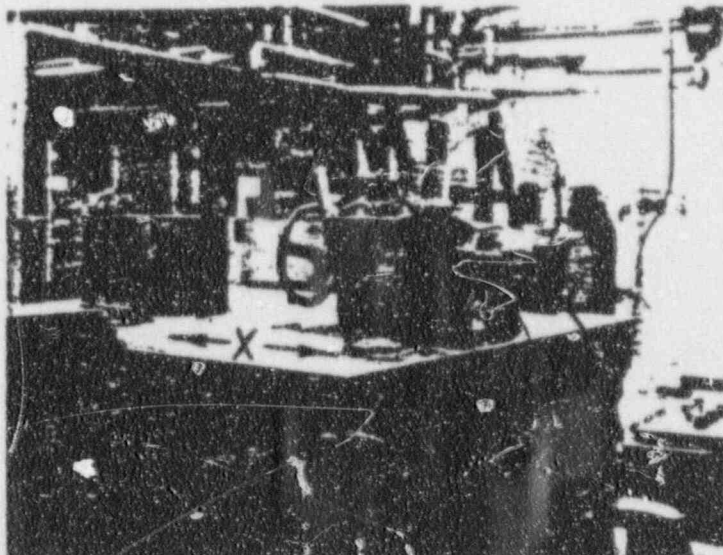


FIGURE 2
TEST SETUP - Y AXIS
A. SMBC OPERATOR W/40' LBS. MOTOR
B. MOTOR 25' LBS.

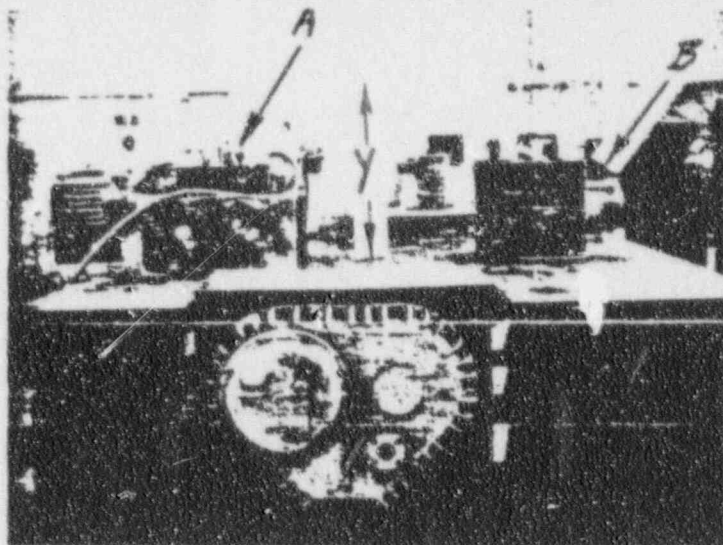


FIGURE 3
TEST SETUP - Z AXIS



VIBRATION TEST DATA SHEET
 AXIS: 2 Axis

030594

REPORT NO. 3521 - 4811

DATE: 6/12/74

NOTE: RECORDED DATA IS
 DOUBLE AMPLITUDE
 (INCHES)

ENDURANCE TEST (PARA.2.23)

Hz	INPUT	DURATION
35	.100	10 sec.

TEST SPECIMEN
 NOMENCLATURE

1 mtr. with fixture
 1 SMBO Operator
 with motor

SERIAL NO.

MANUFACTURER

LIMITORQUE CORPORATION

ACCELEROMETER LOCATION

CH. 1 side of motor
 CH. 2 top of unit

REMARKS:

Operator actuated during
 this portion of test

TEST ENGINEER

Wm. C. Black

Hz	EXPLORATORY (Para. 1)			VARI. FREQUENCY (Para. 2.2)		
	INPUT	CH. 1	CH. 2	PUT	CH. 1	CH. 2
4						
5	.014	.016	.013			
6	.016	.016	.014	.054	.049	.047
7	.017	.016	.016			
8	.018	.017	.017	.054	.050	.052
9	.018	.017	.018			
10	.018	.017	.0125	.052	.052	.056
11	.018	.017	.019			
12	.018	.017	.019	.051	.054	.058
13	.017	.018	.020			
14	.017	.018	.020	.050	.054	.059
15	.017	.018	.021			
16	.017	.018	.021	.050	.054	.060
17	.017	.018	.021			
18	.017	.019	.022	.050	.054	.062
19	.017	.019	.022			
20	.017	.019	.022	.049	.055	.063
21	.017	.019	.022			
22	.017	.019	.023	.048	.056	.064
23	.017	.019	.023			
24	.017	.019	.023	.048	.056	.067
25	.017	.019	.023			
26	.017	.019	.023	.048	.056	.066
27	.017	.019	.023			
28	.017	.019	.024	.048	.056	.068
29	.017	.019	.024			
30	.017	.019	.024	.048	.056	.069
31	.017	.019	.024			
32	.0165	.0195	.0245	.048	.056	.072
33	.0165	.0195	.0245			
34	.0165	.0195	.0245	.048	.056	.072
35	.0165	.0195	.0245			
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						

RES. none Hz

FORM LEC 922B

VIBRATION TEST DATA SHEET
 AXIS: X Axis

REPORT NO. 3521 - 4811
 DATE: 6/12/74

NOTE: RECORDED DATA IS
 DOUBLE AMPLITUDE
 (INCHES)

Hz	EXPERIMENTAL (Para. 1)			VIB. FREQUENCY (Para. 2.2)		
	INPUT	CH. 1	CH. 2	INPUT	CH. 1	CH. 2
6	.014	.014	.015	.038	.044	.035
7	.017	.015	.016			
8	.018	.016	.016			
9	.019	.0165	.017			
10	.019	.017	.018			
11	.019	.017	.019	.052	.050	.050
12	.0185	.018	.020			
13	.0185	.018	.020			
14	.018	.018	.021			
15	.018	.018	.021			
16	.018	.018	.021	.050	.052	.058
17	.0175	.019	.022			
18	.0175	.019	.022			
19	.017	.019	.022			
20	.017	.019	.023			
21	.017	.019	.023	.048	.054	.062
22	.017	.019	.023			
23	.017	.019	.0235			
24	.017	.019	.024			
25	.017	.019	.024	.047	.055	.066
26	.0165	.019	.024			
27	.0165	.019	.025			
28	.0165	.019	.025			
29	.0165	.0195	.025			
30	.016	.0195	.026	.047	.056	.072
31	.016	.95	.026			
32	.016	.5	.027			
33	.016	.5	.027			
34	.016	.5	.028			
35	.016	.0195	.028	.047	.056	.086
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						
RES. none Hz						

ENDURANCE TEST (PARA. 2.23)

Hz	INPUT	DURATION
35	.009	10 sec

TEST SPECIMEN
 NOMENCLATURE

1 motor with fixture
 1 SMBO Operator
 with motor

SERIAL NO.

MANUFACTURER

LIMITORQUE CORPORATION

ACCELEROMETER LOCATION

CH. 1 rear of motor
 CH. 2 front of handwheel

REMARKS:

Operator actuated during
 this portion of test

TEST ENGINEER

Wm. C. Black

VIBRATION TEST DATA SHEET
 AXIS: Y Axis

030596

REPORT NO. 3521 - 4811
 DATE: 6/12/74

NOTE: RECORDED DATA IS
 DOUBLE AMPLITUDE
 (INCHES)

Hz	EXPLORATORY (Para. 1)			VARI.FREQUENCY(Para.2.2)		
	INPUT	CH. 1	CH. 2	INPUT	CH. 1	CH. 2
4						
5	.009	.016	.010			
6	.009	.014	.012	.052	.049	.032
7	.013	.017	.013			
8	.014	.017	.014			
9	.015	.017	.015			
10	.0155	.017	.016	.051	.049	.042
11	.016	.017	.016			
12	.0165	.017	.017			
13	.017	.017	.017			
14	.017	.018	.017			
15	.017	.018	.0175	.049	.052	.047
16	.017	.018	.018			
17	.017	.018	.018			
18	.017	.018	.018			
19	.017	.018	.0185			
20	.017	.0185	.019	.048	.052	.050
21	.017	.0185	.019			
22	.017	.0185	.019			
23	.017	.019	.019			
24	.017	.019	.020	.048	.054	.052
25	.017	.019	.020			
26	.017	.019	.020			
27	.017	.019	.0205			
28	.017	.0195	.021			
29	.017	.0195	.021			
30	.017	.020	.022	.048	.056	.058
31	.017	.020	.0225			
32	.017	.020	.023			
33	.017	.020	.023			
34	.017	.020	.024			
35	.017	.0205	.024	.049	.058	.062
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						

ENDURANCE TEST (PARA.2.23)

Hz	INPUT	DURATION
35	.100	10 sec

TEST SPECIMEN
 NOMENCLATURE

1 motor with fixture
 1 SMBO Operator
 with motor

SERIAL NO.

MANUFACTURER

LIMITORQUE CORPORATION

ACCELEROMETER LOCATION

CH. 1 Top of motor
 CH. 2 Top front of
 Handwheel

REMARKS:

Operator actuated during
 this portion of test

TEST ENGINEER

Wm. C. Black

RES. none Hz
 FORM LEC 922B

APPENDIX E

- Figure 1 Test Chamber
- Figure 2 Steam Generator
- Figure 3 Control and Instrumentation
Panel

030598

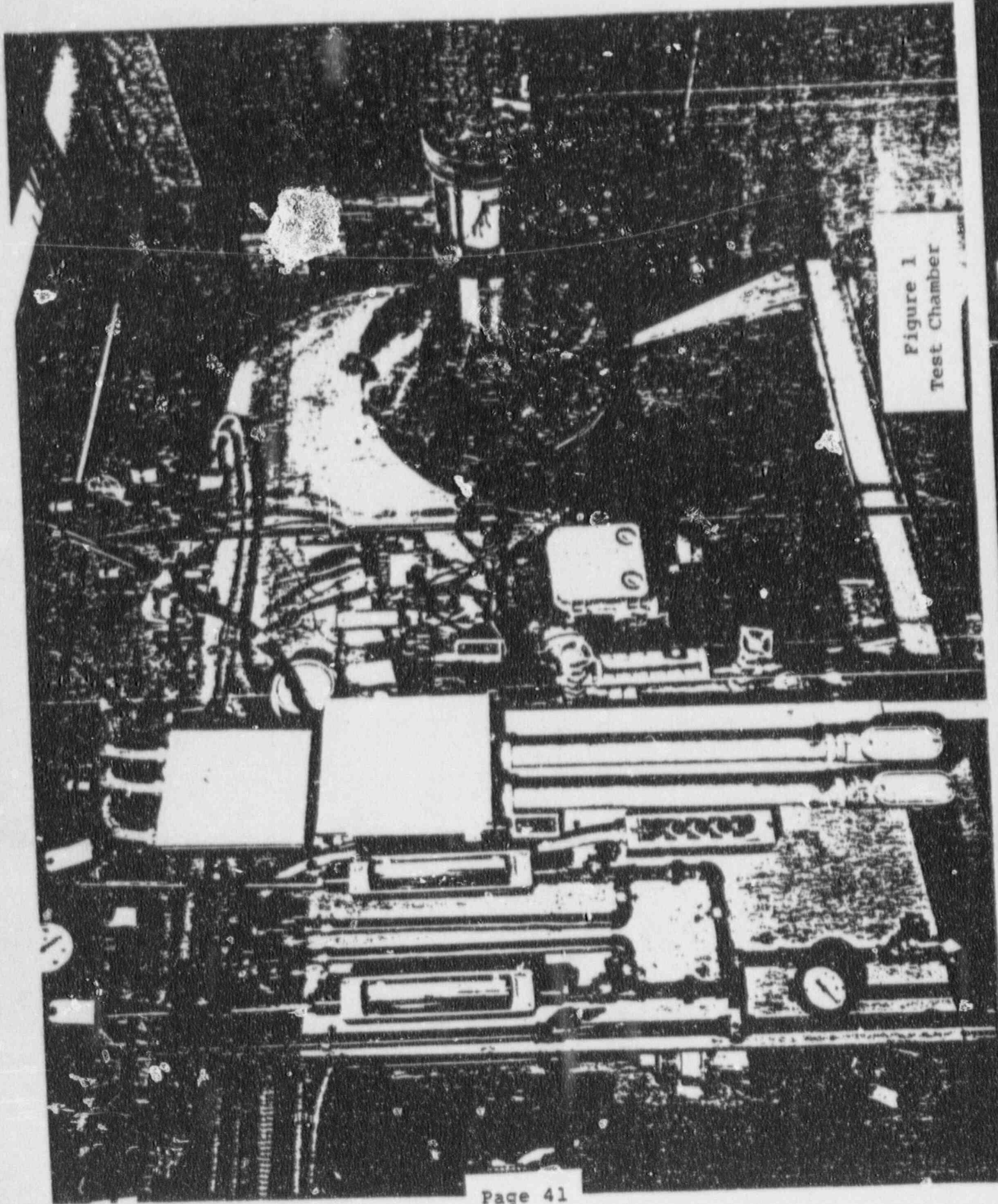


Figure 1
Test Chamber

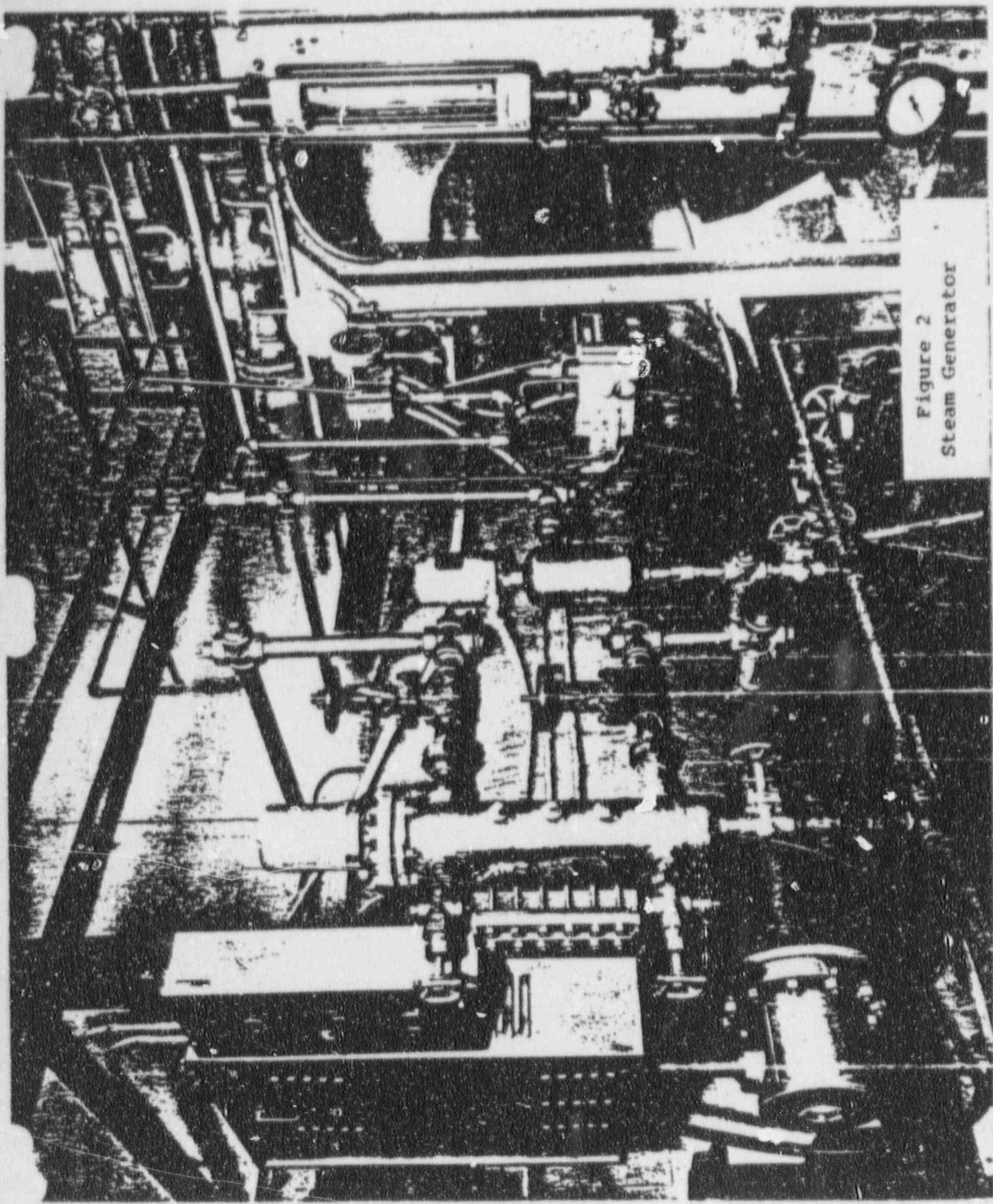
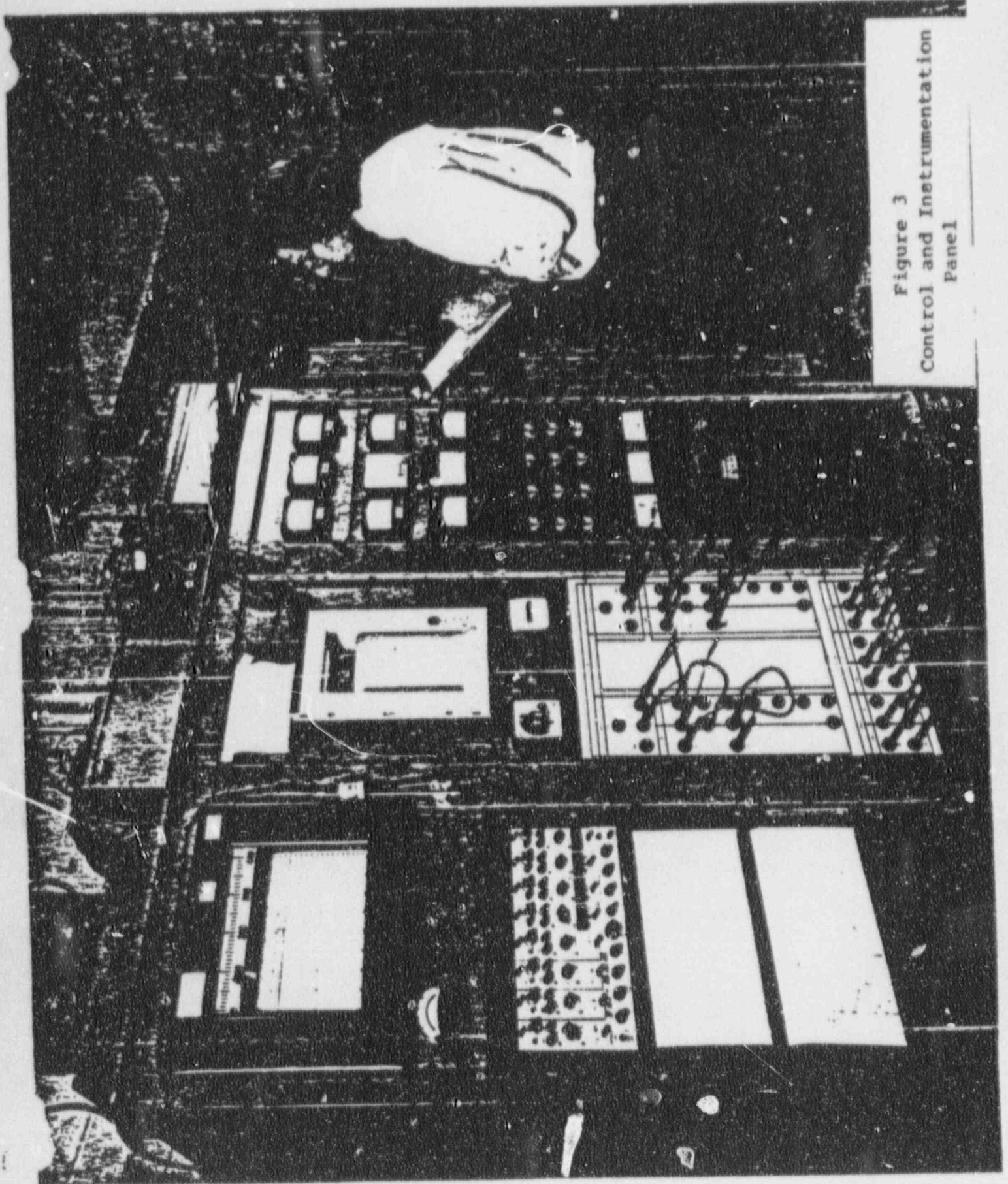


Figure 2
Steam Generator

070600

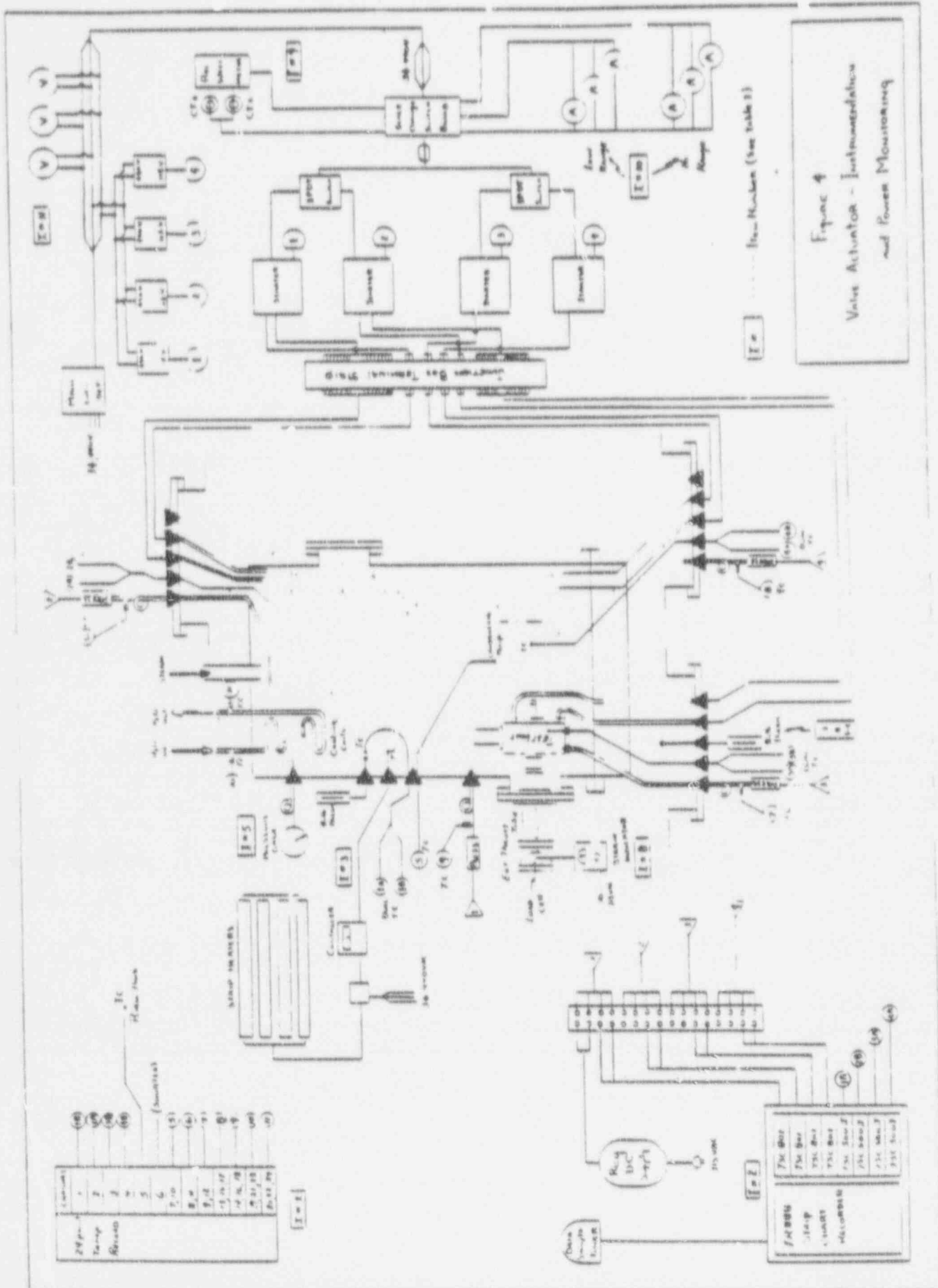
Figure 3
Control and Instrumentation
Panel



APPENDIX F

Figure 4 - Schematic - Instrumentation

Table I Summary of Instruments used for
Data Acquisition



Instrument Number (see table 1)

Figure 4
Valve Actuator - Instrumentation
and Power Monitoring

Instrument	Component
I=1	Relay 11A
I=2	Relay 11B
I=3	Relay 11C
I=4	Relay 11D
I=5	Relay 11E
I=6	Relay 11F
I=7	Relay 11G
I=8	Relay 11H
I=9	Relay 11I
I=10	Relay 11J
I=11	Relay 11K
I=12	Relay 11L
I=13	Relay 11M
I=14	Relay 11N
I=15	Relay 11O
I=16	Relay 11P
I=17	Relay 11Q
I=18	Relay 11R
I=19	Relay 11S

Instrument	Component
I=1	Relay 11A
I=2	Relay 11B
I=3	Relay 11C
I=4	Relay 11D
I=5	Relay 11E
I=6	Relay 11F
I=7	Relay 11G
I=8	Relay 11H
I=9	Relay 11I
I=10	Relay 11J
I=11	Relay 11K
I=12	Relay 11L
I=13	Relay 11M
I=14	Relay 11N
I=15	Relay 11O
I=16	Relay 11P
I=17	Relay 11Q
I=18	Relay 11R
I=19	Relay 11S

TABLE I

SUMMARY OF DATA ACQUISITION SYSTEM

Measurement Categories IEEE Std. 382 Par. 4.5.1	PARAMETER	Item No.	MEASURING SYSTEM				LAST CALIBRATION	NEXT CALIBRATION			
			Indicator	Signal Conditioner	X-Ducer	Monitoring Point					
I - ENVIRONMENT	TEMPERATURE	1. Multipoint Temperature Recorder Type J T. C. Honeywell Model No. K153x80-c- II-W6-65 Serial No. T11806-83004	1		1B T. C.-J(?)	Chamber Amb.	Feb. 1974	Feb. 1975			
			2		2A T. C.-J(?)	Test Unit					
3			3B T. C.-J(?)	L.S. Comp							
4			4B T. C.-J(2)	Chamber Amb.							
5			- -	Room Amb.							
6			- -	Shorted							
7,10			5 T. C.-J	Condensate							
8,11			6 T. C.-J	Press x-D#2							
9,12			7 T. C.-J	Press x-D#3							
13,15,17			8 T. C.-J	Press x-D#4							
14,16,18			9 T. C.-J	Press x_D#1							
19,21,23		10 T. C.-J	H ₂ O input								
20,22,24		11 T. C.-J	H ₂ O output								
TEMPERATURE & PRESSURE	2. Strip Chart Recorder 8 Channel Gulton TR888 S/N 3042802	1 Amplif.		Press x-D#1	Chamber Amb.	Mar. 1974	Sept. 1974				
		2 "		Press x-D#2	Test Unit						
		3 "		Press x-D#3	L.S. Comp.						
		4 "		Press x-D#4	Chamber Amb.						
		5 T.C. Mod.		1A T.C.-J(2)	Chamber Amb.						
		6 "		2B T.C.-J(2)	Test Unit						
		7 "		3A T.C.-J(2)	L.S. Comp.						
		8 "		4A T.C.-J(2)	Chamber Amb.						
		Note: Amp. TSC 801 T.C.Mod. TSC 500J									

TABLE I (continued)

650604

SUMMARY OF DATA ACQUISITION SYSTEM

Measurement Categories, IEEE Std. 382 para. 4.5.1	PARAMETER	Item No.	Measuring System			Monitoring Point	LAST CALIBRATION	NEXT CALIBRATION
			Indicator	Signal Conditioner	X-Ducer			
			I - Environment	TEMPERATURE	3			
4	Bi-metal Dial Thermometer Wexler 50-400 F				Chamber Ambient	New 2/74	2/75	
Pressure	5	Dial Pressure Gage Ashcroft 30 in Hg to 200 psig			Chamber Pressure	5/74	11/74	
Time	6	Time of Day Wall-Clock			Time of Day	-	-	
	7	Running Time Clock 1000 hours 0.1 hr. Resolution			Total Test Time	-	-	
II Power & Cycle Time	LOAD	8		Strain Indicator Bridge BL &H Typen S/N 443604	20,000 lb Load Cell BL&H U-1 S/N 2512	Test Unit Thrust Output	12/73	12/74

TABLE I (continued)

SUMMARY OF DATA ACQUISITION SYSTEM

C30695

MEASUREMENT Categories IEEE Std. 382 Para 4.5.1	PARAMETER	Item NO.	Measuring System			Monitoring Point	LAST Calibration	Next Calibration
			Indic- ator	Signal Condit.	X-Ducer			
II - POWER & CYCLE TIME	POWER	9.	3 phase Recording Wattimeter Esterline Angus Model A 601C S/N 192358			Power Consumption of operator	New 2/74	2/75
	CURRENT	10.	Panel Meters 3 meters one in each phase Low Range - 3-0-10 amp meters Triplett Type 430 Hi Range - 3-0-50 amp meters Triplett Type 430			Test Unit Current	New 3/74	3/75
	VOLTAGE	11.	Panel Meters 3 meters one across each phase 0-500VAC Triplett Type 430			Test Unit Voltage	New 3/74	3/75

TABLE I (continued)

030606

SUMMARY OF DATA ACQUISITION SYSTEM

Measurement Categories	PARAMETER	Item No.	Measuring System			Monitoring Point	LAST CALIBRATION	NEXT CALIBRATION
			Indicator	Signal Conditioner	X-Ducer			
II Power & Cycle	TIME	12	Stopwatch Hever S/N 512406			Stroke Time	-	-
III Fluid Characteristics	FLOW	13	Flow Meters (2) Fisher & Porter Model S/N 10A1735Y 7309A0574A1 10A1735 7407A0403A1			Chemical Flow	New 2/74	2/75
		14	2 Dial Pressure Gages (2) Wesler Model BA14P 1 Acco Helicoid 0-200 psig			Manifold Pressure Pump Pressure	New 2/74 Indicator only	2/75
	PH	15	PH Meter			PH of Chem. Solution	Comparison Against Standard Solution	
V Electrical Resistance		16	Megohmmeter James G. Biddle Model 21159 S/N 732521			Motor & Control Leads	New 2/74	2/75

3WR Qualification

030607

APPENDIX C

Reliance Electric Company
Certificate of Compliance for Heat Aging

RELIANCE ELECTRIC COMPANY
CERTIFICATE OF COMPLIANCE



Limiterque Corp.
5114 Woodall Road
Lynchburg Va. 24502

March 3, 1972

EQUIPMENT: Qty. 1, R56 Frame, 25 ft.lbs. Start Torque
REFERENCE: Purchase Order No. 355696-A
FILE: Order No. 601962-P

We certify that the equipment identified above has been designed, manufactured, inspected, and/or tested in accordance with the requirements established by the following specifications:

Insulation C.F.I. 226.59
Finish C.F.I. 336.163
Class k Radiation Insulation
Heat aged 100 hrs. at 180°C
Rotor treatment U-475 Varnish
Winding Epoxy coated 4824-3A
Drain in B.E. Shield - U.L. approved

R. G. Lunsford
R.G. Lunsford, Manager
Quality Control Department
Madison, Indiana

(RPH) O/D VIND 13/1/72

RGL:st

030699

BWR Qualification

070610

APPENDIX D

Radiation International, Inc.
Certification of Test Unit Irradiation

670611

May 23, 1972

Mr. W. H. Steigelmann, Manager
Nuclear Systems Laboratory
Franklin Institute Research Laboratory
20th and Race Streets
Philadelphia, Pennsylvania 19103

Dear Mr. Steigelmann:

This will summarize the parameters pertinent to the irradiation of Limitorque Corporation's materials, described below, per your Case C-3327.

Motor

SN601962P) Motor used in FIRL test
Reliance Electric Company) report #F-C3441

Magnetic Brake and Motor

Motor: SN601960P
Reliance Electric Company

Brake: Magnetic Brake
Reliance Electric Company
Model X7-62008-26
SN-2-53276
6 Ft.-Lb. Torque, 460V

Valve and Motor

Limitorque
SMB Size 0
SN 144068
Motor - Limitorque
Reliance Electric Company
SN601961-P

4 Mr. W. H. Steigelmann

- 2 -

May 23, 1972

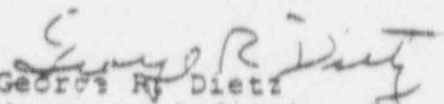
Components were placed in a cobalt-60 gamma field of 1.0 Mrad per hour intensity for a period of 4 hours, and received a total minimum dose of 4 Mrad. They were then shipped via RII truck to Ogden Technical Labs for testing. The units were then received for further irradiation, and were exposed in a 1.0 Mrad field for an additional 200 hours or 200 Mrad. Portions of the outer sides of the components received a 25% higher dose to assure that inner portions received the designated 204 Mrad. Components were turned several times during exposure to assure a more uniform dose distribution. Irradiation was in air at ambient temperature and pressure. Radiant heat from the source heated the samples somewhat, but did not exceed 100°F, as confirmed by measurement of an oil solution in the same relative position.

Dosimetry was performed using a Victoreen Model 555 Integrating Dose Rate Meter and Probe. The unit was calibrated on January 15, 1971 by the Victoreen Instrument Company, using cobalt-60 and cesium-137 sources whose calibrations are traceable to the U.S. National Bureau of Standards. A copy of the calibration certificate is available.

Following irradiation, components were visually inspected for obvious irradiation damage. None was noted.

Irradiation was completed on May 8, 1972 and picked up by FIRM May 9, 1972.

Very truly yours,


George R. Dietz
Manager, Radiation Services

GRD:km



A-8
50-348/364-CIVP
2/20/92

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA ST., N.W., SUITE 2100
ATLANTA, GEORGIA 30303

APCo Exhibit 08
DOCKETED
USNRC

'92 MAR 13 P3:56

JAN 17 1980

In Reply Refer To:
R11:JPO
50-348

Ballard
8004160038
LC# 1960
KWRD 4/7/87
4/22/87

Em. JCA

OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

File # 101C

Alabama Power Company R.807
Attn: F. L. Clayton, Jr.
Senior Vice President
Post Office Box 2641
Birmingham, Alabama 35291

IEB 79-01B

Gentlemen:

Please disregard IE Bulletin No. 79-01B and enclosures dated January 14, 1980.

Enclosed is IE Bulletin No. 79-01B which requires action by you with regard to your power reactor facility(ies) with an operating license.

Should you have questions regarding this Bulletin or the actions required of you, please contact this office.

Sincerely,

James P. O'Reilly
Director

Enclosures:

1. IE Bulletin No. 79-01B with Enclosures
2. List of Recently Issued IE Bulletins

~~8004160038~~

NUCLEAR REGULATORY COMMISSION

Docket No. 50-346/364-CivP Original File No. 8

In the matter of Alabama Power Company

Staff _____ IDENTIFIED 9:03 a.m. 2/20/92

Applicant RECEIVED 2/20/92

Intervenor _____ REJECTION _____

Cont. g. Off'r _____

Contractor _____ DATE _____

Other _____ WITHHELD _____

Reporter D. Esch

JAN 17 1980

Alabama Power Company

-2-

cc w/encl:
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0051547

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0051548

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

SSINS No.: 6820
Accessions No.:
-7910250528

January 14, 1980

IE Bulletin No. 79-01B

ENVIRONMENTAL QUALIFICATION OF CLASS IE EQUIPMENT

Description of Circumstances:

IE Bulletin No. 79-01 required the licensee to perform a detailed review of the environmental qualification of Class IE electrical equipment to ensure that the equipment will function under (i.e. during and following) postulated accident conditions.

The NRC staff has completed the initial review of licensees' responses to Bulletin No. 79-01. Based on this review, additional information is needed to facilitate completion of the NRC evaluation of the adequacy of environmental qualification of Class IE electrical equipment in the operating facilities. In addition to requesting more detailed information, the scope of this Bulletin is expanded to resolve safety concerns relating to design basis environments and current qualification criteria not addressed in the facilities' FSARS. These include high energy line breaks (HELB) inside and outside primary containment, aging, and submergence.

Enclosure 4, "GUIDELINES FOR EVALUATING ENVIRONMENTAL QUALIFICATION OF CLASS IE ELECTRICAL EQUIPMENT IN OPERATING REACTORS", provides the guidelines and criteria the staff will use in evaluating the adequacy of the licensee's Class IE equipment evaluation in response to this Bulletin.

In general, the reporting problems encountered in the original responses and the additional information needed can be grouped into the following areas:

1. All Class IE electrical equipment required to function under the postulated accident conditions, both inside and outside primary containment, was not included in the responses.
2. In many cases, the specific information requested by the Bulletin for each component of Class IE equipment was not reported.
3. Different methods and/or formats were used in providing the written evidence of Class IE electrical equipment qualifications. Some licensees used the System Analysis Method which proved to be the most effective approach. This method includes the following information:
 - a. Identification of the protective plant systems required to function under postulated accident conditions. The postulated accident conditions are defined as those environmental conditions resulting from both LOCA and/or HELB inside primary containment and HELB outside the primary containment.

- b. Identification of the Class IE electrical equipment items within each of the systems identified in Item a, that are required to function under the postulated accident conditions.
 - c. The correlation between the environmental data requirements specified in the FSAR and the environmental qualification test data for each Class IE electrical equipment item identified in Item b above.
4. Additional data not previously addressed in IE Bulletin No. 79-01 are needed to determine the adequacy of the environmental qualification of Class IE electrical equipment. These data address component aging and operability in a submerged condition.

Action To Be Taken By Licensees Of All Power Reactor Facilities With An Operating License (Except those 11 SEP Plants Listed on Enclosure 1)

1. Provide a "master list" of all Engineered Safety Feature Systems (Plant Protection Systems) required to function under postulated accident conditions. Accident conditions are defined as the LOCA/HELB inside containment, and HELB outside containment. For each system within (including cables, EPA's terminal blocks, etc.) the master list identify each Class IE electrical equipment item that is required to function under accident conditions. Pages 1 and 2 of Enclosure 2 are standard formats to be used for the "master list" with typical information included.

Electrical equipment items, which are components of systems listed in Appendix A of Enclosure 4, which are assumed to operate in the FSAR safety analysis and are relied on to mitigate design basis events are considered within the scope of this Bulletin, regardless whether or not they were classified as part of the engineered safety features when the plant was originally licensed to operate. The necessity for further up grading of nonsafety-related plant systems will be dependent on the outcome of the licensees and the NRC reviews subsequent to TMI/2.

2. For each class IE electrical equipment item identified in Item 1, provide written evidence of its environmental qualification to support the capability of the item to function under postulated accident conditions. For those class IE electrical equipment items not having adequate qualification data available, identify your plans for determining qualifications of these items and your schedule for completing this action. Provide this in the format of Enclosure 3.
3. For equipment identified in Items 1 and 2 provide service condition profiles (i.e., temperature, pressure, etc., as a function of time). These data should be provided for design basis accident conditions and qualification tests performed. This data may be provided in profile or tabular form.

4. the qualification of Class IE electrical equipment against the lines provided in Enclosure 4. Enclosure 5, "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment," contains supplemental information to be used with these guidelines. For the items identified as having "Outstanding Items" by Enclosure 3, provide a "Equipment Qualification Plan." Include in this plan specific actions which will be taken to determine equipment qualification and the schedule for completing the actions.
5. the maximum expected flood level inside the primary containment from postulated accidents. Specify this flood level by elevation above the 620 foot elevation. Provide this information in the format of Item 3.
6. "Licensee Event Report" (LER) for any Class IE electrical equipment which has been determined as not being capable of meeting environmental qualification requirements for service intended. Send the LER to the appropriate NRC Regional Office within 24 hours of identification. If plant operations are to continue following identification, provide justification for such operations in the LER. Provide a detailed written report within 14 days of identification to the appropriate NRC Regional Office. Those items which have previously been reported to the NRC as not being qualified per IEB-79-01 do not require an LER.
7. the actions specified by this bulletin in accordance with the following schedule:
- (a) Submit a written report required by Items 1, 2, and 3 within 45 days from receipt of this Bulletin.
 - (b) Submit a written report required by Items 4 and 5 within 90 days from receipt of this Bulletin.

This information is requested under the provisions of 10 CFR 50.54(f). Accordingly, you are requested to provide within the time periods specified in Items 7.a and 7.b above, written statements of the above information, signed under each of the following affirmations.

Submit the reports to the Director of the appropriate NRC Regional Office. Send a copy of your report to the U.S. Nuclear Regulatory Commission, Office of Inspection and Enforcement, Division of Reactor Operations Inspection, Washington, D.C. 20555.

Approved by GAO, B180225 (R0072); clearance expires 7/31/80. Approval was given under a blanket clearance specifically for identified generic problems.

Enclosures:

1. 11 SEP Plants
2. Master List
3. System Component Evaluation Work Sheet Instructions
4. Guidelines for Evaluating Environmental Qualification of Class IE Electrical Equipment in Operating Reactors
5. Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment (NUREG-0588)

Note: The above enclosures are to be sent to the corporate offices only.

RECENTLY ISSUED
IE BULLETINS

Bulletin No.	Subject	Date Issued	Issued To
80-01	Operability of Ads Valve Pneumatic Supply	1/11/80	All BWR power reactor facilities with an operating license
79-01B	Environmental Qualification of Class IE Equipment	1/14/80	All power reactor facilities with an operating license
79-28	Possible Malfunction of Namco Model EA 180 Limit Switches at Elevated Temperatures	12/7/79	All power reactor facilities with an OL or a CP
79-27	Loss Of Non-Class-1-E Instrumentation and Control Power System Bus During Operation	11/30/79	All power reactor facilities holding OLs and to those nearing licensing
79-26	Boron Loss From BWR Control Blades	11/20/79	All BWR power reactor facilities with an OL
79-25	Failures of Westinghouse BFD Relays In Safety-Related Systems	11/2/79	All power reactor facilities with an OL or CP
79-17 (Rev. 1)	Pipe Cracks In Stagnant Borated Water System At PWR Plants	10/29/79	All PWR's with an OL and for information to other power reactors
79-24	Frozen Lines	9/27/79	All power reactor facilities which have either OLs or CPs and are in the late stage of construction
79-23	Potential Failure of Emergency Diesel Generator Field Exciter Transformer	9/12/79	All Power Reactor Facilities with an Operating License or a construction permit
79-14 (Supplement 2)	Seismic Analyses For As-Built Safety-Related Piping Systems	9/7/79	All Power Reactor Facilities with an OL or a CP
79-22	Possible Leakage of Tubes of Tritium Gas in Timepieces for Luminosity	9/5/79	To Each Licensee who Receives Tubes of Tritium Gas Used in Timepieces for Luminosity

0051552
Enclosure 1

SEP Plants

<u>Plant</u>	<u>Region</u>
Dresden 1	III
Yankee Rowe	I
Big Rock Point	III
San Onofre 1	V
Haddam Neck	I
LaCrosse	III
Oyster Creek	I
R. E. Ginna	I
Dresden 2	III
Millstone	I
Palisades	III

0051553

(Class IE Electrical Equipment Required to Function Under Postulated Accident Conditions)

I. SYSTEM: RESIDUAL HEAT REMOVAL (RHR)

COMPONENTS			
Plant Identification Number	Generic Name	Location	
		Inside Primary Containment	Outside Primary Containment
1PT 456	PRESSURE TRANSMITTER	x	
1LT 594	LEVEL TRANSMITTER	x	
1LS 210	LIMIT SWITCH	x	

II. SYSTEM: AUTOMATIC DEPRESSURIZATION SYSTEM (ADS)

COMPONENTS			
Plant Identification Number	Generic Name	Location	
		Inside Primary Containment	Outside Primary Containment
B21-R001	VALVE MOTOR OPERATOR	x	
B21-F003	SOLENOID VALVE		x
B21-F010	PRESSURE SWITCH		x

111. SYSTEM: RHR EQUIPMENT/COMPONENTS (Typical)

0051554

**COMPONENTS			
Plant Identification Number	Generic Name	Location	
		Inside Primary Containment	Outside Primary Containment
16xP455	O-RING GASKET	x	
EPA, Class E, Westinghouse, 100C	ELECTRICAL PENETRATION ASSEMBLY	x	
KULKA No. ET35	TERMINAL BOARD	x	
ONKONITE, 1000V, 3C Black	POWER CABLE	x	x
X BRAND 10W-40	LUBRICATE OIL		x
15 KB69 (Boston Wire & Cable)	INSTRUMENTATION CABLE	x	x
Cutler Hammer TB No. 6	TERMINAL BOX		x
RAYCHEM XYZ	CABLE SPLICE	x	x
Scotch No. 54	INSULATING TAPE		x
T&B No. 10 INSULATED	TERMINAL LUG		x
Y Brand Epoxy No. 111	SEALANT	x	x

- * When a component is not identified by plant identification number, use the manufacturer, model number, serial number, etc.
- ** Like components may be referenced.

SYSTEM COMPONENT EVALUATION WORK SHEET
INSTRUCTIONS

1. Equipment Description: Provide the specific information requested for each Class 1A electrical component. Provide component location, specific information such as the building, access floor elevations, and whether the component is above the flood level elevation. In addition, provide the specified and demonstrated accuracies of all instruments for their trip functions and/or post accident monitoring requirements. Cables, EPA's, terminal blocks, and other items shall be identified as part of the engineered safety features systems.
2. Environment: List values for each environmental parameter indicated. List the "specification values" obtained from postulated accident analysis in the "SPEC" column. List the "qualification values" obtained from test reports, engineering analysis data, etc. in the "Qual" column. Temperature, pressure, etc., as a function of time shall be provided in profile or tabular form. Specify the time period that the component or equipment is required to function and identify the document which provides the basis for this time interval.

It is expected that some listed parameters were not requested of the licensee at the time of their license issuance. Address each parameter condition during this review. If it is determined that a parameter such as submergence or a service condition such as aging was not previously considered, identify it as an "Outstanding Item."
3. Documentation Reference: Reference the documents from which information was obtained in the "Spec" column. Identify the document, paragraph, etc., that contains the postulated accident environmental specification data. In the "Qual" column identify the document, paragraph, etc., that contains the environmental qualification data.
4. Qualification Method: Identify the method of qualification. To describe the qualification method use words such as simultaneous test, comparison test, sequential test, and/or engineering/mathematical analysis. Words such as "test" and/or "analysis" when used alone do not adequately identify the qualification method.
5. Outstanding Items: Identify parameters for which no qualification data is presently available. Also, identify parameters, service conditions, or environments not previously addressed during FSAR environmental qualification analysis such as submergence, qualified life (aging), or HELB. Identify in the "Notes" section on page 1 of this enclosure the actions planned for determining qualification and the schedule for completing these actions.

Activity:
 Unit:
 Socket:

SYSTEM COMPONENT EVALUATION WORK SHEET
 (Typical)

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF ^A		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: RHR Plant ID No. IPT456	Operating Time	15 min.	300 min.	1	5	Simultaneous Test	None
Component: PRESSURE TRANSMITTER	Temperature (°F)	SEE ACCIDENT AND TEST PROFILES PROVIDED		1	5	Simultaneous Test	None
Manufacturer: Fischer-Porter Co.	Pressure (PSIA)			1	5	Simultaneous Test	None
Model Number: MO-EN-1071-BCXN-NS	Relative Humidity (%)	100%	100%	1	5	Simultaneous Test	None
Function: Accident Monitoring	Chemical Spray	N ₂ BO ₃ / NAOH		1			See Note 1
Accuracy: Spec: 5% Demon: 4%	Radiation	4x10 ⁶ rads	1.2x10 ⁸ rads	2	6	Sequential Test	None
Service: RHR Pump 1A Discharge Pressure S/N107	Aging	40 yrs	40 yrs	3	7, 8	1. Sequential Test 2. Eng. Analysis	None
Location: Containment	Submergence	Not Required	Not Required				None See Note 2
Good Level Elev: 620' Above Flood Level: Yes No x'							

Documentation References:

- FSAR Chapter 3, Paragraph 3.11
- FSAR Chapter 14, Paragraph 14.2.3.1
- Technical Specification 3.4.1, Paragraph A
- Technical Specification 4.6.5, Paragraph B
- FIRC Test Report No. 3000 dated November 2, 1972
- Fischer and Porter Co. Test Report No. 2500-1
- A. B. DOD Engineering Evaluation Data Report No. 6932
- Wylie Laboratory Report No. 467

Notes:

1. XYZ Letter No. 237-1, dated November 2, 1979, has been sent to MFG. requesting the qualification information. If qualification not determined acceptable by December 15, 1979, component will be replaced during refueling outage March 1980.
2. In the FSAR submergence was not considered an environmental parameter. ABC Laboratory is to perform submergence test in April 1980.

0051556

GUIDELINES FOR EVALUATING ENVIRONMENTAL QUALIFICATION
OF CLASS IE ELECTRICAL EQUIPMENT
IN OPERATING REACTORS

0051557

- 1.0 Introduction
- 2.0 Discussion
- 3.0 Identification of Class IE Equipment
- 4.0 Service Conditions
 - 1 Service Conditions Inside Containment for a Loss of Coolant Accident (LOCA)
 1. Temperature and Pressure Steam Conditions
 2. Radiation
 3. Submergence
 4. Chemical Sprays
 - 4.2 Service Conditions for a PWR Main Steam Line Break (MSLB) Inside Containment
 1. Temperature and Pressure Steam Conditions
 2. Radiation
 3. Submergence
 4. Chemical Sprays
 - 4.3 Service Conditions Outside Containment
 - 4.3.1 Areas Subject to a Severe Environment as a Result of a High Energy Line Break (HEL B)
 - 4.3.2 Areas Where Fluids are Recirculated From Inside Containment to Accomplish Long-term Emergency Core Cooling Following a LOCA
 1. Temperature, Pressure and Relative Humidity
 2. Radiation
 3. Submergence
 4. Chemical Sprays

4.3.3 Areas Normally Maintained at Room Conditions

5.0 Qualification Methods

5.1 Selection of Qualification Method

5.2 Qualification by Type Testing

1. Simulated Service Conditions and Test Duration
2. Test Specimen
3. Test Sequence
4. Test Specimen Aging
5. Functional Testing and Failure Criteria
6. Installation Interfaces

5.3 Qualification by a Combination of Methods (Test, Evaluation, Analysis)

6.0 Margin

7.0 Aging

8.0 Documentation

Appendix A - Typical Equipment/Functions Needed for Mitigation of a LOCA or MSLB Accident

Appendix B - Guidelines for Evaluating Radiation Service Conditions Inside Containment for a LOCA and MSLB Accident

Appendix C - Thermal and Radiation Aging Degradation of Selected Materials

GUIDELINES FOR EVALUATING ENVIRONMENTAL QUALIFICATION
OF CLASS IE ELECTRICAL EQUIPMENT
IN OPERATING REACTORS

1.0 INTRODUCTION

On February 8, 1979, the NRC Office of Inspection and Enforcement issued IE Bulletin 79-01, entitled, "Environmental Qualification of Class IE Equipment." This bulletin requested that licensees for operating power reactors complete within 120 days their reviews of equipment qualification begun earlier in connection with IE Circular 78-08. The objective of IE Circular 78-08 was to initiate a review by the licensees to determine whether proper documentation existed to verify that all Class IE electrical equipment would function as required in the hostile environment which could result from design basis events.

The licensees' reviews are now essentially complete and the NRC staff has begun to evaluate the results. This document sets forth guidelines for the NRC staff to use in its evaluations of the licensees' responses to IE Bulletin 79-01 and selected associated qualification documentation. The objective of the evaluations using these guidelines is to identify Class IE equipment whose documentation does not provide reasonable assurance of environmental qualification. All such equipment identified will then be subjected to a plant application specific evaluation to determine whether it should be requalified or replaced with a component whose qualification has been adequately verified.

These guidelines are intended to be used by the NRC staff to evaluate the qualification methods used for existing equipment in a particular class of plants, i.e., currently operating reactors including SEP plants.

Equipment in other classes of plants not yet licensed to operate, or replacement equipment for operating reactors, may be subject to different requirements such as those set forth in NUREG-0588, Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment.

In addition to its reviews in connection with IE Bulletin 79-01 the staff is engaged in other generic reviews that include aspects of the equipment qualification issue. TMI-2 lessons learned and the effects of failures of non-Class IE control and indication equipment are examples of these generic reviews. In some cases these guidelines may be applicable, however, this determination will be made as part of that related generic review.

2.0 DISCUSSION

IEEE Std. 323-1974¹ is the current industry standard for environmental qualification of safety-related electrical equipment. This standard was first issued as a trial use standard, IEEE Std. 323-1971, in 1971 and later after substantial revision, the current version was issued in 1974. Both versions of the standard set forth generic requirements for equipment qualification but the 1974 standard includes specific requirements for aging, margins, and maintaining documentation records that were not included in the 1971 trial use standard.

The intent of this document is not to provide guidelines for implementing either version of IEEE Std. 323 for operating reactors. In fact most of the operating reactors are not committed to comply with any particular industry standard for electrical equipment qualification. However, all of the operating reactors are required to comply with the General Design Criteria

¹IEEE Std. 323-1974, "IEEE Standard for Qualifying Class IE Equipment for Nuclear Power Generating Stations."

specified in Appendix A of 10 CFR 50. General Design Criterion 4 states in part that "structures, systems and components important to safety shall be designed to accommodate the effects of and to be compatible with the environmental conditions associated with normal operation, maintenance, testing and postulated accidents, including loss-of-coolant accidents." The intent of these guidelines is to provide a basis for judgements required to confirm that operating reactors are in compliance with General Design Criterion 4.

3.0 IDENTIFICATION OF CLASS IE EQUIPMENT

Class IE equipment includes all electrical equipment needed to achieve emergency reactor shutdown, containment isolation, reactor core cooling, containment and reactor heat removal, and prevention of significant release of radioactive material to the environment. Typical systems included in pressurized and boiling water reactor designs to perform these functions for the most severe postulated loss of coolant accident (LOCA) and main steamline break accident (MSLB) are listed in Appendix A.

More detailed descriptions of the Class IE equipment installed at specific plants can be obtained from FSARs, Technical specifications, and emergency procedures. Although variation in nomenclature may exist at the various plants, environmental qualification of those systems which perform the functions identified in Appendix A should be evaluated against the appropriate service conditions (Section 4.0).

The guidelines in this document are applicable to all components necessary for operation of the systems listed in Appendix A including but not limited to valves, motors, cables, connectors, relays, switches, transmitters and valve position indicators.

4.0 SERVICE CONDITIONS

In order to determine the adequacy of the qualification of equipment it is necessary to specify the environment the equipment is exposed to during normal and accident conditions with a requirement to remain functional. These environments are referred to as the "service conditions."

The approved service conditions specified in the FSAR or other licensee submittals are acceptable, unless otherwise noted in the guidelines discussed below.

4.1 Service Conditions Inside Containment for a Loss of Coolant Accident (LOCA)

1. Temperature and Pressure Steam Conditions - In general, the containment temperature and pressure conditions as a function of time should be based on the analyses in the FSAR. In the specific case of pressure suppression type containments, the following minimum high temperature conditions should be used: (1) BWR Drywells - 340°F for 6 hours; and (2) PWR Ice Condenser Lower Compartments - 340°F for 3 hours.
2. Radiation - When specifying radiation service conditions for equipment exposed to radiation during normal operating and accident conditions, the normal operating dose should be added to the dose received during the course of an accident. Guidelines for evaluating beta and gamma radiation service conditions for general areas inside containment are provided below. Radiation service conditions for equipment located directly above the containment sump, in the vicinity of filters, or submerged in contaminated liquids must be evaluated on a case by case basis. Guidelines for these evaluations are not provided in this document.

Gamma Radiation Doses - A total gamma dose radiation service condition of 2×10^7 RADS is acceptable for Class IE equipment located in general areas inside containment for PWRs with dry type containments. Where a dose less than this value has been specified, an application specific evaluation must be performed to determine if the dose specified is acceptable. Procedures for evaluating radiation service conditions in such cases are provided in Appendix B. The procedures in Appendix B are based on the calculation for a typical PWR reported in Appendix D of NUREG-0588¹.

Gamma dose radiation service conditions for BWRs and PWRs with ice condenser containments must be evaluated on a case by case basis. Since the procedures in Appendix B are based on a calculation for a typical PWR with a dry type containment, they are not directly applicable to BWRs and other containment types. However, doses for these other plant configurations may be evaluated using similar procedures with conservative dose assumptions and adjustment factors developed on a case by case basis.

Beta Radiation Doses - Beta radiation doses generally are less significant than gamma radiation doses for equipment qualification. This is due to the low penetrating power of beta particles in comparison to gamma rays of equivalent energy. Of the general classes of electrical equipment in a plant (e.g., cables, instrument transmitters, valve operators, containment penetrations), electrical cable is considered the most

¹ NUREG-0588, Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment.

vulnerable to damage from beta radiation. Assuming a TID 14844 source term, the average maximum beta energy and isotopic abundance will vary as a function of time following an accident. If three parameters are considered in a detailed calculation, the conservative beta surface dose of 1.40×10^8 RADS reported in Appendix D of NUREG 0188 would be reduced by approximately a factor of ten within 30 mils of the surface of electrical cable insulation of unit density. An additional 40 mils of insulation (total of 70 mils) results in another factor of 10 reduction in dose. Any structures or other equipment in the vicinity of the equipment of interest would act as shielding to further reduce beta doses. If it can be shown, by assuming a conservative unshielded surface beta dose of 2.0×10^8 RADS and considering the shielding factors discussed here, that the beta dose to radiation sensitive equipment internals would be less than or equal to 10% of the total gamma dose to which an item of equipment has been qualified, then that equipment may be considered qualified for the total radiation environment (gamma plus beta). If this criterion is not satisfied the radiation service condition should be determined by the sum of the gamma and beta doses.

3. Submergence - The preferred method of protection against the effects of submergency is to locate equipment above the water flooding level. Specifying saturated steam as a service condition during type testing of equipment that will become flooded in service is not an acceptable alternative for actually flooding the equipment during the test.

4. Containment Sprays - Equipment exposed to chemical sprays should be qualified for the most severe chemical environment (acidic or basic) which could exist. Demineralized water sprays should not be exempt from consideration as a potentially adverse service condition.

4.2 Service Conditions for a PWR Main Steam Line Break (MSLB) Inside Containment

Equipment required to function in a steam line break environment must be qualified for the high temperature and pressure that could result. In some cases the environmental stress on exposed equipment may be higher than that resulting from a LOCA, in others it may be no more severe than for a LOCA due to the automatic operation of a containment spray system.

1. Temperature and Pressure Steam Conditions - Equipment qualified for a LOCA environment is considered qualified for a MSLB accident environment in plants with automatic spray systems not subject to disabling single component failures. This position is based on the "Best Estimate" calculation of a typical plant peak temperature and pressure and a thermal analysis of typical components inside containment.^{1/} The final acceptability of this approach, i.e., use of the "Best Estimate", is pending the completion of Task Action Plan A-21, Main Steamline Break Inside Containment.

Class IE equipment installed in plants without automatic spray systems or plants with spray systems subject to disabling single failures or delayed initiation should be qualified for a MSLB accident environment determined by a plant specific analysis. Acceptable methods

^{1/} See NUREG 0458, Short Term Safety Assessment on the Environmental Qualification of Safety-Related Electrical Equipment of SEP Operating Reactors, for a more detailed discussion of the best estimate calculation.

for performing such an analysis for operating reactors are provided in Section 1.2 for Category II plants in NUREG-0588, Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment.

2. Radiation - Same as Section 4.1 above except that a conservative gamma dose of 2×10^6 RADS is acceptable.
3. Submergence - Same as Section 4.1 above.
4. Chemical Sprays - Same as Section 4.1 above.

4.3 Service Conditions Outside of Containment

4.3.1 Areas Subject to a Severe Environment as a Result of a High Energy Line Break (HELB)

Service conditions for areas outside containment exposed to a HELB were evaluated on a plant by plant basis as part of a program initiated by the staff in December, 1972 to evaluate the effects of a HELB. The equipment required to mitigate the event was also identified. This equipment should be qualified for the service conditions reviewed and approved in the HELB Safety Evaluation Report for each specific plant.

4.3.2 Areas Where Fluids are Recirculated from Inside Containment to Accomplish Long-Term Core Cooling Following a LOCA

1. Temperature and Relative Humidity - One hundred percent relative humidity should be established as a service condition in confined spaces. The temperature and pressure as a function of time should be based on the plant unique analysis reported in the FSAR.

2. Radiation - Due to differences in equipment arrangement within these areas and the significant effect of this factor on doses, radiation service conditions must be evaluated on a case by case basis. In general, a dose of at least 4×10^6 RADS would be expected.
3. Submergence - Not applicable.
4. Chemical Sprays - Not applicable.

4.3.3 Areas Normally Maintained at Room Conditions

Class IE equipment located in these areas does not experience significant stress due to a change in service conditions during a design basis event. This equipment was designed and installed using standard engineering practices and industry codes and standards (e.g., ANSI, NEMA, National Electric Code). Based on these factors, failures of equipment in these areas during a design basis event are expected to be random except to the extent that they may be due to aging or failures of air conditioning or ventilation systems. Therefore, no special consideration need be given to the environmental qualification of Class IE equipment in these areas provided the aging requirements discussed in Section 7.0 below are satisfied and the areas are maintained at room conditions by redundant air conditioning or ventilation systems served by the onsite emergency electrical power system. Equipment located in areas not served by redundant systems powered from onsite emergency sources should be qualified for the environmental extremes which could result from a failure of the systems as determined from a plant specific analysis.

5.0 QUALIFICATION METHODS

5.1 Selection of Qualification Method

The choice of qualification method employed for a particular application of equipment is largely a matter of technical judgement based on such factors as: (1) the severity of the service conditions; (2) the structural and material complexity of the equipment; and (3) the degree of certainty required in the qualification procedure (i.e., the safety importance of the equipment function). Based on these considerations, type testing is the preferred method of qualification for electrical equipment located inside containment required to mitigate the consequences of design basis events, i.e., Class IE equipment (see Section 3.0 above). As a minimum, the qualification for severe temperature, pressure, and steam service conditions for Class IE equipment should be based on type testing.

Qualification for other service conditions such as radiation and chemical sprays may be by analysis (evaluation) supported by test data (see Section 5.3 below). Exceptions to these general guidelines must be justified on a case by case basis.

5.2 Qualification by Type Testing

The evaluation of test plans and results should include consideration of the following factors:

1. Simulated Service Conditions and Test Duration - The environment in the test chamber should be established and maintained so that it envelopes the service conditions defined in accordance with Section 4.0 above. The time duration of the test should be at least as long as the period from the initiation of the accident until the temperature and pressure service conditions return to essentially the same levels that existed before the postulated accident. A shorter test duration may be acceptable

- if specific analyses are provided to demonstrate that the materials involved will not experience significant accelerated thermal aging during the period not tested.
2. Test Specimen - The test specimen should be the same model as the equipment being qualified. The type test should only be considered valid for equipment identical in design and material construction to the test specimen. Any deviations should be evaluated as part of the qualification documentation (see also Section 8.0 below).
 3. Test Sequence - The component being tested should be exposed to a steam/air environment at elevated temperature, and pressure in the sequence defined for its service conditions. Where radiation is a service condition which is to be considered as part of a type test, it may be applied at any time during the test sequence provided the component does not contain any materials which are known to be susceptible to significant radiation damage at the service condition levels or materials whose susceptibility to radiation damage is not known (see Appendix C). If the component contains any such materials, the radiation dose should be applied prior to or concurrent with exposure to the elevated temperature and pressure steam/air environment. The same test specimen should be used throughout the test sequence for all service conditions the equipment is to be qualified for by type testing. The type test should only be considered valid for the service conditions applied to the same test specimen in the appropriate sequence.
 4. Test Specimen Aging - Tests which were successful using test specimens which had not been preaged may be considered acceptable provided the component does not contain materials which are known to be susceptible

5.3 Qualification by a Combination of Methods (Test, Evaluation, Analysis)

As discussed in Section 5.1 above, an item of Class IE equipment may be shown to be qualified for a complete spectrum of service conditions even though it was only type tested for high temperature, pressure and steam. The qualification for service conditions such as radiation and chemical sprays may be demonstrated by analysis (evaluation). In such cases the overall qualification is said to be by a combination of methods. Following are two specific examples of procedures that are considered acceptable. Other similar procedures may also be reviewed and found acceptable on a case by case basis.

1. Radiation Qualification - Some of the earlier type tests performed for operating reactors did not include radiation as a service condition. In these cases the equipment may be shown to be radiation qualified by performing a calculation of the dose expected, taking into account the time the equipment is required to remain functional and its location using the methods described in Appendix B, and analyzing the effect of the calculated dose on the materials used in the equipment (see Appendix C). As a general rule, the time required to remain functional assumed for dose calculations should be at least 1 hour.
2. Chemical Spray Qualification - Components enclosed entirely in corrosion resistant cases (e.g., stainless steel) may be shown to be qualified for a chemical environment by an analysis of the effects of the particular chemicals on the particular enclosure materials. The effects of chemical sprays on the pressure integrity of any gaskets or seals present should be considered in the analysis.

to significant degradation due to thermal and radiation aging. (see Section 7.0). If the component contains such materials a qualified life for the component must be established on a case by case basis. Arrhenius techniques are generally considered acceptable for thermal aging.

5. Functional Testing and Failure Criteria - Operational modes tested should be representative of the actual application requirements (e.g., components which operate normally energized in the plant should be normally energized during the tests, motor and electrical cable loading during the test should be representative of actual operating conditions). Failure criteria should include instrument accuracy requirements based on the maximum error assumed in the plant safety analyses. If a component fails at any time during the test, even in a so called "fail safe" mode, the test should be considered inconclusive with regard to demonstrating the ability of the component to function for the entire period prior to the failure.
6. Installation Interfaces - The equipment mounting and electrical or mechanical seals used during the type test should be representative of the actual installation for the test to be considered conclusive. The equipment qualification program should include an as-built inspection in the field to verify that equipment was installed as it was tested. Particular emphasis should be placed on common problems such as protective enclosures installed upside down with drain holes at the top and penetrations in equipment housings for electrical connections being left unsealed or susceptible to moisture incursion through stranded conductors.

6.0 Margin

IEEE Std. 323-1974 defines margin as the difference between the most severe specified service conditions of the plant and the conditions used in type testing to account for normal variations in commercial production of equipment and reasonable errors in defining satisfactory performance. Section 6.3.1.5 of the standard provides suggested factors to be applied to the service conditions to assure adequate margins. The factor applied to the time equipment is required to remain functional is the most significant in terms of the additional confidence in qualification that is achieved by adding margins to service conditions when establishing test environments. For this reason, special consideration was given to the time required to remain functional when the guidelines for Functional Testing and Failure Criteria in Section 5.2 above were established. In addition, all of the guidelines in Section 4.0 for establishing service conditions include conservatism which assure margins between the service conditions specified and the actual conditions which could realistically be expected in a design basis event. Therefore, if the guidelines in Section 4.0 and 5.2 are satisfied, no separate margin factors are required to be added to the service conditions when specifying test conditions.

7.0 Aging

Implicit in the staff position in Regulatory Guide 1.89 with regard to backfitting IEEE Std. 323-1974 is the staff's conclusion that the incremental improvement in safety from arbitrarily requiring that a specific qualified life be demonstrated for all Class IE equipment is not sufficient to justify the expense for plants already constructed and operating. This position does not, however, exclude equipment

using materials that have been identified as being susceptible to significant degradation due to thermal and radiation aging. Component maintenance or replacement schedules should include considerations of the specific aging characteristics of the component materials. Ongoing programs should exist at the plant to review surveillance and maintenance records to assure that equipment which is exhibiting age related degradation will be identified and replaced as necessary. Appendix C contains a listing of materials which may be found in nuclear power plants along with an indication of the material susceptibility to thermal and radiation aging.

8.0 Documentation

Complete and auditable records must be available for qualification by any of the methods described in Section 5.0 above to be considered valid. These records should describe the qualification method in sufficient detail to verify that all of the guidelines have been satisfied. A simple vendor certification of compliance with a design specification should not be considered adequate.

APPENDIX A

0051574

TYPICAL EQUIPMENT/FUNCTIONS NEEDED FOR
MITIGATION OF A LOCA OR MSLB ACCIDENT

Engineered Safeguards Actuation
Reactor Protection
Containment Isolation
Steamline Isolation
Main Feedwater Shutdown and Isolation
Emergency Power

Emergency Core Cooling¹
Containment Heat Removal
Containment Fission Product Removal
Containment Combustible Gas Control
Auxiliary Feedwater
Containment Ventilation
Containment Radiation Monitoring
Control Room Habitability Systems (e.g., HVAC, Radiation Filters)
Ventilation for Areas Containing Safety Equipment
Component Cooling
Service Water
Emergency Shutdown²
Post Accident Sampling and Monitoring³
Radiation Monitoring³
Safety Related Display Instrumentation³

¹ These systems will differ for PWRs and BWRs, and for older and newer plants. In each case the system features which allow for transfer to recirculation cooling mode and establishment of long term cooling with boron precipitation control are to be considered as part of the system to be evaluated.

² Emergency shutdown systems include those systems used to bring the plant to a cold shutdown condition following accidents which do not result in a breach of the reactor coolant pressure boundary together with a rapid depressurization of the reactor coolant system. Examples of such systems and equipment are the RHR system, PORVs, RCIC, pressurizer sprays, chemical and volume control system, and steam dump systems.

³ More specific identification of these types of equipment can be found in the plant emergency procedures.

PROCEDURES FOR EVALUATING GAMMA RADIATION SERVICE CONDITIONSIntroduction and Discussion

The adequacy of gamma radiation service conditions specified for inside containment during a LOCA or MSLB accident can be verified by assuming a conservative dose at the containment centerline and adjusting the dose according to the plant specific parameters. The purpose of this appendix is to identify those parameters whose effect on the total gamma dose is easy to quantify with a high degree of confidence and describe procedures which may be used to take these effects into consideration.

The bases for the procedures and restrictions for their use are as follows:

- (1) A conservative dose at the containment centerline of 2×10^7 RADS for a LOCA and 2×10^6 RADS for a MSLB accident has been assumed. This assumption and all the dose rates used in the procedure outlined below are based on the methods and sample calculation described in Appendix D of NUREG-0588, "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment." Therefore, all the limitations listed in Appendix D of NUREG-0588 apply to these procedures.
- (2) The sample calculation in Appendix D of NUREG-0588 is for a 4,000 MWh pressurized water reactor housed in a 2.52×10^6 ft³ containment with an iodine scrubbing spray system. A similar calculation without iodine scrubbing sprays would increase the dose to equipment approximately 15%. The conservative dose of 2×10^7 RADS assumed

- in the procedure below includes sufficient conservatism to account for this factor. Therefore, the procedure is also applicable to plants without an iodine scrubbing spray system.
- (3) Shielding calculations are based on an average gamma energy of 1 MEV derived from TID 14844.
 - (4) These procedures are not applicable to equipment located directly above the containment sump, submerged in contaminated liquids, or near filters. Doses specified for equipment located in these areas must be evaluated on a case by case basis.
 - (5) Since the dose adjustment factors used in these procedures are based on a calculation for a typical pressurized water reactor with a dry type containment, they are not directly applicable to boiling water reactors or other containment types. However, doses for these other plant configurations may be evaluated using similar procedures with conservative dose assumptions and adjustment factors developed on a case by case basis.

Procedure

Figures 1 through 4 provide factors to be applied to the conservative dose to correct the dose for the following plant specific parameters: (1) reactor power level; (2) containment volume; (3) shielding; (4) compartment volume; and (5) time equipment is required to remain functional.

The procedure for using the figures is best illustrated by an example. Consider the following case. The radiation service condition for a particular item of equipment has been specified as 2×10^6 RADS. The application specific parameters are:

Reactor power level - 3,000 MWth

Containment volume - 2.5×10^6 ft³

Compartment Volume - 8,000 ft³

Thickness of compartment shield wall (concrete) - 24"

Time equipment is required to remain functional - 1 yr.

The problem is to make a reasonable estimate of the dose that the equipment could be expected to receive in order to evaluate the adequacy of the radiation service condition specification.

Step 1

Enter the nomogram in Figure 1 at 3,000 MWth reactor power level and 2.5×10^6 ft³ containment volume and read a 30-day integrated dose of 1.5×10^7 RADS.

Step 2

Enter Figure 2 at a dose of 1.5×10^7 RADS and 24" of concrete shielding for the compartment the equipment is located in and read 4.5×10^6 RADS. This is the dose the equipment receives from sources outside the compartment. To this must be added the dose from sources inside the compartment (Step 3).

Step 3

Enter Figure 3 at 8,000 ft³ and read a correction factor of 0.13. The dose due to sources inside the compartment would then be $0.13 (1.5 \times 10^7) = 1.95 \times 10^6$ RADS. The sums of the doses from steps 2 and 3 equals:

$$4.5 \times 10^6 \text{ RADS} + 0.13 (1.5 \times 10^7) \text{ RADS} = 2.0 \times 10^6 \text{ RADS}$$

Step 4

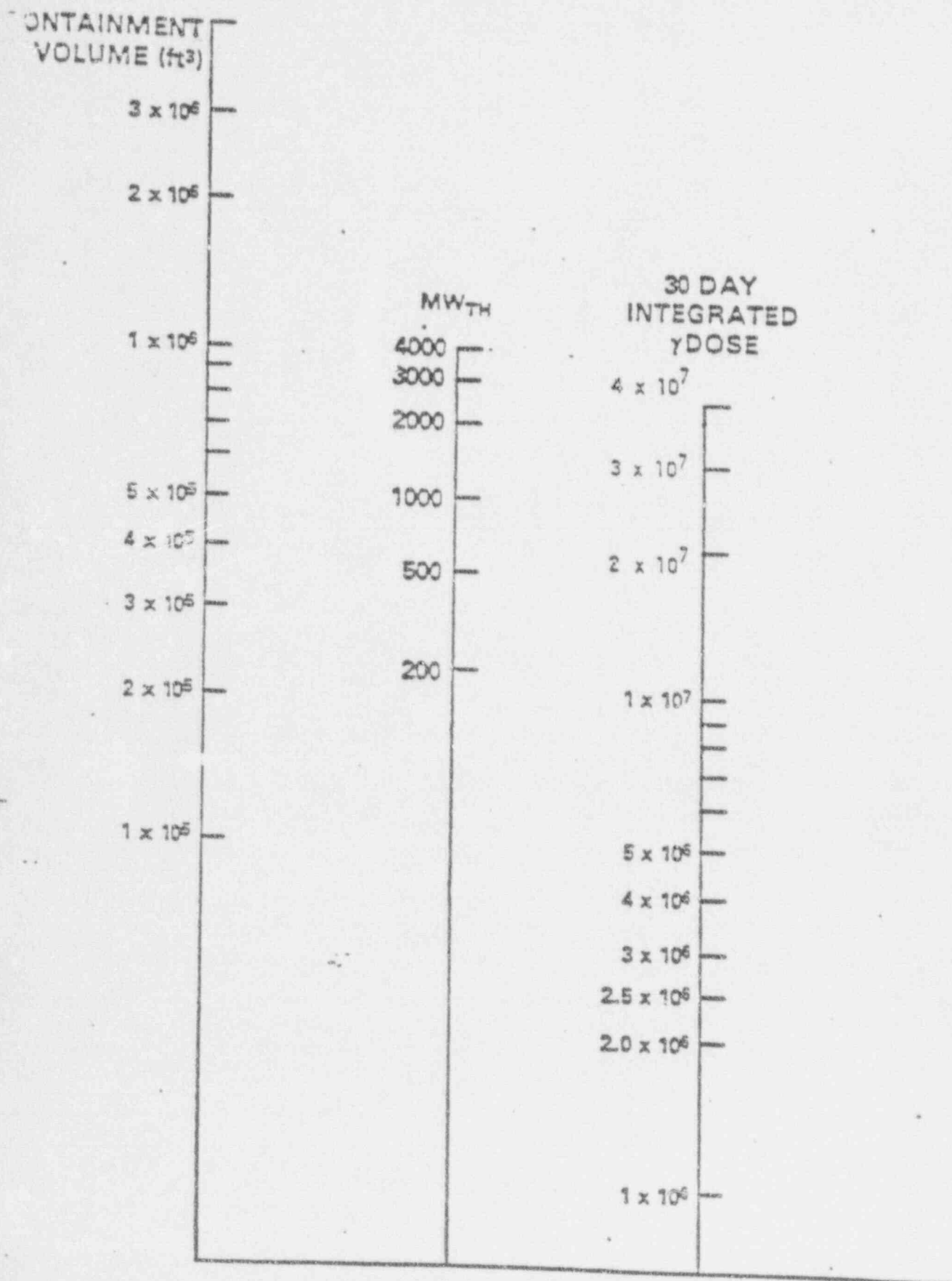
Enter Figure 4 at 1 hour and read a correction factor of 0.15. Apply this factor to the sum of the doses determined from steps 2 and 3 to correct the 30 day total dose to the equipment inside the compartment to 1 hour.

$$0.15 (2.0 \times 10^6) = 3 \times 10^5 \text{ RADS}$$

In this particular example the service condition of 2×10^6 RADS specified is conservative with respect to the estimated dose of 3×10^5 RADS calculated in steps 1 through 4 and is, therefore, acceptable.

FIGURE 1
 PROGRAM FOR CONTAINMENT VOLUME AT REACTOR POWER
 LOCA DOSE CORRECTIONS*

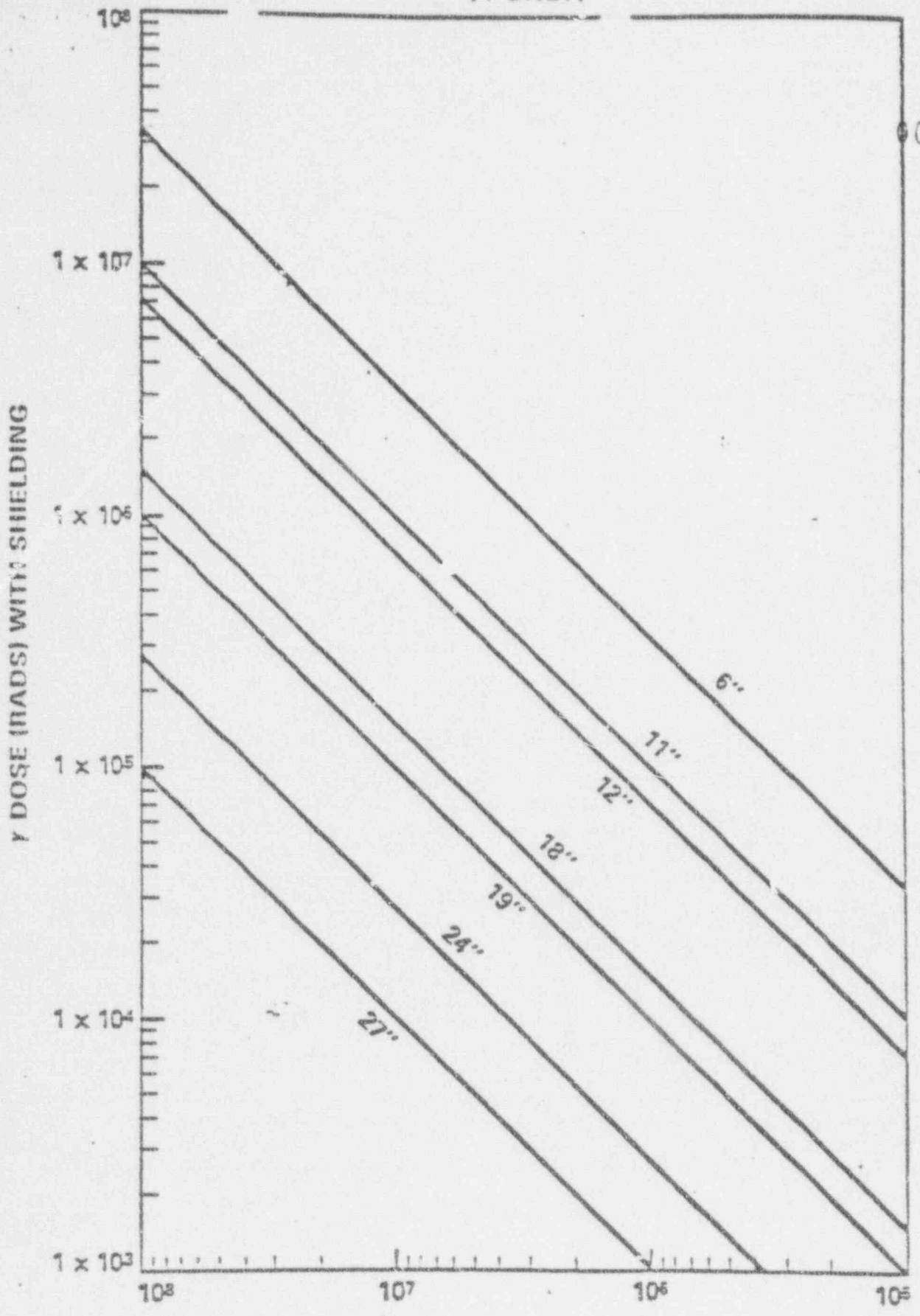
0051579



*MSLB ACCIDENT DOSES SHOULD BE READ AS A FACTOR OF 10 LESS

(γ ONLY)

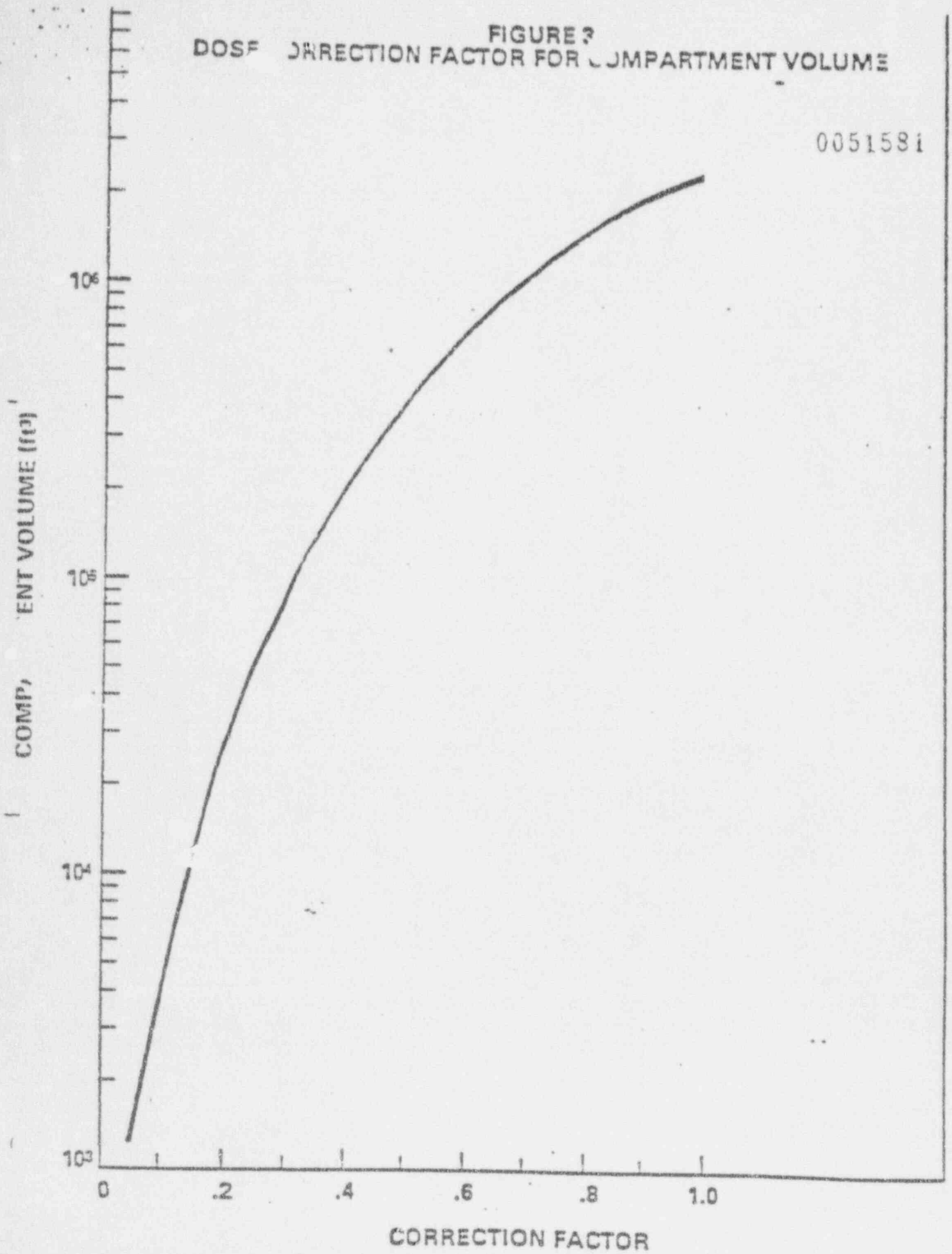
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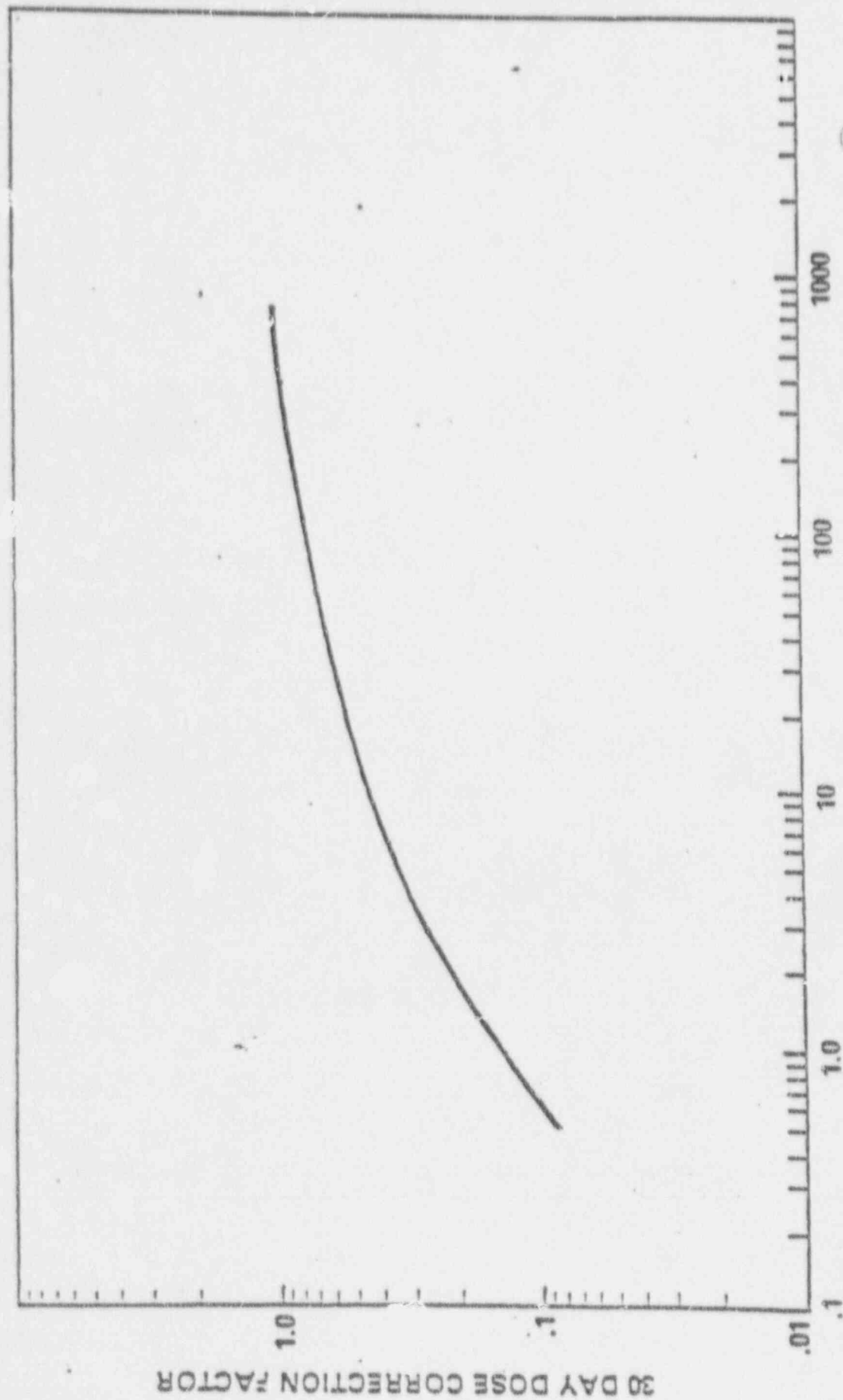
Y DOSE (RADS) WITHOUT SHIELDING (FROM FIGURE 1)

FIGURE 3
DOSF CORRECTION FACTOR FOR COMPARTMENT VOLUME

0051581



DOSE CORRECTION FOR TIM. ¹ REQUIRED TO REMAIN FUNCTIONAL



0051582

TIME REQUIRED TO REMAIN FUNCTIONAL (HRS)

30 DAY DOSE CORRECTION FACTOR

APPENDIX C
THERMAL AND RADIATION AGING DEGRADATION
OF SELECTED MATERIALS

0051583

Table C-1 is a partial list of materials which may be found in a nuclear power plant along with an indication of the material susceptibility to radiation and thermal aging.

Susceptibility to significant thermal aging in a 45°C environment and normal atmosphere for 10 or 40 years is indicated by an (*) in the appropriate column. Significant aging degradation is defined as that amount of degradation that would place in substantial doubt the ability of typical equipment using these materials to function in a hostile environment.

Susceptibility to radiation damage is indicated by the dose level and the observed effect identified in the column headed BASIS. The meaning of the terms used to characterize the observed effect is as follows:

- Threshold - Refers to damage threshold, which is the radiation exposure required to change at least one physical property of the material.
- Percent Change of Property - Refers to the radiation exposure required to change the physical property noted by the percent.
- Allowable - Refers to the radiation which can be absorbed before serious degradation occurs.

The information in this appendix is based on a literature search of sources including the National Technical Information Service (NTIS), the National Aeronautics and Space Administration's Scientific and Technical Aerospace Report (STAR), NTIS Government Report Announcements and Index (GRA), and

various manufacturers data reports. The materials list is not to be considered all inclusive neither is it to be used as a basis for specifying materials to be used for specific applications within a nuclear plant. The list is solely intended for use by the NRC staff in making judgements as to the possibility of a particular material in a particular application being susceptible to significant degradation due to radiation or thermal aging.

The data base for thermal and radiation aging in engineering materials is rapidly expanding at this time. As additional information becomes available Table C-1 will be updated accordingly.

0051365

TABLE C-1
THERMAL AND RADIATION AGING DEGRADATION
OF SELECTED MATERIALS

11/14/79

MATERIAL	ALLOY GRADE AN	THERMAL STRESS AGEING		RADIATION SUSCEPTIBILITY		TYPES OF EQUIPMENT (SYSTEM MODEL MATERIALS) OR SERVICE																		
		10 YRS	40 YRS	10 ³ GMPA	THRESHOLD GMPA	CABLE	CONNECTORS	ELECTRICAL PENETRATIONS	HEATERS	INSTRUMENT PACKS & PANELS	LIGHT SWITCHES	MOTORS	SENSORS	SPICES	TERMINAL BLOCKS	VALVE OPERATORS	CONTROL BOARDS	DIESEL GENER- ATOR CONTROL EQUIPMENT	FANS	WATER EQUIPMENT	MT. CONTROL CENTERS	SWITCHES		
Integrated Circuits (IC)				10 ³	Threshold			X									X							
W-MW				10 ⁴				X									X							
Integrated Circuits (IC)				10 ⁴				X									X							
C-MW				10 ⁴				X									X							
TV - ACMA				10 ⁴				X									X							
diodes				10 ⁴				X									X							
Silicon-Controlled Rectifiers				10 ⁴				X									X							
Integrated Circuits (IC)				10 ⁴				X									X							
Monoly				10 ⁴				X									X							
Waterproof Fibers				10 ⁵				X									X							
Fish Paper				10 ⁵				X									X							
Polyester (unfilled)				10 ⁵				X									X							
Nylon				10 ⁵				X									X							
Polyacrylate				10 ⁵				X									X							
Polyamide				10 ⁶				X									X							
Chloroacetylated Poly- ethylene				10 ⁷	Allowable			X									X							
Butyl-Rubber				10 ⁵	Threshold			X									X							
Integrated Circuit - (IC)				10 ⁶				X									X							
TP				10 ⁵				X									X							
Allyl Polystyrene				10 ⁵				X									X							
Silicone Rubber				10 ⁶				X									X							

Indicates that there is data available which shows a potential for significant thermal aging of the materials when exposed to normal operating conditions for either 10 or 40 years as indicated.

MATERIAL	ALSO KNOWN AS	RADIATION FOR DISPERSED ACID		RAIS CAPAS	RAIS BASIS	TYPES OF EQUIPMENT (WITHIN WHICH MATERIAL MAY BE USED)																
		10 YRS	40 YRS			CABLE	CONNECTORS	ELECTRICAL PENETRATIONS	HEATERS	INSTRUMENT RACKS & PANELS	LEAD SWITCHES	MOTORS	SENSORS	SPLICES	TERMINAL BLOCKS	VALVE OPERATORS	CONTROL BOARDS	DIESEL GENERATOR CONTROL EQUIPMENT	FANS	LOGIC EQUIPMENT	RF. CONTROL CENTERS	SWITCHGEAR
Capacitors - Tantalum Dialin Teflon				10 ⁶ 10 ⁸ 10 ⁶	Allowable Threshold 15% Loss of elongation	X																
G.P. Phenolic P-4030 RTV Silicone Cyrolon (AKG) Integrated Circuits (IC) MCL				10 ⁶ 10 ⁷ 10 ⁷ 10 ⁷	Threshold Allowable Threshold		X															
Resistor MMA Polyester Glass Laminates, Grade GPO-2 MMA Polyester Glass Laminates, Grade GPO-3 Polyethylene Morgese MFR				10 ⁷ 10 ⁷ 10 ⁷ 10 ⁷ 10 ⁷	- - - Allowable -		X	X	X	X												
Poly urethane Cross-linked polyethylene Capacitors - Mylar	ethylene-oxypylene rubber			10 ⁹ 10 ⁷ 10 ⁸	Threshold Allowable -	X		X	X	X												

0051587

MATERIAL	ALSO KNOWN AS	POTENTIAL FOR SIGNIFICANT ACING		RADIATION SENSITIVITY		TYPES OF EQUIPMENT (WITHIN WHICH MATERIAL MAY BE FOUND)																		
		10 SES	40 SES	10 ³ GRAMS	10 ⁶ GRAMS	CABLE	CONNECTORS	ELECTRICAL PENETRATIONS	HEATERS	INSTALLMENT RACKS & PANELS	LIMIT SWITCHES	MOTORS	SENSORS	SPLICES	TERMINAL BLOCKS	VALVE OPERATORS	CONTROL BOARDS	DIESEL GENERATOR CONTROL EQUIPMENT	PANS	LOGIC EQUIPMENT	REC. CONTROL CENTERS	SWITCHGEAR		
Polyethylene	None			10 ⁷	10 ⁶	Allowable																		
Insulators - Wire-Wound				10 ⁸	10 ⁷	1st Loss of Elongation																		
Insulators - Ceramic				10 ⁸	10 ⁷	Threshold																		
Capacitors - Ceramic				10 ⁸	10 ⁷	Allowable																		
Capacitors - Glass				10 ⁸	10 ⁷	-																		
Capacitors - Mica				10 ⁸	10 ⁷	-																		
MICA Thermosetting Laminates, Grade XXXPC				10 ⁹	10 ⁸	-																		
MICA Thermosetting Laminates, Grade XXXP				10 ⁹	10 ⁸	-																		
MICA Thermosetting Laminates, Grade BXX				10 ⁹	10 ⁸	-																		
MICA Thermosetting Laminates, Grade BVC				10 ⁹	10 ⁸	-																		
MICA Thermosetting Laminates, Grade KA				10 ⁹	10 ⁸	-																		
Thermosetting Laminates, Grade BXP				10 ⁹	10 ⁸	-																		
MICA Thermosetting Laminates, Grade BXX				10 ⁹	10 ⁸	-																		
MICA Thermosetting Laminates, Grade CB				10 ⁹	10 ⁸	-																		
MICA Thermosetting Laminates, Grade C				10 ⁹	10 ⁸	-																		

11/14/79

005158

MATERIAL	AUTO SWITCH AS	POTENTIAL FOR SIGNIFICANT AGING		RADIATION SUSCEPTIBILITY		TYPES OF EQUIPMENT (ENTER IN WHICH MATERIAL MAY BE FOUND)																	
		10 YRS	40 YRS	RAIS CURVA	RAIS BASE	CABLE	CONNECTORS	ELECTRICAL PENETRATIONS	HEATERS	INSTRUMENT BACKS & PANELS	LIMIT SWITCHES	MOTORS	SENSORS	SPLICES	TERMINAL BLOCKS	VALVE OPERATORS	CONTROL BOARDS	DIESEL GENERATOR EQUIPMENT	FANS	LOGIC EQUIPMENT	REF. CONTROL CENTERS	SWITCHGEAR	
					Threshold																		
NEMA Thermosetting Laminates, Grade L				10 ⁹	Threshold																		
NEMA Thermosetting Laminates, Grade LB				10 ⁹																			
NEMA Thermosetting Laminates, Grade PB-2		*	*	10 ⁹																			
NEMA Thermosetting Laminates, Grade PB-2				10 ⁹																			
NEMA Thermosetting Laminates, Grade PB-4				10 ⁹																			
NEMA Thermosetting Laminates, Grade PB-10				10 ⁹																			
NEMA Thermosetting Laminates, Grade A				10 ⁹																			
NEMA Thermosetting Laminates, Grade AA				10 ⁹																			
NEMA Thermosetting Laminates, Grade G-1				10 ⁹																			
NEMA Thermosetting Laminates, Grade G-11				10 ⁹																			
NEMA Thermosetting Laminates, Grade PB-5				10 ⁹																			
Insulator - Film				10 ¹⁰																			

11/14/19



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APCo Exhibit 41

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NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA ST., N.W., SUITE 3100
ATLANTA, GEORGIA 30303

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In Reply Refer To:
RII:JPO
50-348
50-364

APR 29 1980

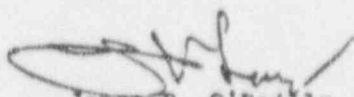
OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

Alabama Power Company
Attn: R. P. McDonald
Vice President-Nuclear Generation
Post Office Box 541
Birmingham, AL 35291

Gentlemen:

The enclosed Circular No. 80-10, is forwarded to you for information.
If there are any questions related to your understanding of the suggested
actions, please contact this office.

Sincerely,


James P. O'Reilly
Director

Enclosures:

- 1. IE Circular No. 80-10
- 2. List of Recently Issued
IE Circulars

*Need copy of
response. This
response should
have returned 79-0-15
effort which set up
ED program along with
admin controls.*

5005190502

NUCLEAR REGULATORY COMMISSION

Product No. 50-348/364-CivP Original Ex. No. 41
In the matter of Alabama Power Company
Staff _____ IDENTIFIED 3:40 p.m. 2/20/92
Applicant RECEIVED 3:41 p.m. 2/20/92
Intervenor _____ REJECTED _____
Com's Off' _____
Contractor _____ DATE 2/20/92
Other _____ Witness _____
Reporter L. C. [Signature]

APR 29 1980

0057307

Alabama Power Company

-2-

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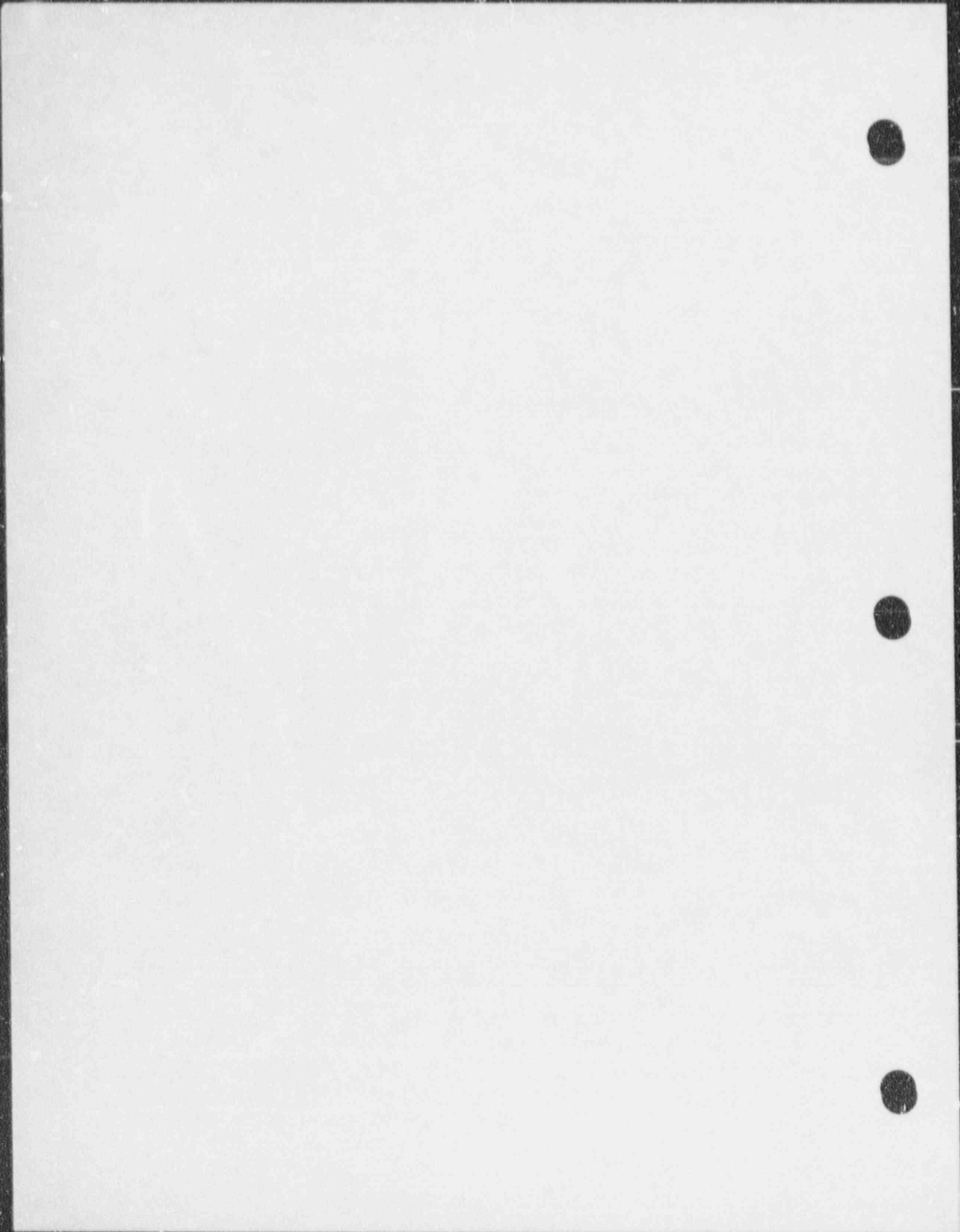
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0057308

SSINS No.: 6830
Accession No.:
8002280665

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

April 29, 1980

IE Circular No. 80-10

FAILURE TO MAINTAIN ENVIRONMENTAL QUALIFICATION OF EQUIPMENT

Description of Circumstances:

Carolina Power and Light recently reported that the wrong class of insulating material had been used at their H. B. Robinson Nuclear Plant when the motor leads of a containment fan cooler were reconnected. The motor leads had been disconnected during the refueling outage to supply power to welding equipment. When the motor leads were reconnected, the wrong class of insulating material degraded the environmental qualification of the containment fan cooler motor. A similar event, reported by Duquesne Light Company, occurred when a containment fan cooler motor was not installed with the proper cable insulation.

The NRC has previously issued IE Circular 78-08 and IE Bulletins 79-01 and 79-01B concerning environmental qualification of Class IE equipment. These Bulletins primarily address the environmental qualification of equipment as purchased and installed; however, the above events emphasize the importance of proper installing and maintaining environmentally qualified equipment.

Recommended Action for Licensee Consideration:

All holders of operating licenses or construction permits should recognize the potential for degradation of environmentally qualified equipment due to improper maintenance or improper use. It is recommended that licensees review current maintenance procedures and administrative policies to ensure the following:

1. Adequate administrative controls exist to ensure that equipment which is environmentally qualified is identified prior to maintenance.
2. Maintenance procedures provide necessary instructions and precautions to ensure that the environmental qualification of equipment is not degraded when maintenance is completed.
3. Maintenance personnel are adequately trained on environmental qualification requirements and the potential for equipment degradation from improper maintenance.

No written response to this Circular is required. If you require additional information regarding this matter, contact the Director of the appropriate NRC Regional Office.

IE Circular No. 80-10
April 29, 1980

Enclosure

RECENTLY ISSUED
IE CIRCULARS

Circular No.	Subject	Date of Issue	Issued to
80-10	Failure to Maintain Environmental Qualification of Equipment	4/29/80	All holders of a power reactor OL or CP
80-09	Problems with Plant Internal Communications Systems	4/28/80	All holders of a power reactor OL or CP
80-08	BWR Technical Specification Inconsistency - RPS Response Time	4/18/80	All General Electric BWR's holding a power reactor OL
80-07	Problems with HPCI Turbine Oil System	4/3/80	All holders of a power reactor OL or CP
80-06	Control and Accountability Systems for Implant Therapy Sources	4/1/80	Medical licensees in categories G and G1
80-05	Emergency Diesel-Generator Lubricating Oil Addition and Onsite Supply	4/1/80	All holders of a power reactor OL or CP
80-04	Securing of Threaded Locking Devices on Safety-Related Equipment	3/14/80	All holders of a power reactor OL or CP
80-03	Protection from Toxic Gas Hazards	3/6/80	All holders of a power reactor OL
80-02	Nuclear Power Plant Staff Work Hours	2/1/80	All holders of power reactor OLs, including research and test reactors and CPs
80-01	Service Advice for GE Induction Disc Relays	1/17/80	All licensees of nuclear power reactor operating facilities and holders of nuclear power reactor CPs





APCO 2/12/85 A-85 50-348/364-CIVP(1) File # 101c

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

2/12/92

DOCKETED
USNRC

xc: RPM
ODK ✓

9-26-80

September 19, 1980

BO. D. K. 5	
R. L. G.	✓
T. N. E.	
M. D. R.	
D. M. V.	
W. M. J.	
H. O. T.	
P. M.	

Docket No. 50-348

— R's copy
— ODK original

Mr. F. L. Clayton, Jr.
Senior Vice President
Alabama Power Company
Post Office Box 2641
Birmingham, Alabama 35291

IEB 79-01B
5

Dear Mr. Clayton:

The Order for Modification of License dated August 29, 1980, contained incorrect references. We have accordingly revised the Order. In view of this revision, the date for which a hearing may be requested is also accordingly revised.

Sincerely,

Darrell G. Eisenhut
Darrell G. Eisenhut, Director
Division of Licensing

Enclosure:
Revised Order

cc: See next page

8/10/100587

MILLER - HOT DOCS



NUCLEAR REGULATORY COMMISSION

Docket No. _____ Official Exh. No. 85
In the matter of ALABAMA POWER CO.
Staff _____ IDENTIFIED 2/11/92
L. W. H. S. W. ✓ RECEIVED 3/12/92
Applicant _____ INTERVIEWED _____
Intervenor _____
Cont'g. Off'r _____
Contractor _____ DATE 9-19-80
Other _____ WITNESS _____
Reporter L. Estep

Mr. F. L. Clayton
Alabama Power Company

- 2 -

September 19, 1980

cc: Alan R. Barton
Executive Vice President
Alabama Power Company
Post Office Box 2641
Birmingham, Alabama 35291

U. S. Environmental Protection Agency
Region IV Office
ATTN: EIS COORDINATOR
345 Courtland Street, N.E.
Atlanta, Georgia 30308

Ruble A. Thomas, Vice President
Southern Company Services, Inc.
Post Office Box 2625
Birmingham, Alabama 35202

George F. Trowbridge, Esquire
Shaw, Pittman, Potts and Trowbridge
1800 M Street, N.W.
Washington, D. C. 20036

Chairman
Houston County Commission
Dothan, Alabama 36301

Mr. Robert A. Buettner, Esquire
Balch, Bingham, Baker, Hawthorne,
Williams and Ward
Post Office Box 306
Birmingham, Alabama 35201

Edward H. Keiler, Esquire
Keiler and Buckley
9047 Jefferson Highway
River Ridge, Louisiana 70123

George S. Houston Memorial Library
212 W. Burdeshaw Street
Dothan, Alabama 36303

State Department of Public Health
ATTN: State Health Officer
State Office Building
Montgomery, Alabama 36104

Director, Technical Assessment Division
Office of Radiation Programs (AW-459)
U. S. Environmental Protection Agency
Crystal Mall #2
Arlington, Virginia 20460

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of
ALABAMA POWER AND LIGHT COMPANY
(Joseph M. Farley Nuclear Plant,
Unit No. 1)

} Docket No. 50-348

REVISED ORDER FOR MODIFICATION OF LICENSE

I.

Alabama Power and Light Company (the licensee) is the holder of Facility Operating License No. NPF-2, which authorizes the operation of the Joseph M. Farley Nuclear Power Plant, Unit No. 1 at steady state reactor power levels not in excess of 2652 megawatts thermal (rated power). The facility consists of a pressurized water reactor located at the licensee's site near the City of Dothan, Alabama.

II.

On November 4, 1977, the Union of Concerned Scientists (UCS) filed with the Commission a "Petition for Emergency and Remedial Relief." The petition sought action in two areas: fire protection for electrical cables, and environmental qualification of electrical components. By Memorandum and Order dated April 13, 1978 (7 NRC 400), the Commission denied certain aspects of the petition and, with respect to other aspects, ordered the NRC staff to take several related actions. UCS filed a Petition for Reconsideration on May 2, 1978. By Memorandum and Order, dated May 23, 1980, the Commission reaffirmed its April 13, 1978 decision

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regarding the possible shutdown of operating reactors. However, the Commission's May 23, 1980 decision directed licensees and the NRC staff to undertake certain actions.

With respect to environmental qualification of safety-related electrical equipment, the Commission determined that the provisions of the two staff documents - the Division of Operating Reactors "Guidelines for Evaluating Environmental Qualification of Class 1E Electrical Equipment in Operating Reactors" (DOR Guidelines) and NUREG-0588, "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment," December 1979 "form the requirements which licensees and applicants must meet in order to satisfy those aspects of 10 CFR Part 50, Appendix A General Design Criterion (GDC-4), which relate to environmental qualification of safety-related electrical equipment." The Commission directed, for replacement parts in operating plants, "unless there are sound reasons to the contrary, the 1974 standard in NUREG-0588 will apply." The Commission also directed the staff to complete its review of the information sought from licensees by Bulletin 79-01B¹ and to complete its review of environmental qualification of safety-related electrical equipment in all operating plants, including the publication of Safety Evaluation Reports, by February 1, 1981. The Commission

¹ Bulletin 79-01B was not sent to licensees for plants under review as part of the staff's Systematic Evaluation Program. The information sought by Bulletin 79-01B was requested from these licensees by a series of letters and meetings during the months of February and March, 1980.

imposed a deadline that, "by no later than June 30, 1982 all safety-related electrical equipment in all operating plants shall be qualified to the DOR Guidelines or NUREG-0588." The Commission requested the staff to, "keep the Commission and the public apprised of any further findings of incomplete environmental qualification of safety-related electrical equipment, along with corrective actions taken or planned," and requested the staff to provide bi-monthly progress reports to the Commission.

The Commission further directed the staff to add certain documentation requirements to each license after the specific requirements were approved by the Commission. The Commission also pointed out that the various deadlines imposed in its Order, "do not excuse a licensee from the obligation to modify or replace inadequate equipment promptly."

III.

The information developed during this proceeding emphasizes the importance of adequate documentation, the prompt completion of the review of environmental qualification of safety-related electrical equipment, and the prompt completion of any plant modification needed to assure conformance with the DOR Guidelines or NUREG-0588. A significant aspect of this review is the timely submittal of environmental qualification information by the operating plant licensees to enable the staff to complete its review in accordance with the Commission's Order. The staff has a program presently underway to reevaluate, using the DOR Guidelines and NUREG-0588, the qualifications of safety-related electrical equipment exposed

to environments that may exist following postulated accidents. These accidents are Loss of Coolant Accident and Main Steam Line Break inside containment, and High Energy Line Breaks inside and outside containment.

In this connection the licensee was requested by I&E Bulletin 79-01B of January 14, 1980 to provide a detailed review of the environmental qualification of Class 1E electrical equipment. This review was to include all equipment required to function under postulated accident conditions, both inside and outside the primary containment, and recognize all conditions specified in the bulletin. Evidence of qualification together with methods and justification, was requested.

Clarification was provided by supplemental information, briefings, and in some cases, meetings with the licensee. Timely completion of the staff's review of environmental qualification of electrical equipment and timely completion of needed modifications by the licensee is required to provide continuing reasonable assurance of public health and safety. Such completion is dependent on the prompt receipt of a complete response by the licensee to the staff's requests for information. However, the licensee's response, to date, is incomplete.

Therefore, I have concluded that the public health, safety, and interest require that a firm schedule for the timely submission of all the information previously requested by the staff should be established by Order effective immediately.

IV.

Accordingly, pursuant to the Atomic Energy Act of 1954, as amended, and the Commission's regulations in 10 CFR Parts 2 and 50, IT IS ORDERED THAT EFFECTIVE IMMEDIATELY Facility Operating License No. NPF-2 is hereby amended to add the following provisions:

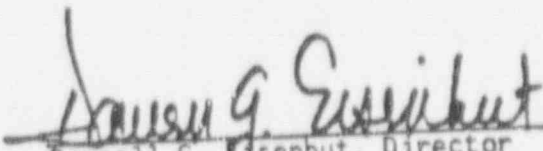
"Information which fully and completely responds to the staff's request as specified in I & E Bulletin 79-01B, shall be submitted to the Director, Region II, Office of Inspection and Enforcement, by the licensee not later than November 1, 1980."

An earlier response is encouraged to facilitate staff review and issuance of the safety evaluation report. The licensee or any person whose interest may be affected by this Order may request a hearing within 20 days of the date of publication of this Revised Order in the Federal Register. Any request for a hearing will not stay the effective date of this Order. Any request for a hearing shall be addressed to the Director, Office of Nuclear Reactor Regulation, U. S. Nuclear Regulatory Commission, Washington, D. C. 20555. A copy of the request should also be sent to the Executive Legal Director, U. S. Nuclear Regulatory Commission, Washington, D. C. 20555, and to George F. Trowbridge, Esquire, Shaw, Pittman, Potts and Trowbridge, 1800 M Street, N.W., Washington, D. C. 20036, attorney for the licensee.

If a hearing is held concerning this Order, the issue to be considered at the hearing shall be whether the license should be modified to require submission of information as set forth in Section IV. of the Order.

Operating of the facility on terms consistent with this Order is not stayed by the pendency of any proceedings on the Order. This Order revises, in its entirety, the Order issued August 29, 1980, and published in the Federal Register September 11, 1980, (45 FR 60064).

FOR THE NUCLEAR REGULATORY COMMISSION



Darrell G. Eisenhut, Director
Division of Licensing

Effective Date: September 19, 1980
Bethesda, Maryland

A-11 50-348/364-CIUP 2/19/92



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA ST., N.W., SUITE 3100
ATLANTA, GEORGIA 30303
JAN 15 1992

APCo Exhibit 11

0056298

DOCKETED
USNRC

T. N. J.	
M. D. R.	
W. A. J.	
H. O. T.	

92 MAR 13 4:57

IEB 79-01B
9

735.02.01

Alabama Power Company
ATTN: R. P. McDonald
Vice President-Nuclear Generation
P. O. Box 2641
Birmingham, AL 35291

Gentlemen:

Subject: Report Nos. 50-248/80-38 and 50-364/80-49

This refers to the special inspection conducted by T. D. Gibbons of this office on December 2-5, 1980, of activities authorized by NRC License Nos. NPF-2 and NPF-8 for the Farley facility, and to the discussion of our findings held with W. G. Hairston at the conclusion of the inspection.

Areas examined during the inspection and our findings are discussed in the enclosed inspection report. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations by the inspector.

Within the scope of this inspection, no violations or deviations were disclosed.

In accordance with Section 2.790 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this letter and the enclosed inspection report will be placed in the NRC's Public Document Room. If this report contains any information that you (or your contractor) believe to be proprietary, it is necessary that you make a written application within 20 days to this office to withhold such information from public disclosure. Any such application must include a full statement of the reasons on the basis of which it is claimed that the information is proprietary, and should be prepared so that proprietary information identified in the application is contained in a separate part of the document. If we do not hear from you in this regard within the specified period, the report will be placed in the Public Document Room.

Should you have any questions concerning this letter, we will be glad to discuss them with you.

Sincerely,

C. E. Murphy, Chief
Reactor Construction and
Engineering Support Branch

1 1/22/92
2 1/22/92

Enclosure:
Inspection Report Nos.
50-348/80-38 and 50-364/80-49

cc w/encl: (See Page 2)

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2605
IEB 79-01B
NUREG-0589

NUCLEAR REGULATORY COMMISSION

Docket No. _____ Official Exh. No. 11
In the matter of ALABAMA POWER CO.
Staff _____ IDENTIFIED 2/11/92
Applicant APCO RECEIVED 2/19/92
Intervenor _____ REJECTED _____
Conf'g Off'r _____
Contractor _____ DATE 1-12
Other _____ Witness _____
Reporter L. Ester

0056299

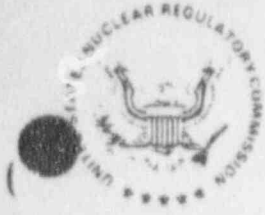
Alabama Power Company

-2-

JAN 13 1981

cc w/encl:

W. O. Whitt, Executive Vice President
F. L. Clayton, Jr., Senior Vice President
H. O. Thrash, Manager-Nuclear Generation
O. D. Kingsley, Jr., Manager, Nuclear Engineering
and Technical Services
J. W. McGowan, Manager-Operations
Quality Assurance
W. G. Hairston, III, Plant Manager
W. C. Petty, Manager-Quality Assurance
(Design and Construction)
R. E. Hollands, Jr., QA Supervisor



UNITED STATES
 NUCLEAR REGULATORY COMMISSION
 REGION II
 101 MARIETTA ST., N.W., SUITE 3100
 ATLANTA, GEORGIA 30303
 JAN 14 1981

0056300

Report Nos. 50-348/80-38 and 50-364/80-49

Licensee: Alabama Power Company
 600 North 18th Street
 Birmingham, Alabama 35202

Facility: Farley Units 1 and 2

License No. NPF-2 and NPF-8

Inspection near Dothan, Alabama

Inspector: T. D. Gibbons *T. D. Gibbons for* 1-14-81
 Date Signed

Approved by T. E. Conlon *T. E. Conlon* 1-14-81
 Date Signed

Inspection on December 2-5, 1980

SUMMARY

Areas Inspected

This special, announced inspection involved 31 inspector-hours onsite in the areas of installed equipment review with respect to IE Bulletin 79-01B and NUREG 580.

RESULTS

Of the 2 areas inspected, no violations or deviation were identified.

~~8103050078~~

DETAILS

1. Persons Contacted

Licensee Employees

- *W. G. Hairston, Plant Manager
- *J. A. Mooney, Project Manager Construction
- *T. L. Crawley, Project Engineer, General Office
- *B. Hollands, QA Supervisor
- *D. E. Mansfield, Startup Superintendent

Other licensee employees contacted included construction craftsmen, technicians, operators, mechanic, security force members, and office personnel.

Other Organizations

G. M. Langford, Electrical Engineer, Bechtel Power Corporation

NRC Resident Inspector

*W. Bradford

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on December 5, 1980 with those persons indicated in Paragraph 1 above.

3. Licensee Action on Previous Inspection Findings

Not inspected.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. IE Bulletin 79-01B (Unit 1)

A physical examination was made of installed electrical instrumentation and control equipment associated with the Auxiliary Steam, Feedwater Control, Main Steam, Auxiliary Feedwater, Condensate and Main Feedwater systems. The equipment that was examined is located outside the primary containment. The specific equipment examined is listed below:

AUXILIARY STEAM

PLANT I.D.	DISCRIPTION	VENDOR	MODEL
QIN12ZS3234A	Limit Switch	NAMCO	EA170/31100
QIN12ZS3235A	Limit Switch	Microswitch	Not Accessible
QIN12SV3235A	Solenoid Valve	ASCO	HT8321A6
QIN12SV3234A	Solenoid Valve	ASCO	HT8320A108

FEEDWATER CONTROL

NIC22SV0479A	Solenoid Valve	ASCO	HV-202-301-3U
NIC22SV0479B	Solenoid Valve	ASCO	HV-202-301-3U
NIC22SV0489A	Solenoid Valve	ASCO	HV-202-301-3V
NIC22SV0489B	Solenoid Valve	ASCO	HV-202-301-3U
NIC22SV0499A	Solenoid Valve	ASCO	HV-202-301-3U
NIC22SV0499B	Solenoid Valve	ASCO	HV-202-301-3U
NIC22ZS0489	Limit Switch	NAMCO	EA170/61100
NIC22ZS0479	Limit Switch	NAMCO	EA170/61100

MAIN STEAM

QIN11SV3369AC	Solenoid Valve	ASCO	8311B54
QIN11SV3370AC	Solenoid Valve	ASCO	8311B54
QIN11SV3369AA	Solenoid Valve	ASCO	HT8211B35
QIN11SV3370AA	Solenoid Valve	ASCO	HT8211B35
QIN11ZS3369A	Limit Switch	NAMCO	EA170/31100
QIN11ZS3370A	Limit Switch	NAMCO	EA170/31100

AUXILIARY FEEDWATER

QIN23SV3227AA	Solenoid Valve	ASCO	HT8320A108
QIN23SV3228AA	Solenoid Valve	ASCO	HT8320A108
QIN23SV3228BA	Solenoid Valve	ASCO	HT8320A108
QIN23SV3228CA	Solenoid Valve	ASCO	HT8320A108
QIN23ES3227A	Limit Switch	NAMCO	EA170/31100
QIN23ZS3228A	Limit Switch	NAMCO	EA170/31100
QIN23ZS3228C	Limit Switch	NAMCO	EA170/31100
QIN23V011C	Motor Operator	Limitorque	SMB-1
QIN23V011B	Motor Operator	Limitorque	SMB-1
QIN23V011A	Motor Operator	Limitorque	SMB-1

CONDENSATE AND FEEDWATER

QIN21LSH2828A	Level Switch	Delaval	LS-36497
QIN21LSH2828C	Level Switch	Delaval	LS-36497
QIN21LSH2829A	Level Switch	Delaval	LS-36497

MAIN FEEDWATER

Q1121V001C-B	Motor Operator	Limiterque	SMB-4T
Q1N21V001B-B	Motor Operator	Limiterque	SMB-4T
Q1N21V001A-B	Motor Operator	Limiterque	SMB-4T

The equipment inspected was examined for proper installation, overall interface integrity and manufacturers nameplate data was obtained. The nameplate data obtained was compared to the information listed in the licensee's report. Several minor differences were identified and the licensee's report is being updated.

Within the areas examined, there were no violations identified.

6. NUREG 588 (Unit 2)

A physical examination was made of installed electrical instrumentation and control equipment associated with this Reactor Coolant, Reactor Cavity Post LOCA Dilution, Containment Post LOCA Air Mixing, Chemical and Volume Control and Containment Cooling and Purge systems. The equipment that was examined is located inside the primary containment. The specific equipment examined is listed below.

REACTOR COOLANT

Plant I.D.	DESCRIPTION	VENDOR	MODEL
Q2B31PT455	Pressure Transmitter	ITT Barton	763
Q2B31PT456	Pressure Transmitter	ITT Barton	763
Q2B31PT457	Pressure Transmitter	ITT Barton	763
Q2B31LT461	Level Transmitter	ITT Barton	764
Q2B31LT459	Level Transmitter	ITT Barton	764
Q2B31LT460	Level Transmitter	ITT Barton	764

REACTOR CAVITY POST LOCA DILUTION

Q2E22M001A-A	Dilution Fan Motor	Joy Mfg. Co.	18-14-1770
Q2E22M001B-B	Dilution Fan Motor	Joy Mfg. Co.	18-14-1770
Q2E22M001A-A	Motor Operator	Limiterque	SMB-00
Q2E22V001B	Motor Operator	Limiterque	SMB-00

CONTAINMENT POST LOCA AIR MIXING

Q2E19C001B-B	Mixing Fan Motor	Joy Mfg. Co.	23-25-14-1750
Q2E19C001A-B	Mixing Fan Motor	Joy Mfg. Co.	23-25-14-1750
Q2E19C001D-A	Mixing Fan Motor	Joy Mfg. Co.	23-25-14-1750
Q2E19C001C-A	Mixing Fan Motor	Joy Mfg. Co.	23-25-14-1750

HYDROGEN RECOMBINER

Q2E17G001A-A	H Recombiner	Westinghouse	APR-GHREEE-01
Q2E17G001B-B	H Recombiner	Westinghouse	APR-GHREEE-02

CHEMICAL AND VOLUME CONTROL

Q2E21V038A	Motor Operator	Limitorque	SMB-4
Q2E21V038B	Motor Operator	Limitorque	SMB-4
Q2E21V038C	Motor Operator	Limitorque	SMB-4
N2E21ZS8149A	Limit Switch	NAMCO	EA180/11302
N2E21ZS8149B	Limit Switch	NAMCO	EA180/11302
N2E21ZS8149C	Limit Switch	NAMCO	EA180/11302
Q2E21SV8149AB	Solenoid Valve	ASCO	NP831654E
Q2E21SV8149BB	Solenoid Valve	ASCO	NP831654E
Q2E21SV8149CB	Solenoid Valve	ASCO	NP831654E

CONTAINMENT COOLING AND PURGE

Q2E14V004	Motor Operator	Limitorque	SMB000
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The equipment inspected was examined for proper installation, overall interface integrity and manufacturers nameplate date was obtained. The nameplate data obtained was compared to the information listed in the licensee's report. Several minor differences were identified and the licensee's report is being updated.

Within the areas examined there were no identified violations.



A-14
50-348/364-CIVP
2/19/92

APCo Exhibit 14

5/ 1/81

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

LOCKETED
USNRC Orig.: ODK

May 21, 1981 '92 MAR 13 P3:58

Docket No. 50-348

OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

MAY 1981
V.P.-NUCLEAR

Mr. F. L. Clayton, Jr.
Ser. or Vice President
Alabama Power Company
Post Office Box 2641
Birmingham, Alabama 35291

IEB 79-01B
it

SUBJECT: ENVIRONMENTAL QUALIFICATION OF SAFETY-RELATED ELECTRICAL EQUIPMENT

RE: Farley Unit 1, License No. WPF-2

Reference (a) - Order for Modification of License Concerning the Environmental Qualification of Safety-Related Electrical Equipment dated October 24, 1980

Dear Mr. Clayton:

This letter transmits the Safety Evaluation for the Environmental Qualification of Safety-Related Electrical Equipment at your facility. This evaluation was based on your submittals dated April 29, July 30, October 20, and November 12, 1980. Our letter of February 13, 1981, to which you responded affirmatively on February 26, 1981, forwarded our preliminary evaluation and indicated that an item-by-item re-evaluation would be required at a later date. The enclosed Safety Evaluation identifies the specific information required by the staff and the actions, on your part, necessary to comply with Reference (a). We request that you provide the information identified in sections 3 and 4 of this Safety Evaluation to us within 90 days of receipt of this letter.

Our Safety Evaluation addresses only the safety-related electrical equipment exposed to a harsh environment resulting from an accident (i.e., the IEB 79-01B review). Reference (a) requires that all safety-related electrical equipment be qualified by June 30, 1982. The NRC review effort for the equipment in mild environments will be addressed by separate correspondence.

Your response may present alternatives to the staff positions in the evaluation. The staff will consider alternative approaches if these methods are within the DOR Guidelines or NUREG-0588, as appropriate. For example, an acceptable alternative to the NRC staff's temperature criterion used for the service conditions (i.e. Section 3.3) must base that service condition on the FSAR analysis or other NRC approved analysis, provided that the specific analysis, together with reference to the previous NRC acceptance of that analysis, accompanies the 90 day response. In addition, some of the information in the Safety Evaluation may require clarification. Contact your project manager for assistance in these matters.

~~5106050001~~ 3pp

NUCLEAR REGULATORY COMMISSION

Docket No. _____ Official Exh. No. 14
in the matter of ALABAMA POWER CO.
Staff _____ IDENTIFIED 2/11/92
Applicant APCO RECEIVED 2/19/92
Intervenor _____ REJECTED _____
Cont'g Off'r _____
Contractor _____ DATE 5-21-81
Other _____ Witness _____
Reporter L Estep

0053763

Mr. F. L. Clayton
Alabama Power Company

cc: Mr. W. O. Whitt
Executive Vice President
Alabama Power Company
Post Office Box 2641
Birmingham, Alabama 35291

U. S. Environmental Protection Agency
Region IV Office
ATTN: EIS COORDINATOR
345 Courtland Street, N.E.
Atlanta, Georgia 30308

Ruble A. Thomas, Vice President
Southern Company Services, Inc.
Post Office Box 2625
Birmingham, Alabama 35202

George F. Trowbridge, Esquire
Shaw, Pittman, Potts and Trowbridge
1800 M Street, N.W.
Washington, D. C. 20036

Chairman
Houston County Commission
Dothan, Alabama 36301

Mr. Robert A. Buettner, Esquire
Balch, Bingham, Baker, Hawthorne,
Williams and Ward
Post Office Box 306
Birmingham, Alabama 35201

George S. Houston Memorial Library
212 W. Burdeshaw Street
Dothan, Alabama 36303

Resident Inspector
U.S. Nuclear Regulatory Commission
Post Office Box 24-Route 2
Columbia, Alabama 36319

State Department of Public Health
ATTN: State Health Officer
State Office Building
Montgomery, Alabama 36104

Director, Criteria and Standards Division
Office of Radiation Programs (ANR-460)
U. S. Environmental Protection Agency
Washington, D. C. 20460

0053764

SAFETY EVALUATION REPORT BY THE
OFFICE OF NUCLEAR REACTOR REGULATION
EQUIPMENT QUALIFICATION BRANCH
FOR ALABAMA POWER COMPANY
JOSEPH M. FARLEY UNIT 1
DOCKET NO. 50-348

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ENVIRONMENTAL QUALIFICATION OF SAFETY-RELATED ELECTRICAL EQUIPMENT 1EB 79-01B Technical Evaluation Report, Revision 1, dated December 10, 1980.	

SAFETY EVALUATION REPORT BY THE
OFFICE OF NUCLEAR REACTOR REGULATION
EQUIPMENT QUALIFICATION BRANCH
FOR ALABAMA POWER COMPANY
JOSEPH M. FARLEY UNIT 1
DOCKET NO. 50-348

ENVIRONMENTAL QUALIFICATION OF SAFETY-RELATED ELECTRICAL EQUIPMENT

1 INTRODUCTION

General Design Criteria 1 and 4 specify that safety-related electrical equipment in nuclear facilities must be capable of performing its safety-related function under environmental conditions associated with all normal, abnormal and accident plant operation. In order to ensure compliance with the criteria, the NRC staff required all licensees of operating reactors to submit a reevaluation of the qualification of safety-related electrical equipment which may be exposed to a harsh environment.

2 BACKGROUND

On February 8, 1979, the NRC Office of Inspection and Enforcement (IE) issued to all licensees of operating plants (except those included in the systematic evaluation program (SEP)) IE Bulletin IEB 79-01, "Environmental Qualification of Class IE Equipment." This bulletin, together with IE Circular 78-08 (issued on May 31, 1978), required the licensees to perform reviews to assess the adequacy of their environmental qualification programs.

Subsequently, Commission Memorandum and Order CLI-80-21 (issued on May 23, 1980) states that the DOR guidelines and portions of NUREG-0588 (which were issued on January 14, 1980, as enclosures 4 and 5 to IEB-79-01B) form the requirements that licensees must meet regarding environmental qualification of safety-related electrical equipment in order to satisfy those aspects of 10 CFR 50, Appendix A, General Design Criterion (GDC)-4. This order also requires the staff to complete safety evaluation reports (SERs) for all operating plants by February 1, 1981. In addition, this order requires that the licensees have qualified safety-related equipment installed in their plants by June 30, 1982.

Supplements to IEB 79-01B were issued for further clarification and definition of the staff's needs. These supplements were issued on February 29, September 30, and October 24, 1980.

In addition, the staff issued orders dated August 29, 1980 (amended in September 1980) and October 24, 1980 to all licensees. The August order amendment required that the licensees provide a report, by November 1, 1980, documenting the qualification of safety-related electrical equipment. The October order required the establishment of a central file location for the maintenance of all equipment-qualification records. The central file was mandated to be established by December 1, 1980. The order also required that

all safety-related electrical equipment be qualified by June 30, 1982. In response, the licensee submitted information through letters dated April 29, July 30, October 30, and November 12, 1980. Subsequent licensee submittals dated February 2, 12, and 30, and March 30, 1981 are not included in the SER. However, licensee letter of February 26, 1981, in response to our letter dated February 13, 1981, is discussed in paragraph 6 below.

2.1 Purpose

The purpose of this SER is to identify equipment whose qualification program does not provide sufficient assurance that the equipment is capable of performing the design function in hostile environments. The staff position relating to any identified deficiencies is provided in this report.

2.2 Scope

The scope of this report is limited to an evaluation of the equipment which must function in order to mitigate the consequences of a loss-of-coolant accident (LOCA) or a high-energy-line-break (HELB) accident, inside or outside containment, while subjected to the hostile environments associated with these accidents.

3 STAFF EVALUATION

The staff evaluation of the licensee's response included an onsite inspection of selected Class IE equipment and an examination of the licensee's report for completeness and acceptability. The criteria described in the DOR guidelines and in NUREG-0588, in part, were used as a basis for the staff evaluation of the adequacy of the licensee's qualification program.

The NRC Office of Inspection and Enforcement performed (1) a preliminary evaluation of the licensee's response, documented in a technical evaluation report (TER) and (2) an onsite verification inspection (week of December 1, 1980) of selected safety-related electrical equipment. The main steam, auxiliary steam and auxiliary feedwater, and feedwater control systems were inspected. The inspection verified proper installation of equipment, overall interface integrity, and manufacturers' nameplate data. The manufacturer's name and model number from the nameplate data were compared to information given in the Component Evaluation Work Sheets (CES) of the licensee's report. The site inspection is documented in report IE 50-348/80-38. No deficiencies were noted other than discrepancies identified on 14 components where actual nameplate data are different from the information in the licensee's submittals. These discrepancies had been identified by the licensee before the site inspection and corrective measures had been taken. For this review, the documents referenced above have been factored into the overall staff evaluation.

3.1 Completeness of Safety-Related Equipment

In accordance with IEB 79-01B, the licensee was directed to (1) establish a list of systems and equipment that are required to mitigate a LOCA and an HELB and (2) identify components needed to perform the function of safety-related display information, post-accident sampling and monitoring, and radiation monitoring.

The staff developed a generic master list based upon a review of plant safety analyses and emergency procedures. The instrumentation selected includes parameters to monitor overall plant performance as well as to monitor the performance of the systems on the list. The systems list was established on the basis of the functions that must be performed for accident mitigation (without regard to location of equipment relative to hostile environments).

The list of safety-related systems provided by the licensee was reviewed against the staff-developed master list.

Based upon information in the licensee's submittal, the equipment location references, and in some cases subsequent conversations with the licensee, the staff has verified and determined that the systems included in the licensee's submittal are those required to achieve or support: (1) emergency reactor shutdown, (2) containment isolation, (3) reactor core cooling, (4) containment heat removal, (5) core residual heat removal, and (6) prevention of significant release of radioactive material to the environment. The staff therefore concludes that the systems identified by the licensee (listed in Appendix D) are acceptable, with the exception of those items deferred in Section 5 of this report.

Display instrumentation which provides information for the reactor operators to aid them in the safe handling of the plant was not specifically identified by the licensee. A complete list of all display instrumentation mentioned in the LDC and HELB emergency procedures must be provided. Equipment qualification information in the form of summary sheets should be provided for all components of the display instrumentation exposed to harsh environments. Instrumentation which is not considered to be safety-related, but which is mentioned in the emergency procedures should appear on the list. For these instruments, (1) justification should be provided for not considering the instrument safety-related and (2) assurance should be provided that its subsequent failure will not mislead the operator or adversely affect the mitigation of the consequences of the accident.

The environmental qualification of post-accident sampling and monitoring, and radiation monitoring equipment is closely related to the review of the TMI lessons-learned modifications and will be performed in conjunction with that review.

The licensee identified 703 items of equipment which were assessed by the staff.

3.2 Service Conditions

Commission Memorandum and Order CLI-80-21 requires that the DOR guidelines and the "For Comment" NUREG-0588 are to be used as the criteria for establishing the adequacy of the safety-related electrical equipment environmental qualification program. These documents provide the option of establishing a bounding pressure and temperature condition based on plant-specific analysis identified in the licensee's Final Safety Analysis Report (FSAR) or based on generic profiles using the methods identified in these documents.

On this basis, the staff has assumed, unless otherwise noted, that the analysis for developing the environmental envelopes for Farley Unit 1, relative to the temperature, pressure, and the containment spray caustics, has been performed in accordance with the requirements stated above. The staff has reviewed the qualification documentation to ensure that the qualification specifications envelope the conditions established by the licensee. During this review, the staff assumed that for plants designed and equipped with an automatic containment spray system which satisfies the single-failure criterion, the main-steam-line-break (MSLB) environmental conditions are enveloped by the large-break-LOCA environmental conditions. The staff assumed, and requires the licensee to verify, that the containment spray system is not subjected to a disabling single-component failure and therefore satisfies the requirements of Section 4.2.1 of the DOR guidelines.

Equipment submergence has also been addressed where the possibility exists that flooding of equipment may result from HELBs.

3.3 Temperature, Pressure, and Humidity Conditions Inside Containment

The licensee has provided the results of accident analyses as follows:

	<u>Max Temp (°F)</u>	<u>Max Press (psig)</u>	<u>Humidity (%)</u>
LOCA	300	47.5	100
MSLB	381	44.8	100

The staff has concluded that the minimum temperature profile used in the specifications for equipment qualification purposes should include a margin to account for higher-than-average temperatures in the upper regions of the containment that can exist due to stratification, especially following a postulated MSLB. Use of the steam saturation temperature corresponding to the total building pressure (partial pressure of steam plus partial pressure of air) versus time will provide an acceptable margin for either a postulated LOCA or MSLB, whichever is controlling, as to potential adverse environmental effects on equipment.

The licensee's temperature profile does not appear to fully envelope in all cases the saturation temperature profile recommended by the staff. The peak temperature and peak pressure conditions do not occur at the same time. The saturation temperature of 295°F at the pressure of 47.5 psig should be used instead. The licensee temperature of 272°F at 47.5 psig does not satisfy the above requirement. The licensee should update his equipment summary tables to reflect the change. If there is any equipment that does not meet the staff position, the licensee must either provide justification that the equipment will perform its intended function under the specified conditions or propose corrective action.

The licensee has provided the results of the analysis, which was performed based on the NUREG-0588, to predict the equipment surface temperature during the MSLB event. Furthermore, the licensee has also provided information to show that equipment qualification temperature is higher than expected equipment surface temperature during the MSLB event. However the licensee has failed to

List higher equipment surface temperature as the required temperature in the Component Evaluation Worksheets. The licensee is requested to update the Component Evaluation Worksheets to reflect the higher equipment surface temperature expected due to the MSLB event as the required temperature.

3.4 Temperature, Pressure, and Humidity Conditions Outside Containment

The licensee has provided the temperature, pressure, and humidity associated with an MELB outside containment and applicable radiation levels associated with equipment in the proximity of recirculating fluid lines. The following area outside containment has been addressed:

(1) Auxiliary building

The staff has verified that the parameters identified by the licensee for the MSLB are acceptable.

3.5 Submergence

The maximum submergence levels have been established and assessed by the licensee. Unless otherwise noted, the staff assumed for this review that the methodology employed by the licensee is in accordance with the appropriate criteria as established by Commission Memorandum and Order CLI-80-21.

The licensee's value for maximum submergence is 15 ft elevation inside containment. Equipment below this level has been identified by the licensee.

The licensee stated that the components will perform their functions before becoming submerged. In this case, the licensee should provide an assessment of the failure modes associated with the submergence of the equipment. The licensee should also provide assurance that the subsequent failure of the component(s) will not adversely affect any other safety functions or mislead an operator. Additionally, the licensee should discuss operating time, across the spectrum of events, in relation to the time of submergence. If the results of the licensee's assessment are acceptable, then the component(s) may be exempt from the submergence parameter of qualification.

In addition, the licensee has identified a flood level of 3 ft 5 in. above the floor as the maximum flood level resulting from the worst-case MELB outside containment. The licensee has stated that all safety-related equipment outside containment is above this level.

3.6 Chemical Spray

The licensee has specified that boric acid solution constitutes its chemical spray; however, the exact volume percent concentration and pH values were not provided. Therefore, for the purpose of this review, the effects of chemical spray will be considered unresolved. The staff will review the licensee's response when it is submitted and discuss the resolution in a supplemental report.

3.7 Aging

Section 7 of the DOR guidelines does not require a qualified life to be established for all safety-related electrical equipment. However, the following actions are required:

- (1) Make a detailed comparison of existing equipment and the materials identified in Appendix C of the DOR guidelines. The first supplement to IEB-79-01B requires licensees to utilize the table in Appendix C and identify any additional materials as the result of their effort.
- (2) Establish an ongoing program to review surveillance and maintenance records to identify potential age-related degradations.
- (3) Establish component maintenance and replacement schedules which include considerations of aging characteristics of the installed components.

The licensee identified a number of equipment items for which a specified qualified life was established (for examples, 5 years, 15 years, or 40 years). In its assessment of these submittals, the staff did not review the adequacy of the methodology nor the basis used to arrive at these values; the staff has assumed that the established values are based on state-of-the-art technology and are acceptable.

For this review, however, the staff requires that the licensee submit supplemental information to verify and identify the degree of conformance to the above requirements. The response should include all the equipment identified as required to maintain functional operability in harsh environments.

The licensee indicated that the phase of their response is outstanding and that the review is in progress. The staff will review the licensee's response when it is submitted and discuss its evaluation in a supplemental report.

3.8 Radiation (Inside and Outside Containment)

The licensee has provided values for the radiation levels postulated to exist following a LOCA. The application and methodology employed to determine these values were presented to the licensee as part of the NRC staff criteria contained in the DOR guidelines, in NUREG-0588, and in the guidance provided in IEB-79-01B, Supplement 2. Therefore, for this review, the staff has assumed that, unless otherwise noted, the values provided have been determined in accordance with the prescribed criteria. The staff review determined that the values to which equipment was qualified enveloped the requirements identified by the licensee.

The value required by the licensee inside containment is 5×10^7 gamma and 2×10^8 beta rads for the integrated dose. These values envelope the DOR guideline requirements and therefore are acceptable.

A required value outside containment of 1.1×10^6 rads in the RHR/LHSI pump room has been used by the licensee to specify limiting radiation levels outside containment. This value appears to consider the radiation levels influenced by the source term methodology associated with post-LOCA recirculation fluid lines and is therefore acceptable.

4 QUALIFICATION OF EQUIPMENT

The following subsections present the staff's assessment, based on the licensee's submittal, of the qualification status of safety-related electrical equipment.

The staff has separated the safety-related equipment into three categories: (1) equipment requiring immediate corrective action, (2) equipment requiring additional qualification information and/or corrective action, and (3) equipment considered acceptable if the staff's concern identified in Section 3.7 is satisfactorily resolved.

In its assessment of the licensee's submittal, the NRC staff did not review the methodology employed to determine the values established by the licensee. However, in reviewing the data sheets, the staff made a determination as to the stated conditions presented by the licensee. Additionally, the staff has not completed its review of supporting documentation referenced by the licensee (for example, test reports). It is expected that when the review of test reports is complete, the environmental qualification data bank established by the staff will provide the means to cross reference each supporting document to the referencing licensee.

If supporting documents are found to be unacceptable, the licensee will be required to take additional corrective actions to either establish qualification or replace the item(s) of concern. This effort will begin in 1981.

An appendix for each subsection of this report provides a list of equipment for which additional information and/or corrective action is required. Where appropriate, a reference is provided in the appendices to identify deficiencies. It should be noted, as in the Commission Memorandum and Order, that the deficiencies identified do not necessarily mean that equipment is unqualified. However, they are cause for concern and may require further case-by-case evaluation.

4.1 Equipment Requiring Immediate Corrective Action

Appendix A identifies equipment (if any) in this category. The licensee was asked to review the facility's safety-related electrical equipment. The licensee's review of this equipment has not identified any equipment requiring immediate corrective action; therefore, no licensee event reports (LERs) were submitted. In addition, in this review, the staff has not identified any safety-related electrical equipment which is not able to perform its intended safety function during the time in which it must operate.

4.2 Equipment Requiring Additional Information and/or Corrective Action

Appendix B identifies equipment in this category, including a tabulation of deficiencies. The deficiencies are noted by a letter relating to the legend (identified below), indicating that the information provided is not sufficient for the qualification parameter or condition.

Legend

R - radiation
 T - temperature
 QT - qualification time
 RT - required time
 P - pressure
 H - humidity
 CS - chemical spray
 A - material-aging evaluation; replacement schedule; ongoing equipment surveillance
 S - submergence
 M - margin
 I - HELB evaluation outside containment not completed
 QM - qualification method
 RPN - equipment relocation or replacement; adequate schedule not provided
 EXN - exempted equipment justification inadequate
 SEN - separate-effects qualification justification inadequate
 QI - qualification information being developed
 RPS - equipment relocation or replacement schedule provided

As noted in Section 4, these deficiencies do not necessarily mean that the equipment is unqualified. However, the deficiencies are cause for concern and require further case-by-case evaluation. The staff has determined that an acceptable basis to exempt equipment from qualification, in whole or part, can be established provided the following can be established and verified by the licensee:

- (1) Equipment does not perform essential safety functions in the harsh environment, an equipment failure in the harsh environment will not impact safety-related functions or mislead an operator.
- (2a) Equipment performs its function before its exposure to the harsh environment, and the adequacy for the time margin provided is adequately justified, and
- (2b) Subsequent failure of the equipment as a result of the harsh environment does not degrade other safety functions or mislead the operator.
- (3) The safety-related function can be accomplished by some other designated equipment that has been adequately qualified and satisfies the single-failure criterion.
- (4) Equipment will not be subjected to a harsh environment as a result of the postulated accident.

The licensee is, therefore, required to supplement the information presented by providing resolutions to the deficiencies identified; these resolutions should include a description of the corrective action, schedules for its completion (as applicable), and so forth. The staff will review the licensee's response, when it is submitted, and discuss the resolution in a supplemental report.

It should be noted that in cases where testing is being conducted, a condition may arise which results in a determination by the licensee that the equipment does not satisfy the qualification test requirements. For that equipment, the licensee will be required to provide the proposed corrective action, on a timely basis, to ensure that qualification can be established by June 30, 1982.

4.3 Equipment Considered Acceptable or Conditionally Acceptable

Based on the staff review of the licensee's submittal, the staff identified the equipment in Appendix C as (1) acceptable on the basis that the qualification program adequately enveloped the specific environmental plant parameters, or (2) conditionally acceptable subject to the satisfactory resolution of the staff concern identified in Section 3.7.

For the equipment identified as conditionally acceptable, the staff determined that the licensee did not clearly

- (1) state that an equipment material evaluation was conducted to ensure that no known materials susceptible to degradation because of aging have been used,
- (2) establish an ongoing program to review the plant surveillance and maintenance records in order to identify equipment degradation which may be age related, and/or
- (3) propose a maintenance program and replacement schedule for equipment identified in item 1 or equipment that is qualified for less than the life of the plant.

The licensee is, therefore, required to supplement the information presented for equipment in this category before full acceptance of this equipment can be established. The staff will review the licensee's response when it is submitted and discuss the resolution in a supplemental report.

5 DEFERRED REQUIREMENTS

IEB 79-01B, Supplement 3 has relaxed the time constraints for the submission of the information associated with cold shutdown equipment and TMI lessons-learned modifications. The staff has required that this information be provided by February 1, 1981. The staff will provide a supplemental safety evaluation addressing these concerns.

6 CONCLUSIONS

The staff has determined that the licensee's listing of safety-related systems and associated electrical equipment whose ability to function in a harsh environment following an accident is required to mitigate a LOCA or HELB is complete and acceptable except as noted in Section 3 of this report. The staff has also determined that the environmental service conditions to be met by the electrical equipment in the harsh accident environment are appropriate, except as noted in Section 3 of this report. Outstanding information identified in Section 3 should be provided within 90 days of receipt of this SER.

The staff has reviewed the qualification of safety-related electrical equipment to the extent defined by this SER and has found no outstanding items which would require immediate corrective action to ensure the safety of plant operation. However, the staff has determined that many items of safety-related electrical equipment identified by the licensee for this review do not have adequate documentation to ensure that they are capable of withstanding the harsh environmental service conditions. This review was based on a comparison of the qualification values with the specified environmental values required by the design, which were provided in the licensee's summary sheets.

Subsection 4.2 identified deficiencies that must be resolved to establish the qualification of the equipment; the staff requires that the information lacking in this category be provided within 90 days of receipt of this SER. Within this period, the licensee should either provide documentation of the missing qualification information which demonstrates that such equipment meets the DOR guidelines or NUREG-0588 or commit to a corrective action (requalification, replacement, relocation, and so forth) consistent with the requirements to establish qualification by June 30, 1982. If the latter option is chosen, the licensee must provide justification for operation until such corrective action is complete.

Subsection 4.3 identified acceptance and conditional acceptance based on noted deficiencies. Where additional information is required, the licensee should respond within 90 days of receipt of this SER by providing assurance that these concerns will be satisfactorily resolved by June 30, 1982.

On February 13, 1981 the staff issued to the licensee Sections 3 and 4 of this report and requested, under the provisions of 10 CFR 50.54(f), that the licensee review the deficiencies enumerated and the ramifications thereof to determine whether safe operation of the facility would be impacted in consideration of the deficiencies. By letter of February 26, 1981, the licensee responded that it has completed a preliminary review of the identified deficiencies and has determined that, after due consideration of the deficiencies and their ramifications, continued safe operation would not be adversely affected.

Based on these considerations, the staff concludes that conformance with the above requirements and satisfactory completion of the corrective actions by June 30, 1982 will ensure compliance with the Commission Memorandum and Order of May 23, 1980. The staff further concludes that there is reasonable assurance of continued safe operation of this facility pending completion of these corrective actions. This conclusion is based on the following:

- (1) that there are no outstanding items which would require immediate corrective action to assure safety of plant operation
- (2) some of the items found deficient have been or are being replaced or relocated, thus improving the facility's capability to function following a LOCA or HELB
- (3) the harsh environmental conditions for which this equipment must be qualified result from low-probability events; events which might reasonably be anticipated during this very limited period would lead to less demanding service conditions for this equipment.

0053776

APPENDIX A

Equipment Requiring
Immediate Corrective Action
(Category 4.1)

No equipment in this category

0053777

APPENDIX B

Equipment Requiring Additional Information
and/or Corrective Action
(Category 4.2)LEGEND:Designation for Deficiency

- R - Radiation
- T - Temperature
- QT - Qualification Time
- RT - Required Time
- P - Pressure
- H - Humidity
- CS - Chemical spray
- A - Material aging evaluation, replacement schedule, ongoing equipment surveillance
- S - Submergence
- M - Margin
- I - HELB evaluation outside containment not completed
- QM - Qualification method
- RPN - Equipment relocation or replacement, adequate schedule not provided
- EXN - Exempted equipment justification inadequate
- SEN - Separate effects qualification justification inadequate
- QI - Qualification information being developed
- RPS - Equipment relocation or replacement schedule provided

Equipment Description	Manufacturer	Component No.	Deficiency
Resistance Thermometer Detector	Rosemount	N1B13TE412B	R,A,QM,M,CS
Resistance Thermometer Detector	Rosemount	N1B13TE412D	R,A,QM,M,CS
Resistance Thermometer Detector	Rosemount	N1B13TE422B	R,A,QM,M,CS
Resistance Thermometer Detector	Rosemount	N1B13TE422D	R,A,QM,M,CS
Resistance Thermometer Detector	Rosemount	N1B13TE432B	R,A,QM,M,CS
Resistance Thermometer Detector	Rosemount	N1B13TE432D	R,A,QM,M,CS

APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Terminal Block	States	11TB001	A,QM,S,CS
Terminal Block	States	11TB002	A,QM,S,CS
Terminal Block	States	21TB003	A,QM,S,CS
Terminal Block	States	21TB004	A,QM,S,CS
Terminal Block	States	31TB001	A,QM,S,CS
Terminal Block	States	31TB002	A,QM,S,CS
Electrical Penetration	GE	Q1T52B012	A,M,CS
Electrical Penetration		Q1T02B028	A,M,CS
Electrical Penetration	GE	Q1T52B030	A,M,CS
Instrument Cable	Boston Insul. Wire	1V1V5002B	A,M,CS
Instrument Cable	Boston Insul. Wire	1V1V5002D	A,M,CS
Instrument Cable	Boston Insul. Wire	1V2V5002B	A,M,CS
Instrument Cable	Boston Insul. Wire	1V2V5002D	A,M,CS
Instrument Cable	Boston Insul. Wire	1V3V5002B	A,M,CS
Instrument Cable	Boston Insul. Wire	1V3V5002D	A,M,CS
Pressure Transmitter	Barton	N1B21PT402	R,T,P,H,A,QM,M,CS
Pressure Transmitter	Barton	N1B21PT403	R,T,P,H,A,QM,M,CS
Resistance Thermometer Detector	Rosemount	N1B21TE410	R,A,QM,M,CS
Resistance Thermometer Detector	Rosemount	N1B21TE413	R,A,QM,M,CS

APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Resistance Thermometer Detector	Rosemount	N1B21TE420	R,A,QM,M,CS
Resistance Thermometer Detector	Rosemount	N1B21YE423	R,A,QM,M,CS
Resistance Thermometer Detector	Rosemount	N1B21TE430	R,A,QM,M,CS
Resistance Thermometer Detector	Rosemount	N1B21TE433	R,A,QM,M,CS
Terminal Block	States	11TB001	A,QM,S,CS
Terminal Block	States	11TB003	A,QM,S,CS
Terminal Block	States	11TB004	A,QM,S,CS
Terminal Block	States	21TB001	A,QM,S,CS
Terminal Block	States	21TB002	A,QM,S,CS
Terminal Block	States	21TB005	A,QM,S,CS
Electrical Penetration	GE	Q1T52B012	A,M,CS
Electrical Penetration	GE	Q1T52B030	A,M,CS
Electrical Penetration	GE	Q1T52B040	A,M,CS
Instrument Cable	Boston Insul. Wire	1VYV5031B	A,M,CS
Instrument Cable	Boston Insul. Wire	1VYV5033B	A,M,CS
Instrument Cable	Boston Insul. Wire	1VYV5002E	A,M,CS
Instrument Cable	Boston Insul. Wire	1VYV5002F	A,M,CS
Instrument Cable	Boston Insul. Wire	1VYV5002G	A,M,CS
Instrument Cable	Boston Insul. Wire	1V2V5002E	A,M,CS

APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Instrument Cable	Boston Insul. Wire	1V2V5002F	A,M,CS
Instrument Cable	Boston Insul. Wire	1V2V5002G	A,M,CS
Limit Switch	Namco Controls	N1B31Z58047	A,QM,S,CS
Electrical Penetration	GE	QIT52B022	A,M,CS
Electrical Penetration	GE	QIT52B038	A,M,CS
Terminal Block	States	N1B31SV8047-B/JB	A,QM,S,CS
Level Transmitter	Barton	Q1B31LT459	R,T,P,H,A,QM,M,CS
Level Transmitter	Barton	Q1B31LT460	R,T,P,H,A,QM,M,CS
Level Transmitter	Barton	Q1B31LT461	R,T,P,H,A,QM,M,CS
*Pressure Transmitter	Foxboro	Q1B31PT455	R,T,P,H,A,QM,M,CS
*Pressure Transmitter	Foxboro	Q1B31PT456	R,T,P,H,A,QM,M,CS
*Pressure Transmitter	Foxboro	Q1B31PT457	R,T,P,H,A,QM,M,CS
Instrument Cable	Boston Insul. Wire	1VYV5031D	A,S,M,CS
Instrument Cable	Boston Insul. Wire	1VYV5002U	A,S,M,CS
Instrument Cable	Boston Insul. Wire	1V2V5002T	A,S,M,CS
Instrument Cable	Boston Insul. Wire	1V2V5002U	A,S,M,CS
Instrument Cable	Boston Insul. Wire	1V3V5002T	A,S,M,CS
Instrument Cable	Boston Insul. Wire	1V3V5002U	A,S,M,CS
Electrical Penetration	GE	QIT52B012	A,M,CS

*See Attachment 1: Foxboro Letter (3/12/81) "Potential Deficiency Affecting Foxboro Transmitters," For Corrective Action.

APPENDIX B (Continued)

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Equipment Description	Manufacturer	Component No.	Deficiency
Electrical Penetration	GE	Q1T52B028	A,M,CS
Electrical Penetration	GE	Q1T52B030	A,M,LS
Electrical Penetration	GE	Q1T52B040	A,M,CS
Control Cable	Okonite	1VBL8079C	A,S,M,CS
Control Cable	Okonite	1VBQ5021E	A,S,M,CS
Solenoid Valve	ASCO	N1C22SV0498A	R,T,QT,P,H,A,QM,QI
Solenoid Valve	ASCO	N1C22SV0479B	R,T,QT,P,H,A,QM,QI
Terminal Block	States	N1C22VD478A-A/JB	T,A
Terminal Block	States	N1C22VC488A-A/JB	T,A
Terminal Block	States	N1C22VD498A-A/JB	T,A
Level Transmitter	Barton	Q1C22LT474	R,T,P,H,A,QM,M,CS
Level Transmitter	Barton	Q1C22LT475	R,T,P,H,A,QM,M,CS
Level Transmitter	Barton	Q1C22LT476	R,T,P,H,A,QM,M,CS
Level Transmitter	Barton	Q1C22LT484	R,T,P,H,A,QM,M,CS
Level Transmitter	Barton	Q1C22LT485	R,T,P,H,A,QM,M,CS
Level Transmitter	Barton	Q1C22LT486	R,T,P,H,A,QM,M,CS
Level Transmitter	Barton	Q1C22LT494	R,T,P,H,A,QM,M,CS
Level Transmitter	Barton	Q1C22LT495	R,T,P,H,A,QM,M,CS
Level Transmitter	Barton	Q1C22LT496	R,T,P,H,A,QM,M,CS
*Flow Transmitter	Foxboro	Q1C22FT474	R,T,P,H,A,QM,M,CS
*Flow Transmitter	Foxboro	Q1C22FT475	R,T,P,H,A,QM,M,CS
*Flow Transmitter	Foxboro	Q1C22FT484	R,T,P,H,A,QM,M,CS
*Flow Transmitter	Foxboro	Q1C22FT485	R,T,P,H,A,QM,M,CS

*See Attachment I: Foxboro Letter (3/12/81) "Potential Deficiency Affecting Foxboro Transmitters," For Corrective Action.

APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
*Flow Transmitter	Foxboro	Q1C22FT494	R,T,P,H,A,QM,M,CS
*Flow Transmitter	Foxboro	Q1C22FT495	R,T,P,H,A,QM,M,CS
Electrical Penetration	GE	Q1T52B010	A,M,CS
Electrical Penetration	GE	Q1T52B012	A,M,CS
Electrical Penetration	GE	Q1T52B028	A,M,CS
Electrical Penetration	GE	Q1T52B030	A,M,CS
Instrument Cable	Boston Insul. Wire	1V1V5002L	A,M,CS
Instrument Cable	Boston Insul. Wire	1V1V5002M	A,M,CS
Instrument Cable	Boston Insul. Wire	1V1V5002N	A,M,CS
Instrument Cable	Boston Insul. Wire	1V2V5002L	A,M,CS
Instrument Cable	Boston Insul. Wire	1V2V5002M	A,M,CS
Instrument Cable	Boston Insul. Wire	1V2V5002N	A,M,CS
Instrument Cable	Boston Insul. Wire	1V3V5002H	A,M,CS
Instrument Cable	Boston Insul. Wire	1V3V5002J	A,M,CS
Instrument Cable	Boston Insul. Wire	1V3V5002K	A,M,CS
Instrument Cable	Boston Insul. Wire	1V3V5002L	A,M,CS
Instrument Cable	Boston Insul. Wire	1V3V5002M	A,M,CS

*See Attachment 1: Foxboro Letter (3/12/81) "Potential Deficiency Affecting Foxboro Transmitters," For Corrective Action.

APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Instrument Cable	Boston Insul. Wire	1V3V5002N	A,M,CS
Instrument Cable	Boston Insul. Wire	1V4V5002A	A,M,CS
Instrument Cable	Boston Insul. Wire	1V4V5002B	A,M,CS
Instrument Cable	Boston Insul. Wire	1V4V5002C	A,M,CS
Level Transmitter	Delaval	Q1E11LT3594A	A,M,CS
Level Transmitter	Delaval	Q1E11LT3594B	A,M,CS
Electrical Penetration	GE	Q1T52B006	A,M,CS
Electrical Penetration	GE	Q1T52B020	A,M,CS
Control Cable	Okonite	1VAI5009F	A,M,CS
Control Cable	Okonite	1VBI5008C	A,M,CS
1-in. Motor-Operated Valve	Limitorque	Q1E14V002	A,M,CS
1-in. Motor-Operated Valve	Limitorque	Q1E14V004	A,M,CS
Limit Switch	Namco Controls	Q1P13ZS3196	A,CS
Limit Switch	Namco Controls	Q1P13ZS2867B	A,CS
Limit Switch	Namco Controls	Q1P13ZS3197	A,CS
Limit Switch	Namco Controls	Q1P13ZS2866B	A,CS
Limit Switch	Namco Controls	Q1E12ZS3999A	A,CS
Limit Switch	Namco Controls	Q1E12ZS3999B	A,CS
Motor	Joy Manufacturing	Q1E12M001A	A,CS
Motor	Joy Manufacturing	Q1E12M001B	A,CS
Motor	Joy Manufacturing	Q1E12M001C	A,CS

APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Motor	Joy Manufacturing	Q1E12M001D	A,CS
Terminal Block	States	Q1P13SV3196-B/JB	A,CS
Electrical Penetration	GE	Q1T52B001	A,M,CS
Electrical Penetration	GE	Q1T52B002	A,M,CS
Electrical Penetration	GE	Q1T52B005	A,M,CS
Electrical Penetration	GE	Q1T52B006	A,M,CS
Electrical Penetration	GE	Q1T52B007	A,M,CS
Electrical Penetration	GE	Q1T52B019	A,M,CS
Electrical Penetration	GE	Q1T52B020	A,M,CS
Electrical Penetration	GE	Q1T52B022	A,M,CS
Electrical Penetration	GE	Q1T52B023	A,M,CS
Electrical Penetration	GE	Q1T52B025	A,M,CS
Electrical Penetration	GE	Q1T52B041	A,M,CS
Terminal Block	States	Q1P13SV2867B-B/JB	A,CS
Terminal Block	States	Q1P13SV3197B-B/JB	A,CS
Terminal Block	States	Q1P13SV2866B-B/JB	A,CS
Terminal Block	States	Q1P13SV3999A-A/JB	A,CS
Terminal Block	States	Q1P13SV3999B-B/JB	A,CS
Power Cable	Okonite	1VAFU-R5Q	A,M,CS
Power Cable	Okonite	1VAFU-J4Q	A,M,CS
Power Cable	Okonite	1VAED-15Q	A,M,CS
Power Cable	Okonite	1VAED-16Q	A,M,CS
Power Cable	Okonite	1VBEE-08Q	A,M,CS
Power Cable	Okonite	1VBEE-16Q	A,M,CS

APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Control Cable	Okonite	1VAFU-R5D	A,M,CS
Control Cable	Okonite	1VAQ5048F	A,M,CS
Control Cable	Okonite	1VXR5005H	A,M,CS
Control Cable	Okonite	1VAFU-J4D	A,M,CS
Control Cable	Okonite	1VAQ5009C	A,M,CS
Control Cable	Okonite	1VBL5008C	A,M,CS
Control Cable	Okonite	1VBL5008D	A,M,CS
Control Cable	Okonite	1VBL5008K	A,M,CS
Control Cable	Okonite	1VBL5008L	A,M,CS
Control Cable	Okonite	1VBQ5010J	A,M,CS
Control Cable	Okonite	1VYR5035D	A,M,CS
Control Cable	Okonite	1VBL5008X	A,M,CS
Control Cable	Okonite	1VBL5008W	A,M,CS
Control Cable	Okonite	1VBQ5012F	A,M,CS
Control Cable	Okonite	1VYR5035F	A,M,CS
Control Cable	Okonite	1VAL5122C	A,M,CS
Control Cable	Okonite	1VAQ5029E	A,M,CS
Control Cable	Okonite	1VBL5094C	A,M,CS
Control Cable	Okonite	1VBQ5029E	A,M,CS
Instrument Cable	Boston Insul. Wire	1VYR5065B	A,M,CS
Electric Hydrogen Recombiner	Westinghouse	Q1E17K001A-A	A,CS
Electric Hydrogen Recombiner	Westinghouse	Q1E17K001B-B	A,CS
Electric Penetration	GE	Q1T52B001	A,M,CS

APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Electric Penetration	GE	Q1T52B023	A,M,CS
Electric Penetration	GE	Q1T52B024	A,M,CS
Electric Penetration	GE	Q1T52B042	A,M,CS
Power Cable	Okonite	1VAFALL3T	A,M,CS
Power Cable	Okonite	1VBFBRH6T	A,M,CS
Instrument Cable	Boston Insul. Wire	1VXQ5009B	A,M,CS
Instrument Cable	Boston Insul. Wire	1VXQ5009D	A,M,CS
Instrument Cable	Boston Insul. Wire	1VXQ500S	A,M,CS
Instrument Cable	Boston Insul. Wire	1VYQ5017B	A,M,CS
Instrument Cable	Boston Insul. Wire	1VYQ5017D	A,M,CS
Instrument Cable	Boston Insul. Wire	1VYQ5017F	A,M,CS
Motor	Joy Manufactur- ing	Q1E19M001A	A,CS
Motor	Joy Manufactur- ing	Q1E19M001B	A,CS
Motor	Joy Manufactur- ing	Q1E19M001C	A,CS
Motor	Joy Manufactur- ing	Q1E19M001D	A,CS
Electrical Penetration	GE	Q1T52B002	A,M,CS
Electrical Penetration	GE	Q1T52B014	A,M,CS
Electrical Penetration	GE	Q1T52B015	A,M,CS
Electrical Penetration	GE	Q1T52B017	A,M,CS
Power Cable	Okonite	1VAFA-J5Q	A,M,CS

APPENDIX B (Continued)

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Equipment Description	Manufacturer	Component No.	Deficiency
Power Cable	Okonite	1VAFA-15Q	A,M,CS
Power Cable	Okonite	1VAFA-14Q	A,M,CS
Power Cable	Okonite	1VAFA-13Q	A,M,CS
12-in. Motor-Operated Valve	Limitorque	Q1E21V038A	A,S,CS
12-in. Motor-Operated Valve	Limitorque	Q1E21V038B	A,S,CS
12-in. Motor-Operated Valve	Limitorque	Q1E21V038C	A,S,CS
Limit Switch	Namco Controls	N1E21ZS8871	A,CS
3-in. Motor-Operated Valve	Limitorque	Q1E21V249A	A,S,CS
Limit Switch	Namco Controls	N1E21ZS8149A	QM,S,CS,A
Limit Switch	Namco Controls	N1E21ZS8149B	QM,S,CS,A
Limit Switch	Namco Controls	N1E21ZS8149C	QM,S,CS,A
Limit Switch	Namco Controls	N1E21ZS8808AB	QM,S,CS,A
Limit Switch	Namco Controls	N1E21ZS8808BB	QM,S,CS,A
Limit Switch	Namco Controls	N1E21ZS8808CB	QM,S,CS,A
Terminal Block	States	N1E21SV8871-A/JB	A,CS
Terminal Block	States	N1E21SV8149AA-A/JB	CS,A,QM,S
Terminal Block	States	N1E21SV8149BA-A/JB	CS,A,QM,S
Terminal Block	States	N1E21SV8149CA-A/JB	CS,A,QM,S
Electrical Penetration	GE	Q1T52B002	A,M,CS
Electrical Penetration	GE	Q1T52B006	A,M,CS

APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Electrical Penetration	GE	Q1T52B014	A,M,CS
Electrical Penetration	GE	Q1T52B016	A,M,CS
Electrical Penetration	GE	Q1T52B019	A,M,CS
Electrical Penetration	GE	Q1T52B038	A,M,CS
Power Cable	Okonite	1VAFU-Z2Q	H,K,G,A
Power Cable	Okonite	1VBFU-S2Q	H,K,G,A
Power Cable	Okonite	1VAFU-Z3Q	H,K,G,A
Power Cable	Okonite	1VBFU-T4Q	H,K,G,A
Control Cable	Okonite	1VAFU-Z2D	H,K,G,A
Control Cable	Okonite	1VAFU-Z2G	H,K,G,A
Control Cable	Okonite	1VAQ-5023E	H,K,G,A
Control Cable	Okonite	1VXKA163B	H,K,G,A
Control Cable	Okonite	1VBFV-S2D	H,K,G,A
Control Cable	Okonite	1VBFV-S2G	H,K,G,A
Control Cable	Okonite	1VBQ5024C	H,K,G,A
Control Cable	Okonite	1VYKA163B	H,K,G,A
Control Cable	Okonite	1VAFU-Z3D	H,K,G,A
Control Cable	Okonite	1VAFU-Z3G	H,K,G,A
Control Cable	Okonite	1VAQ5024E	H,K,G,A
Control Cable	Okonite	1VXA163D	H,K,G,A
Control Cable	Okonite	1VAL5049C	H,K,G,A
Control Cable	Okonite	1VAQ5022H	H,K,G,A
Control Cable	Okonite	1VAFU-T4	H,K,G,A
Control Cable	Okonite	1VAQ5018E	H,K,G,A

APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Control Cable	Okonite	1VAL5042F	H,K,G,A
Control Cable	Okonite	1VAL5042G	H,K,G,A
Control Cable	Okonite	1VAQ5022F	A,M,CS
Control Cable	Okonite	1VAL5043F	A,M,CS
Control Cable	Okonite	1VAL5043G	A,M,CS
Control Cable	Okonite	1VAL5023C	A,M,CS
Control Cable	Okonite	1VAL5044F	A,M,CS
Control Cable	Okonite	1VAL5044G	A,M,CS
Control Cable	Okonite	1VAQ5024C	A,M,CS
Fans	Joy Manufacturing Co.	Q1E22M001A	A,CS
Fans	Joy Manufacturing Co.	Q1E22M001B	A,CS
2½-in. Motor-Operated Valve	Limitorque	Q1E22V001A	A,M,CS
2½-in. Motor-Operated Valve	Limitorque	Q1E22V001B	A,M,CS
Electrical Penetration	GE	Q1T52B001	A,M,CS
Electrical Penetration	GE	Q1T52B019	A,M,CS
Electrical Penetration	GE	Q1T52B020	A,M,CS
Electrical Penetration	GE	Q1T52B023	A,M,CS
Power Cable	Okonite	1VAED06Q	A,M,CS
Power Cable	Okonite	1VBEE09Q	A,M,CS
Control Cable	Okonite	1VAED06E	A,M,CS
Control Cable	Okonite	1VBEE09E	A,M,CS

APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
2-in. Motor-Operated Valve	Limitorque	Q1E23V021	A,S,M,CS
6-in. Motor-Operated Valve	Limitorque	Q1E23V003	A,M,CS
3/4-in. Motor-Operated Valve	Limitorque	Q1E23V022A	A,M,CS
3/4-in. Motor-Operated Valve	Limitorque	Q1E23V022B	A,M,CS
3/4-in. Motor-Operated Valve	Limitorque	Q1E23V022C	A,M,CS
3/4-in. Motor-Operated Valve	Limitorque	Q1E23V022D	A,M,CS
3/4-in. Motor-Operated Valve	Limitorque	Q1E23V025A	A,M,CS
3/4-in. Motor-Operated Valve	Limitorque	Q1E23V025B	A,M,CS
Electrical Penetration	GE	Q1T52B005	A,M,CS
Electrical Penetration	GE	Q1T52B007	A,M,CS
Electrical Penetration	GE	Q1T52B015	A,M,CS
Electrical Penetration	GE	Q1T52B016	A,M,CS
Electrical Penetration	GE	Q1T52B017	A,M,CS
Electrical Penetration	GE	Q1T52B019	A,M,CS
Electrical Penetration	GE	Q1T52B020	A,M,CS
Electrical Penetration	GE	Q1T52B038	A,M,CS
Power Cable	Okonite	1VAFU-W#Q	A,M,CS
Power Cable	Okonite	1VAFU-N2Q	A,M,CS
Power Cable	Okonite	1VAFV-Y5Q	A,M,CS
Power Cable	Okonite	1VBFV-Y4Q	A,M,CS

APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Power Cable	Okonite	1VAFU-L4Q	A,M,CS
Power Cable	Okonite	1VAFU-L5Q	A,M,CS
Power Cable	Okonite	1VBFV-H4Q	A,M,CS
Power Cable	Okonite	1VBFV-H5Q	A,M,CS
Power Cable	Okonite	1VAFU-M4Q	A,M,CS
Power Cable	Okonite	1VBFV-M3Q	A,M,CS
Control Cable	Okonite	1VAFU-W4C	A,M,CS
Control Cable	Okonite	1VAED06E	A,M,CS
Control Cable	Okonite	1VBFV-N2C	A,M,CS
Control Cable	Okonite	1VBEE09E	A,M,CS
Control Cable	Okonite	1VBFV-Y5C	A,M,CS
Control Cable	Okonite	1VBFV-Y5C	A,M,CS
Control Cable	Okonite	1VAFU-L4C	A,M,CS
Control Cable	Okonite	1VAFU-L5C	A,M,CS
Control Cable	Okonite	1VAFV-H4C	A,M,CS
Control Cable	Okonite	1VAFV-H5C	A,M,CS
Control Cable	Okonite	1VAFU-M4C	A,M,CS
Control Cable	Okonite	1VBFV-M3C	A,M,CS
Limit Switch	Namco Controls	Q1G21ZS3376	A,QM,S,CS
Limit Switch	Namco Controls	N1G21ZS1003	A,QM,S,CS
Limit Switch	Namco Controls	Q1G21ZS7126	A,QM,S,CS
Electrical Penetration	GE	Q1T52B019	A,M,CS
Electrical Penetration	GE	Q1T52B038	A,M,CS
Electrical Penetration	GE	Q1T52B041	A,M,CS

APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Terminal Block	States	Q1G21SV3376-B/JB	A, QM, S, CS
Terminal Block	States	N1G21SV1003A-A/JB	A, QM, S, CS
Terminal Block	States	N1G21SV7426-A/JB	A, QM, S, CS
Instrument Cable	Boston Insul. Wire	1VYR5066G	A, M, CS, H, K, G
Control Cable	Okonite	1VBL5045C	A, M, CS, H, K, G
Control Cable	Okonite	1VBQ5030J	A, M, CS, H, K, G
Control Cable	Okonite	1VAL5037D	A, M, CS, H, K, G
Control Cable	Okonite	1VAQ5021J	A, M, CS, H, K, G
Control Cable	Okonite	1VAL5036C	A, M, CS, H, K, G
Control Cable	Okonite	1VAQ5020J	A, M, CS, H, K, G
Terminal Block	States	Q1N11SV3369AA-A/JB	A, M
Terminal Block	States	Q1N11SV3369BA-A/JB	A, M
Terminal Block	States	Q1N11SV3369CA-A/JB	A, M
Terminal Block	States	Q1N11SV3370AA-A/JB	A, M
Terminal Block	States	Q1N11SV3370BA-A/JB	A, M
Terminal Block	States	Q1N11SV3370CA-A/JB	A, M
Terminal Block	States	Q1N11SV3368AA-A/JB	A, M
Terminal Block	States	Q1N11SV3368BA-A/JB	A, M
Terminal Block	States	Q1N11SV3368CA-A/JB	A, M

APPENDIX B (Continued)

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Equipment Description	Manufacturer	Component No.	Deficiency
Terminal Block	States	Q1N11SV3976A-B/JB	A,M
Terminal Block	States	Q1N11SV3976B-B/JB	A,M
Terminal Block	States	Q1N11SV3976C-B/JB	A,M
Level Transmitter	Barton	Q1N11LT477	R,T,P,H,CS,A,QM,M
Level Transmitter	Barton	Q1N11LT487	R,T,P,H,CS,A,QM,M
Level Transmitter	Barton	Q1N11LT497	R,T,P,H,CS,A,QM,M
Electrical Penetration	GE	Q1T52B040	A,M,CS
Electrical Penetration	GE	Q1T52B041	A,M,CS
Instrument Cable	Boston Insul. Wire	1VXV5013L	A,M,CS
Instrument Cable	Boston Insul. Wire	1VXV5014P	A,M,CS
Instrument Cable	Boston Insul. Wire	1VXV5014J	A,M,CS
Terminal Block	States	Q1N12SV3234A-A/JB	M,A
Terminal Block	States	Q1N12SV3234B-B/JB	M,A
Terminal Block	States	Q1N12SV3235A-A/JB	M,A
Terminal Block	States	Q1N12SV3235B-B/JB	M,A
Level Switch	Delaval	Q1N21LSH2828A	A,M
Level Switch	Delaval	Q1N21LSH2828B	A,M
Level Switch	Delaval	Q1N21LSH2828C	A,M
Level Switch	Delaval	Q1N21LSH2829A	A,M
Level Switch	Delaval	Q1N21LSH2829B	A,M
Level Switch	Delaval	Q1N21LSH2829C	A,M
Terminal Block	States	A1TB034	M,A

APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Terminal Block	States	Q1N23SV3227AA-A/JD	M,A
Terminal Block	States	Q1N23SV3227BA-A/JB	M,A
Terminal Block	States	Q1N23SV3227CA-A/JB	M,A
Terminal Block	States	Q1N23SV3228AA-A/JB	M,A
Terminal Block	States	Q1N23SV3228BA-A/JB	M,A
Terminal Block	States	Q1N23SV3228CA-A/JB	M,A
Terminal Block	States	Q1N25SV3772A-A/JB	M,A
Terminal Block	States	Q1N25SV3772B-A/JB	M,A
Terminal Block	States	Q1N25SV3772C-A/JB	M,A
Limit Switch	Namco Controls	Q1P15ZS3103	A,QM,CS
Limit Switch	Namco Controls	Q1P15ZS3765	A,QM,CS
Limit Switch	Namco Controls	Q1P15ZS3766	A,QM,CS
Limit Switch	Namco Controls	Q1P15ZS3179A	A,QM,CS
Limit Switch	Namco Controls	Q1P15ZS3179B	A,QM,CS
Limit Switch	Namco Controls	Q1P15ZS3179C	A,QM,CS
Limit Switch	Namco Controls	Q1P15ZS3180A	A,QM,CS
Limit Switch	Namco Controls	Q1P15ZS3180B	A,QM,CS
Limit Switch	Namco Controls	Q1P15ZS3180C	A,QM,CS
Limit Switch	Namco Controls	Q1P15ZS3181A	A,QM,CS
Limit Switch	Namco Controls	Q1P15ZS3181B	A,QM,CS
Limit Switch	Namco Controls	Q1P15ZS3181C	A,QM,CS

APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Limit Switch	Namco Controls	Q1P15ZS3104	A,QM,CS
Terminal Block	States	Q1P15SV3103-A/JB	A,CS
Terminal Block	States	Q1P15SV3765-A/JB	A,CS
Electrical Penetration	GE	Q1T52B007	A,M,CS
Electrical Penetration	GE	Q1T52B019	A,M,CS
Electrical Penetration	GE	Q1T52B020	A,M,CS
Terminal Block	States	Q1P15SV3765-A/JB	A,CS
Terminal Block	States	Q1P15SV3179A-A/JB	A,CS
Terminal Block	States	Q1P15SV3179B-A/JB	A,CS
Terminal Block	States	Q1P15SV3179C-B/JB	A,CS
Terminal Block	States	Q1P15SV3180A-A/JB	A,CS
Terminal Block	States	Q1P15SV3180B-A/JB	A,CS
Terminal Block	States	Q1P15SV3180C-B/JB	A,CS
Terminal Block	States	Q1P15SV3181A-A/JB	A,CS
Terminal Block	States	Q1P15SV3181B-A/JB	A,CS
Terminal Block	States	Q1P15SV3181C-B/JB	A,CS
Terminal Block	States	Q1P15SV3104-A/JB	A,CS
Control Cable	Okonite	1VAL5063B	A,M,CS
Control Cable	Okonite	1VAQ5049H	A,M,CS
Control Cable	Okonite	1VXR5010B	A,M,CS
Control Cable	Okonite	1VAL5065B	A,M,CS
Control Cable	Okonite	1VAQ5032J	A,M,CS
Control Cable	Okonite	1VXR5010F	A,M,CS
Control Cable	Okonite	1VAL5066A	A,M,CS

APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Control Cable	Okonite	1VAQ5033J	A,M,CS
Control Cable	Okonite	1VXR5010H	A,M,CS
Control Cable	Okonite	1VAL5084B	A,M,CS
Control Cable	Okonite	1VAL5085B	A,M,CS
Control Cable	Okonite	1VBL5074B	A,M,CS
Control Cable	Okonite	1VAL5086B	A,M,CS
Control Cable	Okonite	1VAL5087B	A,M,CS
Control Cable	Okonite	1VBL5075B	A,M,CS
Control Cable	Okonite	1VAL5088B	A,M,CS
Control Cable	Okonite	1VAL5089B	A,M,CS
Control Cable	Okonite	1VBL5076B	A,M,CS
Control Cable	Okonite	1VAL5064B	A,M,CS
Control Cable	Okonite	1VAQ5047H	A,M,CS
Control Cable	Okonite	1VXR5010D	A,M,CS
10-in. Motor-Operated Valve	Limitorque	Q1P16V0207A	A,M,CS
10-in. Motor-Operated Valve	Limitorque	Q1P16V0207B	A,M,CS
10-in. Motor-Operated Valve	Limitorque	Q1P16V0207C	A,M,CS
10-in. Motor-Operated Valve	Limitorque	Q1P16V0207D	A,M,CS
6-in. Motor-Operated Valve	Limitorque	Q1P16V081	A,M,CS
Electrical Penetration	GE	Q1T52B005	A,M,CS
Electrical Penetration	GE	Q1T52B007	A,M,CS

APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Electrical Penetration	GE	Q1T52B014	A, M, CS
Electrical Penetration	GE	Q1T52B015	A, M, CS
Electrical Penetration	GE	Q1T52B019	A, M, CS
Electrical Penetration	GE	Q1T52B020	A, M, CS
Power Cable	Okonite	1VBFV-J4Q	A, M, CS
Power Cable	Okonite	1VBFV-J5Q	A, M, CS
Power Cable	Okonite	1VAFU-K6Q	A, M, CS
Power Cable	Okonite	1VAFU-W2Q	A, M, CS
Power Cable	Okonite	1VAFU-H4Q	A, M, CS
Control Cable	Okonite	1VBFV-J4D	A, M, CS
Control Cable	Okonite	1VBG5007D	A, M, CS
Control Cable	Okonite	1VYR4006B	A, M, CS
Control Cable	Okonite	1VYR4006D	A, M, CS
Control Cable	Okonite	1VYKB164B	A, M, CS
Control Cable	Okonite	1VYKB164C	A, M, CS
Control Cable	Okonite	1VBFV-J5D	A, M, CS
Control Cable	Okonite	1VBQ5009D	A, M, CS
Control Cable	Okonite	1VAFU-K6D	A, M, CS
Control Cable	Okonite	1VAQ5007D	A, M, CS
Control Cable	Okonite	1VXR5005B	A, M, CS
Control Cable	Okonite	1VXR5005D	A, M, CS
Control Cable	Okonite	1VXR5005F	A, M, CS
Control Cable	Okonite	1VXKB164B	A, M, CS
Control Cable	Okonite	1VXKB164C	A, M, CS

APPENDIX B (Continued)

0053798

Equipment Description	Manufacturer	Component No.	Deficiency
Control Cable	Okonite	1VAFJ W2D	A,M,CS
Control Cable	Okonite	1VAFU-H4A	A,M,CS
Control Cable	Okonite	1VAQ5002F	A,M,CS
6-in. Motor-Operated Valve	Limitorque	Q1P17V097	A,M,CS
Limit Switch	Namco Controls	Q1P17ZS3184	A,QM,S,CS
Limit Switch	Namco Controls	Q1P17ZS3443	A,QM,S,CS
Electric Penetration	GE	Q1T52B016	A,M,CS
Electric Penetration	GE	Q1T52B019	A,M,CS
Electric Penetration	GE	Q1T52B020	A,M,CS
Electric Penetration	GE	Q1T52B038	A,M,CS
Electric Penetration	GE	Q1T52B041	A,M,CS
Terminal Block	States	Q1P17SV3184-B/JB	A,QM,S,CS
Terminal Block	States	Q1P17SV3443-A/JB	A,QM,S,CS
Power Cable	Okonite	1VBFV-C3Q	A,M,CS
Control Cable	Okonite	1VBFV-C3D	A,M,CS
Control Cable	Okonite	1VBQ5017C	A,M,CS
Control Cable	Okonite	1VYR5006F	A,M,CS
Control Cable	Okonite	1VBL5009C	A,M,CS
Control Cable	Okonite	1VBL5009D	A,M,CS
Control Cable	Okonite	1VBL5009E	A,M,CS
Control Cable	Okonite	1VBL5009F	A,M,CS
Control Cable	Okonite	1VBQ5017H	A,M,CS
Control Cable	Okonite	1VYR5035B	A,M,CS
Control Cable	Okonite	1VAL5055C	A,M,CS

APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Control Cable	Okonite	1VAQ5029H	A, M, CS
Instrument Cable	Boston Insul. Wire	1VYR5064F	A, M, CS
Solenoid Valve	ASCO	Q1B31SV8047	R, T, QT, P, H, CS, A, QM, S, M, RPN
Limit Switch	Namco Controls	N1C22Z5047B	T, QT, P, H, A, QM, M, RPN
Solenoid Valve	ASCO	N1C22SV0478A	T, QT, P, H, A, QM, M, RPN
Solenoid Valve	ASCO	N1C22SV0478B	T, QT, P, H, A, QM, M, RPN
Limit Switch	Namco Controls	N1C22Z5048B	T, QT, P, H, A, QM, M, RPN
Solenoid Valve	ASCO	N1C22SV0488A	T, QT, P, H, A, QM, M, RPN
Solenoid Valve	ASCO	N1C22SV0488B	T, QT, P, H, A, QM, M, RPN
Limit Switch	Namco Controls	N1C22Z5049B	T, QT, P, H, A, QM, M, RPN
Solenoid Valve	ASCO	N1C22SV0498B	T, QT, P, H, A, QM, M, RPN
Limit Switch	Namco Controls	N1C22Z50479	T, QT, P, H, A, QM, M, RPN
Solenoid Valve	ASCO	N1C22SV0479A	T, QT, P, H, A, QM, M, RPN
Limit Switch	Namco Controls	N1C22Z50489	T, QT, P, H, A, QM, M, RPN
Solenoid Valve	ASCO	N1C22SV0489A	T, QT, P, H, A, QM, M, RPN
Solenoid Valve	ASCO	N1C22SV0489B	T, QT, P, H, A, QM, M, RPN
Limit Switch	Namco Controls	N1C22Z50499	T, QT, P, H, A, QM, M, RPN
Solenoid Valve	ASCO	N1C22SV0499A	T, QT, P, H, A, QM, M, RPN
Solenoid Valve	ASCO	N1C22SV0499B	T, QT, P, H, A, QM, M, RPN
Solenoid Valve	ASCO	Q1P13SV3196	R, T, QT, P, H, CS, A, QM, M, RPN
Solenoid Valve	ASCO	Q1P13SV2867B	R, T, QT, P, H, CS, A, QM, M, RPN

APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Solenoid Valve	ASCO	Q1P13SV3197	R, T, QT, P, H, CS, A, QM, M, RPN
Solenoid Valve	ASCO	Q1P13SV2866B	R, T, QT, P, H, CS, A, QM, K, RPN
Solenoid Valve	ASCO	Q1E12SV3999A	R, T, QT, P, H, CS, A, QM, S, M, RPN
Solenoid Valve	ASCO	Q1E12SV3999B	R, T, QT, P, H, CS, A, QM, S, M, RPN
Solenoid Valve	ASCO	Q1E21SV6671	R, T, QT, P, H, CS, A, QM, M, RPN
Solenoid Valve	ASCO	Q1E21SV8149AB	R, T, QT, P, H, CS, A, QM, S, M, RPN
Solenoid Valve	ASCO	Q1E21SV8149BB	R, T, QT, P, H, CS, A, QM, S, M, RPN
Solenoid Valve	ASCO	Q1E21SV8149CB	R, T, QT, P, H, CS, A, QM, S, M, RPN
Solenoid Valve	ASCO	Q1G21SV3376	R, T, QT, P, H, CS, A, QM, S, M, RPN
Solenoid Valve	ASCO	N1G21SV1003B	R, T, QT, P, H, CS, A, QM, S, M, RPN
Solenoid Valve	ASCO	Q1G21SV7126	R, T, QT, P, H, CS, A, QM, S, M, RPN
Limit Switch	Namco Controls	Q1N11ZS3369A	T, QT, P, H, A, QM, M, RPN
Solenoid Valve	ASCO	Q1N11SV3369AA	T, QT, P, H, A, QM, M, RPN
Solenoid Valve	ASCO	Q1N11SV3369AC	T, QT, P, H, A, QM, M, RPN
Limit Switch	Namco Controls	Q1N11ZS3369A	T, QT, P, H, A, QM, M, RPN
Solenoid Valve	ASCO	Q1N11SV3369BA	T, QT, P, H, A, QM, M, RPN
Solenoid Valve	ASCO	Q1N11SV3369BC	T, QT, P, H, A, QM, M, RPN
Limit Switch	Namco Controls	Q1N11ZS3369C	T, QT, P, H, A, QM, M, RPN

APPENDIX B (Continued)

0053801

Equipment Description	Manufacturer	Component No.	Deficiency
Solenoid Valve	ASCO	Q1N11SV3369CA	T,QT,P,H,A,QM,M,RPN
Solenoid Valve	ASCO	Q1N11SV3369CC	T,QT,P,H,A,QM,M,RPN
Limit Switch	Namco Controls	Q1N11ZS3370A	T,QT,P,H,A,QM,M,RPN
Solenoid Valve	ASCO	Q1N11SV3370AA	T,QT,P,H,A,QM,M,RPN
Solenoid Valve	ASCO	Q1N11SV3370AC	T,QT,P,H,A,QM,M,RPN
Limit Switch	Namco Controls	Q1N11ZS3370B	T,QT,P,H,A,QM,M,RPN
Solenoid Valve	ASCO	Q1N11SV3370BA	T,QT,P,H,A,QM,M,RPN
Solenoid Valve	ASCO	Q1N11SV3370BC	T,QT,P,H,A,QM,M,RPN
Limit Switch	Namco Controls	Q1N11ZS3370C	T,QT,P,H,A,QM,M,RPN
Solenoid Valve	ASCO	Q1N11SV3370CA	T,QT,P,H,A,QM,M,RPN
Solenoid Valve	ASCO	Q1N11SV3370CC	T,QT,P,H,A,QM,M,RPN
Limit Switch	Namco Controls	Q1N11ZS3368A	T,QT,P,H,A,QM,M,RPN
Solenoid Valve	ASCO	Q1N11SV3368AA	T,QT,P,H,A,QM,M,RPN
Limit Switch	Namco Controls	Q1N11ZS3368B	T,QT,P,H,A,QM,M,RPN
Solenoid Valve	ASCO	Q1N11SV3368BA	T,QT,P,H,A,QM,M,RPN
Limit Switch	Namco Controls	Q1N11ZS3358C	T,QT,P,H,A,QM,M,RPN
Solenoid Valve	ASCO	Q1N11SV3368CA	T,QT,P,H,A,QM,M,RPN
Solenoid Valve	ASCO	Q1N11SV3976A	T,QT,P,H,A,QM,M,RPN
Limit Switch	Namco Controls	Q1N11ZS3976A	T,QT,P,H,A,QM,M,RPN
Solenoid Valve	ASCO	Q1N11SV3976B	T,QT,P,H,A,QM,M,RPN
Limit Switch	Namco Controls	Q1N11ZS3976B	T,QT,P,H,A,QM,M,RPN
Solenoid Valve	ASCO	Q1N11SV3976C	T,QT,P,H,A,QM,M,RPN
Limit Switch	Namco Controls	Q1N11ZS3976C	T,QT,P,H,A,QM,M,RPN
Limit Switch	Namco Controls	Q1N11ZS3369AJ	T,QT,P,H,A,QM,M,RPN

APPENDIX B (Continued)

0053802

Equipment Description	Manufacturer	Component No.	Deficiency
Limit Switch	Namco Controls	Q1N11ZS3369BJ	T,QI,P,H,A,QM,M,RPN
Limit Switch	Namco Controls	Q1N11ZS3369CJ	T,QT,P,H,A,QM,M,RPN
Limit Switch	Namco Controls	Q1N11ZS3370AJ	T,QT,P,H,A,QM,M,RPN
Limit Switch	Namco Controls	Q1N11ZS3370BJ	T,QT,P,H,A,QM,M,RPN
Limit Switch	Namco Controls	Q1N11ZS3370CJ	T,QT,P,H,A,QM,M,RPN
Limit Switch	Namco Controls	Q1N12ZS3234A	T,QT,P,H,A,QM,M,RPN
Limit Switch	Namco Controls	Q1N12ZS3234B	T,QT,P,H,A,QM,M,RPN
Limit Switch	Namco Controls	Q1N12ZS3235A	T,QT,P,H,A,QM,M,RPN
Limit Switch	Namco Controls	Q1N12ZS3235B	T,QT,P,H,A,QM,M,RPN
Limit Switch	Namco Controls	Q1N23ZS3228A	T,QT,P,H,A,QM,M,RPN
Limit Switch	Namco Controls	Q1N23ZS3228B	T,QT,P,H,A,QM,M,RPN
Limit Switch	Namco Controls	Q1N23ZS3228C	T,QT,P,H,A,QM,M,RPN
Limit Switch	Namco Controls	Q1N23ZS3227A	T,QT,P,H,A,QM,M,RPN
Limit Switch	Namco Controls	Q1N23ZS3227B	T,QT,P,H,A,QM,M,RPN
Limit Switch	Namco Controls	Q1N23ZS3227C	T,QT,P,H,A,QM,M,RPN
Limit Switch	Namco Controls	Q1N25ZS3772A	T,QT,P,H,A,QM,M,RPN
Limit Switch	Namco Controls	Q1N25ZS3772B	T,QT,P,H,A,QM,M,RPN
Limit Switch	Namco Controls	Q1N25ZS3772C	T,QT,P,H,A,QM,M,RPN
Solenoid Valve	ASCO	Q1N12SV3234A	T,QT,P,H,A,QM,M,RPN
Solenoid Valve	ASCO	Q1N12SV3234B	T,QT,P,H,A,QM,M,RPN
Solenoid Valve	ASCO	Q1N12SV3235A	T,QT,P,H,A,QM,M,RPN
Solenoid Valve	ASCO	Q1N12SV3235B	T,QT,P,H,A,QM,M,RPN
Solenoid Valve	ASCO	Q1N23SV3228AA	T,QT,P,H,A,QM,M,RPN
Solenoid Valve	ASCO	Q1N23SV3228BA	T,QT,P,H,A,QM,M,RPN

Equipment Description	Manufacturer	Component No.	Deficiency
Solenoid Valve	ASCO	Q1N23SV3228CA	T,QT,P,H,A,QM,M,RPN
Solenoid Valve	ASCO	Q1N23SV3227AA	T,QT,P,H,A,QM,M,RPN
Solenoid Valve	ASCO	Q1N23SV3227DA	T,QT,P,H,A,QM,M,RPN
Solenoid Valve	ASCO	Q1N23SV3227CA	T,QT,P,H,A,QM,M,RPN
Solenoid Valve	ASCO	Q1N25SV3772A	T,QT,P,H,A,QM,M,RPN
Solenoid Valve	ASCO	Q1N25SV3772B	T,QT,P,H,A,QM,M,RPN
Solenoid Valve	ASCO	Q1N25SV3772C	T,QT,P,H,A,QM,M,RPN
Solenoid Valve	ASCO	Q1P15SV3103	R,T,QT,P,H,CS, A,QM,M,RPN
Solenoid Valve	ASCO	Q1P15SV3765	R,T,QT,P,H,CS, A,QM,M,RPN
Solenoid Valve	ASCO	Q1P15SV3766	R,T,QT,P,H,CS, A,QM,M,RPN
Solenoid Valve	ASCO	Q1P15SV3179A	R,T,QT,P,H,CS, A,QM,M,RPN
Solenoid Valve	ASCO	Q1P15SV3179B	R,T,QT,P,H,CS, A,QM,M,RPN
Solenoid Valve	ASCO	Q1P15SV3179C	R,T,QT,P,H,CS, A,QM,M,RPN
Solenoid Valve	ASCO	Q1P153180A	R,T,QT,P,H,CS, A,QM,M,RPN
Solenoid Valve	ASCO	Q1P153180B	R,T,QT,P,H,CS, A,QM,M,RPN
Solenoid Valve	ASCO	Q1P153180C	R,T,QT,P,H,CS, A,QM,M,RPN
Solenoid Valve	ASCO	Q1P153181A	R,T,QT,P,H,CS, A,QM,M,RPN
Solenoid Valve	ASCO	Q1P153181B	R,T,QT,P,H,CS, A,QM,M,RPN

0053804

Equipment Description	Manufacturer	Component No.	Deficiency
Solenoid Valve	ASCO	Q1P1531810	R, T, QT, P, H, CS, A, Q, M, RPN
Solenoid Valve	ASCO	Q1P15SV3104	R, T, QT, P, H, CS, A, Q, M, RPN
Solenoid Valve	ASCO	Q1P17SV3184	R, T, QT, P, H, CS, A, QM, M, RPN
Solenoid Valve	ASCO	Q1P17SV3443	R, T, QT, P, H, CS, A, QM, M, RPN

Equipment Considered Acceptable or Conditionally Acceptable
(Category 4.3)

LEGEND:Classification for Deficiency

- R - Radiation
- T - Temperature
- QT - Qualification time
- RT - Required time
- P - Pressure
- H - Humidity
- CS - Chemical spray
- A - Material aging evaluation, replacement schedule, ongoing equipment surveillance
- S - Submergence
- M - Margin
- I - HELB evaluation outside containment not completed
- QM - Qualification method
- RPN - Equipment relocation or replacement, adequate schedule not provided
- EXN - Exempted equipment justification inadequate
- SEN - Separate effects qualification justification inadequate
- QI - Qualification information being developed
- RPS - Equipment relocation or replacement schedule provided

Equipment Description	Manufacturer	Component No.	Deficiency
Control Cable	Okonite	1VAL5060B	A
Control Cable	Okonite	1VBL4025B	A
Control Cable	Okonite	1VXL5071A	A
Control Cable	Okonite	1VAL5061C	A
Control Cable	Okonite	1VBL5034C	A
Control Cable	Okonite	1VBL5034D	A
Control Cable	Okonite	1VXL5072B	A
Control Cable	Okonite	1VAL5062B	A
Control Cable	Okonite	1VBL5035B	A
Control Cable	Okonite	1VBL5035D	A

0053806

APPENDIX C (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Control Cable	Okonite	1VXL5073A	A
Control Cable	Okonite	1VAL5019E	A
Control Cable	Okonite	1VAL5019F	A
Control Cable	Okonite	1VAL5045C	A
Control Cable	Okonite	1VAQ5013A	A
Control Cable	Okonite	1VAT0001C	A
Control Cable	Okonite	1VAT0001D	A
Control Cable	Okonite	1VAT0001E	A
Control Cable	Okonite	1VAL5020E	A
Control Cable	Okonite	1VAL5020F	A
Control Cable	Okonite	1VAL5046C	A
Control Cable	Okonite	1VAQ5015A	A
Control Cable	Okonite	1VAL5021E	A
Control Cable	Okonite	1VAL5021F	A
Control Cable	Okonite	1VAL5047C	A
Control Cable	Okonite	1VAQ5017A	A
Control Cable	Okonite	1VBL5010E	A
Control Cable	Okonite	1VBL5010D	A
Control Cable	Okonite	1VBL5021C	A
Control Cable	Okonite	1VBQ5013D	A
Control Cable	Okonite	1VBT0001F	A
Control Cable	Okonite	1VBT0001G	A
Control Cable	Okonite	1VBT0001H	A

APPENDIX (continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Control Cable	Okonite	1VBL5011E	A
Control Cable	Okonite	1VBL5011D	A
Control Cable	Okonite	1VBL1022C	A
Control Cable	Okonite	1VBQ5015D	A
Control Cable	Okonite	1VBL5012E	A
Control Cable	Okonite	1VBL5012D	A
Control Cable	Okonite	1VBL5023C	A
Control Cable	Okonite	1VBQ5017E	A
Control Cable	Okonite	1VAL5045B	A
Control Cable	Okonite	1VAQ5013B	A
Control Cable	Okonite	1VXR5008A	A
Control Cable	Okonite	1VAL5046B	A
Control Cable	Okonite	1VAQ5015B	A
Control Cable	Okonite	1VXR5008B	A
Control Cable	Okonite	1VAL5047B	A
Control Cable	Okonite	1VAQ5017B	A
Control Cable	Okonite	1VXR5008C	A
Control Cable	Okonite	1VBL5021B	A
Control Cable	Okonite	1VBQ5013E	A
Control Cable	Okonite	1VBL5022B	A
Control Cable	Okonite	1VBQ5015E	A
Control Cable	Okonite	1VBL5023B	A
Control Cable	Okonite	1VBQ5017E	A
Control Cable	Okonite	1VAL5003B	A

Equipment Description	Manufacturer	Component No.	Deficiency
Control Cable	Okonite	1VAQ5011A	A
Control Cable	Okonite	1VXR5007B	A
Control Cable	Okonite	1VBL5007B	A
Control Cable	Okonite	1VBQ5013B	A
Control Cable	Okonite	1VYR5033E	A
Control Cable	Okonite	1VAL5004C	A
Control Cable	Okonite	1VAQ5010D	A
Control Cable	Okonite	1VBL5005C	A
Control Cable	Okonite	1VBQ5011B	A
Control Cable	Okonite	1VXKJ183C	A
Control Cable	Okonite	1VXKJ183D	A
Control Cable	Okonite	1VXKJ183G	A
Control Cable	Okonite	1VXKJ183H	A
Instrument Cable	Boston Insulated Wire	1VYR5064A	A
Instrument Cable	Boston Insulated Wire	1VYR5064B	A
14-in. Motor-Operated Stop-Check Globe Valve	Limitorque	Q1N21V001A-B	A
14-in. Motor-Operated Stop-Check Globe Valve	Limitorque	Q1N21V001B-B	A
14-in. Motor-Operated Stop-Check Globe Valve	Limitorque	Q1N21V001C-B	A
Control Cable	Okonite	1VAL5120A	A
Control Cable	Okonite	1VAL5120B	A
Control Cable	Okonite	1VAL5120C	A

0053809

Equipment Description	Manufacturer	Component No.	Deficiency
Control Cable	Okonite	1VAL5120D	A
Control Cable	Okonite	1VBLE0072A	A
Control Cable	Okonite	1VBLE0007	A
Control Cable	Okonite	1VBLE5092C	A
Control Cable	Okonite	1VBFV-K2A	A
Control Cable	Okonite	1VBFV-K3A	A
Control Cable	Okonite	1VBFV-L2A	A
Power Cable	Okonite	1VBFV-K2Q	A
Power Cable	Okonite	1VBFV-K3Q	A
Power Cable	Okonite	1VBFV-L2Q	A
4-in. Motor-Operated Stop-Check Globe Valve	Limitorque	Q1N23V011A	A
4-in. Motor-Operated Stop-Check Globe Valve	Limitorque	Q1N23V011B	A
4-in. Motor-Operated Stop-Check Globe Valve	Limitorque	Q1N23V011C	A
Power Cable	Okonite	1VAFU-U4Q	A
Power Cable	Okonite	1VAFU-U5Q	A
Power Cable	Okonite	1VAFU-I2Q	A
Control Cable	Okonite	1VAFU-U4A	A
Control Cable	Okonite	1VAFU-U4D	A
Control Cable	Okonite	1VAFU-U5A	A
Control Cable	Okonite	1VAFU-U5D	A
Control Cable	Okonite	1VAFU-I2A	A
Control Cable	Okonite	1VAFU-I2D	A

Equipment Description	Manufacturer	Component No	Deficiency
Control Cable	Okonite	1VAL5007B	A
Control Cable	Okonite	1VAL5008B	A
Control Cable	Okonite	1VAL5009B	A
Control Cable	Okonite	1VAQ5010E	A
Control Cable	Okonite	1VAQ5010K	A
Control Cable	Okonite	1VAQ5012E	A
Control Cable	Okonite	1VAQ5012K	A
Control Cable	Okonite	1VAQ5014E	A
Control Cable	Okonite	1VAQ5014K	A
Control Cable	Okonite	1VXR5007K	A
Control Cable	Okonite	1VXR5007L	A
Control Cable	Okonite	1VXR5007M	A
Control Cable	Okonite	1VAL5013C	A
Control Cable	Okonite	1VAL5014C	A
Control Cable	Okonite	1VAL5015C	A
Control Cable	Okonite	1VAQ5048H	A
Control Cable	Okonite	1VAQ50-8K	A
Control Cable	Okonite	1VAQ5006C	A
Control Cable	Okonite	1VAQ5006H	A
Control Cable	Okonite	1VAQ5006K	A
Control Cable	Okonite	1VAQ5008H	A
Control Cable	Okonite	1VXR5007G	A
Control Cable	Okonite	1VXR5007H	A
Control Cable	Okonite	1VXR5007J	A

0053811

APPENDIX A (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Instrument Cable	Boston Insulated Wire	1VAL5007C	A
Instrument Cable	Boston Insulated Wire	1VAL5008C	A
Instrument Cable	Boston Insulated Wire	1VAL5009C	A
Instrument Cable	Boston Insulated Wire	1VAL5013D	A
Instrument Cable	Boston Insulated Wire	1VAL5014D	A
Instrument Cable	Boston Insulated Wire	1VAL5015D	A
Control Cable	Okonite	1VAL5076A	A
Control Cable	Okonite	1VAL5077A	A
Control Cable	Okonite	1VAL5078A	A
Control Cable	Okonite	1VAQ5030F	A
Control Cable	Okonite	1VAQ5031E	A
Control Cable	Okonite	1VAQ5032E	A
Control Cable	Okonite	1VXR5008G	A
Control Cable	Okonite	1VXR5009H	A
Control Cable	Okonite	1VXR500BJ	A

Safety-Related Systems List¹

Function	System
Emergency Reactor Shutdown	Reactor Protection
	Engineered Safeguards Actuation
	Reactor Coolant
	Chemical and Volume Control
Containment Isolation	Main Feedwater and Condensate
	Auxiliary Feedwater
	Main and Auxiliary Steam
	Residual Heat Removal
	Chemical Injection
	Chemical and Volume Control
	Liquid Waste Disposal
	Component Cooling Water
	Service Water
	Containment Spray
	Sampling
	Containment Cooling and Purge
	Reactor Core Cooling
Safeguards System, RHR/LHSI	

¹The NRC staff recognized that there are differences in nomenclature of systems because of plant vintage and engineering design, consequently, some systems performing identical or similar functions may have different names. In those instances, it was necessary to verify the function of the system(s) with the responsible IE regional reviewer and/or the licensee.

Function	System
Containment Heat Removal	Containment Spray Containment Cooling Air Purge Residual Heat Removal ¹
Core Residual Heat Removal	Auxiliary Feedwater Main Feedwater and Condensate Main Steam Residual Heat Removal ¹ Component Cooling Water Service Water Chemical and Volume Control
Prevention of Significant Release of Radioactive Material to Environment	Containment Spray (Iodine Removal) Containment Post-LOCA Air Mixing Reactor Cavity Post-LOCA Dilution Hydrogen Recombiner Radiation Monitoring Sampling
Supporting Systems	Emergency Power Control Room Habitability Safety Equipment Area Ventilation

¹Only equipment required to achieve hot shutdown following an accident is included in the master list submitted by licensee. Cold shutdown equipment is to be addressed later.

The Foxboro Company

Foxboro, MA 02035 U.S.A.
(617) 543-8750

12 March 1981

Partial Deficiency Affecting Foxboro Transmitters,
Model Numbers N-E11, N-E13 or E11, E13 with suffix
/MCA, /MCA/RRW, or /MCA/RR

Gentle:

Our records indicate that you have received one or more of the Foxboro model numbers transmitters listed above. This letter is to notify you that two deficiencies have been discovered in some of these transmitters which may exist in the units shipped to you. The transmitters in question operate at a normal level of 10-50mA. Similar model numbered units operating at 4-20mA are not affected.

The first issue involves the possible use of incorrect insulating sleeving on transistor and zener diode lead wires in the amplifier. The second issue involves the use of a specific vendor's capacitor which is not hermetically sealed (although claimed to be so). As a result, the capacitor electrolyte can leak under adverse service conditions, specifically heat and time. The failure mode is a decrease in resistance across the capacitor resulting in electrical leakage. Transmitter operation can be affected by limiting the output to something less than full value which, in time, can degrade to no output at all.

Insulating Sleeving - Radiation resistant sleeving consisting of a silicone coated glass fiber braid has been substituted by a teflon sleeving in some transmitters. Tests have shown that teflon will become brittle and deteriorate with a substantial integrated radiation dose. Foxboro testing has demonstrated that the teflon sleeving used in these devices will withstand an integrated dose of 10 megarads with no noticeable deterioration. Tests to 200 megarads produce the brittle conditions which can result in the teflon flaking from the wires. Based on these tests, operating plants not expected to exceed an integrated dose of 10 megarads have no potential problem and no action is required.

Where the integrated dose rate could exceed 10 megarads, then units in service should be inspected to determine if the proper insulating material has been used. This can be accomplished by opening the transmitter in accordance with Foxboro Master Instruction MI 40-145. The amplifier cover must be removed exposing the amplifier assembly. At one end of the assembly, a transistor and a zener diode are mounted in the base casting which serves as a heat sink. The insulating material in question is a sleeving slipped over the lead wires from these two components. The proper material is white and heavy looking. Positive

FOXBORO
CORPORATION

Subject:

identification can be made by inspecting one end of the material to establish that the outer material covers an inner braid. Teflon, if used, will be a single layer material and could be either clear or white.

If improper insulation is present, then the corrective action is to replace the amplifier (Foxboro P/N N0148PW). Replacement amplifiers can be purchased from your local Foxboro Sales or Service Representatives. If you prefer to have Foxboro Service Personnel inspect the equipment and, if necessary, replace the amplifier, this can be arranged at standard service rates.

Capacitor - The capacitor degradation problem was discovered over time through tracking failure situations. Internal corrective action has been taken to remove the vendor involved from the qualified vendor list and to purge all stock of capacitors from this vendor. Degradation of this capacitor is a function of time and service conditions with heat being a primary contributor. This phenomenon was observed in recent tests of transmitters using these capacitors. The capacitor in question is manufactured by Cornell-Duebiller and can be specifically identified by a type number in the form TX-65-XXXX as well as a monogram in a box followed by a date code, e.g. CDE 0874. It is assigned Foxboro part number N0141MF.

To determine if this capacitor is present requires a visual inspection of the amplifier which can be accomplished as described above for the insulating sleeving inspection. The recommended corrective action should the above described capacitor be present is to replace the amplifier (Foxboro P/N N0148PW) although it is possible to replace the capacitor with a Foxboro provided substitute. Use of Foxboro Service personnel to perform the inspection and replacement, if necessary, can be arranged at standard service rates as described above.

Due to lack of knowledge of specific application, redundancy, and the like, Foxboro cannot determine if the NRC reporting requirements of 10CFR Part 21 are applicable. This determination is the responsibility of the user and any such reporting would be made by them after completing their evaluation of the situation.

If you have any questions regarding the above, please contact the undersigned directly.

Very truly yours,

THE FOXBORO COMPANY

W Calder
William Calder, Manager
Corporate Quality Assurance

joy
120381

Enclosure MI 20-145

FOXBORO

0053816

ENVIRONMENTAL QUALIFICATION OF SAFETY-RELATED
ELECTRICAL EQUIPMENT
IEB 79-01B

TECHNICAL EVALUATION REPORT

DOCKET NO. 57-348

PLANT: Joseph M. Farley Nuclear Plant, Unit 1

DATED: December 10, 1980

REVISION 1

Licensee: Alabama Power Company

Type Reactor: Pressurized Water Reactor

Prepared by: N. I. ... weather
N. I. ...

Engineering Support Section No. 1
Reactor Construction and Engineering
Support Branch, RII

~~810605 000 3~~

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Attachment 2	List of Standard Systems
Attachment 3	List of Documents That Support Environmental Qualifica- tion of Licensee's Equipment
Attachment 4	Outstanding Items (Licensee Identified)

1. INTRODUCTION

1.1 General

The NRC Office of Inspection and Enforcement (I/E) issued Bulletin 79-01B, "Environmental Qualification of Class 1E Equipment" in January 1980. This bulletin required the licensee to perform a detailed evaluation of the environmental qualification on Class 1E electrical equipment required to function under postulated accident conditions and to submit a report on this action.

This document is a report on the evaluation of the licensee's response to this bulletin.

2. BACKGROUND AND DISCUSSION

2.1 General

The evaluation of the licensee's response was accomplished by examining the licensee's report for completeness and technical accuracy. The licensee's report used in this evaluation is dated November 12, 1980, and includes the responses to the Bulletin Supplements with the exception of I/E Supplement No. 3 issued on October 24, 1980.

2.2 On-Site Inspections

The on-site inspection, made on selected IE equipment, verified proper installation of equipment, overall interface integrity, location with respect to flood level for equipment inside the containment, and manufacturers nameplate data. The manufacturer and model number from the nameplate data was compared to information given in the Component Evaluation Work Sheets (CES) to the licensee's report. Ri

Components that were examined during the field inspection are identified by an asterisk (*) in Attachment 1. If any discrepancies were noted between the installed equipment and the correspondent equipment addressed in the licensee's report, they are discussed in Section 4 of this report. The site inspection is documented by IE report number 50-348/80-38. Ri

2.3 Evaluation of Licensee's Report

Each component as addressed on the Component Evaluation Work Sheets (CES) of the licensee's report was examined for completeness and accuracy to the criteria given in the bulletin. This examination assumed qualification documents (analysis, test reports, etc.) referenced by the licensee in their submittal are acceptable.

The results of this examination are documented in Attachment 1. The CES page numbers in column 1 of Attachment 1 is the same CES page found in the licensee's report.

3. GENERAL INFORMATION

3.1 Identification Of Class 1E Electrical Equipment

The licensee's list of systems was compared to the systems listed on Attachment 2. This list is considered to be a standard list for pressurized water reactors.

It is recognized that there are differences in nomenclature of systems because of plant vintage and engineering design, therefore, many of these systems may not exist for Farley Unit 1 plant or the function of these systems for the Farley Unit 1 plant may be performed by comparable systems with different names. In any case, all the systems of Attachment 2 were not addressed or listed in the licensee's report. To insure completeness and uniformity of reports of similar design, it is considered that the licensee should address the following systems:

- (1) Steam Dump
- (2) Containment Sump.

Each of the above systems should be analyzed and a brief discussion should explain how the system was addressed or why it was excluded from the report. For example: "Reactor Protection System - This is a

valid system designation at Farley Unit 1 plant; however, the input signals to this system are obtained from various components in other systems that are included in this report."

3.2 Service Conditions

The service condition accident environment, HELB/LOCA inside containment and HELB outside containment are indicated or discussed in the licensee's report.

3.3 Qualification Documentation

Attachment 3 is a list of documents (test reports, analysis, letters, etc.) used by the licensee in determining the environmental qualification of plant equipment for Farley Unit 1. These references have been tabulated by the licensee and are indicated on the applicable CES of their report.

4. EQUIPMENT DATA REVIEW

4.1 Equipment that is considered to meet IEB 79-01B requirements are categorized as 1 in the last column of Attachment 1.

4.2 Equipment whose qualified life (Aging) is less than the life of the plant is categorized as 2 in the last column of Attachment 1.

- 4.3 The licensee has identified specific equipment which has been or is being replaced, modified or relocated as a result of their IEB 79-01B efforts. This equipment is categorized as 3 in the last column of Attachment 1.
- 4.4. Equipment whose qualification is unresolved (such as, a qualification record search is still in process, tests are scheduled to determine qualification, additional information is needed by the NRC reviewer to satisfy him that equipment is qualified, etc.) is categorized as 4 in the last column of Attachment 1.
- 4.5 Equipment that the licensee has identified as not being qualified required an LER with justification for continued plant operation.

No LER's were received in Region II for Farley 1.

- 4.6 Equipment whose qualification (Aging exempted to a certain degree - see DOR guideline Section 4) is unresolved, as identified by the licensee is listed in Attachment 4 as Outstanding Items.

The licensee has provided justification for continued plant operation for many, if not all, of these outstanding items in their report. In many cases, this is provided on their CES or in a special section of the report. In some cases the licensee states that this justification is by Engineering Analysis that are available at their office.

4.7 The components reviewed during the on-site inspection were examined for proper installation, interface integrity, location and manufacturers nameplate data. The manufacturers nameplate data was compared to the information shown in the component evaluation sheets of the licensee's report. The components that contained discrepancies between the actual nameplate data and the licensee's submittal to IEB 79-01B are identified by double asterisks (**) in Attachment 1. However, these have been identified by the licensee as a result of a walkdown program initiated prior to the on-site inspection as indicated in their report, Section C.1.4.

R1

5. CONCLUSIONS

Due to the time constraints imposed by the Commission Memo and Order of 5/23/80 this evaluation is based on the licensee submittal dated November 12, 1980. This licensee's report does not address all items that may be pertinent to Farley Unit 1 plant as a result of IEB 79-01B Bulletin Supplements 2 and 3 issued on 9/30/80 and 10/24/80, respectively. Specifically, information on cold shutdown and TMI Lessons Learned related equipment which is received subsequent to 11/1/80 will be evaluated by EQB of NRR.

The licensee's actions meet the requirements of the Commission Memo and Order of 5/23/80 and justification for continued plant operation with many of the components that have unresolved qualification items is indicated in Section 4.6. Based on the information available, the Region II reviewer

considers that the justification is commensurate for the areas identified, that the proposed corrective action meets requirements of the Commission Memo and Order of 5/23/80, and therefore, plant operation can continue until these items are resolved as committed to by the licensee.

This evaluation is based on the information supplied by the licensee in their submittal, their FSAR, and the assumption that the Qualification Documents (Test Reports, Analysis, Letter, etc.) are acceptable.

The results of this evaluation does not necessarily imply that the equipment is unreliable, unsafe or represents a significant safety issue; it does imply that additional information is required. This is indicated by the applicable categorization indicated in the last column of Attachment 1.

00558000

PAL. 110
SIST. 4
FBI
AMX. 51-170

ATTACHMENT I
FOR ISB 72-018
TKR

PAGE 1 of 2

CRS. P. No. No.	Equip. I. D. No.	Genetic Mark	Accid. Profile	Qual. Profile		Qual. Method		Licenses Action	Outstanding Items Submitted by	Category of Item
				inside	outside	Qual. Method	Spray			
1	Q1M135A	SV						yes	L	3*
2	Q1M135B	LS						yes	L	3**
3	Q1M135C	SV						yes	L	3
4	Q1M135D	LS						yes	L	3
5	Q1M135E	SV						yes	L	3*
6	Q1M135F	LS						yes	L	3*
7	Q1M135G	SV						yes	L	3*
8	Q1M135H	LS						yes	L	3*
9	Q1M135I	SV						yes	L	3
10	Q1M135J	LS						yes	L	3
11	Q1M135K	TS/LS						yes	L	1
12	Q1M135L	TS/LS						yes	L	1
13	Q1M135M	TS/LS						yes	L	1

3 - Equipment requires modification (resolution, shielding, etc.)
 4 - Qualification of equipment unqualified
 5 - Testing schedule but not complete
 6 - Reviewer needs additional information
 7 - (Qual. Record search still in process)
 8 - Equipment not qualified
 9 - Item identified to EPA for resolution
 10 - Reviewer not qualified

REVIEWER: Vic Brown 1/60

0033827

Feb 14 #1
 SYSTEM - 0033827

ATTACHMENT 1
 FORM ILE 79-018
 ILE

Ch. Page No.	Equip. I. D. #	Genetic Memo	Acid. Problem	Qual. Problem	Replication Qual.		Qual. Method	Eum. Spray	Accur.	Subs.	Licensee Action		Outstanding Items Identified by	Category of Items
					In. Side	Out side					Replace	Relocate		
C.2.4 16	104889	18.5w	✓									Yes	-	3, **
C.2.4 17	104890	SV	✓									Yes	-	3, **
C.2.4 18	104891	SV	✓									Yes	-	3, **
C.2.4 19	104892	18.5w	✓									Yes	-	3
C.2.4 20	104893	SV	✓									Yes	-	3, **
C.2.4 21	104894	SV	✓									Yes	-	3, **
C.2.4 22	A/18	T.B/38	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	1
C.2.4 23	A/14	T.B/40	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	1
C.2.4 24	104895	T.G/40	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	1
C.2.4 25	T/74	T	✓	P	P	-	✓	P	✓	✓	✓	-	-	2
C.2.4 26	T/75	T	✓	P	P	-	✓	P	✓	✓	✓	-	-	2
C.2.4 27	T/76	T	✓	P	P	-	✓	P	✓	✓	✓	-	-	2

3 - Equipment requires modification (resolution, shielding, etc.)
 4 - Qualification of equipment unresolved
 a) Testing schedule but not complete
 b) Reviewer needs additional information
 c) Qual. Record search still in process
 5 - Equipment not qualified
 6 - Item identified to NPS for resolution

3 - Indicate the item is below the flood level
 ✓ or 3 - Indicate the item is satisfactory
 - or M - Indicate the item is not applicable
 BL - Indicate the item is borrowed, licensee identified
 P - Proprietary
 L - License identified
 N - Reviewer identified
 1 - Item is qualified
 2 - Item is less than 50% of part with licensee testing periodic replacement

REVISED DATE: 02/14/81

PROJECT: FARLEY I
 SYSTEM: MAIN STEAM

ATTACHMENT 1
 FORM 830 79-008
 30M

LES Page No.	Equip. I. D. #	Generic Name	Accd. Possible	Qual. Possible	Part. In. Sched.		Qual. Method	Item Agency	Accur.	Subst.	Maintenance Action		Outstanding Items Identified by	Category of Issue
					Include	Exclude					Replace	Autocare		
5	QIN112S 3369A	LS	✓								Yes	-	L	3, **
6	QIN115V 3369AA	SV	✓								Yes	-	L	3, *
7	QIN115V 2369AC	SV	✓								Yes	-	L	3, *
8	QIN112S 3369A	LS	✓								Yes	-	L	3, *
9	QIN115V 3369BA	SV	✓								Yes	-	L	3
10	QIN115V 3370CC	SV	✓								Yes	-	L	3
11	QIN112S 3369C	LS	✓								Yes	-	L	3
12	QIN115V 3369CA	SV	✓								Yes	-	L	3
13	QIN115V 3369CC	SV	✓								Yes	-	L	3
14	QIN112S 3370A	LS	✓								Yes	-	L	3, **
15	QIN115V 3370AA	SV	✓								Yes	-	L	3, *
16	QIN115V 3370AC	SV	✓								Yes	-	L	3, *

3 - Equipment requires modification (renovation, alteration, etc.)
 4 - Qualification of equipment unreviewed
 a) Testing schedule has not complete
 b) Reviewer needs additional information
 c) Test record search still in process
 5 - Equip not qualified
 6 - Item tied to type for renovation

00013828

PROJECT: FARLEY I
SYSTEM: MAIN STERN

ATTACHMENT 1
FOR RFP 77-018
TAB

PAGE 1 OF 5

EIS Page No.	Equip. I. D. #	Name of Make	Accid. Possible	Qual. Possible	Point of Int. Imp.		Qual. Method	Subst.	Economic Action		Outstanding Items Identified by	Category of Items
					Structure	Location			Replace	Migrate		
5	QVNHZ V69EE	LS	✓		-	-		-	Yes	-	L	3,*,*
6	QVNHSA V369EE	SV	✓		-	-		-	Yes	-	L	3,*,*
7	QVNHSA V369AC	SV	✓		-	-		-	Yes	-	L	3,*,*
8	QVNHSA V369A	LS	✓		-	-		-	Yes	-	L	3
9	QVNHSA V369BA	SV	✓		-	-		-	Yes	-	L	3
10	QVNHSA V370BC	SV	✓		-	-		-	Yes	-	L	3
11	QVNHSA V369C	LS	✓		-	-		-	Yes	-	L	3
12	QVNHSA V369CA	SV	✓		-	-		-	Yes	-	L	3
13	QVNHSA V369CC	SV	✓		-	-		-	Yes	-	L	3
14	QVNHSA V370A	LS	✓		-	-		-	Yes	-	L	3,*,*
15	QVNHSA V370AR	SV	✓		-	-		-	Yes	-	L	3,*,*
16	QVNHSA V370AC	SV	✓		-	-		-	Yes	-	L	3,*,*

3 = Equipment requires modification (renovation, alteration, etc.)
 4 = Qualification of equipment unmet
 a) Testing schedule but not complete
 b) Reviewer needs additional information
 c) Test record search still in process
 5 = Equip. not qualified
 6 = Item listed to RFP for resolution

05
03
02
01

PAGE 1 OF 1

ATTACHMENT 1
FORM IEN 79-018
TUR

Facility: Fairley
System: Main F. 2nd

Chk. No.	Equip. I. D. #	Generic Name	Accid. Profile	Qual. Profile	Mediating Qual. Control		Qual. Method	Chem. Spray	Accur.	Subst.	Li. enter Action		Outstanding Items Identified by	Category of Items
					Inside	Outside					Replace	Relocate		
2	Q121V	N10V	✓	✓	-	✓	✓	✓	-	-	-	-	-	1, *
3	Q121V	N10V	✓	✓	-	✓	✓	✓	-	-	-	-	-	1, *
4	Q121V	M01V	✓	✓	-	✓	✓	✓	-	-	-	-	-	1, *
5	Q121V	LS	✓	✓	-	✓	✓	✓	✓	-	-	-	-	1, *
6	Q121V	LS	✓	✓	-	✓	✓	✓	✓	-	-	-	-	1, *
7	Q121V	LS	✓	✓	-	✓	✓	✓	✓	-	-	-	-	1, *
8	Q121V	LS	✓	✓	-	✓	✓	✓	✓	-	-	-	-	1, *
9	Q121V	LS	✓	✓	-	✓	✓	✓	✓	-	-	-	-	1, *
10	Q121V	LS	✓	✓	-	✓	✓	✓	✓	-	-	-	-	1, *
11	Q121V	700B	✓	✓	-	✓	✓	✓	✓	-	-	-	-	1, *
12	R22	CCU	✓	✓	-	✓	✓	✓	✓	-	-	-	-	1, *

3 - Equipment requires modification (resolution, shielding, etc.)
 4 - Qualification of equipment unresolved
 a) Testing schedule but not complete
 b) Reviewer needs additional information
 c) Qual. Record search still in process
 5 - Equipment not qualified
 6 - Item identified to SQB for resolution

9 - Indicate the item is below the flood level
 ✓ or 5 - Indicate the item is satisfactory
 - or N - Indicate the item is Not Applicable
 UL - Indicate the item is Unresolved, Licensee Identified
 P - Proprietary
 L - Licensee Identified
 R - Reviewer Identified
 1 - Equipment to be qualified
 2 - Item to be less than life -- plant with licensee indicating periodic replacement

REVISIONS 1/2/80 DATE

Facility: Forky 1
 System: Aux Excl w/rt. (Aux Fw)

ATTACHMENT I
 FORM NEW 78-018
 12M

EIS. Page No.	Equip. I. D.	Genetic Name	Accid. Profile	Qual. Profile	Magnification Qual. (Contamination)		Qual. Method	Chum. Spray	Accur.	Subst.	Lic. New Action		Outstanding Items Identified by	Cat. of Items
					Inside	Outside					Replace	Malaceto		
4	Q1023 V011A	MOV	L	L	-	✓	L	-	-	-	-	-	-	1, *
5	Q1025 V011B	MOV	L	L	-	✓	L	-	-	-	-	-	-	1, * R1
6	Q1023 V011C	MOV	L	L	-	✓	L	-	-	-	-	-	-	1, * R1
7	Q1023 E3 3228A	Limit SW	L	3	-	3	3	-	-	-	-	L	-	3, ** R1
8	Q1023 SV 3228A	SV Limit SW	L	3	-	3	3	-	-	-	-	L	-	3, * R1
9	Q1023 E3 3228A	Limit SW	L	3	-	3	3	-	-	-	-	L	-	3, * R1
10	Q1023 SV 3228A	SV Limit SW	L	3	-	3	3	-	-	-	-	L	-	3, * R1
11	Q1023 SV 3228A	Limit SW	L	3	-	3	3	-	-	-	-	L	-	3, * R1
12	Q1023 SV 3228A	SV Limit SW	L	3	-	3	3	-	-	-	-	L	-	3, ** R1
13	Q1023 E3 3227A	Limit SW	L	3	-	3	3	-	-	-	-	L	-	3, * R1
14	Q1023 SV 3227A	SV Limit SW	L	3	-	3	3	-	-	-	-	L	-	3, ** R1
15	Q1023 E3 3227B	Limit SW	L	3	-	3	3	-	-	-	-	L	-	3, * R1

1 - Indicate the item to below the flood level
 2 - Indicate the item to satisfactory
 3 - Indicate the item to not applicable
 4 - Indicate the item is unresolved, license identified
 5 - upstator
 6 - license identified
 7 - license identified
 8 - equipment in qualified
 9 - to less than life of plant with license
 10 - testing periodic replacement
 11 - Equipment requires qualification (renovation, shielding, etc.)
 12 - Qualification of equipment unresolved
 13 - Testing schedule but not complete
 14 - Reviewer needs additional information
 15 - Qual. Record search still in process
 16 - Equipment not qualified
 17 - Item identified to EIS for resolution

REVISOR: M. D. ... DATE: ...

0053831

ENVIRONMENTAL QUALIFICATION OF SAFETY-RELATED
ELECTRICAL EQUIPMENT
EEL 79-0...

TECHNICAL EVALUATION REPORT
DOCKET NO. 50-348
PLANT: Joseph M. Farley Nuclear Plant, Unit 1
DATED: November 14, 1980

Licensee: Alabama Power Company

Type Reactor: Pressurized Water Reactor

Prepared by: N. Merriweather

N. Merriweather
N. Merriweather

Engineering Support Section No. 1
Reactor Construction and Engineering
Support Branch, RII

8106050004

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Attachment 2	List of Standard Systems
Attachment 3	List of Documents That Support Environmental Qualifica- tion of Licensee's Equipment
Attachment 4	Outstanding Items (Licensee Identified)

1. INTRODUCTION

1.1 General

The NRC Office of Inspection and Enforcement (I/E) issued Bulletin 79-01B, "Environmental Qualification of Class 1E Equipment" in January 1980. This bulletin required the licensee to perform a detailed evaluation of the environmental qualification on Class 1E electrical equipment required to function under postulated accident conditions and to submit a report on this action.

This document is a report on the evaluation of the licensee's response to this bulletin.

2. BACKGROUND AND DISCUSSION

2.1 General

The evaluation of the licensee's response was accomplished by examining the licensee's report for completeness and technical accuracy. The licensee's report used in this evaluation is dated November 12, 1980, and includes the responses to the Bulletin Supplements with the exception of I/E Supplement No. 3 issued on October 24, 1980.

2.2 On-Site Inspections

Inspection that will be examined during the field inspection scheduled for the first part of December will be identified in Revision 1 to the TER.

2.3 Evaluation of Licensee's Report

Each component as addressed on the Component Evaluation Work Sheets (CES) of the licensee's report was examined for completeness and accuracy to the criteria given in the bulletin. This examination assumed qualification documents (analysis, test reports, etc.) referenced by the licensee in their submittal are acceptable.

The results of this examination are documented in Attachment 1. The CES page number in column 1 of Attachment 1 is the same CES page found in the licensee's report.

3. GENERAL INFORMATION

3.1 Identification Of Class 1E Electrical Equipment

The licensee's list of systems was compared to the systems listed on Attachment 2. This list is considered to be a standard list for pressurized water reactors.

It is recognized that there are differences in nomenclature of systems because of plant vintage and engineering design. therefore, many of these systems may not exist for Farley Unit 1 plant or the function of these systems for the Farley Unit 1 plant may be performed by comparable systems with different names. In any case, all the systems of Attachment 2 were not addressed or listed in the licensee's report. To insure completeness and uniformity of reports of similar design, it is considered that the licensee should address the following systems:

- (1) Steam Dump
- (2) Containment Sump.

Each of the above systems should be analyzed and a brief discussion should explain how the system was addressed or why it was excluded from the report. For example: "Reactor Protection System - This is a valid system designation at Farley Unit 1 plant; however, the input signals to this system are obtained from various components in other systems that are included in this report."

3.2 Service Conditions

The service condition accident environment, HELB/LOCA inside containment and HELB outside containment are indicated or discussed in the licensee's report.

3.3 Qualification Documentation

Attachment 3 is a list of documents (test reports, analysis, letters, etc.) used by the licensee in determining the environmental qualification of plant equipment for Parley Unit 1. These references have been tabulated by the licensee and are indicated on the applicable CES of their report.

4. EQUIPMENT DATA REVIEW

- 4.1 Equipment that is considered to meet IEB 79-01B requirements are categorized as 1 in the last column of Attachment 1.
- 4.2 Equipment whose qualified life (Aging) is less than the life of the plant is categorized as 2 in the last column of Attachment 1.
- 4.3 The licensee has identified specific equipment which has been or is being replaced, modified or relocated as a result of their IEB 79-01B efforts. This equipment is categorized as 3 in the last column of Attachment 1.
- 4.4. Equipment whose qualification is unresolved (such as, a qualification record search is still in process, tests are scheduled to determine qualification, additional information is needed by the NRC reviewer to satisfy him that equipment is qualified, etc.) is categorized as 4 in the last column of Attachment 1.

- 4.5 Equipment that the licensee has identified as not being qualified required an LER with justification for continued plant operation.

No LER's were received in Region II for Farley 1.

- 4.6 Equipment whose qualification (Aging exempted to a certain degree - see DOR guideline Section 4) is unresolved, as identified by the licensee is listed in Attachment 4 as Outstanding Items.

The licensee has provided justification for continued plant operation for many, if not all, of these outstanding items in their report. In many cases, this is provided on their CES or in a special section of the report. In some cases the licensee states that this justification is by Engineering Analysis that are available at their office.

- 4.7 A discussion of the equipment examined during the onsite inspection will be addressed in Revision 1.

5. CONCLUSIONS

Due to the time constraints imposed by the Commission Memo and Order of 5/23/80 this evaluation is based on the licensee submittal dated November 12, 1980. This licensee's report does not address all items that may be pertinent to Farley Unit 1 plant as a result of IEB 79-01B Bulletin Supplements 2 and 3 issued on 9/30/80 and 10/24/80, respectively. Specifically, information on cold shutdown and Lessons Learned related equipment which is received subsequent to 11/1/80 will be evaluated by EQB of NRR.

The licensee's actions meet the requirements of the Commission Memo and Order of 5/23/80 and justification for continued plant operation with many of the components that have unresolved qualification items is indicated in Section 4.0. Based on the information available, the Region II reviewer considers that the justification is commensurate for the areas identified, that the proposed corrective action meets requirements of the Commission Memo and Order of 5/23/80, and therefore, plant operation can continue until these items are resolved as committed to by the licensee.

This evaluation is based on the information supplied by the licensee in their submittal, their FSAR, and the assumption that the Qualification Documents (Test Reports, Analysis, Letter, etc.) are acceptable.

The results of this evaluation does not necessarily imply that the equipment is unreliable, unsafe or represents a significant safety issue; it does imply that additional information is required. This is indicated by the applicable categorization indicated in the last column of Attachment 1.

0053839

EARLEY I

10/1/58

ATTENTION
Form No. 74-01a
120

PAGE 1 OF 2

Case Page No.	Equip. No.	Location	Status	Part. No.	Part. on Equip.		Spec. Method	Thru. Copy	Acct.	Subj.	Effective Action		Outstanding Items Identified by	Category of Item
					in file	not in file					Suppl.	Accelerate		
2	V1813	RTD	✓	P	P	-	P	P	P	✓	-	-	-	/
3	TE 428	RTD	✓	P	P	-	P	P	P	✓	-	-	-	/
4	V1813	RTD	✓	P	P	-	P	P	P	✓	-	-	-	/
5	TE 428	RTD	✓	P	P	-	P	P	P	✓	-	-	-	/
6	V1813	RTD	✓	P	P	-	P	P	P	✓	-	-	-	/
7	TE 428	RTD	✓	P	P	-	P	P	P	✓	-	-	-	/
8	V1813	RTD	✓	✓	✓	-	✓	✓	✓	✓	-	-	-	/
9	TE 428	RTD	✓	✓	✓	-	✓	✓	✓	✓	-	-	-	/
10	TB/36		✓	✓	✓	-	✓	✓	✓	✓	-	-	-	/
11	TB/36		✓	✓	✓	-	✓	✓	✓	✓	-	-	-	/
12	TB/36		✓	✓	✓	-	✓	✓	✓	✓	-	-	-	/
13	TB/36		✓	✓	✓	-	✓	✓	✓	✓	-	-	-	/

- 1 - Equipment requires maintenance (overhaul, etc.)
- 2 - Qualification of personnel unclassified
- 3 - Working schedule but not complete
- 4 - Review needs additional information
- 5 - Total record not still in process
- 6 - Item still in process

Source Identified

10/1/58

10/1/58

533839

FAKLEY I

1. 1/2/71 to 1/2/71

AT 1000000000
 SUB 100 19-010
 100

Case No.	Equip. I. No.	Equip. Name	Std. All.	Prod. Facility	Part of Equip. (P. or S.)		Spec. Method	Spec. Spray	Mount.	Subst.	Electronic Action		Interlocking Items Identified by	Category of Item
					u. Sub.	Sub. side.					Keyf. u.	Calculate		
2	V1813	RTD	✓	P	-	-	P	P	P	✓	-	-	-	/
3	TE 4128	RTD	✓	P	-	-	P	P	P	✓	-	-	-	/
4	N1813	RTD	✓	P	-	-	P	P	P	✓	-	-	-	/
5	TE 4128	RTD	✓	P	-	-	P	P	P	✓	-	-	-	/
6	V1813	RTD	✓	P	-	-	P	P	P	✓	-	-	-	/
7	TE 4320	RTD	✓	P	-	-	P	P	P	✓	-	-	-	/
8	11T8001	TB/36	✓	✓	-	-	✓	✓	-	B	-	-	-	/
9	11T8002	TB/36	✓	✓	-	-	✓	✓	-	B	-	-	-	/
10	21T8003	TB/36	✓	✓	-	-	✓	✓	-	B	-	-	-	/
11	11T8004	TB/36	✓	✓	-	-	✓	✓	-	B	-	-	-	/
12	11T8005	TB/36	✓	✓	-	-	✓	✓	-	B	-	-	-	/
13	11T8006	TB/36	✓	✓	-	-	✓	✓	-	B	-	-	-	/

3 - Equipment requires maintenance. (See for details, see sheet 19-A, etc.)
 A - Qualification of equipment unreviewed
 B - Testing schedule but not complete
 C - Working needs additional instructions
 D - Good, tested OK, still in process
 E - Item 1 qualified
 F - Item 2 qualified for resolution

1 - Under the review
 2 - Under the review
 3 - Under the review
 4 - Under the review
 5 - Under the review
 6 - Under the review
 7 - Under the review
 8 - Under the review
 9 - Under the review
 10 - Under the review
 11 - Under the review
 12 - Under the review
 13 - Under the review

0053840

0053840
 0053840
 0053840

AT 3/24/80
 Form 310 79-018
 USE

PAGE 2 of 2

Page No.	E. P. No.	Agency Name	State	Qual. Facility	Pollution Control		Spec. Method	Spec. Agency	Status	Subst.	License Action		Outstanding Items Identified by	Category of Items
					Subst.	Other					Revoke	Renew		
14	71758	EPA	✓	✓	✓	-	✓	✓	-	✓	-	-	-	/
14	71752	EPA	✓	✓	✓	-	✓	✓	-	✓	-	-	-	/
14	71752	EPA	✓	✓	✓	-	✓	✓	-	✓	-	-	-	/
15	71711	INDSTR. TABLE	✓	✓	✓	-	✓	✓	-	✓	-	-	-	/

1 - Indicate the item to show the final level
 2 - Indicate the item to show the final level
 3 - Equipment requires maintenance, cleaning, etc.
 4 - Qualification of personnel not complete
 5 - Testing schedule not complete
 6 - Review needs state of information
 7 - Record not up to date in process
 8 - Not identified
 9 - Item led to up for revocation

005384

NAME: FARLEY

UNIT: Lt Colonel

FORM 100 19-UBB
25a

Page 1 of 2

No.	Equip. I. D. #	Equip. Name	A. S. D. Problem	Qual. Problem	Fault in Equip. (in this column)		Check Method	Time Spent	Accus.	Status	License Action		Outstanding Items Identified by	Category of Items
					In Use	Outside					replace	rework		
2	N1821	PT	✓	2	P	-	P	P	P	✓	-	-	R	A
3	N1821	PT	✓	2	P	-	P	P	P	✓	-	-	R	Z
4	TE410	RTD	✓	P	P	-	P	P	P	✓	-	-	-	I
5	N1821	RTD	✓	P	P	-	P	P	P	✓	-	-	-	I
6	TE420	RTD	✓	P	P	-	P	P	P	✓	-	-	-	I
7	N1821	RTD	✓	P	P	-	P	P	P	✓	-	-	-	I
8	TE430	RTD	✓	P	P	-	P	P	P	✓	-	-	-	I
9	N1821	RTD	✓	P	P	-	P	P	P	✓	-	-	-	I
10	TE433	TB	✓	✓	✓	-	✓	✓	-	✓	-	-	-	I
11	N1821	TB	✓	✓	✓	-	✓	✓	-	✓	-	-	-	I
12	N1821	TB	✓	✓	✓	-	✓	✓	-	✓	-	-	-	I
13	21TB001	TB	✓	✓	✓	-	✓	✓	-	✓	-	-	-	I

1 - Equipment requires modification (revision, establishment, etc.)
 2 - Identification of equipment manufacturer
 3 - Equipment not complete
 4 - Equipment needs additional information
 5 - Equipment not qualified
 6 - Equipment not tested for resolution

0053842

FARLEY I
 R. Lambert -

A-14 (Rev. 1-1-64)
 Form 170-012
 IBM

PAGE 2 of 3

Job No.	Equip. I. No.	Source Name	Acid Problem	Sp. Problem	Particulate		Qual. Method	Th. M. Spray	Accuf.	Subst.	Emission Action		Outstanding Items Identified by	Category of Item
					In. In.	Outside					Replace	Calibrate		
14	217802	TB	✓	✓	✓	✓	✓	✓	-	B	-	-	-	1
15	217805	TB	✓	✓	✓	✓	✓	✓	-	B	-	-	-	1
16	91752 B012	EPA	✓	✓	✓	✓	✓	✓	-	✓	-	-	-	1
16	91752 B030	EPA	✓	✓	✓	✓	✓	✓	-	✓	-	-	-	1
16	91752 B040	EPA	✓	✓	✓	✓	✓	✓	-	✓	-	-	-	1
17	CABLE Y11	XNSII CABLE	✓	✓	✓	✓	✓	✓	-	✓	-	-	-	1

1 - Equipment requires maintenance (e.g., oiling, whitening, etc.)
 2 - Qualification of a subject not required
 3 - Action not taken but not complete
 4 - Action not taken additional information
 5 - Item is not qualified
 6 - Item is not qualified

0053843

FAK-5
 Subject: -R. Arger

AFIA-UNCLAS I
 RUC NEW IN-USE
 ILM

No.	Equip. I. No.	Acc. No.	Equip. Title	Serial	Part No.	No. of Items		Qual. Method	Spec. Copy	Accur.	Status	Literature Action		Identifying Items	Category of Items
						Subj.	Other					Replace	Substitute		
6	Q1B31S VB047	SV	✓								B	Yes	-	L	3
7	NI831Z X9047	LS	✓	48		✓		✓			B	-	N ₀	R	48
8	PT52 B022	EP ₁	✓			✓		✓			✓	-	-	-	1
9	PT52 B038	EP ₁	✓			✓		✓			✓	-	-	-	1
10	NI831S VB047	T ₁ J ₁	✓			✓		✓			B	-	N ₀	-	1
11	Q1B31 LT459	LT	✓	2		P		P		P	✓	-	-	R	2
12	Q1B31 LT460	LT	✓	2		P		P		P	✓	-	-	R	2
13	Q1B31 LT461	LT	✓	2		P		P		P	✓	-	-	R	2
14	Q1B31 PT455	PT	✓	P		P		P		P	✓	-	-	-	1
15	Q1B31 PT456	PT	✓	P		P		P		P	✓	-	-	-	1
16	Q1B31 PT457	PT	✓	P		P		P		P	✓	-	-	-	1
17	CABLE Y01	INST. CADD.	✓	✓		✓		✓			✓	-	-	-	1

1 - Equipment requires maintenance (rejection, adjustment, etc.)
 2 - Qualification of equipment necessary.
 3 - Working maintenance but not copy.
 4 - Failure needs additional instruction for
 5 - Record maintenance skills in process
 6 - Not qualified
 7 - Attended to for resolution

0053847

ATTACHMENT 2
FORM ICB 79-018
128

PAGE 2 of 4

Equip. I. D. #	Genetic Name	Accid. Profile	Qual. Profile	Regul. Inj. Dept.		Qual. Method	Chem. Spray	Accur.	Sube.	License Action		Outstanding Items Identified by	Category of Items
				Inside	Outside					Replace	Reallocate		
C.2.7		✓	P	P	-	P	✓	P	✓	-	-	-	3
C.2.8	AT-485	✓	P	P	-	P	✓	P	✓	-	-	-	2
C.2.9	FT-486	✓	P	P	-	P	✓	P	✓	-	-	-	2
C.2.10	AT-487	✓	P	P	-	P	✓	P	✓	-	-	-	2
C.2.11	FT-488	✓	P	P	-	P	✓	P	✓	-	-	-	2
C.2.12	FT-489	✓	P	P	-	P	✓	P	✓	-	-	-	2
C.2.13	FT-490	✓	P	P	-	P	✓	P	✓	-	-	-	2
C.2.14	FT-491	✓	P	P	-	P	✓	P	✓	-	-	-	2
C.2.15	FT-492	✓	P	P	-	P	✓	P	✓	-	-	-	2
C.2.16	FT-493	✓	P	P	-	P	✓	P	✓	-	-	-	2
C.2.17	FT-494	✓	P	P	-	P	✓	P	✓	-	-	-	2
C.2.18	FT-495	✓	P	P	-	P	✓	P	✓	-	-	-	2
C.2.19	FT-496	✓	P	P	-	P	✓	P	✓	-	-	-	2
C.2.20	FT-497	✓	P	P	-	P	✓	P	✓	-	-	-	2
C.2.21	FT-498	✓	P	P	-	P	✓	P	✓	-	-	-	2
C.2.22	FT-499	✓	P	P	-	P	✓	P	✓	-	-	-	2
C.2.23	FT-500	✓	P	P	-	P	✓	P	✓	-	-	-	2

3 - Equipment requires modification (resolution, shielding, etc.)
 4 - Qualification of equipment unresolved
 a) Testing schedule but not complete
 b) Reviewer needs additional information
 c) Qual. Record search still in process
 5 - Equipment not qualified
 6 - Item identified to RQB for resolution

REVIEWER *Boyer* DATE *1/20/80*

3 - Equipment is below the flood level
 4 - Indicates the item is satisfactory
 5 - Indicates the item is not applicable
 6 - Indicates the item is damaged, license identified
 7 - Proprietary
 8 - License identified
 9 - Reviewer identified
 10 - Equipment to be qualified
 11 - Aging in loss the life of plant with license
 12 - Indicating potential replacement

0053848

PROJECT: Fwy 7
 SECTION: Freeway ntrol

ATTACHMENT 1
 FOR ILM 79-018
 TLM

PAGE 4 OF 4

GIS Page No.	Equip. I. D. #	Genert. Name	Acct. Profile	Qual. Profile	Insulation Qual. (contaminant)		Qual. Method	Chem. Spray	Accur.	Subs.	License Action		Outstanding Items Identified by	Category of Items
					Inside	Outside					Replace	Relace		
C.2.4	1070		✓	✓	✓		✓			✓				
41	1071	Eff.			✓									
C.2.4	5028													
41	5030													
C.2.4	Cable	CBL	✓	✓	✓		✓			✓				
42	Cable	CBL	✓	✓	✓		✓			✓				
	Cable	CBL	✓	✓	✓		✓			✓				

B - Indicates the item is before the flood level
 ✓ or S - Indicates the item is satisfactory
 - or N - Indicates the item is not applicable
 1 - Indicates the item is inspected, license identified
 2 - Indicates the item is inspected, license identified
 3 - Equipment requires modification (resolution, etc.)
 4 - Identification of equipment unresolved
 a) Tracking schedule but not complete
 b) Reviewer needs additional information
 5 - Equipment not qualified
 a) Qual. Record needs work still in process
 b) Item identified to ILM for resolution

REVISOR Shy DATE 1/80

6053849

DATE: Feb 21
 BY: J. J. ...

ATTACHMENT 1
 FBI 100-79-018
 TLR

PAGE 1 OF 1

Equip. I.D. #	Equip. Name	Acc. Profile	Registration (Unit #)		Chim. Method	Chim. Spray	Accur.	Subst.	License Action		Inspector Item Identified by	Category of Item
			Inside	Outside					Replace	Relocate		
C-15	...	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
C-15	...	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
C-15	Book	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
C-16	Cable	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
C-16	Cable (S)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1

- 1 - Equipment requires modification (resolution, shield, etc.)
- 2 - Qualification of equipment unresolved
- 3 - Testing schedule not complete
- 4 - Reviewer needs additional information
- 5 - (Post) Record search still in process
- 6 - Equipment not qualified
- 7 - Item identified as type for resolution

Indicate the item to be in the flood level
 Indicate the item is satisfactory
 Indicate the item is not applicable
 Indicate the item is unresolved, license identified
 Proprietary
 License identified
 Reviewer identified
 Equipment to be replaced
 Being in use the life of plant with license indicating periodic replacement

REVISOR: [Signature] 1/20

For the
 Certain
 Carrying Charge

FORM NO. 77-016
 11-68

Item No.	Equip. No.	Name	Accid. Profile	Qual. Profile	Original In-Plant Condition		Qual. Method	Chem. Copy	Actual	Subst.	Emission Action		Identifying System	Category of Item
					Inside	Outside					Replace	Increase		
4	01014	MS	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1
5	01015	MS	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1
6	01016	MS	✓	✓	✓	✓	✓	✓	yes	-	-	L	R	3
7	01017	MS	✓	✓	✓	✓	✓	✓	yes	-	-	L	R	1/4
8	01018	MS	✓	✓	✓	✓	✓	✓	yes	-	-	L	R	3
9	01019	MS	✓	✓	✓	✓	✓	✓	yes	-	-	L	R	1/4
10	01020	MS	✓	✓	✓	✓	✓	✓	yes	-	-	L	R	3
11	01021	MS	✓	✓	✓	✓	✓	✓	yes	-	-	L	R	1/4
12	01022	MS	✓	✓	✓	✓	✓	✓	yes	-	-	L	R	3
13	01023	MS	✓	✓	✓	✓	✓	✓	yes	-	-	L	R	1/4
14	01024	MS	✓	✓	✓	✓	✓	✓	yes	✓	✓	L	R	3
15	01025	MS	✓	✓	✓	✓	✓	✓	yes	✓	✓	L	R	1/4
16	01026	MS	✓	✓	✓	✓	✓	✓	yes	-	-	L	R	3

- Indicate the following in below the flow chart:
- 1 - Indicate the item is satisfactory
 - 2 - Indicate the item is not applicable
 - 3 - Indicate the item is discovered, licensee identified
 - 4 - Indicate the item is discovered, licensee identified
 - 5 - License identified
 - 6 - License identified
 - 7 - Equipment to be replaced
 - 8 - Equipment to be replaced
 - 9 - Equipment to be replaced
 - 10 - Equipment to be replaced
 - 11 - Equipment to be replaced
 - 12 - Equipment to be replaced
 - 13 - Equipment to be replaced
 - 14 - Equipment to be replaced
 - 15 - Equipment to be replaced
 - 16 - Equipment to be replaced

REVIEWER: *[Signature]* 1/16/80

0053851

Facility: Fairley 1

ATTACHMENT 1
FOR 168 79-012
ICR

SYSTEM: Water Treatment Testing of Pumps

PAGE 2 OF 4

CES. Item No.	Equip. I. D. #	Genetic No.	M/C, P. #	Qual. Profile	Regulation (up/down)		Qual. Method	Chem. Spray	Active	Subst.	License Action		Date and Item Identified by	Category of Item
					Inside	Outside					Replac.	Relocate		
17	Q1E122 5377-0	LS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	R	4r
18	Q1E122 5377-0	MTA	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	1
19	Q1E122 5377-0	MTR	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	1
20	Q1E122 5377-0	MTR	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	1
21	Q1E122 5377-0	MTR	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	1
22	Q1E122 5377-0	TA/JS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	1
23	Q1E122 5377-0	EPA	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	1
23	Q1E122 5377-0	EPA	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	1
23	Q1E122 5377-0	EPA	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	1
23	Q1E122 5377-0	EPA	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	1
23	Q1E122 5377-0	EPA	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	1
23	Q1E122 5377-0	EPA	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	1

Code:

- ✓ = Indicated the item is below the flood level
- ✓ = Satisfactory
- ✓ = Indicated the item is not applicable
- ✓ = Indicated the item is unresolved. License identified
- P = Proprietary
- L = License identified
- R = Reviewer identified
- 4 = Equipment is qualified
- 5 = Equipment not qualified
- 6 = Item identified to RHP for resolution

3 = Equipment requires modification (resolution, abetting, etc.)
 4 = Qualification of equipment unresolved
 a) Testing schedule but not complete
 b) Reviewer needs additional information
 c) Qual. Record search still in process
 5 = Equipment not qualified
 6 = Item identified to RHP for resolution

REVIEWER: MSB DATE: 11/6/80

00538853

PAGE 11

SYSTEM

Central

at Colby & Jay

ATTACHMENT 1
FOR IS 79-018
TER

PAGE

4 OF 4

Eqs. Page No.	Equip. I. D. #	Genetic Name	Accid. Profile	Qual. Profile	Maglin Inj. / Opt. Contamination		Qual. Method	Chem. Spray	Accor.	Subm.	License Action		Outstanding Items Identified by	Category of Item
					Inside	Outside					Replace	Substrate		
31	L51	GPL	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
31	R11	GPL	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
31	R21	GPL	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
31	R22	GPL	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
31	R23	GPL	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1

1 - Indicates the item is below the blood level
 2 - Indicates the item is satisfactory
 3 - Indicates the item is Not Applicable
 4 - Indicates the item is Unremoved, License Identified
 5 - Proprietary
 6 - License Identified
 7 - Equipment to qualify
 8 - Equipment to qualify
 9 - Aging is less than life of plant with license
 10 - Aging period, replacement

REVISOR Veronica DATE 1/1/80

FORM 100

Table 1

NEW OPERATOR TRAINING SYSTEM

AT FALCONHILL 1
FHS 128 79-018
TER

PAGE 1 OF 1

Cr. No.	Equip. I. D. #	Generic Name	Accid. Profile	Qual. Profile	Regulation Qual. Compliance		Qual. Method	Chem. Spray	Accur.	Subs.	License Action		Outstanding Items Identified by	Category of Item
					Inside	Outside					Replace	Relocate		
2	41617	FH	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	R167A	...	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
1	41736	EH	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
1	001	EH	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
1	023	EH	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
1	024	EH	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4	042	EH	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
5	J08	CL	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
6	Y31	CL	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Code

1 - Indicates the item is below the flood level
 2 - Indicates the item is satisfactory
 3 - Indicates the item is not applicable
 4 - Indicates the item is removed, license identified
 5 - Proprietary
 6 - License identified
 7 - Reviewer identified
 8 - Equipment is qualified
 9 - Aging in less than life of plant with license indicating periodic replacement
 10 - Equipment requires modification (revision, abiding, etc.)
 11 - Qualification of equipment unsatisfactory
 12 - Testing schedule but not complete
 13 - Reviewer needs additional information
 14 - Qual. Record search still in process
 15 - Equipment not qualified
 16 - Item identified to EOP for resolution

REVISED 1/28/80

005336

DATE: 12/1/72
 SYSTEM: 105/15

ATTACHMENT 1
 FORM 100 79-018
 1EM

PAGE 1 OF 3

Eq. Page No.	Equip. I. D. No.	Monette Model	A. I. No.	Qual. Profile	Major Cmt. Dist.		Qual. Method	Lic. Spray	Accot.	Subm.	License Action		Outstanding Items Identified by	Category of Items
					Inside	Outside					Replace	Relocate		
4	036A	MOV	✓	✓	✓	✓	✓	✓	✓	B	-	-	-	1
5	038B	MOV	✓	✓	✓	✓	✓	✓	✓	B	-	-	-	1
6	038C	MOV	✓	✓	✓	✓	✓	✓	✓	B	-	-	-	1
7	0667	SV	✓	3	3	3	3	3	3	-	Yes	-	L	3
8	0871	Switch	✓	46	✓	✓	46	✓	✓	L	-	-	R	46
9	077A	MOV	✓	✓	✓	✓	✓	✓	✓	B	-	-	-	1
10	0899A	Switch	✓	✓	46	✓	46	✓	✓	B	-	-	R	46
11	0948	SV	✓	3	3	3	3	3	3	-	Yes	-	L	3
12	0825	SW	✓	46	✓	✓	46	✓	✓	B	-	-	R	46
13	0978	SV	✓	3	3	3	3	3	3	-	Yes	-	L	3
14	0976	SW	✓	46	✓	✓	46	✓	✓	B	-	-	R	46
15	0978	SV	✓	3	✓	✓	3	✓	✓	-	Yes	-	L	3

1 - Equipment requires modification (removal, obsolesc. etc.)
 2 - Qualification of equipment unresolved
 3 - Testing schedule but not complete
 4 - Reviewer needs additional information
 5 - Item, record search still in process
 6 - Equipment not qualified
 7 - Item identified to EIP for resolution

REVISOR: 11/1/72

Plant: Fanley 2
 System: CV 25/5

Attachment 1
 Form No 29-018
 11X

Line No.	Equip. I.D. #	Equip. Name	Limit	Qual. Profile	Regulation Qual.		Qual. Method	Chase Spray	Accur.	Subm.	Licenses Action		Outstanding Items Identified by	Category of Issue
					Inside	Outside					Replaco	Revoke		
14	Q1E2E	Limit	4B	L	L	-	4B	-	-	B	-	-	R	46
17	Q1E2I	Limit	4B	L	L	-	4B	-	-	B	-	-	R	45
18	Q1E2I	Limit	4B	L	L	-	4B	-	-	B	-	-	R	46
19	Q1E2I	Limit	L	L	L	-	L	-	-	-	-	-	-	1
20	Q1E2I	Box	L	L	L	-	L	-	-	B	-	-	-	1
21	Q1E2I	Box	L	L	L	-	L	-	-	B	-	-	-	1
22	Q1E2I	Box	L	L	L	-	L	-	-	B	-	-	-	1
23	Q1E2I	FPA	L	L	L	-	L	-	-	-	-	-	-	1
	B014		L	L	L	-	L	-	-	-	-	-	-	
	B014		L	L	L	-	L	-	-	-	-	-	-	
	B014		L	L	L	-	L	-	-	-	-	-	-	
	B017		L	L	L	-	L	-	-	-	-	-	-	

Legend:
 B - indicates the item is below the flood level
 L - indicates the item is satisfactory
 N - indicates the item is not applicable
 UL - indicates the item is unlicensed, license identified
 P - proprietary
 L - license identified
 R - revoker identified
 E - equipment in question
 * - to be less than 1 m of plant with license
 - - - - - testing period, equipment

3 - Equipment requires modification (resolution, shelving, etc.)
 4 - Qualification of equipment uncompleted
 a) Testing schedule not complete
 b) Operator needs additional information
 c) Qual. Record search still in process
 5 - Equipment not qualified
 6 - Item identified to LTB for resolution

REVISED BY: [Signature] DATE: 1/4

0053859

Lot #1 Farley 1
 Serial # 0053859

Form 100-29-01b
 1-8

PAGE 3 OF 3

Eq. No.	Equip. I. D. #	Serial #	Accid. Profile	Qual. Profile	Mag. Inj. Cont. (conf. in hand)		Qual. Method	Vism. Spray	Accid.	Subm.	E.E. Space Action		Outstanding Items Identified by	Category of Items
					Inj. Side	Cont. Side					Replace	Relocate		
23	0151	0151	L	L	L	-	L	L	-	-	L	-	-	I
24	0018	0018	L	L	L	-	L	L	-	-	L	-	-	I
	0018	0018	L	L	L	-	L	L	-	-	L	-	-	I

Code

- 1 - Indicate the I. D. # is below the flood level
- 2 - Indicate the I. D. # is satisfactory
- 3 - Indicate the I. D. # is not applicable
- 4 - Indicate the serial # is unsolved, licensee identified
- 5 - Proprietary
- 6 - Licensee identified
- 7 - Equipment in queue
- 8 - Aging in less than 100% of plant with licensee indicating percentage replacement
- 9 - Equipment requires modification (replacement, shielding, etc.)
- 0 - Qualification of equipment unknown
- 1 - Testing schedule but not complete
- 2 - Reviewer needs additional information
- 3 - Total. Record search still in process
- 4 - Equipment not qualified
- 5 - Item identified as EEP for resolution

REVIEWER: *[Signature]* DATE: 4/7/80

0053859

Form 10-74
 508 100 79-01b
 TLR

FACTORY
 ACTIVATION

508 100 79-01b
 TLR

PAGE 1 OF 1

Equip. I. D.	Constr. Item	Spec. Profile	Plant Profile	Reg. Sub. Allocated		Qual. Method	Chem. Spray	Accur.	Subm.	License Action		Outstanding Items Identified by	Category of Item
				Initial	Final					Replace	Locate		
2	01E22 M001 MTK	✓	✓	✓	-	✓	✓	-	-	-	-	-	1
3	01E22 M001 MTK	✓	✓	✓	-	✓	✓	-	-	-	-	-	1
3	01E22 V001A MDV	✓	✓	✓	-	✓	✓	-	-	-	-	-	1
4	01E22 V001B MOL	✓	✓	✓	-	✓	✓	-	-	-	-	-	1
5	01E22 V001C ETD	✓	✓	✓	-	✓	✓	-	-	-	-	-	1
5	01E22 B001 ↓	✓	✓	✓	-	✓	✓	-	-	-	-	-	1
5	01E22 B020 ↓	✓	✓	✓	-	✓	✓	-	-	-	-	-	1
5	01E22 B023 ↓	✓	✓	✓	-	✓	✓	-	-	-	-	-	1
6	L55 C001 ↓	✓	✓	✓	-	✓	✓	-	-	-	-	-	1
6	R22 C001 ↓	✓	✓	✓	-	✓	✓	-	-	-	-	-	1

Code:

1 - Indicate the item is below the flood level
 2 - Indicate the item is satisfactory
 3 - Indicate the item is not applicable
 4 - Indicate the item is unsolved, license identified
 5 - Proprietary
 6 - License identified
 7 - Equipment to be qualified
 8 - Equipment identified
 9 - Equipment to be qualified
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REVIEWER M.D. [Signature] DATE 1/80

0053860

053860

053860
 SYSTEM CONTROL
 FARLEY 1
 L. H. Smith
 T. Corporation Control

053860
 SYSTEM CONTROL
 FARLEY 1
 L. H. Smith
 T. Corporation Control

PAGE 1 of 2

Item No.	Equip. I. D. #	Gen. Equip. Name	Std. of Eff.	Qual. Profile	Regulatory Req.		Qual. Method	Chem. Output	Accur.	Subm.	License Action		Outstanding Items Identified by	Category of Items
					Inside	Outside					Replace	Relocate		
3	PIE23 V021	2" MOV	✓	✓	✓	✓	✓	-	B	-	No	-	1	
4	PIE23 V005	6" MOV	✓	✓	✓	✓	✓	-	✓	-	-	-	1	
5	PIE23 V022A	1" MOV	✓	✓	✓	✓	✓	-	✓	-	-	-	1	
6	PIE23 V022B	1" MOV	✓	✓	✓	✓	✓	-	✓	-	-	-	1	
7	PIE23 V022C	1" MOV	✓	✓	✓	✓	✓	-	✓	-	-	-	1	
8	PIE23 V022D	1" MOV	✓	✓	✓	✓	✓	-	✓	-	-	-	1	
9	PIE23 V025A	1" MOV	✓	✓	✓	✓	✓	-	✓	-	-	-	1	
10	PIE23 V025B	1" MOV	✓	✓	✓	✓	✓	-	✓	-	-	-	1	
11	HT52 V005	EPA	✓	✓	✓	✓	✓	-	✓	-	-	-	1	
11	HT52 V007	EPA	✓	✓	✓	✓	✓	-	✓	-	-	-	1	
11	HT52 V015	EPA	✓	✓	✓	✓	✓	-	✓	-	-	-	1	
11	HT52 V016	EPA	✓	✓	✓	✓	✓	-	✓	-	-	-	1	

1 - Item not identified
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0053863

FARLEY I

SYSTEMS DATA CENTER SYSTEM

2-14-64 (Rev. 1)
Form DA Form 19-61B
11A

PAGE 2 of 2

Eq. No.	Equip. I. D. No.	Accessories	Serial No.	Ident. Method	Ident. Date	Ident. By	Status	Remarks	Maintenance Action		Outstanding Items Identified by	Category of Item
									Replace	Relocate		
12	TABLE Y01			✓			✓					1
13	POWER CONTROLLER			✓			✓					1
13	POWER CONTROLLER			✓			✓					1

1 = Item identified
 2 = Item identified and qualified
 3 = Equipment requires modification (replacement, alterations, etc.)
 4 = Identification of equipment unnecessary
 5 = Item log schedule but not complete
 6 = Review needs additional information
 7 = Item record search still in process
 8 = Item identified and qualified
 9 = Item identified and qualified

0053864

NAME: FARLEY
 STATUS: MAIN STAIR

Serial No. 1
 BOM No. 76-018
 128

PAGE 1 OF 5

LES Page No.	Equip. I. D. #	Serial No.	Acc'd. (✓/✗)	Spec. Profile	Part. In. Impl.		Inst. Method	Cham. Spray	Accor.	Subst.	Exclosure Action		Outstanding Items Identified by	Category of Item
					Block	Thru					Replace	Re-locate		
5	91N1125	LS	✓								Yes	-	L	3
6	91N1125	SV	✓								Yes	-	L	3
7	91N1125	SV	✓								Yes	-	L	3
8	91N1125	LS	✓								Yes	-	L	3
9	91N1125	SV	✓								Yes	-	L	3
10	91N1125	SV	✓								Yes	-	L	3
11	91N1125	LS	✓								Yes	-	L	3
12	91N1125	SV	✓								Yes	-	L	3
13	91N1125	SV	✓								Yes	-	L	3
14	91N1125	LS	✓								Yes	-	L	3
15	91N1125	SV	✓								Yes	-	L	3
16	91N1125	SV	✓								Yes	-	L	3

3 - Equipment requires modification (removal, relocation, etc.)
 4 - Modification of equipment unnecessary
 a) Existing substance but not complete
 b) Exclosure needs additional information
 c) Second watch will be placed
 5 - Item not qualified
 6 - Item listed to log for resolution

3 - Item for use to take the lead level
 4 - Item for use to take the level
 5 - Item for use to take the level
 6 - Item for use to take the level

3 - Item for use to take the level
 4 - Item for use to take the level
 5 - Item for use to take the level
 6 - Item for use to take the level

0053867
 FARLEY
 RAIN SEAL

ATTACHED 3
 100-100-20-610

LES Page No.	Group S. B.	Access Number	Add. collie	Qual. Profile	Profile		Qual. Method	Thm. Spray	Accut.	Subm.	License Action		Outstanding Items Identified by	Category of Item
					Profile	Profile					Replace	Relocate		
41	Q111-V	J0	✓	✓	✓	-	✓	-	-	-	-	-	-	1
42	Q111-V	J0	✓	✓	✓	-	✓	-	-	-	-	-	-	1
43	Q111-V	J0	✓	✓	✓	-	✓	-	-	-	-	-	-	1
44	Q111-V	J0	✓	✓	✓	-	✓	-	-	-	-	-	-	1
45	Q111-V	J0	✓	✓	✓	-	✓	-	-	-	-	-	-	1
46	Q111-V	J0	✓	✓	✓	-	✓	-	-	-	-	-	-	1
47	Q111-V	J0	✓	✓	✓	-	✓	-	-	-	-	-	-	1
48	Q111-V	J0	✓	✓	✓	-	✓	-	-	-	-	-	-	1
49	Q111-V	J0	✓	✓	✓	-	✓	-	-	-	-	-	-	1
50	Q111-V	LS	✓	✓	✓	-	✓	-	-	-	Yes	-	L	3
51	Q111-V	LS	✓	✓	✓	-	✓	-	-	-	Yes	-	L	3
52	Q111-V	LS	✓	✓	✓	-	✓	-	-	-	Yes	-	L	3

1 - Item is in the field
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 100 - Item is in the field

0053868

FAMILY 1
MAY STEAD

ATTACHMENT 1
FORM 100 7-6-68
122

PAGE 5 OF 5

SLS Page No.	Equip. I. D. #	Complete Name	Std. Office	Qual. Profile	Position Type		Qual. Method	Thrm. Spray	Accur.	Subst.	Emission Action		Outstanding Items Identified by	Category of Items
					Incluc.	Exclucible					replace	relocate		
53	PM11 LY72	LT	✓	2	P	-	P	P	P	✓	-	-	R	2
54	PM11 LY92	LT	✓	2	P	-	P	P	P	✓	-	-	R	2
55	PM11 LY17	LT	✓	2	P	-	P	P	P	✓	-	-	R	2
56	PM11 EPA	EPA	✓	✓	V	-	✓	✓	-	✓	-	-	R	2
57	CABLE Y01	INSTR CABLE	✓	✓	V	-	✓	✓	-	✓	-	-	-	1
58	CABLE R11	PM11 CONTEN	✓	✓	-	-	✓	-	-	-	-	-	-	1
58	CABLE R21		✓	✓	-	-	✓	-	-	-	-	-	-	1
58	CABLE R22		✓	✓	-	-	✓	-	-	-	-	-	-	1
58	CABLE R23		✓	✓	-	-	✓	-	-	-	-	-	-	1
58	CABLE W1		✓	✓	-	-	✓	-	-	-	-	-	-	1

1 - Equipment requires modification (suspension, shrouds, etc.)
 2 - Qualification of equipment unperfected
 3 - Testing schedule not complete
 4 - Review needs additional information
 5 - No record search still in process
 6 - Item qualified
 7 - Item not to be qualified

0053869

Facility: TR 1
 System: TR 1
 ATTACHMENT 1
 FOR IER 79-015
 TER

PAGE 1 OF 2

Ins. Page No.	Equip. I.D. #	Equip. Name	Accid. Profile	Qual. Profile	Mod. Type (Qual. Profile)		Qual. Method	Chim. Spray	Accur.	Subst.	License Action		Outstanding Items Identified by	Category of Item
					Inside	Outside					Replace	Reinspect		
2	101250	SU									yes		L	3
3	101251	LS									yes		L	3
4	101252	SU									yes		L	3
5	101253	LS									yes		L	3
6	101254	SU									yes		L	3
7	101255	LS									yes		L	3
8	101256	SU									yes		L	3
9	101257	LS									yes		L	3
10	101258	TB/LS	✓	✓		✓							-	1
11	101259	TB/LS	✓	✓		✓							-	1
12	101260	TB/LS	✓	✓		✓							-	1
13	101261	TB/LS	✓	✓		✓							-	1

6 - Indicate the item is below the flood level
 7 - Indicate the item is satisfactory
 8 - Indicate the item is not applicable
 9 - Indicate the item is unresolved, license identified
 10 - Equipment requires modification (resolution, abiding, etc.)
 11 - Qualification of equipment unresolved
 12 - Testing schedule but not complete
 13 - Reviewer needs additional information
 14 - Qual. Record search still in process
 15 - Equipment not qualified
 16 - Item identified to IEP for resolution

REVISOR: W. B. ... DATE: ...

0053870

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ATTACHMENT 1
FOR ICM 79-018
TEN

PAGE 2 OF 2

Elt. Page No.	Ap. B.	Generic Name	Acctd. Profile	Qual. Profile	Regulation Compl. Containment		Qual. Method	Chem. Spray	Accur.	Subst.	License Action		Outstanding Items Identified by	Category of Items
					Inside	Outside					Replace	Balance		
14	R11	CB1	✓	✓	-	✓	✓	-	-	-	-	-	-	1
14	P22	Q22	✓	✓	-	✓	✓	-	-	-	-	-	-	1
14	R23	Q23	✓	✓	-	✓	✓	-	-	-	-	-	-	1
14	P21	Q21	✓	✓	-	✓	✓	-	-	-	-	-	-	1
15	P11	Q11	✓	✓	-	✓	✓	-	-	-	-	-	-	1

Index:

- ✓ B - Indicates the item is below the flood level
- ✓ or S - Indicates the item is Satisfactory
- or N - Indicates the item is Not Applicable
- UL - Indicates the item is Unresolved, Licenses Identified
- P - Primary
- L - License Identified
- A - Activities Identified
- I - Equipment is Qualified
- Aging in less than life of plant with licenses indicating periodic replacement
- 3 - Equipment requires modification (resolution, shielding, etc.)
- 4 - Qualification of equipment unresolved
- a) Testing schedule but not complete
- b) Reviewer needs additional information
- c) Qual. Record search still in process
- 5 - Equipment not qualified
- 6 - Item identified to ICB for resolution

REVIEWER: W. J. ... DATE: 10/10/00

005384

FARLEY

on 1/10/56

ATTENTION: 1
FORM 100 (9-55)

Page 1 of 2

Item No.	Equip. I. D. #	Equip. Name	A. S. D. #	Quant. Problem	Part of Equip. Available		Qual. Method	Time - Spray	Acc. #	Status	REPAIRS ACTION		Outstanding Items Identified by	Category of Items
					In. Lib.	Out of Lib.					Complete	Balance		
2	N1821 PT102	PT	V	2	P	-	P	P	P	V	-	-	R	2
3	N1821 PT103	PT	V	2	P	-	P	P	P	V	-	-	R	2
4	N1821 TE410	RTD	V	P	P	-	P	P	P	V	-	-	-	1
5	N1821 TE413	RTD	V	P	P	-	P	P	P	V	-	-	-	1
6	N1821 TE420	RTD	V	P	P	-	P	P	P	V	-	-	-	1
7	N1821 TE423	RTD	V	P	P	-	P	P	P	V	-	-	-	1
8	N1821 TE430	RTD	V	P	P	-	P	P	P	V	-	-	-	1
9	N1821 TE433	RTD	V	P	P	-	P	P	P	V	-	-	-	1
10	111804	T8	V	V	V	-	V	V	-	B	-	-	-	1
11	111843	T8	V	V	V	-	V	V	-	B	-	-	-	1
12	111804	T8	V	V	V	-	V	V	-	B	-	-	-	1
13	2118001	T8	V	V	V	-	V	V	-	B	-	-	-	1

3 - Equipment requires modification (revolution, shielding, etc.)
 4 - Identification of equipment untraceable
 5) Testers available but not complete
 6) Parts not available additional information
 7) Tests located but still in process
 8 - 1 - Not qualified
 9 - 1 - Tried to fix for resolution

1 - All items the item to test. The fixed level
 2 - 1 - Location the item to test facility
 3 - 1 - Location the item to test facility
 4 - 1 - Location the item to test facility
 5 - 1 - Location the item to test facility
 6 - 1 - Location the item to test facility
 7 - 1 - Location the item to test facility
 8 - 1 - Location the item to test facility
 9 - 1 - Location the item to test facility
 10 - 1 - Location the item to test facility
 11 - 1 - Location the item to test facility
 12 - 1 - Location the item to test facility
 13 - 1 - Location the item to test facility

00538
SYSTEM FAV-1

ATTACHMENT 1
FEB 1987 79-018
TEL

PAGE 1 OF 1

AES Page No.	Equip. I.D. #	Is it in ...	Accid. Profile	Qual. Profile	Regulation Impl. Conformance		Qual. Method	Chem. Spray	Accur.	Subm.	Licenses Action		Outstanding Items Ident. Effected by	Category of Items
					Inside	Outside					Replace	Relocate		
2	QW21V	1.11	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	1
3	QW21V	1.11	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	1
4	QW21V	1.11	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	1
5	QW21V	1.11	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	1
6	QW21V	1.11	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	1
7	QW21V	1.11	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	1
8	QW21V	1.11	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	1
9	QW21V	1.11	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	1
10	QW21V	1.11	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	1
11	QW21V	1.11	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	1
12	QW21V	1.11	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	1

0 = Indicates the item is below the flood level
 1 = Indicates the item is satisfactory
 2 = Indicates the item is not applicable
 3 = Indicates the item is removed, Licensee Identified
 4 = Proprietary
 5 = Licensee Identified
 6 = Reviewer Identified
 7 = Equipment is qualified
 8 = Being in from item 1111 of plant with license
 9 = Being in from pre-lic replacement
 10 = Equipment requires modification (resolution, abiding, etc.)
 11 = Qualification of equipment unresolved
 a) Testing schedule but not complete
 b) Reviewer needs additional information
 c) Qual. Record search still in process
 12 = Equipment not qualified
 13 = Item identified to EIP for resolution

REVIEWER W. B. ... DATE 1/25/80

82870

APPROVAL: 2/2/77
 APPROVED BY: FW

APPROVAL: 1
 FOR IIR 79-018
 IIR

PAGE 2 OF 3

Cat. Page No.	Licenses	Lic. No.	Lic. Type	Lic. Status	Qual. Profile	Reg. Test (if applicable)		Qual. Method	Class. - Gray	Rev. of.	Subm.	License Action		Outstanding Items Identified by	Category of Item
						Inside	Outside					Suppl.	Relocate		
16	SV	322	SV	2V	3	-	3	3	-	-	-	-	L	3	
17	SV	323	SV	2V	3	-	3	3	-	-	-	-	L	3	
18	SV	324	SV	2V	3	-	3	3	-	-	-	-	L	3	
19	SV	325	SV	2V	4	-	4	4	-	-	-	-	-	1	
20	SV	326	SV	2V	4	-	4	4	-	-	-	-	-	1	
21	SV	327	SV	2V	4	-	4	4	-	-	-	-	-	1	
22	SV	328	SV	2V	4	-	4	4	-	-	-	-	-	1	
23	SV	329	SV	2V	4	-	4	4	-	-	-	-	-	1	
24	SV	330	SV	2V	4	-	4	4	-	-	-	-	-	1	
25	SV	331	SV	2V	4	-	4	4	-	-	-	-	-	1	
25	SV	332	SV	2V	4	-	4	4	-	-	-	-	-	1	
25	SV	333	SV	2V	4	-	4	4	-	-	-	-	-	1	

1 - Indicate the item to follow the listed level
 2 - Indicate the item is satisfactory
 3 - Indicate the item is not applicable
 4 - Indicate the item is unsolved, license identified
 5 - Qualify
 6 - License identified
 7 - License identified
 8 - License identified
 9 - License identified
 10 - License identified
 11 - License identified
 12 - License identified
 13 - License identified
 14 - License identified
 15 - License identified
 16 - License identified
 17 - License identified
 18 - License identified
 19 - License identified
 20 - License identified
 21 - License identified
 22 - License identified
 23 - License identified
 24 - License identified
 25 - License identified
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 92 - License identified
 93 - License identified
 94 - License identified
 95 - License identified
 96 - License identified
 97 - License identified
 98 - License identified
 99 - License identified
 100 - License identified

REVIEWED BY: FW

0053875

0053875
 0053875
 (CPIN25)

FORM 100-1
 FOR IIR 79-018
 FBI

PAGE 1 OF 1

Code	IP No.	Cat No.	Acct. Profile	Qual. Profile	Reg. Ins. Dept.		Qual. Method	Chem. Spray	Accot.	Sube.	E.E. Action		Insulating Items Identified by	Category of Items
					Inside	Outside					W/trace	Balance		
2	3771A	SV	✓	3	-	3	-	-	-	-	yes	-	L	3
3	3A	SV	✓	3	-	3	-	-	-	-	yes	-	L	3
4	3771B	S	✓	3	-	3	-	-	-	-	yes	-	L	3
5	32B	S	✓	3	-	3	-	-	-	-	yes	-	L	3
6	3771C	SV	✓	3	-	3	-	-	-	-	yes	-	L	3
7	3771D	SV	✓	3	-	3	-	-	-	-	yes	-	L	3
8	3771E	SV	✓	3	-	3	-	-	-	-	yes	-	L	3
9	3771F	SV	✓	3	-	3	-	-	-	-	yes	-	L	3
10	3771G	SV	✓	3	-	3	-	-	-	-	yes	-	L	3
11	3771H	SV	✓	3	-	3	-	-	-	-	yes	-	L	3
12	3771I	SV	✓	3	-	3	-	-	-	-	yes	-	L	3
13	3771J	SV	✓	3	-	3	-	-	-	-	yes	-	L	3
14	3771K	SV	✓	3	-	3	-	-	-	-	yes	-	L	3
15	3771L	SV	✓	3	-	3	-	-	-	-	yes	-	L	3
16	3771M	SV	✓	3	-	3	-	-	-	-	yes	-	L	3
17	3771N	SV	✓	3	-	3	-	-	-	-	yes	-	L	3
18	3771O	SV	✓	3	-	3	-	-	-	-	yes	-	L	3
19	3771P	SV	✓	3	-	3	-	-	-	-	yes	-	L	3
20	3771Q	SV	✓	3	-	3	-	-	-	-	yes	-	L	3
21	3771R	SV	✓	3	-	3	-	-	-	-	yes	-	L	3
22	3771S	SV	✓	3	-	3	-	-	-	-	yes	-	L	3
23	3771T	SV	✓	3	-	3	-	-	-	-	yes	-	L	3
24	3771U	SV	✓	3	-	3	-	-	-	-	yes	-	L	3
25	3771V	SV	✓	3	-	3	-	-	-	-	yes	-	L	3
26	3771W	SV	✓	3	-	3	-	-	-	-	yes	-	L	3
27	3771X	SV	✓	3	-	3	-	-	-	-	yes	-	L	3
28	3771Y	SV	✓	3	-	3	-	-	-	-	yes	-	L	3
29	3771Z	SV	✓	3	-	3	-	-	-	-	yes	-	L	3

3 - Equipment requires modification (resolution, shielding, etc.)
 4 - Qualification of equipment unresolved
 a) Testing schedule but not complete
 b) System needs additional information
 c) Qual. Search still in progress
 5 - Equipment not qualified
 6 - Item identified to high for resolution

0 - Indicate the item is below the flood level
 1 - Indicate the item is satisfactory
 2 - Indicate the item is not applicable
 3 - Indicate the item is unresolved, licensee identified
 4 - Licensee identified
 5 - Licensee identified
 6 - Equipment is qualified
 7 - Item is from the site of plant with licensee
 8 - Item is from the site of plant with licensee

REVISED by [Signature] DATE 1/2/84

FACTORY
SYSTEM
Sampling
QIPIT

ATTACHMENT 1
FORM IEN 79-018
REV

LES Page No.	Author Name	V.C.D. Profile	Qual. Profile	Method of Test		Spec. Method	Spec. Spray	Accur.	Subst.	Licenses	Licenses Action		Category of Items
				Inside	Outside						People	Machine	
4	SV	✓	3	3	-	3	-	-	-	yes	-	L	3
5	limit SW	✓	46	46	-	46	-	-	-	-	-	R	46
6	SV	✓	3	3	-	3	-	-	-	yes	-	L	3
7	limit SW	✓	46	46	-	46	-	-	B	-	-	R	46
8	SV	✓	3	3	-	3	-	-	B	yes	-	L	3
9	limit SW	✓	46	46	-	46	-	-	-	-	-	R	46
10	SV	✓	3	3	-	3	-	-	-	yes	-	L	3
11	limit SW	✓	46	46	-	46	-	-	-	-	-	R	46
12	SV	✓	3	3	-	3	-	-	-	-	-	L	3
13	limit SW	✓	46	46	-	46	-	-	-	-	-	R	46
14	SV	✓	3	3	-	3	-	-	-	-	-	L	3
15	limit SW	✓	46	46	-	46	-	-	-	-	-	R	46

3 - Equipment requires modification (resolution, shielding, etc.)
 4 - Qualification of equipment unresolved
 a) Testing schedule but not complete
 b) Reviewer needs additional information
 5 - Qual. Record search still in process
 6 - Item identified to be for resolution

8 - Indicate the item to be in the Good level
 9 - Indicate the item to be in the Not Applicable level
 10 - Indicate the item to be in the Resolved, Licenses Identified level
 11 - Licenses Identified
 12 - Licenses Identified
 13 - Licenses Identified
 14 - Licenses Identified
 15 - Licenses Identified

REVISION 1/1/1982

PROJECT

FA: 104-2

SYSTEM

3180 (31815)

AT FACILITY 1
DUR 100 29-010
ELM

V.S. Page No.	Equip. I. No.	Generic Name	Id. #	Qual. Profile	Mgmt. Type		Qual. Method	Item. Type	Accur.	Subm.	Maintenance Action		Outstanding Items Identified by	Category of Item
					Insul	Outsine					Replace	Protect		
16	318	SV	L	3	-	-	3	-	-	-	Yrs	-	L	3
17	3180	Limit SV	L	4b	-	-	4b	-	-	-	-	-	R	4b
18	3180	SV	-	3	-	-	3	-	-	-	Yr	-	L	3
19	3180	Limit SV	L	4b	-	-	4b	-	-	-	-	-	R	4b
20	3180C	SV	L	3	-	-	3	-	-	-	Yrs	-	L	3
21	3180	Limit SV	L	4b	-	-	4b	-	-	-	-	-	R	4b
22	3581A	SV	L	3	-	-	3	-	-	-	Yrs	-	L	3
23	318	Limit SV	L	4b	-	-	4b	-	-	-	-	-	R	4b
24	3180	SV	L	3	-	-	3	-	-	-	Yrs	-	L	3
25	3180	Limit SV	L	4b	-	-	4b	-	-	-	-	-	R	4b
26	3180	SV	L	3	-	-	3	-	-	-	Yrs	-	L	3
27	3180	Limit SV	L	4b	-	-	4b	-	-	-	-	-	R	4b

2 - Equipment requires maintenance (lubrication, oiling, etc.)
 3 - Qualification of equipment unresolved
 4 - Testing schedule but not complete
 5 - System needs additional information
 6 - Qual. Record search still in process
 7 - Equipment not qualified
 8 - Item identified to tip for resolution

REVISIONS
 11/15/80
 11/15/80

0053879

SYSTEM: Imply (915)

ASSTANT 1
FOR THE DIRECTOR
TLR

PAGE 4 of 4

Page No.	Equip. No.	Equip. Name	Lic. No.	Qual. Probable	Replication		Qual. Method	Spec. Copy	Account	Sub.	Equipment Action		Outstanding Items Identified by	Category of Item
					Inside	Outside					Replace	Relace		
38	03380	T BIK JB		L	L	L	L							1
39	03381	T BIK JB		L	L	L	L							1
40	03382	T BIK JB		L	L	L	L							1
41	03383	T BIK JB		L	L	L	L							1
42	03384	T BIK JB		L	L	L	L							1
43	03385	T BIK JB		L	L	L	L							1
44	03386	Cable		L	L	L	L							1
44	03387	Cable		L	L	L	L							1
44	03388	Cable		L	L	L	L							1

Code:

1 - Equipment requires modification (renovation, obsolescing, etc.)
 2 - Qualification of equipment unreviewed
 3 - Testing schedule not complete
 4 - Review needs additional information
 5 - Qual. Record needs still in process
 6 - Equipment not qualified
 7 - Item identified to ASP for resolution

REVISED 02/08/07 DATE 4/15/07

OS Page No.	I.P. I.D. #	Genus Name	Accd. Profile	Qual. Profile	Reg. In Qual.		Qual. Method	Chem. Spray	Accur.	Subm.	Licenses Action		Outstanding Items Identified by	Category of Items
					Outside	Inside					Replace	Reinspect		
3	2018A	MDV	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	1
4	2018B	MIC	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	1
5	2016A	RCV	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	1
6	2016B	MDV	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	1
7	2016C	MDV	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	1
8	20152	CIA	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	1
8	2017	EPA	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	1
8	2014	EPA	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	1
8	2011	EPA	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	1
8	2011	EPA	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	1
9	2011	CIC	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	1

3 - Equipment requires modification (resolution, abriding, etc.)
 4 - Qualification of equipment unresolved
 5 - Testing schedule but not complete
 6 - Reviewer needs additional information
 7 - Qual. Record search still in process
 8 - Equipment not qualified
 9 - Item identified to hip for resolution

REVISOR: W. Brewster DATE: 1/20

0053881

Exhibit 3
 57531-
 10/1/01
 10/1/01
 10/1/01

A - EQUIPMENT 1
 FOR ITEM 79-018
 11.8

PAGE 2 OF 2

Eq. No.	Equip. I.D. #	Equip. Name	Accid. Involve	Qual. Profile	Major Inj. (containing)		Chem. Method	Spray	Accur.	Subm.	License Action		Outstanding Items Submitted by	Category of Item
					Inside	Outside					Replace	Relocate		
9	R11	GL	✓	✓	✓	-	✓	-	-	-	-	-	-	1
9	R13	GL	✓	✓	✓	-	✓	-	-	-	-	-	-	1
9	R01	GL	✓	✓	✓	-	✓	-	-	-	-	-	-	1

0 = Indicate the item is below the listed level
 1 = Indicate the item is satisfactory
 2 = Indicate the item is not applicable
 3 = Indicate the item is unresolved, license identified
 4 = Equipment requires modification (resolution, shielding, etc.)
 5 = Qualification of equipment unsolved
 6 = Testing schedule not complete
 7 = Equipment needs additional information
 8 = Qual. Record search still in process
 9 = Equipment not qualified
 10 = Item identified to MIB for resolution

REVISION: 10/1/01 DATE: 10/1/01

Ch. No.	App. No.	Gene. No.	Acc'd. Profile	Qual. Profile	Reg. Type (Inpl.)		Qual. Method	Chem. Spray	Accur.	Subst.	E.L. Name Action		Outstanding Items Submitted by	Category of Item
					Inside	Outside					Replace	Relocate		
2	077	1012	✓	✓	✓	✓	✓	✓						1
3	078	1013											L	3
4	079	1014	✓	46	✓	✓	✓	✓	✓	✓			R	4 1/2
5	080	1015	✓		✓	✓	✓	✓					L	3
6	081	1016	✓	✓	✓	✓	✓	✓						1
7	082	1017	✓	✓	✓	✓	✓	✓						1
8	083	1018	✓	✓	✓	✓	✓	✓						1
9	084	1019	✓	✓	✓	✓	✓	✓						1

- 1 - Indicate the flow to below the flood level
- 2 - Indicate the flow to below the flood level
- 3 - Indicate the flow to below the flood level
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- 14 - Indicate the flow to below the flood level
- 15 - Indicate the flow to below the flood level
- 16 - Indicate the flow to below the flood level
- 17 - Indicate the flow to below the flood level
- 18 - Indicate the flow to below the flood level
- 19 - Indicate the flow to below the flood level
- 20 - Indicate the flow to below the flood level

REVISOR: DATE: 11/1/80

0053883

TABLE 1
SYSTEM 1
ACTIVITIES 1
FOR IEM 79-018
TER

PAGE 2 OF 2

Cl. No.	P. No.	Cons. No.	Accid. Profile	Inspection (In/Out)		Qual. Method	Chem. Spray	A/CUR.	Subst.	License Action		Outstanding Items Identified by	Category of Items
				Inside	Outside					Replace	Relocate		
10	104	101	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
10	101	101	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
10	103	101	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
10	101	101	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
11	101	101	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

1 - Equipment requires modification (resolution, abiding, etc.)
 2 - Qualification of equipment unresolved
 3 - Testing schedule not complete
 4 - Licenses need additional information
 5 - Qual. Record search still in process
 6 - Equipment not qualified
 7 - Item identified to high for resolution

REVISION: 11/21/2010 DATE: 11/21/2010

ATTACHMENT 2
FUNCTIONS/SYSTEMS LIST
(W) PWF

Needs for Mitigation of
Of LOCA Or MSLE

1. Reactor Protection
2. Safeguards Actuation
3. Containment Isolation
4. Main and Auxiliary Steam Isolation
5. Main and Auxiliary Feedwater Isolation
6. Feedwater Control
7. Containment Spray
8. Containment Air Purification/Cleanup
9. Containment Ventilation/Cooling
10. Containment Combustible Gas Control
11. High Pressure Injection
12. Low Pressure Injection
13. Accumulators
14. Residual Heat Removal
15. Chemical and Volume Control
16. Pressurizer Spray
17. Power Operated Relief Valves
18. Steam Dump
19. Containment Radiation/Monitoring
20. Containment Radiation/Sampling
21. Component Cooling Water
22. Service Water
23. Emergency Power
24. Containment Sump
25. Control Room Habitability
26. Safety Equipment Area Ventilation
27. Auxiliary Feedwater
28. Reactor Coolant

ATTACHMENT

LIST OF DOCUMENTS THAT SUPPORT ENVIRONMENTAL QUALIFICATION OF
INSTRUMENT'S COMPONENT

1. WCAP 9157 - Environmental Qualification of Safety-Related Class 1E Process Instrumentation (Westinghouse Proprietary - Class 2) and Westinghouse letter APW-A-5141 dated February 14, 1980.
2. Wyle Laboratories NEQ Test Report 44354-1 dated March 8, 1979.
3. General Electric Company Report -Low Voltage Electrical Containment Penetration Qualification Test Report.
4. Boston Insulated Wire and Cable Company Test Report 73E062 dated September 7, 1973 and Test Report 74A023 dated January 24, 1974.
5. Westinghouse letter APW-A-5141 dated February 14, 1980 and Westinghouse letter NS-TMA-2184, Anderson to Stoltz (Test)(Westinghouse Proprietary - Class 2).
6. Automatic Switch Company Test Report AQS 21678/TR.
7. Acme - Cleveland Development Company Qualification Report for NAMCO Controls Limit Switch Model EA-180 dated November 21, 1977.
8. WCAP 8541 -Topical Report -Seismic and Environmental Testing of Foxboro Transmitters (Westinghouse Proprietary Class 2) and Westinghouse letter APW-A-5141 dated February 14, 1980.
9. The Okonite Company Engineering Report No. 141 dated February 29, 1972 and Report 143 dated March 20, 1972.
10. Wyle Laboratories Test Plan 5-5/0859/ES for Level Transmitters for Deleval/Gems Sensor Division, dated October 6, 1978.
11. Limitorque Corporation Test Report 600456 dated December 9, 1975.
12. Joy Manufacturing Company Qualification Test Report X-604 for Containment Coolers.
13. WCAP 7820 with Supplements 1 through 4, and Westinghouse letter to SCS1 (O. Batum) dated February 14, 1980 for Electric Hydrogen Recombiners.
14. Limitorque Corporation Technical Report No. F-C3441 dated September 1972.
15. Limitorque Corporation Technical Report No. F-C2232-01 dated November 1968.
16. Franklin Institute Research Laboratory Test Report F-C3834 dated March 1974.

OUTSTANDING ITEMS

As of 10-1-1970

Licensee

C E S Page No.	ITEM (See Code)	DISPOSITION				Disposition Schedule, Notes
		Replace	Modify	Ongoing Analysis	Other	
C.2.3-2	SV	X				1
C.2.4-4	LS	X				1
C.2.4-5	SV	X				1
C.2.4-6	SV	X				1
C.2.4-7	LS	X				1
C.2.4-8	SV	X				1
C.2.4-9	SV	X				1
C.2.4-10	LS	X				1
C.2.4-11	SV	X				1
C.2.4-12	SV	X				1
C.2.4-13	LS	X				1
C.2.4-14	SV	X				1
C.2.4-15	SV	X				1
C.2.4-16	LS	X				1
C.2.4-17	SV	X				1
C.2.4-18	SV	X				1
C.2.4-19	LS	X				1

Attachment 1
 OUTSTANDING ITEMS
 As Identified By

C E S Page No.	ITEM (See Code)	DISPOSITION				Disposition Schedule, Notes
		Replace	Modify	Depositing Analysis	Other	
C.2.6-20	SV	X				1
C.2.6-21	SV	X				1
C.2.6-6	SV	X				1
C.2.6-8	SV	X				1
C.2.6-14	SV	X				1
2.6-12	SV	X				1
C.2.6-14	SV	X				1
C.2.6-16	SV	X				1
C.2.8-2	MTR				X	2
C.2.8-3	MTR				X	2
C.2.8-4	MTR				X	2
C.2.8-5	MTR				X	2
C.2.9-7	SV	X				1
C.2.9-11	SV	X				1
C.2.9-13	SV	X				1
C.2.9-15	SV	X				2
2-2	SV	X				1

0053888

Attachment 4
 UNIDENTIFIED ITEMS
 As Identified By
 [Redacted]

C L S Page No.	ITEM (See Code)	DISPOSITION				Disposition Schedule, Notes
		Replace	Modify	Ongoing Analysis	Other	
C.2.12-5	SV	X				1
C.2.12-6	SV	X				1
C.2.13-5	LS	X				1
C.2.13-6	SV	X				1
C.2.13-7	SV	X				1
2.13-8	LS					1
C.2.13-9	SV	X				1
C.2.13-10	SV	X				1
C.2.13-11	LS	X				1
C.2.13-12	SV	X				1
C.2.13-13	SV	X				1
C.2.13-14	LS	X				1
C.2.13-15	SV	X				1
C.2.13-16	SV	X				1
C.2.13-17	LS	X				1
C.2.13-18	SV	X				1
C.2.13-19	SV	X				1

Attachment 4

OCT 2013

As Identified By

10/1/13

C E S Page No.	ITEM (Sec Code)	DISPOSITION				Disposition Schedule, Notes
		Replace	Modify	Ongoing Analysis	Other	
C.2.13-20	LS	X				1
C.2.13-21	SV	X				1
C.2.13-22	SV	X				1
C.2.13-23	LS	X				1
C.2.13-24	SV	X				1
C.2.13-25	LS	X				1
C.2.13-26	SV	X				1
C.2.13-27	LS	X				1
C.2.13-28	SV	X				1
C.2.13-29	SV	X				1
C.2.13-30	LS	X				1
C.2.13-31	SV	X				1
C.2.13-32	LS	X				1
C.2.13-33	SV	X				1
C.2.13-34	LS	X				1
C.2.13-38	LS	X				1
C.2.13-39	LS	X				1

0053890

Attachment 4

OUTSTANDING ITEMS

As Identified By

1-1-1968

C E S Page No.	ITEM (See Code)	DISPOSITION				Disposition Schedule, Notes
		Replace	Modify	Ongoing Analysis	Other	
6.2.13-40	LS	X				1
6.2.13-50	LS	X				1
6.2.13-51	LS	X				1
6.2.13-52	LS	X				1
6.2.14-2	SV	X				1
7.14-3	LS	X				2
6.2.14-4	SV	X				1
6.2.14-5	LS	X				1
6.2.14-6	SV	X				1
6.2.14-7	LS	X				1
6.2.14-8	SV	X				1
6.2.14-9	LS	X				1
6.2.14-7	LS	X				1
6.2.14-8	SV	X				1
6.2.16-9	LS	X				1
6.2.16-10	SV	X				1
6.2.16-11	LS	X				1

0053893

ATTACHMENT 2
FUNCTIONS/SYSTEMS LIST
(W) PWR

Needed For Mitigation Of Consequences
Of LOCA Or MSLE

1. Reactor Protection
2. Safeguards Actuation
3. Containment Isolation
4. Main and Auxiliary Steam Isolation
5. Main and Auxiliary Feedwater Isolation
6. Feedwater Control
7. Containment Spray
8. Containment Air Purification/Cleanup
9. Containment Ventilation/Cooling
10. Containment Combustible Gas Control
11. High Pressure Injection
12. Low Pressure Injection
13. Accumulators
14. Residual Heat Removal
15. Chemical and Volume Control
16. Pressurizer Spray
17. Power Operated Relief Valves
18. Steam Dump
19. Containment Radiation/Monitoring
20. Containment Radiation/Sampling
21. Component Cooling Water
22. Service Water
23. Emergency Power
24. Containment Sump
25. Control Room Habitability
26. Safety Equipment Area Ventilation
27. Auxiliary Feedwater
28. Reactor Coolant

Facility: Farley 1

0053894

Docket No.: 50-348

NOTES:

1. This component is to be replaced with one having full environmental qualification documentation by the end of the third refueling outage.
2. The licensee has determined the qualified life for this component to be in excess of 40 years based on weak link activation energy and Arrhenius model. Manufacturer's confirmation has been requested via Bechtel letter V-3818 dated 6/5/80.

CODE:

- Lt. Sw/LS Limit Switch
- SV Solenoid Valve
- S Switch (Level SW, PS - Pressure SW, FS - Flow SW)
- PT/LT Pressure or Level Transmitter
- MOV Motor Operated Valve
- Mtr Motor
- C Controller
- TE/RTD Temperature Element/Resistance Temperature Detector
- RL Radiation Detector
- TB/JB Terminal Block/Junction Box

A-12

50-348/364 - C.1 VP

2/19/92

NRC Review
of Unit 1

APCo Exhibit 12

11-1-80
Submitted



RECEIVED
USNRC

'92 MAR 13 10 53

ISDM
For file
[Signature]

ENVIRONMENTAL QUALIFICATION OF SAFETY-RELATED
ELECTRICAL EQUIPMENT
IEB 79-01B

OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

TECHNICAL EVALUATION REPORT

DOCKET NO. 50-348

PLANT: Joseph M. Farley Nuclear Plant, Unit 1

DATED: December 10, 1980

REVISION 1

RWS
IEB 79-01B
101

Licensee: Alabama Power Company

Type Reactor: Pressurized Water Reactor

Prepared by: N. Marriweather

N. Marriweather

Engineering Support Section No. 1
Reactor Construction and Engineering
Support Branch, RII

5706050003

NUCLEAR REGULATORY COMMISSION

Docket No. _____ Official Exp. No. 12
In the matter of ALABAMA POWER CO.
Staff _____ IDENTIFIED 2/11/92
Applicant APCO RECEIVED 2/19/92
Intervenor _____ REJECTED _____
Cont'g Off'r _____
Contractor _____ DATE 12-10-80
Other _____ Witness _____
Reporter L. Estep

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Attachment 1	Review Tabulation Sheets Used in Evaluation of Licensee's Report
Attachment 2	List of Standard Systems
Attachment 3	List of Documents That Support Environmental Qualification of Licensee's Equipment
Attachment 4	Outstanding Items (Licensee Identified)

1. INTRODUCTION

1.1 General

The NRC Office of Inspection and Enforcement (I/E) issued Bulletin 79-01B, "Environmental Qualification of Class 1E Equipment" in January 1980. This bulletin required the licensee to perform a detailed evaluation of the environmental qualification on Class 1E electrical equipment required to function under postulated accident conditions and to submit a report on this action.

This document is a report on the evaluation of the licensee's response to this bulletin.

2. BACKGROUND AND DISCUSSION

2.1 General

The evaluation of the licensee's response was accomplished by examining the licensee's report for completeness and technical accuracy. The licensee's report used in this evaluation is dated November 12, 1980, and includes the responses to the Bulletin Supplements with the exception of I/E Supplement No. 3 issued on October 24, 1980.

2.2 On-Site Inspections

The on-site inspection, made on selected IE equipment, verified proper installation of equipment, overall interface integrity, location with respect to flood level for equipment inside the containment, and manufacturers nameplate data. The manufacturer and model number from the nameplate data was compared to information given in the Component Evaluation Work Sheets (CES) to the licensee's report.

R1

Components that were examined during the field inspection are identified by an asterisk (*) in Attachment 1. If any discrepancies were noted between the installed equipment and the correspondent equipment addressed in the licensee's report, they are discussed in Section 4 of this report. The site inspection is documented by IE report number 50-348/80-38.

R1

2.3 Evaluation of Licensee's Report

Each component as addressed on the Component Evaluation Work Sheets (CES) of the licensee's report was examined for completeness and accuracy to the criteria given in the bulletin. This examination assumed qualification documents (analysis, test reports, etc.) referenced by the licensee in their submittal are acceptable.

The results of this examination are documented in Attachment 1. The CES page numbers in column 1 of Attachment 1 is the same CES page found in the licensee's report.

3. GENERAL INFORMATION

3.1 Identification Of Class 1E Electrical Equipment

The licensee's list of systems was compared to the systems listed on Attachment 2. This list is considered to be a standard list for pressurized water reactors.

It is recognized that there are differences in nomenclature of systems because of plant vintage and engineering design, therefore, many of these systems may not exist for Farley Unit 1 plant or the function of those systems for the Farley Unit 1 plant may be performed by comparable systems with different names. In any case, all the systems of Attachment 2 were not addressed or listed in the licensee's report. To insure completeness and uniformity of reports of similar design, it is considered that the licensee should address the following systems:

- (1) Steam Dump
- (2) Containment Sump.

Each of the above systems should be analyzed and a brief discussion should explain how the system was addressed or why it was excluded from the report. For example: "Reactor Protection System - This is a

valid system designation at Farley Unit 1 plant; however, the input signals to this system are obtained from various components in other systems that are included in this report."

3.2 Service Conditions

The service condition accident environment, HEYB/LOCA inside containment and HELB outside containment are indicated or discussed in the licensee's report.

3.3 Qualification Documentation

Attachment 3 is a list of documents (test reports, analysis, letters, etc.) used by the licensee in determining the environmental qualification of plant equipment for Farley Unit 1. These references have been tabulated by the licensee and are indicated on the applicable CES of their report.

4. EQUIPMENT DATA REVIEW

- 4.1 Equipment that is considered to meet IEB 79-01B requirements are categorized as 1 in the last column of Attachment 1.
- 4.2 Equipment whose qualified life (Aging) is less than the life of the plant is categorized as 2 in the last column of Attachment 1.

- 4.3 The licensee has identified specific equipment which has been or is being replaced, modified or relocated as a result of their IEB 79-01B efforts. This equipment is categorized as 3 in the last column of Attachment 1.
- 4.4. Equipment whose qualification is unresolved (such as, a qualification record search is still in process, tests are scheduled to determine qualification, additional information is needed by the NRC reviewer to satisfy him that equipment is qualified, etc.) is categorized as 4 in the last column of Attachment 1.
- 4.5 Equipment that the licensee has identified as not being qualified required an LER with justification for continued plant operation.

No LER's were received in Region II for Farley 1.

- 4.6 Equipment whose qualification (Aging exempted to a certain degree - see DOR guideline Section 4) is unresolved, as identified by the licensee is listed in Attachment 4 as Outstanding Items.

The licensee has provided justification for continued plant operation for many, if not all, of these outstanding items in their report. In many cases, this is provided on their CES or in a special section of the report. In some cases the licensee states that this justification is by Engineering Analysis that are available at their office.

4.7 The components reviewed during the on-site inspection were examined for proper installation, interface integrity, location and manufacturers nameplate data. The manufacturers nameplate data was compared to the information shown in the component evaluation sheets of the licensee's report. The components that contained discrepancies between the actual nameplate data and the licensee's submittal to IEB 79-01B are identified by double asterisks (**) in Attachment 1. However, these have been identified by the licensee as a result of a walkdown program initiated prior to the on-site inspection as indicated in their report, Section C.1.4. Ri

5. CONCLUSIONS

Due to the time constraints imposed by the Commission Memo and Order of 5/23/80 this evaluation is based on the licensee submittal dated November 12, 1980. This licensee's report does not address all items that may be pertinent to Farley Unit 1 plant as a result of IEB 79-01B Bulletin Supplements 2 and 3 issued on 9/30/80 and 10/24/80, respectively. Specifically, information on cold shutdown and TMI Lessons Learned related equipment which is received subsequent to 11/1/80 will be evaluated by EQE of NRC.

The licensee's actions meet the requirements of the Commission Memo and Order of 5/23/80 and justification for continued plant operation with many of the components that have unresolved qualification items is indicated in Section 4.6. Based on the information available, the Region II reviewer

considers that the justification is commensurate for the areas identified, that the proposed corrective action meets requirements of the Commission Memo and Order of 5/23/80, and therefore, plant operation can continue until these items are resolved as committed to by the licensee.

This evaluation is based on the information supplied by the licensee in their submittal, their FSAR, and the assumption that the Qualification Documents (Test Reports, Analysis, Letter, etc.) are acceptable.

The results of this evaluation does not necessarily imply that the equipment is unreliable, unsafe or represents a significant safety issue; it does imply that additional information is required. This is indicated by the applicable categorization indicated in the last column of Attachment 1.

0053459
 ATTACHMENT 1
 FOR IED 79-018
 IED
 PAGE 2 OF 2
 0053459

Qty. Page No.	Equip. I. D. #	Resource Name	Acad. Profile	Qual. Profile	Position Exp.		Qual. Method	Check. Copy	Accur.	Subj.	License Action		Outstanding Items Identified by	Category of Item
					Months	Outside					Replaces	Replaces		
14	91752 B012	EPA	✓	✓	✓	✓	✓	✓	-	✓	-	-	-	/
14	91752 302B	EPA	✓	✓	✓	✓	✓	✓	-	✓	-	-	-	/
14	91752 8030	EPA	✓	✓	✓	✓	✓	✓	-	✓	-	-	-	/
15	CABLE YJI	INSTR. CABLE	✓	✓	✓	✓	✓	✓	-	✓	-	-	-	/

0 = Indicate the item is below the flow level
 1 = Indicate the item is satisfactory
 2 = Indicate the item is not applicable
 3 = Indicate the item is unsatisfactory, license identified
 4 = Proprietary
 5 = License identified
 6 = License identified
 7 = Equipment is qualified
 8 = A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z, AA, AB, AC, AD, AE, AF, AG, AH, AI, AJ, AK, AL, AM, AN, AO, AP, AQ, AR, AS, AT, AU, AV, AW, AX, AY, AZ, BA, BB, BC, BD, BE, BF, BG, BH, BI, BJ, BK, BL, BM, BN, BO, BP, BQ, BR, BS, BT, BU, BV, BW, BX, BY, BZ, CA, CB, CC, CD, CE, CF, CG, CH, CI, CJ, CK, CL, CM, CN, CO, CP, CQ, CR, CS, CT, CU, CV, CW, CX, CY, CZ, DA, DB, DC, DD, DE, DF, DG, DH, DI, DJ, DK, DL, DM, DN, DO, DP, DQ, DR, DS, DT, DU, DV, DW, DX, DY, DZ, EA, EB, EC, ED, EE, EF, EG, EH, EI, EJ, EK, EL, EM, EN, EO, EP, EQ, ER, ES, ET, EU, EV, EW, EX, EY, EZ, FA, FB, FC, FD, FE, FF, FG, FH, FI, FJ, FK, FL, FM, FN, FO, FP, FQ, FR, FS, FT, FU, FV, FW, FX, FY, FZ, GA, GB, GC, GD, GE, GF, GG, GH, GI, GJ, GK, GL, GM, GN, GO, GP, GQ, GR, GS, GT, GU, GV, GW, GX, GY, GZ, HA, HB, HC, HD, HE, HF, HG, HH, HI, HJ, HK, HL, HM, HN, HO, HP, HQ, HR, HS, HT, HU, HV, HW, HX, HY, HZ, IA, IB, IC, ID, IE, IF, IG, IH, II, IJ, IK, IL, IM, IN, IO, IP, IQ, IR, IS, IT, IU, IV, IW, IX, IY, IZ, JA, JB, JC, JD, JE, JF, JG, JH, JI, JJ, JK, JL, JM, JN, JO, JP, JQ, JR, JS, JT, JU, JV, JW, JX, JY, JZ, KA, KB, KC, KD, KE, KF, KG, KH, KI, KJ, KK, KL, KM, KN, KO, KP, KQ, KR, KS, KT, KU, KV, KW, KX, KY, KZ, LA, LB, LC, LD, LE, LF, LG, LH, LI, LJ, LK, LL, LM, LN, LO, LP, LQ, LR, LS, LT, LU, LV, LW, LX, LY, LZ, MA, MB, MC, MD, ME, MF, MG, MH, MI, MJ, MK, ML, MM, MN, MO, MP, MQ, MR, MS, MT, MU, MV, MW, MX, MY, MZ, NA, NB, NC, ND, NE, NF, NG, NH, NI, NJ, NK, NL, NM, NN, NO, NP, NQ, NR, NS, NT, NU, NV, NW, NX, NY, NZ, OA, OB, OC, OD, OE, OF, OG, OH, OI, OJ, OK, OL, OM, ON, OO, OP, OQ, OR, OS, OT, OU, OV, OW, OX, OY, OZ, PA, PB, PC, PD, PE, PF, PG, PH, PI, PJ, PK, PL, PM, PN, PO, PP, PQ, PR, PS, PT, PU, PV, PW, PX, PY, PZ, QA, QB, QC, QD, QE, QF, QG, QH, QI, QJ, QK, QL, QM, QN, QO, QP, QQ, QR, QS, QT, QU, QV, QW, QX, QY, QZ, RA, RB, RC, RD, RE, RF, RG, RH, RI, RJ, RK, RL, RM, RN, RO, RP, RQ, RR, RS, RT, RU, RV, RW, RX, RY, RZ, SA, SB, SC, SD, SE, SF, SG, SH, SI, SJ, SK, SL, SM, SN, SO, SP, SQ, SR, SS, ST, SU, SV, SW, SX, SY, SZ, TA, TB, TC, TD, TE, TF, TG, TH, TI, TJ, TK, TL, TM, TN, TO, TP, TQ, TR, TS, TT, TU, TV, TW, TX, TY, TZ, UA, UB, UC, UD, UE, UF, UG, UH, UI, UJ, UK, UL, UM, UN, UO, UP, UQ, UR, US, UT, UY, UZ, VA, VB, VC, VD, VE, VF, VG, VH, VI, VJ, VK, VL, VM, VN, VO, VP, VQ, VR, VS, VT, VU, VV, VW, VX, VY, VZ, WA, WB, WC, WD, WE, WF, WG, WH, WI, WJ, WK, WL, WM, WN, WO, WP, WQ, WR, WS, WT, WU, WV, WW, WX, WY, WZ, XA, XB, XC, XD, XE, XF, XG, XH, XI, XJ, XK, XL, XM, XN, XO, XP, XQ, XR, XS, XT, XU, XV, XW, XX, XY, XZ, YA, YB, YC, YD, YE, YF, YG, YH, YI, YJ, YK, YL, YM, YN, YO, YP, YQ, YR, YS, YT, YU, YV, YW, YX, YZ, ZA, ZB, ZC, ZD, ZE, ZF, ZG, ZH, ZI, ZJ, ZK, ZL, ZM, ZN, ZO, ZP, ZQ, ZR, ZS, ZT, ZU, ZV, ZW, ZX, ZY, ZZ

ATTACHMENT 3
FORM 104-29-018
12X

PROJECT FARLEY 1
SYSTEM Rx Condensate System Expansion (SG)

115. Page No.	Equip. I. D. #	Generic Name	Acc. Profile	Qual. Profile	Insulation Compl.		Qual. Method	Chas. Spray	Accur.	Subst.	Licensee Action		Outstanding Items Identified by	Category of Items
					Incl'd	Date of In					Replace	Outlets		
2	N1821 PT402	PT	✓	2	-	P	P	P	P	✓	-	-	R	2
3	N1821 PT403	PT	✓	2	-	P	P	P	P	✓	-	-	R	2
4	N1821 TE410	RTD	✓	P	-	P	P	P	P	✓	-	-	-	1
5	N1821 TE413	RTD	✓	P	-	P	P	P	P	✓	-	-	-	1
6	N1821 TE420	RTD	✓	P	-	P	P	P	P	✓	-	-	-	1
7	N1821 TE413	RTD	✓	P	-	P	P	P	P	✓	-	-	-	1
8	N1821 TE430	RTD	✓	P	-	P	P	P	P	✓	-	-	-	1
9	N1821 TE433	RTD	✓	P	-	P	P	P	P	✓	-	-	-	1
10	N17802 TB	TB	✓	✓	-	✓	✓	✓	-	B	-	-	-	1
11	N17803 TB	TB	✓	✓	-	✓	✓	✓	-	B	-	-	-	1
12	N17804 TB	TB	✓	✓	-	✓	✓	✓	-	B	-	-	-	1
13	217B01 TB	TB	✓	✓	-	✓	✓	✓	-	B	-	-	-	1

3 - Equipment requires multi-action (revolution, shielding, etc.)
 4 - Qualification of subject unresolved
 a) Testing schedule but not complete
 b) Reviewer needs additional information
 c) Qual. Record search still in process
 5 - Equipment not qualified
 6 - Item identified to EQS for resolution

8 - Indicate the item is below the listed level
 9 - Indicate the item is satisfactory
 10 - Indicate the item is not applicable
 11 - Indicate the item is unresolved, licensee identified
 12 - Licensee identified
 13 - Licensee identified
 14 - Licensee identified
 15 - Licensee identified
 16 - Licensee identified
 17 - Licensee identified
 18 - Licensee identified
 19 - Licensee identified
 20 - Licensee identified
 21 - Licensee identified
 22 - Licensee identified
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 99 - Licensee identified
 100 - Licensee identified

TABLE III
FARLEY I

SYSTEM Re Contact - 5.6

ATTACHMENT I
FORM IIB 79-014
FAR

PAGE 2 OF 2

Chg. Page No.	Equip. I. D. #	Concrete Source	Recid. Profile	Qual. Profile	Insulation Compl.		Therm. Spray	Accur.	Subm.	Ecclosure Action		Outstanding Items Identified by	Category of Items
					In. Id.	Out. Id.				Replace	Relocate		
14	21TB002	TB	✓	✓	✓	-	✓	-	B	-	-	-	1
15	21TB003	TB	✓	✓	✓	-	✓	-	B	-	-	-	1
16	91T52 B012	EPA	✓	✓	✓	-	✓	-	✓	-	-	-	1
16	91T52 B030	EPA	✓	✓	✓	-	✓	-	✓	-	-	-	1
16	91T52 B040	EPA	✓	✓	✓	-	✓	-	✓	-	-	-	1
17	CABLE Y11	INSTR CABLE	✓	✓	✓	-	✓	-	✓	-	-	-	1

0 - Indicate the item is below the third level
 1 - Indicate the item is satisfactory
 2 - Indicate the item is not applicable
 3 - Indicate the item is unresolved, license identified
 4 - Proprietary
 5 - License identified
 6 - Review identified
 7 - Equipment not qualified
 8 - Item identified to LUP for resolution

PROJECT FARLEY 1

SYSTEM R/C Ambient Sys. - Responder

ATTACHMENT I
SUR IAW 79-015
1A

PAGE 1 OF 2

0053462

EIS Page No.	Equip. I.D. #	Geologic Name	Acid. Resist	Qual. Profile	Pollution Impl.		Qual. Method	Ther. Spray	Accur.	Subg.	License Action		Outstanding Items Identified by	Category of Items
					in situ	test tube					replace	relocate		
2	Q18315	SV	✓		-	-			-	B	Yes	-	L	3
3	N18312 S8047	LS	✓	48	✓	-	✓		-	B	-	N ₀	R	4B
4	P1752 R023	EPA	✓	✓	✓	-	✓		-	V	-	-	-	1
4	Q1752 R038	EPA	✓	✓	✓	-	✓		-	V	-	-	-	1
5	N18315 N0072876	T OP	✓	✓	✓	-	✓		-	B	-	N ₀	-	1
6	Q1831 LT459	LT	✓	2	P	-	P		-	V	-	-	R	2
7	Q1831 LT460	LT	✓	2	P	-	P		-	V	-	-	R	2
8	Q1831 LT461	LT	✓	2	P	-	P		-	V	-	-	R	2
9	PT455 Q1831	PT	✓	P	P	-	P		-	V	-	-	-	1
10	PT456 Q1831	PT	✓	P	P	-	P		-	V	-	-	-	1
11	PT457 CABLE	PT	✓	P	P	-	P		-	V	-	-	-	1
12	Y01 CABLE	CABLE	✓	✓	✓	-	✓		-	V	-	-	-	2

3 - Equipment requires modification (recognition, whitening, etc.)
 4 - Qualification of equipment unresolved
 a) Testing schedule but not complete
 b) Reviewer needs additional information
 c) Qual. Record search still in process
 5 - Equipment not qualified
 B - Item identified to IAW for resolution

✓ - Indicate the item is below the acid test
 ✓ or S - Indicate the item is satisfactory
 - or N - Indicate the item is not applicable
 B - Indicate the item is Buried, Buried, Buried
 P - Proprietary
 L - Equipment identified
 N - Equipment identified
 1 - Equipment is qualified
 2 - Buried, Buried, Buried, Buried, Buried

11

Earley #1

SYSTEM Feedwater Control

AT 11/17/80
FOR ILM 79-018
TER

PAGE 1 OF 4

CES. Page No.	Equip. I. D. #	Generic Name	Accid. Profile	Qual. Profile	Negotiation (by plant)		Qual. Method	7.5um. Spray	Accut.	Subm.	Licensee Action		Outstanding Items Identified by	Category of Items
					Inside	Out side					Repiece	Relocate		
C.2.4	50472	LE 5W	✓									YES	L	3
C.2.4	V0477A	SV	✓									YES	L	3
C.2.4	V0478A	SV	✓									YES	L	3
C.2.4	50478	LE 5W	✓									YES	L	3
C.2.4	V0488A	SV	✓									YES	L	3
C.2.4	V0488B	SV	✓									YES	L	3
C.2.4	50498	LE 5W	✓									YES	L	3
C.2.4	V0498A	SV	✓									YES	L	3
C.2.4	V0498B	SV	✓									YES	L	3
C.2.4	50477	LE 5W	✓									YES	L	3, **
C.2.4	V0479A	SV	✓									YES	L	3, **
C.2.4	V0479B	SV	✓									YES	L	3, **

00153464

3 - Equipment requires modification (resolution, shielding, etc.)
 4 - Qualification of equipment unresolved
 a) Testing schedule but not complete
 b) Reviewer needs additional information
 c) Quali. Record search still in process
 5 - Equipment not qualified
 6 - Item identified to IQR for resolution

B - Indicates the item is below the IQR level
 ✓ or S - Indicates the item is Satisfactory
 - or N - Indicates the item is Not Applicable
 UL - Indicates the item is Unresolved, Licensee Identified
 P - Proprietary
 L - Licensee Identified
 R - Reviewer Identified
 1 - Equipment is qualified
 2 - Aging in less than life of plant with license indicating periodic replacement

REVISED *[Signature]* DATE 11/7/80

ATTACHMENT 1
 FOR IIS 79-015
 TEB

FRUITFUL Policy #1
 SYSTEM Elevator Control

CES Page No.	Equip. I. D. #	Generic Name	Accid. Profile	Qual. Profile	Resolving Compl.		Qual. Method	Chem. Spray	Accur.	Subst.	License Action		Outstanding Items Identified by	Category of Items
					Inside	Outside					Replace	Relocate		
C.2.4 16	50489	28.5w	✓	✓	-	-	-	-	-	-	Yes	-	L	3, ** RI
C.2.4 17	10489A	SV	✓	✓	-	-	-	-	-	-	Yes	-	L	3, ** RI
C.2.4 18	10499A	SV	✓	✓	-	-	-	-	-	-	Yes	-	L	3, ** RI
C.2.4 19	50499	28.5w	✓	✓	-	-	-	-	-	-	Yes	-	L	3
C.2.4 20	10499A	SV	✓	✓	-	-	-	-	-	-	Yes	-	L	3, ** RI
C.2.4 21	10499B	SV	✓	✓	-	-	-	-	-	-	Yes	-	L	3, ** RI
C.2.4 22	A/1A	T.B/60	✓	✓	-	✓	✓	✓	-	-	-	-	-	1
C.2.4 23	A/1B	T.B/60	✓	✓	-	✓	✓	✓	-	-	-	-	-	1
C.2.4 24	A/1B	T.B/60	✓	✓	-	✓	✓	✓	-	-	-	-	-	1
C.2.4 25	AT474	T	✓	P	P	-	P	✓	P	✓	-	-	-	2
C.2.4 26	LT475	T	✓	P	P	-	P	✓	P	✓	-	-	-	2
C.2.4 27	AT476	T	✓	P	P	-	P	✓	P	✓	-	-	-	2

3 - Equipment requires modification (resolution, obsolescing, etc.)
 4 - Qualification of equipment unreviewed
 a) Testing schedule but not complete
 b) Reviewer needs additional information
 c) Qual. Record search still in process
 5 - Equipment not verified
 6 - Item identified for resolution

✓ or B - Indicates the item is below the flood level
 - or B - Indicates the item is Satisfactory
 B - Indicates the item is Not Applicable
 B - Indicates the item is Unresolved, Licensee Identified
 P - Proprietary
 L - Licensee Identified
 M - Reviewer Identified
 I - Equipment is Certified
 2 - Aging is less than life of plant with license indicating periodic replacement

REVISOR *[Signature]* DATE 11-7-80

AT COLUMBIA 1
FOR IED 79-018
TER

SYSTEM Electric Control

CLS. Page No.	Equip. I. D. #	Genetic Name	Accid. Profile	Qual. Profile	Regulation Dept. Controlling		Qual. Method	Chim. Spray	Accur.	Subs.	Licensee Action		Outstanding Items Identified by	Category of Items
					Inside	Outside					Replace	Relocate		
C.2.4. 28	TT-484	T	✓	P	P	-	P	✓	P	✓	-	-	-	2
C.2.4. 29	TT-485	T	✓	P	P	-	P	✓	P	✓	-	-	-	2
C.2.4. 30	TT-486	T	✓	P	P	-	P	✓	P	✓	-	-	-	2
C.2.4. 31	TT-487	T	✓	P	P	-	P	✓	P	✓	-	-	-	2
C.2.4. 32	TT-488	T	✓	P	P	-	P	✓	P	✓	-	-	-	2
C.2.4. 33	TT-489	T	✓	P	P	-	P	✓	P	✓	-	-	-	2
C.2.4. 34	TT-490	T	✓	P	P	-	P	✓	P	✓	-	-	-	2
C.2.4. 35	TT-491	T	✓	P	P	-	P	✓	P	✓	-	-	-	2
C.2.4. 36	TT-492	T	✓	P	P	-	P	✓	P	✓	-	-	-	2
C.2.4. 37	TT-493	T	✓	P	P	-	P	✓	P	✓	-	-	-	2
C.2.4. 38	TT-494	T	✓	P	P	-	P	✓	P	✓	-	-	-	2
C.2.4. 39	TT-495	T	✓	P	P	-	P	✓	P	✓	-	-	-	2

3 - Equipment requires modification (resolution, shielding, etc.)
 4 - Qualification of equipment not unresolved
 a) Testing schedule not complete
 b) Reviewer needs additional information
 c) Qual. Record search still in process
 5 - Equipment not qualified
 6 - Item identified to EIS for resolution

REVIEWER AS/eff DATE 11/2/80

ATTACHMENT 1
FOR LEB 75-018
TEN

SYSTEM Feedwater Control
Fairley #1

CBS Page No.	Equip. I. D. #	Generic Name	Acid. Profile	Qual. Profile	Radiation Containment		Qual. Method	Chem. Spray	Accur.	Subm.	Licensee Action		Outstanding Items Identified by	Category of Items
					Inside	Outside					Replace	Relocate		
C.2.4 40	E-110 S012	ERA	✓	✓		✓	✓			✓				✓
C.2.4 41	S078 E-130 Cable Code Y01	CBA	✓	✓		✓	✓			✓				✓
C.2.4 42	CANs cable R11 A1A	CBL	✓	✓		✓	✓							✓

Code:

B = Indicates the item is below the flood level
 ✓ or B = Indicates the item is Satisfactory
 - or N = Indicates the item is Not Applicable
 UL = Indicates the item is Unresolved, Licensee Identified
 P = Proprietary
 L = Licensee Identified
 R = Reviewer Identified
 I = Equipment is qualified
 2 = Aging in less than life of plant with license indicating periodic replacement
 3 = Equipment requires modification (resolution, shielding, etc.)
 4 = Qualification of equipment unresolved
 a) Testing schedule but not complete
 b) Reviewer needs additional information
 c) Qual. Record search still in process
 5 = Equipment not qualified
 6 = Item identified to IPR for resolution

REVIEWER *[Signature]* DATE 11-2-80

APPENDIX 1
FOR IIS 19-016
IIS

SYSTEM Perky #1
28 Regards Sp, 44R/2HSI

CIS. Page No.	Equip. I. D. #	Equip. Name	Accid. Possible	Qual. Profile	Reg. Ins. Cont. Insuring		Qual. Method	Chm. Spray	Accur.	Subs.	License Status		Outstanding Items Identified by	Category of Items
					Inside	Outside					Replace	Relocate		
C.2.5														
2	AT357A	T	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
C.2.5														
3	AT357B	T	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
C.2.5														
4	Book	EPA	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1
C.2.6														
5	Cable	Cable	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1

Code:

8 = Indicate the item is below the flood level
 ✓ or 5 = Indicate the item is Satisfactory
 - or R = Indicate the item is Not Applicable
 BL = Indicate the item is Buried, Licenses Identified
 P = Proprietary
 L = License Identified
 2 = Review Identified
 1 = Equip. is qualified
 2 = Aging is less than life of plant with licenses
 Indicating periodic replacement

3 = Equipment requires modification (resolution, shielding, etc.)
 4 = Application of equipment unresolved
 a) - safety schedule but not complete
 b) - level needs additional information
 c) - Qual. Record search still in process
 5 = Equipment not qualified
 6 = Item identified to EIP for resolution

REVIEWER CPA DATE 4/7/80

FOR 12.79
SYSTEM *Farley's
Container Co. Inc. & Assoc.*

C.S. Page No.	Equip. S. No.	Generic Name	Accid. Profile	Qual. Profile	Exp. Cont. Amend.		Qual. Method	Check / Copy	Accur.	Subm.	Licenses Action		Outstanding Items Identified by	Category of Items
					Inside	Outside					Replace	Relocate		
4	91619	MOV	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1
5	91617	MOV	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1
6	91618	SU	✓	✓	✓	✓	✓	✓	yes	-	-	L	R	3
7	91612	LS	✓	✓	✓	✓	✓	✓	yes	-	-	L	R	3
8	91613	SV	✓	✓	✓	✓	✓	✓	yes	-	-	L	R	3
9	91614	LS	✓	✓	✓	✓	✓	✓	yes	-	-	L	R	3
10	91615	SV	✓	✓	✓	✓	✓	✓	yes	-	-	L	R	3
11	91616	LS	✓	✓	✓	✓	✓	✓	yes	-	-	L	R	3
12	91617	SV	✓	✓	✓	✓	✓	✓	yes	-	-	L	R	3
13	91618	LS	✓	✓	✓	✓	✓	✓	yes	-	-	L	R	3
14	91619	SV	✓	✓	✓	✓	✓	✓	yes	-	-	L	R	3
15	91620	LS	✓	✓	✓	✓	✓	✓	yes	-	-	L	R	3
16	91621	SV	✓	✓	✓	✓	✓	✓	yes	-	-	L	R	3

Code:

- ✓ or 3 - Indicates the item is below the flood level
- or H - Indicates the item is satisfactory
- UL - Indicates the item is not applicable
- Y - Indicates the item is unresolved, licensee identified
- Y - Proprietary
- L - Licensee identified
- R - Reviewer identified
- 3 - Equipment is qualified
- 2 - Aging is less than life of plant with licensee indicating periodic replacement
- 1 - Equipment requires modification (resolution, shielding, etc.)
- 4 - Qualification of equipment unresolved
 - a) Testing schedule not complete
 - b) Reviewer needs additional information
 - c) Qual. Record search still in process
- 5 - Equipment not qualified
- 6 - Item identified to EOP for resolution

REVIEWER *Vilbrander* DATE *11/6/89*

ATTACHMENT I
FORM 115 79-018
TLM

Forley A
Sampsony (CIPIS)

CBS. Page No.	Equip. I. D. #	Genetic Name	Accid. Profile	Qual. Profile	Regul. Typ. Impl. Cont. Touch		Qual. Method	Chem. Spray	Accur.	Vib.	License Action		Outstanding Items Identified by	Category of Item
					Inside	Outside					Replace	Relocate		
16	3180A	SV	L	3	3	-	3	-	-	-	-	4rs	L	3
17	2S Limit 3180A SW	SV	L	4b	L	-	4b	-	-	-	-	-	R	4b
18	SV 3180B	SV	L	3	3	-	3	-	-	-	-	4rs	L	3
19	2S Limit 3180B SW	SV	L	4b	L	-	4b	-	-	-	-	-	R	4b
20	3180C	SV	L	3	3	-	3	-	-	-	-	4rs	L	3
21	2S Limit 3180C SW	SV	L	4b	L	-	4b	-	-	-	-	-	R	4b
22	SV 3181A	SV	L	3	3	-	3	-	-	-	-	4rs	L	3
23	2S Limit 3181A SW	SV	L	4b	L	-	4b	-	-	-	-	-	R	4b
24	SV 3181B	SV	L	3	3	-	3	-	-	-	-	-	L	3
25	2S Limit 3181B SW	SV	L	4b	L	-	4b	-	-	-	-	yes	R	4b
26	SV 3181C	SV	L	3	3	-	3	-	-	-	-	-	L	3
27	2S Limit 3181C SW	SV	L	4b	L	-	4b	-	-	-	-	4rs	R	4b

3 - Equipment requires modification (resolution, shieling, etc.)

4 - Qualification of equipment unresolved

5 - Testing schedule but not complete

6 - Reviewer needs additional information

7 - Qual. Record search still in process

8 - Equipment not qualified

9 - Item identified to EIR for resolution

B - Indicates the item is below the blood level

C - Indicates the item is satisfactory

D - Indicates the item is not applicable

DL - Indicates the item is downgraded, License Identified

P - Proprietary

L - Licenses Identified

R - Reviewer Identified

3 - Equipment is qualified

4 - Aging is less than life of plant with license indicating periodic replacement

REVIEWER *W. [Signature]* 1/7/80

Facility: Falvey 1
System: 2200 Phos (RIPs)

0053471

CES. Page No.	Equip. I. D. #	Generic Name	Accid. Profile	Qual. Profile	Maintain. (Qual. Inform.)		Qual. Method	Chem. Spray	Accur.	Subm.	Licensee Action		Outstanding Items Identified by	Category of Items
					Inside	Outside					Replace	Relocate		
28	SV 3104	SV	L	3	-	3	-	-	-	-	4rs	-	L	3
29	25 3104	Limit	L	4b	-	4b	-	-	-	-	-	-	R	4b
30	SV 3109 A-1/3B	T ⁴ BIK IB	L	L	-	L	L	-	-	-	-	-	-	1
31	SV 3765 A/3B	T ⁴ B ⁴ IB	L	L	-	L	L	-	-	-	-	-	-	1
32	01752 B007	EPA	L	L	-	L	L	-	-	-	-	-	-	1
	B019	EPA	L	L	-	L	L	-	-	-	-	-	-	1
	B020	EPA	L	L	-	L	L	-	-	-	-	-	-	1
33	01915 SV 3164 A/3B	T ⁴ BIK IB	L	L	-	L	L	-	-	-	-	-	-	1
34	SV 3179 A-1/3B	T ⁴ BIK IB	L	L	-	L	L	-	-	-	-	-	-	1
35	SV 3179 0-A/3B	T ⁴ BIK IB	L	L	-	L	L	-	-	-	-	-	-	1
36	SV 3179 2-0/3B	T ⁴ BIK IB	L	L	-	L	L	-	-	-	-	-	-	1
37	SV 3664 A/3B	T ⁴ BIK IB	L	L	-	L	L	-	-	-	-	-	-	1

B - Indicates the item is below the flood level
 ✓ or S - Indicates the item is Satisfactory
 - or B - Indicates the item is Not Applicable
 UL - Indicates the item is Unresolved, Licensee Identified
 P - Proprietary
 L - Licensee Identified
 R - Reviewer Identified
 1 - Equipment is qualified
 2 - Aging is less than life of plant with licensee participating periodic replacement
 3 - Equipment requires modification (resolution, shielding, etc.)
 4 - Qualification of equipment unresolved
 a) Testing schedule but not complete
 b) Reviewer needs additional information
 c) Qual. Record overb still in process
 5 - Equipment not qualified
 6 - Item identified to LIR for resolution

REVIEWER: Arthur E. Davis DATE: 4/7/80

ATLAS MODEL 1
FOR SER 79-018
TLR

PROJECT Farley I
SYSTEM Sampling (QIPJ5)

CBS Page No.	Equip. I. D. #	Genetic Name	Acctd. Profile	Qual. Profile	Regulation Check		Qual. Method	Chem. Spray	Accur.	Subst.	Licensee Action		Outstanding Items Identified by	Category of Items
					In Side	Out Side					Replace	Relocate		
38	SV3180 L-A/30	T-BLK J-B	L	L	L	-	L	-	-	-	-	-	-	1
39	SV3180 C-Q/3B	T-BLK J-B	L	L	L	-	L	-	-	-	-	-	-	1
40	SV3181 A-M/5D	T-BLK J-B	L	L	L	-	L	-	-	-	-	-	-	1
41	SV3181 B-M/5B	T-BLK J-B	L	L	L	-	L	-	-	-	-	-	-	1
42	SV3181 C-B/5B	T-BLK J-B	L	L	L	-	L	-	-	-	-	-	-	1
43	SV3189 A-1/3B	T-BLK J-B	L	L	L	-	L	-	-	-	-	-	-	1
44	code R11	cable	L	L	L	-	L	-	-	-	-	-	-	1
44	code 23	↓	L	L	L	-	L	-	-	-	-	-	-	1
44	code W01	↓	L	L	L	-	L	-	-	-	-	-	-	1

Code:

0 - Indicate the item is below the flood level
 1 - or 2 - Indicate the item is Satisfactory
 3 - Indicate the item is Not Applicable
 4 - Indicate the item is Unremoved, Licensee Identified
 5 - Proprietary
 6 - Licensee Identified
 7 - Reviewer Identified
 8 - Equipment is qualified
 9 - Aging is less than 15% of plant with licensee
 Indefinite periodic replacement

3 - Equipment requires modification (resolution, shielding, etc.)
 4 - Qualification of equipment unresolved
 a) Testing schedule not complete
 b) Reviewer needs additional information
 c) Qual. Record search still in process
 5 - Equipment not qualified
 6 - Item identified to RIB for resolution

REVIEWER M.D. Bennett DATE 11/7/80

FOR ILS 79-018
TEN

Foray 1
Service Worker

CES Page No.	Equip. I. D. #	Generic Name	Accid. Profile	Qual. Profile	Regulation Compl. Containment		Qual. Method	Chem. Spray	Accur.	Sube.	Licensee Action		Outstanding Items Identified by	Category of Items
					Inside	Outside					Replace	Relocate		
3	Q1P16V 207A	MDV	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1
4	Q1P16V 207B	MDV	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1
5	Q1P16V 207C	MDV	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1
6	Q1P16V 207D	MDV	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1
7	Q1P16V 081	MDV	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1
8	Q1T32 8005	EPA	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1
8	" 8007	EPA	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1
8	" 8014	EPA	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1
8	" 8015	EPA	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1
8	" 8019	EPA	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1
8	" 8020	EPA	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1
9	804	CEL	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1

3 - Equipment requires modification (resolution, shielding, etc.)
 4 - Qualification of equipment unresolved
 a) Testing schedule but not complete
 b) Reviewer needs additional information
 c) Quali. Record search still in process
 5 - Equipment not qualified
 6 - Item identified to EPA for resolution

8 - Indicated the item is below the flood level
 ✓ or 5 - Indicates the item is Satisfactory
 - or H - Indicates the item is Not Applicable
 UL - Indicates the item is Unresolved, Licensee identified
 P - Proprietary
 L - Licensee identified
 R - Reviewer identified
 1 - Equipment is qualified
 2 - Aging is less than life of plant with licensees indicating periodic replacement

REVIEWER W. W. W. W. DATE 1/17/80

Farley
 SYSTEM COMPANIES, INC.

AS LOW AS \$1000
 FOR ITEM 29-018
 TER

0053475

CES. Page No.	Equip. I. D. #	Genetic Name	Accid. Profile	Qual. Profile	Regulatory Qual. (containing)		Qual. Method	Chem. Spray	Accur.	Subm.	Licensee Action		Outstanding Items Identified by	Category of Items
					Inside	Outside					Replace	Relocate		
2	Q1P1TV 097	A12U	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1
3	Q1P1TS 3184	SV							yes				L	3
4	Q1P1TZ 53184	LS	✓	46	✓	✓	✓	✓	-	✓	-	R		46
5	Q1P1TS 3443	SV							yes				L	3
6	Q1P1TZ 53443	LS	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1
7	Q1T52 B016	EPA	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1
7	" B019	EPA	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1
7	" B020	EPA	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1
7	" B033	EPA	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1
7	" L041	EPA	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1
8	Q1P1TS V3054-B	TB/BB	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1
9	Q1P1TS V3443-B	TE/BE	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1

3 - Equipment requires modification (resolution, obsolescing, etc.)
 4 - Qualification of equipment uncompleted
 a) Testing schedule but not complete
 b) Reviewer needs additional information
 c) Qual. Record search still in process
 5 - Equipment not qualified
 6 - Item identified to ERM for resolution

3 - Indicates the item is below the flood level
 4 - Indicates the item is Satisfactory
 5 - Indicates the item is Not Applicable
 L - Indicates the item is Unresolved, Licensee Identified
 P - Proprietary
 L - Licensee Identified
 R - Reviewer Identified
 I - Equipment is qualified
 2 - Aging is less than life of plant with licensee indicating periodic replacement

REVIEWER: *M. Roberts* 11/7/80
 DATE

FOR THE 79-01M
 TER
 SYSTEM Company's
 FAYBY 1

ESS. Page No.	Equip. I. D. #	Genetic Name	Accid. Profile	Qual. Profile	Radiation Contamination		Qual. Method	Chem. Sp. ay	Accur.	Subm.	Licensee Action		Outstanding Items Identified by	Category of Items
					Inside	Outside					Replace	Recreate		
10	J04	CEL	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
10	R11	CEL	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
10	R23	CBL	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
10	W01	CBL	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
11	Y01	CBL	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Code:

- ✓ or B - Indicates the item is below the flood level
- or N - Indicates the item is Satisfactory
- . BL - Indicates the item is Not Applicable
- P - Proprietary
- L - Licensee Identified
- R - Reviewer Identified
- I - Equipment is qualified
- 2 - Aging is less than life of plant with licensees indicating periodic replacement
- 3 - Equipment requires modification (resolution, shielding, etc.)
- 4 - Qualification of equipment unresolved
 - a) Testing schedule but not complete
 - b) Reviewer needs additional information
 - c) Qual. Record search still in process
- 5 - Equipment not qualified
- 6 - Item identified to EEP for resolution

REVIEWER VBK DATE 11/1/80

0053477

ATTACHMENT 2
FUNCTIONS/SYSTEMS LIST
(W) PWR
Needed For Mitigation Of Consequences
Of LOCA Or MSLE

1. Reactor Protection
2. Safeguards Actuation
3. Containment Isolation
4. Main and Auxiliary Steam Isolation
5. Main and Auxiliary Feedwater Isolation
6. Feedwater Control
7. Containment Spray
8. Containment Air Purification/Cleanup
9. Containment Ventilation/Cooling
10. Containment Combustible Gas Control
11. High Pressure Injection
12. Low Pressure Injection
13. Accumulators
14. Residual Heat Removal
15. Chemical and Volume Control
16. Pressurizer Spray
17. Power Operated Relief Valves
18. Steam Dump
19. Containment Radiation/Monitoring
20. Containment Radiation/Sampling
21. Component Cooling Water
22. Service Water
23. Emergency Power
24. Containment Sump
25. Control Room Habitability
26. Safety Equipment Area Ventilation
27. Auxiliary Feedwater
28. Reactor Coolant

ATTACHMENT 3

LIST OF DOCUMENTS THAT SUPPORT ENVIRONMENTAL QUALIFICATION OF
LICENSEE'S EQUIPMENT

1. WCAP 9157 - Environmental Qualification of Safety-Related Class IE Process Instrumentation (Westinghouse Proprietary - Class 2) and Westinghouse letter APW-A-5141 dated February 14, 1980.
2. Wyle Laborat: NEQ Test Report 44354-1 dated March 8, 1979.
3. General Electric Company Report -Low Voltage Electrical Containment Penetration Qualification Test Report.
4. Boston Insulated Wire and Cable Company Test Report 73E062 dated September 7, 1973 and Test Report 74A023 dated January 24, 1974.
5. Westinghouse letter APW-A-5141 dated February 14, 1980 and Westinghouse letter NS-TMA-2184, Anderson to Stoltz (Test)(Westinghouse Proprietary - Class 2).
6. Automatic Switch Company Test Report AQS 21678/TR.
7. Acme - Cleveland Development Company Qualification Report for NAMCO Controls Limit Switch Model EA-180 dated November 21, 1977.
8. WCAP 8541 -Topical Report -Seismic and Environmental Testing of Foxboro Transmitters (Westinghouse Proprietary Class 2) and Westinghouse letter APW-A-5141 dated February 14, 1980.
9. The Okonite Company Engineering Report No. 141 dated February 29, 1972 and Report 143 dated March 20, 1972.
10. Wyle Laboratories Test Plan 545/0859/ES for Level Transmitters for Delaval/Gems Sensor Division, dated October 6, 1978.
11. Limitorque Corporation Test Report 600456 dated December 9, 1975.
12. Joy Manufacturing Company Qualification Test Report X-604 for Containment Coolers.
13. WCAP 7820 with Supplements 1 through 4, and Westinghouse letter to SCS1 (O. Batum) dated February 14, 1980 for Electric Hydrogen Recombiners.
14. Limitorque Corporation Technical Report No. F-C3441 dated September 1972.
15. Limitorque Corporation Technical Report No. F-C2232-01 dated November 1968.
16. Franklin Institute Research Laboratory Test Report F-C3834 dated March 1974.

Attachment 4
 OUTSTANDING ITEMS
 As Identified By
 Licensee

C E S Page No.	ITEM (See Code)	DISPOSITION				Disposition Schedule, Notes
		Replace	Modify	Ongoing Analysis	Other	
C.2.3-2	SV	X				1
C.2.4-4	LS	X				1
C.2.4-5	SV	X				1
C.2.4-6	SV	X				1
C.2.4-7	LS	X				1
C.2.4-8	SV	X				1
C.2.4-9	SV	X				1
C.2.4-10	LS	X				1
C.2.4-11	SV	X				1
C.2.4-12	SV	X				1
C.2.4-13	LS	X				1
C.2.4-14	SV	X				1
C.2.4-15	SV	X				1
C.2.4-16	LS	X				1
C.2.4-17	SV	X				1
C.2.4-18	SV	X				1
C.2.4-19	LS	X				1

Attachment 4
 OUTSTANDING ITEMS
 As Identified By
 License.

C E S Page No.	ITEM (See Code)	DISPOSITION				Disposition Schedule, Notes
		Replace	Modify	Ongoing Analysis	Other	
C.2.4-20	SV	X				1
C.2.4-21	SV	X				1
C.2.6-6	SV	X				1
C.2.6-8	SV	X				1
C.2.6-10	SV	X				1
C.2.6-12	SV	X				1
C.2.6-14	SV	X				1
C.2.6-16	SV	X				1
C.2.8-2	MTR				X	2
C.2.8-3	MTR				X	2
C.2.8-4	MTR				X	2
C.2.8-5	MTR				X	2
C.2.9-7	SV	X				1
C.2.9-11	SV	X				1
C.2.9-13	SV	X				1
C.2.9-15	SV	X				1
C.2.9-2	SV	X				1

Attachment 4
 OUTSTANDING ITEMS
 As Identified By
 Licensee

CES Page No.	ITEM (See Code)	DISPOSITION				Disposition Schedule, Notes
		Replace	Modify	Ongoing Analysis	Other	
C.2.12-5	SV	X				1
C.2.12-6	SV	X				1
C.2.13-5	LS	X				1
C.2.13-6	SV	X				1
C.2.13-7	SV	X				1
C.2.13-8	LS	X				1
C.2.13-9	SV	X				1
C.2.13-10	SV	X				1
C.2.13-11	LS	X				1
C.2.13-12	SV	X				1
C.2.13-13	SV	X				1
C.2.13-14	LS	X				1
C.2.13-15	SV	X				1
C.2.13-16	SV	X				1
C.2.13-17	LS	X				1
C.2.13-18	SV	X				1
C.2.13-19	SV	X				1

Attachment 4
 OUTSTANDING ITEMS
 As Identified By
 Licensee

C E S Page No.	ITEM (See Code)	DISPOSITION				Disposition Schedule, Notes
		Replace	Modify	ONGOING Analysis	Other	
C.2.13-20	LS	X				1
C.2.13-21	SV	X				1
C.2.13-22	SV	X				1
C.2.13-23	LS	X				1
C.2.13-24	SV	X				1
C.2.13-25	LS	X				1
C.2.13-26	SV	X				1
C.2.13-27	LS	X				1
C.2.13-28	SV	X				1
C.2.13-29	SV	X				1
C.2.13-30	LS	X				1
C.2.13-31	SV	X				1
C.2.13-32	LS	X				1
C.2.13-33	SV	X				1
C.2.13-34	LS	X				1
C.2.13-38	LS	X				1
C.2.13-39	LS	X				1

0053483

Attachment 4
 OUTSTANDING ITEMS
 As Identified By
 Licensee

C E S Page No.	ITEM (See Code)	DISPOSITION				Disposition Schedule, Notes
		Replace	Modify	Ongoing Analysis	Other	
C.2.13-40	LS	X				1
C.2.13-50	LS	X				1
C.2.13-51	LS	X				1
C.2.13-52	LS	X				1
C.2.14-2	SV	X				1
4-3	LS	X				1
C.2.14-4	SV	X				1
C.2.14-5	LS	X				1
C.2.14-6	SV	X				1
C.2.14-7	LS	X				1
C.2.14-8	SV	X				1
C.2.14-9	LS	X				1
C.2.16-7	LS	X				1
C.2.16-8	SV	X				1
C.2.16-9	LS	X				1
C.2.16-10	SV	X				1
C.2.16-11	LS	X				1

0053484

Attachment 4
 OUTSTANDING ITEMS
 As Identified By
 Licensee

C E S Page No.	ITEM (See Code)	DISPOSITION				Disposition Schedule, Notes
		Replace	Modify	Ongoing Analysis	Other	
C.2.16-12	SV	X				1
C.2.16-13	LS	X				1
C.2.16-14	SV	X				1
C.2.16-15	LS	X				1
C.2.16-16	SV	X				1
C.2.16-17	LS	X				1
C.2.16-18	SV	X				1
C.2.17-2	SV	X				1
C.2.17-3	LS	X				1
C.2.17-4	SV	X				1
C.2.17-5	LS	X				1
C.2.17-6	SV	X				1
C.2.17-7	LS	X				1
C.2.18-4	SV	X				1
C.2.18-6	SV	X				1
C.2.18-8	SV	X				1
C.2.18-10	SV	X				1

ATTACHMENT 5
FOR IIS 79-18
TER

PAGE 2 OF 4

FILED FOR KEY 1
SYSTEM Centennial Center by of page 2

CES. Page No.	Equip. I. D. #	Genetic Name	Ac. ID. Profile	Qual. Profile	Radiation Dose		Qual. Method	Ches. Spray	Accut.	Sub.	Licensee Action		Outstanding Issue Identified by	Category of Issue
					Inside	Outside					Replace	Relocates		
17	Q1E122 53498	LS	✓	4W	✓	-	✓	-	✓	-	-	-	R	4f
18	Q1E12A MTR	MTR	✓	✓	✓	-	✓	-	-	-	-	-	-	1
19	Q1E12 MTR	MTR	✓	✓	✓	-	✓	-	-	-	-	-	-	1
20	Q1E12 MTR	MTR	✓	✓	✓	-	✓	-	-	-	-	-	-	1
21	Q1E12 MTR	MTR	✓	✓	✓	-	✓	-	-	-	-	-	-	1
22	Q1P135V 3176-B	TA/JO	✓	✓	✓	-	✓	-	-	-	-	-	-	1
23	Q1T52 6001	EPA	✓	✓	✓	-	✓	-	-	-	-	-	-	1
23	Q1E12 8002	EPA	✓	✓	✓	-	✓	-	-	-	-	-	-	1
23	Q1E12 8005	EPA	✓	✓	✓	-	✓	-	-	-	-	-	-	1
23	Q1E12 8026	EPA	✓	✓	✓	-	✓	-	-	-	-	-	-	1
23	Q1E12 8007	EPA	✓	✓	✓	-	✓	-	-	-	-	-	-	1
23	Q1E12 8019	EPA	✓	✓	✓	-	✓	-	-	-	-	-	-	1
23	Q1E12 8028	EPA	✓	✓	✓	-	✓	-	-	-	-	-	-	1

Code:

- B - Indicates the item is below the flood level
- ✓ or Q - Indicates the item is Satisfactory
- or - - - - - Indicates the item is Not Applicable
- 1 - Indicates the item is Unresolved, Licensee Identified
- 2 - Proprietary
- L - Licensee Identified
- R - Reviewer Identified
- 1 - Equipment is qualified
- 2 - Aging is less than life of plant with licensee indicating periodic replacement
- 3 - Equipment requires modification (resolution, shielding, etc.)
- 4 - Qualification of equipment unresolved
 - a) Testing schedule but not complete
 - b) Reviewer needs additional information
 - c) Qual. Record search still in process
- 5 - Equipment not qualified
- 6 - Item identified to EQB for resolution

REVIEWER K. Brown DATE 11/6/80

ATTACHMENT 1
FOR IEB 79-018
TR

Farley
Centennial City of Playa

CAS. Page No.	Equip. I. D. #	Genetic Name	Accid. Profile	Qual. Profile	Regulation Compl.		Qual. Method	Chim. Spray	Accur.	Subm.	Licensee Action		Outstanding Items Identified by	Category
					Inside	Outside					Replace	Relocate		
23	21752	EPA	✓	✓	✓		✓		✓					1
23	B022	EPA	✓	✓	✓		✓		✓					1
24	"	EPA	✓	✓	✓		✓		✓					1
24	B025	EPA	✓	✓	✓		✓		✓					1
24	"	EPA	✓	✓	✓		✓		✓					1
25	B041	EPA	✓	✓	✓		✓		✓					1
25	91P1350	7B/1R	✓	✓	✓		✓		✓					1
26	26670-0	7B/1R	✓	✓	✓		✓		✓					1
26	91P1350	7B/1R	✓	✓	✓		✓		✓					1
27	317-0	7B/1R	✓	✓	✓		✓		✓					1
27	2473502	7B/1R	✓	✓	✓		✓		✓					1
28	8668-0	7B/1R	✓	✓	✓		✓		✓					1
28	81E/1350	7B/1R	✓	✓	✓		✓		✓					1
28	3999A-4	7B/1R	✓	✓	✓		✓		✓					1
29	91E1350	7B/1R	✓	✓	✓		✓		✓					1
29	3999A-0	7B/1R	✓	✓	✓		✓		✓					1
30	Y01	CBL	✓	✓	✓		✓		✓					1
31	J09	CBL	✓	✓	✓		✓		✓					1
31	W01	CBL	✓	✓	✓		✓		✓					1

Code:

6 = Indicates the item is below the floor level
 ✓ or S = Indicates the item is Satisfactory
 - or N = Indicates the item is Not Applicable
 UL = Indicates the item is Unresolved, Licensee Identified
 P = Proprietary
 L = Licensee Identified
 R = Reviewer Identified
 I = Equipment is qualified
 2 = Aging is less than life of plant with licensee indicating periodic replacement

3 = Equipment requires modification (resolution, shielding, etc.)
 4 = Qualification of equipment unresolved
 a) Testing schedule but not complete
 b) Reviewer needs additional information
 c) Qual. Record search still in process
 5 = Equipment not qualified
 6 = Item identified to EGB for resolution

REVIEWER V. Brindle DATE 11/6/50

Forley 1
Hydrogen Recombiner System

ALL INFORMATION IS
FOR IEB 79-018
TRR

CES Page No.	Equip. I. D. #	Generic Name	Accid. Profile	Qual. Profile	Regulation Compl.		Qual. Method	Chem. Spray	Accur.	Subm.	Licensee Action		Outstanding Items Identified by	Category of Item
					Inside	Outside					Replace	Relocate		
2	41617 KOWAN	EHR	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	41617K 205-B	EHR	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4	41728 001	EPA	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4	11 023	EPA	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4	11 024	EPA	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4	11 042	EPA	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
5	708	CBL	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
6	431	CBL	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Code:
 3 - Equipment requires modification (resolution, sharding, etc.)
 4 - Qualification of equipment unresolved
 a) Testing schedule but not complete
 b) Reviewer needs additional information
 c) Qual. Record search still in process
 5 - Equipment not qualified
 6 - Item identified to EQB for resolution

REVIEWER *V. Brown* DATE *11/6/80*

ATTACHMENT 1
 FOR IIR 79-018
 TLR

Facility Fairley 2
 SYSTEM CVES/ST

App. Page No.	Equip. I. D. #	Generic Name	Accid. Profile	Regulation Dept. Containment		Qual. Method	Chm. Spray	Accur.	Subs.	Licensee Action		Outstanding Item Identified by	Category of Item
				Inside	Outside					Replace	Relocate		
16	Q1E2Z	Limit SW	46	L	-	4b	-	-	B	-	-	R	4b
17	S808A SW Q1E21 AS 8808 SW	Limit SW	4b	L	-	4b	-	-	B	-	-	R	4b
18	Q1E2Z	Limit SW	4b	L	-	4b	-	-	B	-	-	R	4b
19	SV 511 M1B	J Box	L	L	-	4	-	-	-	-	-	-	1
20	M1E21 SV 517 AA-A/SB	J Box	L	L	-	L	-	-	B	-	-	-	1
21	M1E21 SV 517 A-A/SB	J Box	L	L	-	L	-	-	B	-	-	-	1
22	M1E21 SV 519 AA-A/SB	J Box	L	L	-	L	-	-	B	-	-	-	1
23	Q1E2Z B002	EPA	L	L	-	L	-	-	-	-	-	-	1
	B006												
	B014												
	B016												
	B019												

Code:

B = Indicated the item is below the flood level
 ✓ or S = Indicated the item is Satisfactory
 - or R = Indicated the item is Not Applicable
 UL = Indicated the item is Unresolved, Licensee Identified
 P = Proprietary
 L = Licensee Identified
 N = Manufacturer Identified
 I = Equipment is qualified
 Z = Aging is less than life of plant with licensees indicating periodic replacement

3 = Equipment requires modification (resolution, shielding, etc.)
 4 = Qualification of equipment unresolved
 a) Testing schedule but not complete
 b) Reviewer needs additional information
 c) Qual. Record search still in process
 5 = Equipment not qualified
 6 = Item identified to EIP for resolution

REVIEWER M. DeLeon DATE 11/7/83

REVIEWER: *W.D. Henderson* 11/14/80

Farley J

SYSTEM Contaminant Test Log A Air Mixing (E-19)

Chs. Page No.	Equip. I. D. #	Generic Name	Accid. Profile	Qual. Profile	Replication Qual.		Qual. Method	Chem. Spray	Accnt.	Subs.	Licensee Action		Outstanding Items Identified by	Category of Item
					Inside	Outside					Replace	Relocate		
2	Q1E19	MTR	✓	✓	✓	✓	4C	✓	-	-	-	-	L	4C
3	M001A	↓	✓	✓	✓	✓	4C	✓	-	-	-	-	L	4C
4	Q1E19	↓	✓	✓	✓	✓	4C	✓	-	-	-	-	L	4
5	M001D	↓	✓	✓	✓	✓	4C	✓	-	-	-	-	L	4C
6	Q1T52	↓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1
6	B002	↓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1
6	Q1T52	EPA	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1
6	B015	↓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1
6	Q1T52	↓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1
7	B017	↓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1
7	IVAF A	cobble	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1
7	J5Q	↓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1
7	IVAF A	↓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1
7	I5Q	↓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1
7	IVAF A	↓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1
7	I4Q	↓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1
7	IVAF A	↓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1
7	I3Q	↓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	1

3 - Equipment requires modification (resolution, shielding, etc.)
 4 - Qualification of equipment unresolvable
 a) Testing schedule but not complete
 b) Reviewer needs additional information
 c) Qual. Record search still in process
 5 - Equipment not qualified
 6 - Item identified to EQB for resolution

8 - Indicates the item is below the flood level
 9 - Indicates the item is satisfactory
 - or H - Indicates the item is Not Applicable
 dl - Indicates the item is Date Resolved, Licensee Identified
 P - Proprietary
 L - Licensee Identified
 R - Reviewer Identified
 I - Equipment is qualified
 - Aging is less than life of plant with license indicating periodic replacement

A-1119 information omitted but motor is the same series shown on drawing

REVIEWER *Handwritten signature* 4/7/80

FAILEY
SYSTEM *CVCS/5I*

ATTACHMENT 1
FOR FEB 79-018
TEN

CRS. Page No.	Equip. I. D. #	Genetic Name	Accid. Profile	Qual. Profile	Regulatory Compl.		Chub. Spray	Accur.	Subm.	Licensee Action		Outstanding Items Identified by	Category of Items
					In Side	Out Side				Repleco	Relocate		
4	D1E21	MOV	V	V	-	V	V	-	B	-	-	-	1
5	VD38A G1E21	MOV	V	V	-	V	V	-	B	-	-	-	1
6	VD38B Q1E21	MOV	V	V	-	V	V	-	B	-	-	-	1
7	VD38C D1E21	MOV	V	V	-	V	V	-	B	-	-	-	1
8	SV6671 N1E21R	Limit	V	3	-	3	-	-	-	Yes	-	L	3
9	38971 D1E21	Switch	V	46	-	V	V	-	L	-	-	R	46
10	VD38A N1E21	MOV	V	V	-	V	V	-	B	-	-	-	1
11	38971 Q1E21	Switch	V	V	-	46	V	-	B	-	-	R	46
12	SV9147A N1E21	SV	V	3	-	3	-	-	-	Yes	-	L	3
13	38971 Q1E21	SW	V	46	-	V	V	-	B	-	-	R	46
14	VD38B N1E21	MOV	V	V	-	V	V	-	-	Yes	-	L	3
15	38971 SV Q1E21	SW	V	46	-	V	V	-	B	-	-	R	46
15	SV Q1E21	SV	V	3	-	V	V	-	-	Yes	-	L	3

Code:
 0 - Indicated the item is below the flood level
 1 - Indicates the item is Satisfactory
 2 - or 3 - Indicate the item is Not Applicable
 BL - Indicate the item is Unresolved, Licensee identified
 P - Proprietary
 L - Licensee identified
 R - Reviewer identified
 1 - Equipment is qualified
 2 - Aging is less than life of plant with licensee indicating periodic replacement
 3 - Equipment requires modification (revolution, abiding, etc.)
 4 - Qualification of equipment unresolved
 a) Testing schedule but not complete
 b) Reviewer needs additional information
 c) Qual. Record search still in process
 5 - Item identified to LQB for resolution
 6 - Item identified to LQB for resolution

FACILITY Farley 7
 SYSTEM CVCS/SE

A-FACILITY 1
 FOR FEB 79/78
 TIM

CLS. Fug. No.	Equip. I. D.	Generic Name	Acid. Profile	Qual. Profile	Radiation Contaminant		Qual. Method	Chem. Spray	Accur.	Subm.	Licensee Action		Outstanding Items Identified	Category Items
					Inside	Outside					Replace	Relocate		
23	Q176L	EPA	L	L	L	-	L	-	-	-	L	-	-	1
24	code R11	Cable	L	L	L	-	L	-	-	-	L	-	-	1
↓	code R12	able	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
↓	code R23	able	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓

Code:
 # - Indicates the item is below the flood level
 S - Indicates the item is satisfactory
 N - Indicates the item is not applicable
 U - Indicates the item is unresolved, licensee identified
 P - Proprietary
 L - Licensee identified
 R - Reviewer identified
 I - Equipment is qualified
 2 - Aging is less than life of plant with licensee indicating periodic replacement
 3 - Equipment requires modification (resolution, welding, etc.)
 4 - Qualification of equipment unresolved
 a) Testing schedule but not complete
 b) Reviewer needs additional information
 c) Qual. Record search still in process
 5 - Equipment not qualified
 6 - Item identified to EJB for resolution

REVISOR Adelbert DATE 4/7/80

ATTACHMENT 3
FORM 1318 79-010
TLD

Farley 7
SYSTEM Revision Quarterly Post Local Distribution Sys

CSL Page No.	Equip. C. D. #	Generic Name	Acct. Profile	Qual. Profile	Radiation Qual. Contamination		Qual. Method	Chem. Spray	Accur.	Subm.	Licensee Action		Outstanding Items Identified by	Category of Items
					inside	outside					Replace	Relocate		
2	01E22 M001 A	MTR	L	L	L	-	L	L	-	-	-	-	-	1
2	01E22 M001 B	MTR	L	L	L	-	L	L	-	-	-	-	-	1
3	01E22 V001A	MOV	L	L	L	-	L	L	-	-	-	-	-	1
4	01E22 V001B	MOV	L	L	L	-	L	L	-	-	-	-	-	1
5	01E22 B001	EPA	L	L	L	-	L	L	-	-	-	-	-	1
5	13019		L	L	L	-	L	L	-	-	-	-	-	1
5	B020		L	L	L	-	L	L	-	-	-	-	-	1
5	B023		L	L	L	-	L	L	-	-	-	-	-	1
6	L55	Cable	L	L	L	-	L	L	-	-	-	-	-	1
6	R22	Cable	L	L	L	-	L	L	-	-	-	-	-	1

3 - Equipment requires modification (rewinding, shielding, etc.)
 4 - Qualification of equipment unsatisfactory
 a) Testing schedule but not complete
 b) Reviewer needs additional information
 c) Qual. Record search still in process
 5 - Equipment not qualified
 6 - Item identified to EQB for resolution

B - Indicates the item is below the licensed level
 ✓ or B - Indicates the item is satisfactory
 - or H - Indicates the item is not applicable
 BL - Indicates the item is below licensed, Licensee identified
 P - Proprietary
 L - Licensee identified
 H - Reviewer identified
 1 - Equipment is qualified
 2 - Aging in less than life of plant with licensee indicating periodic replacement

REVIEWER M.D. [Signature] 11/7/80

PAGE 1

SYSTEM Post-Injector Control of Combustion Gas Control

ATTACHMENT 1
FOR IEM 79-018
FLN

PAGE 1 OF 2

ECS. Page No.	Equip. I. D. #	Generic Name	Accid. Profile	Qual. Profile	Regulatory Imp. (unit attach)		Qual. Method	Chm. Spray	Accur.	Subm.	Licenses Action		Understanding Items Identified by	Category of Issues
					Inside	Outside					Replace	Relocate		
3	PIE23 V021	2"MOV	✓	✓	✓	-	✓	-	-	B	-	-	-	1
4	PIE23 V005	6"MOV	✓	✓	✓	-	✓	-	-	✓	-	-	-	1
5	PIE23 V022A	3/4"MOV	✓	✓	✓	-	✓	-	-	✓	-	-	-	1
6	PIE23 V022B	3/4"MOV	✓	✓	✓	-	✓	-	-	✓	-	-	-	1
7	PIE23 V022C	1"MOV	✓	✓	✓	-	✓	-	-	✓	-	-	-	1
8	PIE23 V022D	3/4"MOV	✓	✓	✓	-	✓	-	-	✓	-	-	-	1
9	PIE23 V022E	3/4"MOV	✓	✓	✓	-	✓	-	-	✓	-	-	-	1
10	PIE23 V025B	5"MOV	✓	✓	✓	-	✓	-	-	✓	-	-	-	1
11	PI752 B005	EPA	✓	✓	✓	-	✓	-	-	✓	-	-	-	1
11	PI752 B007	EPA	✓	✓	✓	-	✓	-	-	✓	-	-	-	1
11	PI752 B015	EPA	✓	✓	✓	-	✓	-	-	✓	-	-	-	1
11	PI752 B016	EPA	✓	✓	✓	-	✓	-	-	✓	-	-	-	1

M = Indicates the item to follow the flood level
 ✓ or S = Indicates the item is Satisfactory
 - or N = Indicates the item is Not Applicable
 UL = Indicates the item is Unresolved, Licenses Identified
 P = Regulatory
 L = Licenses Identified
 R = Reviewer Identified
 I = Equipment to be Qualified
 Z = Aging to less than life of plant with Licenses
 indicating periodic replacement
 3 = Equipment ... vs modification (resolution, shielding, etc.)
 4 = Qualification of equipment unresolved
 a) Testing schedule but not complete
 b) Reviewer needs additional information
 c) Qual. Record search still in process
 5 = Equipment not qualified
 6 = Item identified to KOP for resolution

REVISION #1 - 4/11/80

PACALLES FARLEY I
 SYSTEMS, Inc., + Cont. Combustion Gas Control

ATTACHMENT 4
 FOR IIR 79-018
 TIA

CLS. Page No.	Equip. I. B. #	Equip. Name	Accid. Problem	Qual. Profile	Regulation (Qual. Cont. Structure)		Qual. Method	Comm. Sp. #	Accur.	Subst.	Licensee Action		Outstanding Items Identified by	Category of Items
					Inside	Outside					Replace	Deletate		
11	Q1T52 B017	EPA	✓	✓	✓	✓	✓	✓	-	✓	-	-	-	✓
11	Q1T52 B019	EPA	✓	✓	✓	✓	✓	✓	-	✓	-	-	-	✓
11	Q1T52 B020	EPA	✓	✓	✓	✓	✓	✓	-	✓	-	-	-	✓
11	Q1T52 B039	EPA	✓	✓	✓	✓	✓	✓	-	✓	-	-	-	✓
12	CABLE 304	POWER + CONTROL	✓	✓	✓	✓	✓	✓	-	✓	-	-	-	✓
12	CABLE R22	POWER + CONTROL	✓	✓	✓	✓	✓	✓	-	✓	-	-	-	✓
12	CABLE R23	POWER + CONTROL	✓	✓	✓	✓	✓	✓	-	✓	-	-	-	✓
12	CABLE R51	POWER + CONTROL	✓	✓	✓	✓	✓	✓	-	✓	-	-	-	✓

R = Indicate the item is below the stand level
 ✓ or 3 = Indicate the item is Satisfactory
 - or N = Indicate the item is Not Applicable
 UL = Indicate the item is Unresolved, Licensee Identified
 P = Proprietary
 L = Licensee Identified
 R = Reviewer Identified
 I = Equipment is Qualified
 2 = Aging is less than life of plant with licenses indicating periodic replacement
 3 = Equipment requires modification (resolution, abiding, etc.)
 4 = Qualification of equipment unresolved
 a) Testing schedule not complete
 b) Reviewer needs additional information
 c) (Qual. Record search still in process)
 5 = Equipment not qualified
 6 = Item identified to IIR for resolution

0053496

ATTACHMENT 1
FOR ILM 79-018
TSM

0053496

0053496

0053496

PAGE 1 OF 2

CES Page No.	Equip. I. D. #	Generic Name	Acid. Profile	Qual. Profile	Weathering (Qual. Cont. at least)		Qual. Method	Chem. Spray	Accur.	Subst.	Licensee Action		Outstanding Items Identified by	Category of Item
					Initial	Final					Replace	Relocate		
2	91G21 SV3376	SV	✓							B	Yes	-	L	3
3	91G21 253376	LS	✓	4B	✓		✓			B	-	No	R	4B
4	91G21 51003	LS	✓	4B	✓		✓			B	-	No	-	4B
5	91G21 SV10038	SV	✓							B	Yes	-	L	3
6	91G21 SV7126	SV	✓							B	Yes	-	L	3
7	91G21 257126	LS	✓	4B	✓		✓			B	-	No	R	4B
8	91T52 EPA	EPA	✓	✓	✓		✓			✓	-	-	-	1
8	91T52 EPA	EPA	✓	✓	✓		✓			✓	-	-	-	1
8	91T52 EPA	EPA	✓	✓	✓		✓			✓	-	-	-	1
9	91G21 3376-050	JB	✓	✓	✓		✓			B	-	No	-	1
10	91G21 1003A-10	JB	✓	✓	✓		✓			B	-	No	-	1
11	91G21 7126-A70	JB	✓	✓	✓		✓			B	-	No	-	1

1 = Indicates the item is below the flood level
 2 = Indicates the item is satisfactory
 3 = Indicates the item is not applicable
 4 = Indicates the item is unresolved, licensee identified
 5 = Proprietary
 6 = Licensee identified
 7 = Reviewer identified
 8 = Equipment is qualified
 9 = Aging in tank at a site of plant with licensee indicating post-tank equipment
 10 = Equipment requires modification (resolution, shielding, etc.)
 11 = Qualification of equipment unresolved
 12 = Testing schedule but not complete
 13 = Reviewer needs additional information
 14 = Qual. record search still in process
 15 = Equipment not qualified
 16 = Item identified to ILM for resolution

0053496

FAIRLEY
SYSTEM MAIN STEAM

AS 54300001 I
FOR HM 74-018
TAB

PAGE 1 OF 5

AES Page No.	Equip. I. D. #	Generic No.	Accid. Profile	Qual. Profile	Qual. Method		Qual. Method	Accur.	Subm.	License Action		Outstanding Item Identified by	Category of Issue
					Include	Exclude				Replace	Relocate		
5	QIN1123 3369A	LS	✓							Yes	-	L	3,*,*
6	QIN115V 3369AA	SV	✓							Yes	-	L	3,*,*
7	QIN115V 3369AC	SV	✓							Yes	-	L	3,*,*
8	QIN1123 3369A	LS	✓							Yes	-	L	3,*,*
9	QIN115V 3369AA	SV	✓							Yes	-	L	3
10	QIN115V 33708C	SV	✓							Yes	-	L	3
11	QIN1123 3369C	LS	✓							Yes	-	L	3
12	QIN115V 3369CA	SV	✓							Yes	-	L	3
13	QIN115V 3369CC	SV	✓							Yes	-	L	3
14	QIN1123 3370A	LS	✓							Yes	-	L	3,*,*
15	QIN115V 3370AA	SV	✓							Yes	-	L	3,*,*
16	QIN115V 3370AC	SV	✓							Yes	-	L	3,*,*

0 - Indicate the item is below the third level
 1 - Indicate the item is satisfactory
 2 - Indicate the item is not applicable
 3 - Indicate the item is unresolved, License Identified
 4 - License Identified
 5 - License Identified
 6 - License Identified
 7 - License Identified
 8 - License Identified
 9 - License Identified
 10 - License Identified
 11 - License Identified
 12 - License Identified
 13 - License Identified
 14 - License Identified
 15 - License Identified
 16 - License Identified

3 - Equipment require modification (revolution, overhaul, etc.)
 4 - Qualification of equipment unresolved
 a) Testing schedule but not complete
 b) Reviewer needs additional information
 c) Qual. Record search still in process
 5 - Equipment not qualified
 6 - Item identified to E4B for resolution

RL053498

ATTACHMENT 1
BOM 120 70-018
TLM

UNCLASSIFIED
FARLEY 1
BOSTON MAIN STEAM

CLS Page No.	Equip. I. D. #	Generic Name	Accld. Profile	Spec. Profile	P-Off. In Sp. (App. 100%)		Dowl. Method	Phys. Spray	Accur.	Subst.	License Action		Outstanding Items Identified by	Category of Items
					Inside	Outside					Replace	Relocate		
17	QIN1125 3370B	LS	✓									Yes	L	3
18	QIN115V 3370BA	SV	✓									Yes	L	3
19	QIN115V 3370BC	SV	✓									Yes	L	3
20	QIN1125 3370C	LS	✓									Yes	L	3
21	QIN115V 3370CA	SV	✓									Yes	L	3
22	QIN115V 3370CC	SV	✓									Yes	L	3
23	QIN1125 3368A	LS	✓									Yes	L	3
24	QIN115V 3368AA	SV	✓									Yes	L	3
25	QIN1125 3368B	LS	✓									Yes	L	3
26	QIN115V 3368BA	SV	✓									Yes	L	3
27	QIN1125 3368C	LS	✓									Yes	L	3
28	QIN115V 3368CA	SV	✓									Yes	L	3

3 = Equipment requires modification (resolution, abridging, etc.)
 4 = Qualification of equipment unresolved
 a) Testing schedule but not complete
 b) Reviewer needs additional information
 c) Qual. record with skill in process
 5 = Equipment not qualified
 6 = Item identified to 1-3 for resolution

3 = Indicated the item is below the flood level
 ✓ or S = Indicate the item is Satisfactory
 - or N = Indicate the item is Not Applicable
 DL = Indicate the item is Unresolved, Licensee Identified
 P = Proprietary
 L = Licensee Identified
 R = Reviewer Identified
 I = Equipment is qualified
 2 = Equip. is from this list of plant with license...

PLANT FARLEY
SYSTEM MAIN STEAM

ATTACHMENT 1
FOR ILS 79-018
IEM

EIS Page No.	Equip. I. D. #	Concrete Name	Accid. Profile	Qual. Profile	Part of Ins. Dept. Compliance		Qual. Method	Chem. Spray	Accur.	Subst.	License Action		Outstanding Items Identified by	Category of Item
					Insul.	Outlets					Replece	Relocate		
29	QIN11SV 3976A	SV	✓								Yes	-	L	3
30	QIN11ZS 3976A	LS	✓								Yes	-	L	3
31	QIN11SV 3976B	SV	✓								Yes	-	L	3
32	QIN11ZS 3976B	LS	✓								Yes	-	L	3
33	QIN11SV 3976C	SV	✓								Yes	-	L	3
34	QIN11ZS 3976C	LS	✓								Yes	-	L	3
35	QIN11SV 396AA-408	JB	✓	✓			✓				-	-	-	1
36	QIN11SV 3568A-418	JB	✓	✓			✓				-	-	-	1
37	QIN11SV 3169A-408	JB	✓	✓			✓				-	-	-	1
38	QIN11ZS 3568A-3	LS	✓								Yes	-	L	3
39	QIN11ZS 3368J	LS	✓								Yes	-	L	3
40	QIN11ZS 3568C-3	LS	✓								Yes	-	L	3

3 - Equipment requires modification (revision, shielding, etc.)
 4 - Qualification of equipment unresolved
 a) Testing schedule but not complete
 b) Reviewer needs additional information
 c) Qual. Record search still in process
 5 - Equipment not qualified
 6 - Item identified to IEP for resolution

5 - Indicate the item to below the flood level
 ✓ or S - Indicate the item is satisfactory
 - or N - Indicate the item is not applicable
 UL - Indicate the item is unresolved, license identified
 1 - Proprietary
 L - License identified
 N - Reviewer identified
 I - Equipment is qualified
 2 - Rating to loss thru life of plant with license

PACALIST FARLEY I
SYSTEM MAIN STEAM

AT SALTWATER
FOR THE 79-018
PER

LES Page No.	Equip. I. D. #	Com. etc Name	Accid. Profile	Oper. Profile	Mott. by B. Inc. (1)		Qual. Method	Tham. Spray	Accur.	Subm.	Licensee Action		Outstanding Items Identified by	Category of Item
					Inside	Outside					Replace	Relocate		
41	QINHSV 3770AA-AB8	JB	✓	✓	-	-	✓	-	-	-	-	-	-	1
42	QINHSV 3770AA-AB8	JB	✓	✓	-	-	✓	-	-	-	-	-	-	1
43	QINHSV 3770AA-AB8	JB	✓	✓	-	-	✓	-	-	-	-	-	-	1
44	QINHSV 3770AA-AB8	JB	✓	✓	-	-	✓	-	-	-	-	-	-	1
45	QINHSV 3770AA-AB8	JB	✓	✓	-	-	✓	-	-	-	-	-	-	1
46	QINHSV 3770AA-AB8	JB	✓	✓	-	-	✓	-	-	-	-	-	-	1
47	QINHSV 3770AA-AB8	JB	✓	✓	-	-	✓	-	-	-	-	-	-	1
48	QINHSV 3770AA-AB8	JB	✓	✓	-	-	✓	-	-	-	-	-	-	1
49	QINHSV 3770AA-AB8	JB	✓	✓	-	-	✓	-	-	-	-	-	-	1
50	QINHSV 3770AA-AB8	LS	✓	✓	-	-	✓	-	-	-	-	-	-	1
51	QINHSV 3770AA-AB8	LS	✓	✓	-	-	✓	-	-	-	Yes	-	L	3
52	QINHSV 3770AA-AB8	LS	✓	✓	-	-	✓	-	-	-	Yes	-	L	3
											Yes	-	L	3

3 = Equipment requires modification (revision, elimination, etc.)
 4 = Qualification of equipment unrecalculated
 a) Testing schedule but not complete
 b) Reviewer needs additional information
 c) Used. Record search still in process
 5 = Equipment not qualified
 6 = Item identified to be replaced

3 = Indicate the item is below the flood level
 4 = Indicate the item is satisfactory
 5 = Indicate the item is not applicable
 6 = Indicate the item is unresolved, Licensee Identified
 F = Proprietary
 L = Licensee Identified
 R = Reviewer Identified
 1 = Equipment is qualified
 2 = Agency is below the flood level of plant with license

FARLEY 1
SYSTEM MAIN STREAM

ASSIGNMENTS 1
FOR FEB 79-DIM
TLK

PAGE 5 OF 5

Eqs. Page No.	Equip. I. D. #	Generic Name	Acqd. Profile	Qual. Profile	Performance Index		Qual. Method	Chem. Spray	Accur.	Subm.	License Action		Outstanding Items Identified by	Category of Items
					Time	Quality					Replace	Relocate		
53	QIN11 LT477	LT	✓	2	P	-	P	P	P	✓	-	-	R	2
54	QIN11 LT487	LT	✓	2	P	-	P	P	P	✓	-	-	R	2
55	QIN11 LT497	LT	✓	2	P	-	P	P	P	✓	-	-	R	2
56	QIT52 8043	EPA	✓	✓	V	-	✓	✓	-	✓	-	-	R	2
57	CABLE Y01	INSTD CABLE	✓	✓	✓	-	✓	✓	-	✓	-	-	-	1
58	CABLE R11	POWER CENTRAL	✓	✓	-	-	✓	-	-	-	-	-	-	1
58	CABLE R21		✓	✓	-	-	✓	-	-	-	-	-	-	1
58	CABLE R22		✓	✓	-	-	✓	-	-	-	-	-	-	1
58	CABLE R23		✓	✓	-	-	✓	-	-	-	-	-	-	1
58	CABLE W01		✓	✓	-	-	✓	-	-	-	-	-	-	1

3 - Equipment requires modification (revolution, shielding, etc.)
 4 - Qualification of equipment unresolved
 a) Testing schedule but not complete
 b) Review needs additional information
 c) Qual. Record search still in process
 5 - Equipment not qualified
 6 - Item identified to LTP for resolution

8 - Indicate the item is below the good level
 9 - Indicate the item is satisfactory
 10 - Indicate the item is not applicable
 11 - Indicate the item is discontinued, license identified
 12 - License identified
 13 - Reviewer identified
 14 - Equipment to qualified
 15 - Aging is less than life of plant with license

REVIEWER V. Srinivasa DATE 11/1/80

ATTACHMENT I
FOR IEN 79-018
TKK

SYSTEM Fairchild
AUX. STEER

C&S Page No.	Equip. I. D. #	Generic Name	Accid. Profile	Qual. Profile	Enginign. Qupt. Containment		Qual. Method	Chim. Spray	Accur.	Buim.	Licenses Action		Outstanding Items Identified by	Category of Items
					Inside	Outside					Replace	Relocate		
2	Q1M125V 3234A	SV									yes		L	3,* RI
3	Q1M125 3234A	LS									yes		L	3,** RI
4	Q1M125V 3234B	SV									yes		L	3
5	Q1M125 3234B	LS									yes		L	3
6	Q1M125 3235A	SV									yes		L	3,* RI
7	Q1M125 3235A	LS									yes		L	3,* RI
8	Q1M125 3235E	SV									yes		L	3,*7 RI
9	Q1M125 3235B	LS									yes		L	3
10	Q1M125V 3234A-A TB/JO	TB/JO	✓	✓									L	3
11	Q1M125V 3234B-0 TB/JO	TB/JO	✓	✓									-	1
12	Q1M125V 3235A-A TB/JO	TB/JO	✓	✓									-	1
13	Q1M125V 3235B-0 TB/JO	TB/JO	✓	✓									-	1

✓ or B = Indicates the item is below the flood level
 - or N = Indicates the item is Satisfactory
 BL = Indicates the item is Not Applicable
 P = Indicates the item is Unresolved, Licenses Identified
 P = Proprietary
 L = Licenses Identified
 R = Reviewer Identified
 I = Equipment is qualified
 2 = Aging is less than life of plant with licenses indicating periodic replacement
 3 = Equipment require modification (resolution, shielding, etc.)
 4 = Qualification of equipment unrecieved
 a) Testing schedule but not complete
 b) Reviewer needs additional information
 c) Qual. Record search still in process
 5 = Equipment not qualified
 6 = Item identified to EQB for resolution
 7 = Not safe not acceptable

ATTACHMENT I
FOR FEB 79-016
TER

PAGE 2 OF 2

Early 1
1-2-79

CES. Page No.	Equip. I. D. #	Generic Name	Accid. Profile	Qual. Profile	Maintenance		Qual. Method	Cham. Spray	Accur.	Subs.	Licenses	Action	Outstanding Items Identified by	Category of Items
					Inside	Outside								
14	R11	CBL	✓	✓	-	✓	✓	-	-	-	-	-	-	-
14	R22	CBL	✓	✓	-	✓	✓	-	-	-	-	-	-	-
14	R23	GR	✓	✓	-	✓	✓	-	-	-	-	-	-	-
14	W01	GR	✓	✓	-	✓	✓	-	-	-	-	-	-	-
15	Y01	CEL	✓	✓	-	✓	✓	-	-	-	-	-	-	-

Legend:

- B = Indicates the item to be below the flood level
- or B = Indicates the item is Satisfactory
- or N = Indicates the item is Not Applicable
- UL = Indicates the item is Unretrieved, Licenses identified
- P = Proprietary
- L = Licenses identified
- R = Reviewer identified
- I = Equipment is qualified
- Z = Aging is less than life of plant with licenses indicating periodic replacement
- 3 = Equipment requires modification (resolution, shielding, etc.)
- 4 = Qualification of equipment unreviewed
- a) Testing schedule but not complete
- b) Reviewer needs additional information
- c) Qual. Record search still in process
- 5 = Equipment not qualified
- 6 = Its. identified to EQB for resolution

REVIEWER V. B. ... DATE 11/7/88

ATTACHMENT 1
FOR IER 79-018
TEN

PAGE 1 OF 1

Farley
Main Facility

CES Page No.	Equip. I.D.	Carotic Name	Accid. Profile	Qual. Profile	Magister Qual. Containment		Qual. Method	Chum. Spray	Accur.	Subq.	Licensee Action		Outstanding Items Identified by	Category of Items
					Inside	Outside					Replace	Relocate		
2	RIN2IV 01A-B	MOV	✓	✓	-	✓	✓	-	-	-	-	-	-	1, *
3	RIN2IV 001B-B	MOV	✓	✓	-	✓	✓	-	-	-	-	-	-	1, *
4	RIN2IV 001C-B	MOV	✓	✓	-	✓	✓	-	-	-	-	-	-	1, *
5	RIN2IV 001D-B	LS	✓	✓	-	✓	✓	✓	-	-	-	-	-	1, *
6	RIN2IV 001E-B	LS	✓	✓	-	✓	✓	✓	-	-	-	-	-	1
7	RIN2IV 001F-B	LS	✓	✓	-	✓	✓	✓	-	-	-	-	-	1, *
8	RIN2IV 001G-B	LS	✓	✓	-	✓	✓	✓	-	-	-	-	-	1, *
9	RIN2IV 001H-B	LS	✓	✓	-	✓	✓	✓	-	-	-	-	-	1
10	RIN2IV 001I-B	LS	✓	✓	-	✓	✓	✓	-	-	-	-	-	1
11	RIN2IV 001J-B	LS	✓	✓	-	✓	✓	✓	-	-	-	-	-	1
12	RIN2IV 001K-B	LS	✓	✓	-	✓	✓	✓	-	-	-	-	-	1

B = Indicates the item is below the flood level
 ✓ or B = Indicates the item is Satisfactory
 - or M = Indicates the item is Not Applicable
 UL = Indicates the item is Unresolved, Licensee Identified
 P = Proprietary
 L = Licensee Identified
 R = Reviewer Identified
 I = Equipment is Qualified
 2 = Aging in less than life of plant with licensee indicating periodic replacement
 3 = Equipment requires modification (resolution, shielding, etc.)
 4 = Qualification of equipment unresolved
 a) Testing schedule but not complete
 b) Reviewer needs additional information
 c) Qual. record search still in process
 5 = Equipment not qualified
 6 = Item identified to EQB for resolution

REVISOR V. M. ... DATE 11/7/80

SYSTEM Aux Feedwater (Aux FW)

ATTACHMENT 1
 FOR IIR 79-018
 TER

0053506

CES. Page No.	Equip. I. D. #	Generic Name	Accid. Profile	Qual. Profile	Ballast Vn. Duffl. (on synch)		Qual. Method	Chim. Spray	Accur.	Subm.	Licensee Action		Outstanding Items Identified by	Category of Items
					Inside	Outside					Replace	Relocate		
4	QIN 15 V011A	MOV	L	L	-	✓	L	-	-	-	-	-	-	1, *
5	QIN 25 V011B	MOV	L	L	-	✓	L	-	-	-	-	-	-	1, *
6	QIN 23 V011C	MOV	L	L	-	✓	L	-	-	-	-	-	-	1, *
7	QIN 28 X5 3227A	Limit SW	L	3	-	3	3	-	-	-	-	-	L	3, ** RI
8	QIN 28 SV 3227A	SV	L	3	-	3	3	-	-	-	-	-	L	3, *
9	QIN 23 X5 3227A	Limit SW	L	3	-	3	3	-	-	-	-	-	L	3, *
10	QIN 23 SV 3227A	SV	L	3	-	3	3	-	-	-	-	-	L	3, *
11	QIN 23 SV 3227A	Limit SW	L	3	-	3	3	-	-	-	-	-	L	3, * RI
12	QIN 23 SV 3227A	SV	L	3	-	3	3	-	-	-	-	-	L	3, * RI
13	QIN 23 X5 3227A	Limit SW	L	3	-	3	3	-	-	-	-	-	L	3, * RI
14	QIN 23 SV 3227A	SV	L	3	-	3	3	-	-	-	-	-	L	3, * RI
15	QIN 23 X5 3227B	Limit SW	L	3	-	3	3	-	-	-	-	-	L	3, * RI

3 - Equipment requires modification (resolution, shielding, etc.)
 4 - Qualification of equipment unresolved
 a) Testing schedule but not complete
 b) Reviewer needs additional information
 c) Qual. Record search still in process
 5 - Equipment not qualified
 6 - Item identified to EQB for resolution

5 - Indicates the item is below the flood level
 ✓ or 3 - Indicates the item is Satisfactory
 - or N - Indicates the item is Not Applicable
 DL - Indicates the item is Unresolved, Licensee Identified
 P - Proprietary
 L - Licensee Identified
 R - Reviewer Identified
 1 - Equipment is qualified
 2 - Aging in less than life of plant with licensee indicating periodic replacement

REVIEWER Adrian DATE 4/2/88

REVIEWED BY [Signature] DATE 11/7/83

ATTACHED 1
FOR FEB 79-018
TEX

7-1-1-1
SYSTEM AUX FW

LES Page No.	Equip. I. D. #	Concrete W. #	Accid. Profile	Qual. Profile	Reg. In Containing		Qual. Method	Chem. Spray	Accor.	Subst.	Licensee Action		Outstanding Items Identified by	Category of Items
					Inside	Outside					Replace	Relocate		
16	QIN23 SV 3227A	SV	L	3	-	3	-	-	-	-	-	-	L	3
17	QIN23 SV 3227C	Limit SW	L	3	-	3	3	-	-	-	-	-	L	3
18	QIN23 SV 3227A	SV	L	3	-	3	3	-	-	-	-	-	L	3
19	QIN23 SV 3227A	T BIK JB	L	4	-	4	4	4	-	-	-	-	-	1
20	QIN23 SV 3227A	T BIK JB	L	4	-	4	4	4	-	-	-	-	-	1
21	QIN23 SV 3227A	T BIK JB	L	4	-	4	4	4	-	-	-	-	-	1
22	QIN23 SV 3227A	T BIK JB	L	4	-	4	4	4	-	-	-	-	-	1
23	QIN23 SV 3227A	T BIK JB	L	4	-	4	4	4	-	-	-	-	-	1
24	QIN23 SV 3227A	T BIK JB	L	4	-	4	4	4	-	-	-	-	-	1
25	Code R11	Cable	L	4	-	4	4	4	-	-	-	-	-	1
25	Code R23		L	4	-	4	4	4	-	-	-	-	-	1
25	Code J04		L	4	-	4	4	4	-	-	-	-	-	1

0 - Indicates the item is below the flood level
 1 or 2 - Indicates the item is Satisfactory
 3 - Equipment requires modification (resolution, shielding, etc.)
 4 - Qualification of equipment unresolved
 a) Testing schedule but not complete
 b) Reviewer needs additional information
 c) Qual. Record search still in process
 5 - Equipment not qualified
 6 - Item identified to EOP for resolution
 L - Licensee identified
 R - Reviewer identified
 1 - Equipment is qualified
 2 - Aging is less than life of plant with license indicating periodic replacement

REVIEWER ANN HANCOCK DATE 11/7/86

ATTACHMENT 1
FOR IEN 79-018
TKR

PAGE 1 OF 1

7av 1-1
SYSTEM CHECKS - JAJ (QIN25)

Ch. Page No.	Equip. I. D. #	Genetic Name	Accid. Profile	Qual. Profile	Regulator Qual. Compliance		Qual. Method	Chem. Spray	Accur.	Sub-A.	Licensee Action		Outstanding Items Identified by	Category of Items
					Inside	Outside					Relocate	Relocate		
2	SV 3771A	SV	V	3	-	3	-	-	-	-	yes	-	L	3
3	ZS 3771A	Limit SW	V	3	-	3	-	-	-	-	yes	-	L	3
4	ZS 3771B	SV	V	3	-	3	-	-	-	-	yes	-	L	3
5	ZS 3771B	Limit SW	V	3	-	3	-	-	-	-	yes	-	L	3
6	SV 3772G	SV	V	3	-	3	-	-	-	-	yes	-	L	3
7	ZS 3772G	Limit SW	V	3	-	3	-	-	-	-	yes	-	L	3
8	SV3772 T BIK	A-AB2 T BIK	V	L	-	L	-	-	-	-	-	-	-	1
9	SV3772 T BIK	B-A/IB T BIK	V	L	-	L	-	-	-	-	-	-	-	1
10	SV3772 T BIK	SV3772 T BIK	V	L	-	L	-	-	-	-	-	-	-	1
11	code R11	Cable	V	L	-	L	-	-	-	-	-	-	-	1
11	code R23	Cable	V	L	-	L	-	-	-	-	-	-	-	1
11	code W01	Cable	V	L	-	L	-	-	-	-	-	-	-	1

3 = Equipment requires modification (resolution, shielding, etc.)
4 = Qualification of equipment unreviewed
a) Testing schedule but not complete
b) Reviewer needs additional information
c) Qual. Record search still in process
5 = Equipment not qualified
6 = Item identified to EQS for resolution

8 = Indicates the item is below the flood level
✓ or 3 = Indicates the item is Satisfactory
- or 4 = Indicates the item is Not Applicable
UL = Indicates the item is Unreviewed, Licensee Identified
P = Proprietary
L = Licensee Identified
R = Reviewer Identified
E = Equipment is qualified
3 = Aging in less than 50% of plant visit license
Indicating periodic replacement

Serial 724/1/1
 SYSTEM Sampling (P1P15)

ATTACHMENT 1
 FOR IEB 79-018
 TER

0053510

CES. Page No.	Equip. I. D. #	Equip. Name	Accid. Profile	Qual. Profile	Respiration Qual. Containment		Qual. Method	Chem. Spray	Accur.	Subs.	Licensee Action		Outstanding Items Identified by	Category of Items
					Inside	Outside					Replace	Relocate		
4	SV 3103	SV	L	3	3	-	3	-	-	-	yes	-	L	3
5	23 3103 SV	Limit SW	L	L	46	-	46	-	-	-	-	-	R	46
6	SV 3745	SV	L	L	3	-	3	-	-	-	yes	-	L	3
7	23 3745 SV	Limit SW	L	L	46	-	46	-	-	B	-	-	R	46
8	SV 3744	SV	L	3	3	-	3	-	-	-	-	-	R	46
9	23 3744 SV	Limit SW	L	L	46	-	46	-	-	B	yes	-	R	46
10	SV 3179A	SV	L	3	3	-	3	-	-	-	-	-	R	46
11	23 3179A SV	Limit SW	L	L	46	-	46	-	-	-	yes	-	R	46
12	SV 3179B	SV	L	3	3	-	3	-	-	-	-	-	L	3
13	23 3179B SV	Limit SW	L	L	46	-	46	-	-	-	-	-	R	46
14	SV 3179C	SV	L	L	46	-	46	-	-	-	-	-	L	3
15	23 3179C SV	Limit SW	L	L	46	-	46	-	-	-	-	-	R	46

7 - Equipment requires modification (renovation, shielding, etc.)
 4 - Qualification of equipment unresolved
 a) Testing schedule not complete
 b) Equipment needs additional information
 c) Qual. record search still in process
 5 - Equipment not qualified
 6 - Item identified to EIB for resolution

N - Indicate the item is below the flood level
 ✓ or S - Indicate the item is satisfactory
 - or M - Indicate the item is not applicable
 UL - Indicate the item is Unresolved, Licensee Identified
 P - Proprietary
 L - Licensee Identified
 M - Manufacturer Identified
 I - Equipment is Qualified
 2 - Aging is less than life of plant with licensees indicating periodic replacement

REVIEWED *Handwritten Signature* DATE 11/17/80



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

APCo Exhibit 48

C57731A A-48
58-348/364-CWP
2/20/92

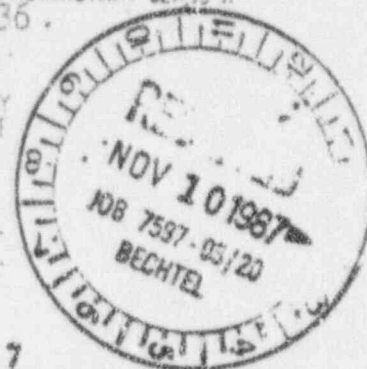
June 22, 1970

DUCKETTED
USNRC

WESTINGHOUSE PROPRIETARY CLASS II

'92 MAR 13 P4:36

OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH



Mr. Thomas H. Anderson, Manager
Nuclear Safety Department
Westinghouse Electric Corporation
P. O. Box 355
Pittsburgh, Pennsylvania 15230

Dear Mr. Anderson:

SUBJECT: EVALUATION OF WCAP-7709L, SUPPLEMENTS 5, 6, AND 7

We have completed our review of Westinghouse Electric Corporation report Supplements 5, 6, and 7 to WCAP-7709L (Proprietary) and WCAP-7820 (Non-Proprietary) entitled "Electric Hydrogen Recombiner for PWR Containments". Our evaluation is enclosed.

As a result of our review, we have concluded, subject to the conditions in our enclosed evaluation, that the Westinghouse electric hydrogen recombinder is acceptably qualified for the seismic and environmental conditions identified in Supplements 1 through 7 of WCAP-7709L in accordance with the requirements of IEEE 323-1974. Applications using the Westinghouse recombinder must include in their Final Safety Analysis Report information to demonstrate either (1) that accident environmental conditions and plant seismic response spectrum are either within the accepted envelope conditions in WCAP-7709L or (2) that the recombinder is acceptably qualified on some other analytical or experimental basis.

Accordingly, topical report WCAP-7709L and its Supplements 1 through 7 are acceptable for reference in license applications. Topical report WCAP-7820 and its Supplements 1 through 7 is an acceptable non-proprietary version of WCAP-7709L. When either of these reports is used as a reference, both the proprietary report and the non-proprietary version must be referenced.

In accordance with established procedures, it is requested that Westinghouse issue revised versions of these reports within three months of receipt of this letter to include this acceptance letter, the enclosed evaluation, and any changes resulting from our review.

We do not intend to repeat our review of these reports when they appear as references in a particular license application except to assure that the material presented in these reports is applicable to the specific plant involved.

8110140037

June 22, 1978

Westinghouse Electric Corporation -2-

057724 B

Should Nuclear Regulatory Commission criteria or regulations change, such that our conclusions concerning these reports are invalidated, you will be notified and given an opportunity to revise and resubmit your topical reports, should you so desire.

Sincerely,

J. F. Stolz

John F. Stolz, Chief
Light Water Reactors Branch No. 1
Division of Project Management

cc: Mr. D. Rawlins
Westinghouse Electric Corporation
P. O. Box 355
Pittsburgh, Pennsylvania 15230

ENCLOSURE

0477340

SAFETY EVALUATION REPORT

SUPPLEMENTS 5, 6, AND 7 OF WCAP-7709-L
"ELECTRICAL HYDROGEN RECOMBINER LWR CONTAINMENT"

Summary of Topical Report

Westinghouse Electric Corporation has developed and tested an electric hydrogen recombiner to limit hydrogen concentration within a pressurized water reactor containment following a loss-of-coolant-accident. This recombiner is located inside the containment and consists of a metal sheathed electric resistance heater provided to heat a continuous flow of containment gas mixture to about 1150°F. At this temperature hydrogen reacts with oxygen in the environment to form steam, thereby reducing the hydrogen content in the containment atmosphere. The control panel and power supply are located outside the containment.

The recombiners are designed to be permanently installed inside of containment and are not intended to be used for sharing between two or more units. Therefore the design criteria for these recombiners do not take into account vibratory and impact loads that would be imposed during transportation in addition to the loads that would be imposed during a seismic event.

WCAP-7709 L provides a description of the electric hydrogen recombiner, design criteria, design bases and performance analyses. Supplement 1 to WCAP-7709 L provides a description, analysis and results of performance tests of a prototype recombiner under conditions simulating post-LOCA conditions inside containment. Supplement 2 to WCAP-7709 L provides a description, analysis and results of tests to qualify the recombiner for seismic loads and loss-of-coolant-accident environment. Supplement 3 provides a description, analysis and results of long term tests of the electric heater elements in air (50 days) and in a post-LOCA steam environment (21 days). Supplement 4 provides a description, analysis, and results of performance tests of a production unit to demonstrate its capability to operate when sprayed with sodium tetraborate and to successfully recombine hydrogen and oxygen.

The staff has previously reviewed WCAP-7709 L through Supplement 4, and found the Westinghouse recombiner functionally acceptable for use in nuclear power plants. In addition, environmental and seismic qualification was found to be acceptable based on the requirements of IEEE 323-1971, "General Trial - Use Guide for Qualifying Class IE Electrical Equipment for Nuclear Power Generating Stations" and IEEE 344-1971, "Trial-Use Guide for Seismic Qualification of Class IE Electrical Equipment for Nuclear Power Generating Stations". Our safety evaluation was transmitted to Westinghouse by letter dated May 1, 1975 from D. B. Vassallo to C. Eicheldinger. In that evaluation we concluded that additional documentation would be required for

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plants committed to meet IEEE-323-1974 "IEEE Standard for Qualification of Class 1E Electrical Equipment for Nuclear Power Generating Stations". This standard includes both seismic and environmental qualifications.

Supplements 5, 6, and 7 to WCAP-7709-L provide additional documentation to demonstrate conformance of the Westinghouse electric hydrogen recombiner to the requirements of IEEE 323-1974. Supplement 5 provides the results of tests to demonstrate design margin, capability to withstand containment leakage tests, and capability to operate during an earthquake. Supplement 6 compares the tests and analyses performed for the recombiner with the requirements in IEEE 323-1974 to demonstrate conformance. Supplement 7 provides results and analyses of additional tests to demonstrate acceptance of auxiliary equipment for the recombiner (power supply, control panel, power cables, cold reference junction box, and automatic temperature controller).

Our evaluation of Supplements 5, 6, and 7 to WCAP-7709-L are provided below.

Summary of Regulatory Evaluation

Information in Supplements 5 and 6 is intended to show that the Westinghouse electric hydrogen recombiner is in conformance with IEEE 323-1974. Type testing (recommended in IEEE 323-1974 as the preferred method), was primarily used to qualify the Westinghouse recombiner. The tests and analyses performed by Westinghouse adequately demonstrate that the recombiner, excluding the control panel and power supply, meets the following specific requirements of IEEE 323-1974.

1. The equipment shall be operated to the extremes of performance and electrical characteristics. The recombiner was operated at higher than normal temperatures (1450° F versus the normal operating temperature of 1200° F). We noted in our May 1, 1975 evaluation that 1450° F gas temperature corresponded to a maximum sheath temperature of 1600° F (rated sheath temperature) and that this temperature was achieved with 66 kilowatts power supplied to the heaters.

In Supplement 5, additional over temperature tests were successfully run with the heater at maximum power level and sheath temperatures up to 1750° F. We conclude based on the tests, that the heaters will operate satisfactorily with the maximum power of 75 kilowatts supplied to the recombiner.

2. Equipment shall be aged in accordance with Section 6.3.2 of IEEE 323-1974 to put it in a condition which simulates its expected end-of-qualified life condition . . . The recombiner inside containment is composed primarily of metallic structural material, metal-enclosed thermal insulation, metal clad ceramic heater elements, and power cables. Since the recombiner is in a normal containment atmosphere and subjected to periodic testing, Westinghouse concluded that the most significant aging factor was the fatigue life of the structure, due to thermal stresses induced by the periodic heat up and cool down tests (i.e., the recombiner would not deteriorate significantly due to normal atmospheric conditions alone). The recombiner structure was subjected to 80 thermal cycles, corresponding to 40 years of expected periodic testing, and was found to be in good operating condition.

We conclude that the recombiner structure was satisfactorily tested to demonstrate acceptable end of life condition. The power cable inside containment was tested in accordance with IEEE Std 383-1974 and after reviewing the details of the tests performed, we conclude that the irradiation, steam, and alkaline spray conditions were sufficiently severe and the cables were acceptably qualified.

3. The aged equipment shall be subjected to mechanical vibration. . .

The Mechanical Engineering Branch has evaluated the mechanical vibration tests conducted on the "aged" equipment. The concept of aging was addressed explicitly for the first time in IEEE-Std. 323-1974. The aging guidance therein reflects the requirements of IEEE Std. 279-1971 Sec. 4.4. The objective of aging is to put samples in a condition equivalent to the end-of-life condition.

For the initial seismic tests reported in WCAP-7709-L, Supplement 2, it was assumed that the recombiner is in the de-energized mode since, for PHR containments, the recombiners are not energized for approximately 24 hours after the DBA. A seismic analysis of the recombiner heater element is presented in Appendix B of Supplement 5 to WCAP-7709-L which demonstrates analytically that the recombiner would function adequately under seismic conditions while it is energized and is in operation. In this analysis the natural frequency of the heater elements are calculated to be 250.5 cps for built-in ends and 112.0 cps for simply supported ends. Static loadings equal to 5.5g horizontal and 2.5g vertical (1.5g seismic + 1g weight) are applied in the analysis. The stresses are determined to be 1322 psi and 507 psi in the horizontal and vertical directions, respectively, which are much less than the yield strength of 13500 psi for Incoloy 600 tubing at 2500°F. This tubing forms the metal cladding of the heater element assembly and since it is the most highly stressed part of the assembly, heater elements are acceptable for the hot seismic condition. The midspan deflection, and the clearance between heater elements and holes in

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the separation plates have also been analyzed and shown to have a negligible effect on recombiner performance.

An additional vibration test of a production recombiner is described in WCAP-7709-L, Supplement 5 in which the recombiner was energized and at temperature before, during and after the vibration test. This test confirms the analysis of the heater elements discussed earlier. The equipment was vibrated in 3 directions, horizontal side-to-side, horizontal front-to-back and vertical. The recombiner was maintained at 1250°F throughout and after the test. The test input was of the sine beat wave form type and was performed at resonant frequencies, determined by a frequency search test performed from 1 to 35 Hz plus additional frequencies described in the report. The test method used is a single frequency method (described in IEEE 344-75 Section 6.6.2.3). The single frequency sine beat method is justified for this application on the basis that the resonances are widely spaced and do not interact to reduce the fragility level, as permitted in Section 6.6.2 of IEEE 344-75. The single axis test is justified on the basis that the tests conservatively reflect the seismic loadings at the equipment mounting locations. A commitment is made in the report that for each plant application, the required seismic response spectrum for that plant will be checked against the test response spectrum to verify that the test response spectrum envelopes the required response spectrum. This is consistent with the requirements of Regulatory Guide 1.100.

4. The aged equipment shall be operated while exposed to a simulated DBA. . . .

A series of tests were performed on the portion of the production recombiner that is located inside the containment, including several post-LOCA pressure transients (69 psia, 302°F) and long term steam tests to demonstrate that the recombiner can successfully withstand the post-LOCA environment. In addition, alkaline solution was sprayed on the recombiner during operation. These tests have been accepted by the staff for qualification of the Westinghouse electric hydrogen recombiner because the recombiner has no temperature sensitive electrical components required to operate during the portion of the post-LOCA pressure transient wherein high temperatures exists and the maximum expected steam temperature following a steam line break (420°F) is not likely to cause structural failure of the recombiner.

5. The equipment shall be operated while exposed to the simulated post-accident conditions. . . . To show the long term capability of the heater banks to operate in the post-LOCA environment, two heater banks were subjected to a DBA plus 12 months of simulated post-LOCA environment. The test showed that the individual heater elements and banks plus thermocouples, electrical cabling, and thermocouple junction boxes which are susceptible to steam would perform satisfactorily.

Supplement 7 to NCAP-7709-L is the last in the series of reports for the Westinghouse electric recombiner and contains qualification results for the recombiner power cable located inside containments, the recombiner control and power supply panels located outside containments, and additional optional features including a cold reference junction box and an automatic temperature control device which may be selected by an applicant.

The qualification of the control panel and power supply located outside the containment does not meet our interpretation of the aging requirements set forth in IEEE Std 323-1974. However, tests performed on the control panel and power supply located outside the containment included short-term high temperature exposure (10 days at 155°F for the control panel and 10 days at 135°F for the power supply). We found the qualification of the control panel and power supply acceptable, based on these tests and also based on the accessibility of these components for repair following a LOCA. The recombiner will not be needed for several days following a LOCA and since these components will be easily accessible, repair of components that may fail can be accomplished.

Seismic tests of the control panel and power supply were performed to demonstrate conformance to IEEE 344-1975 "Recommended Practice for Seismic Qualification of Class IE Equipment for Nuclear Power Generating Stations". IEEE 344-1975 recommends that seismic tests be performed using biaxial motion and both random frequency and sine beat input. The power supply and control panels were mounted on the drive plate of a vibration table and energized. The test series consisted of resonance frequency search plus five OBE's followed by an SSE. The input for the five OBE's was a biaxial, random frequency while the SSE was a biaxial sine beat input, the maximum "g" level being 0.2. The magnitude of the vertical acceleration was kept to two-thirds the magnitude of the horizontal acceleration. The input was made of decaying sinusoids covering the frequency range of 1.25 to 3.50 Hz. The sine beat test was performed at each resonance frequency and at eleven other frequencies ranging between 1.25 and 33.5 Hz. These tests were run four times (once for each equipment mounting direction) without component failure. We find these tests acceptable.

The power cables for the recombiner were tested along with the heater banks in the post LOCA steam and spray environment and seismically tested with the recombiner. The testing did not completely conform to the procedure outlined in IEEE 383-1974, "Standard for Type Tests of Class IE Electric Cables, Field Splices and Connections for Nuclear Power Generating Stations". To meet the requirements of Section 2.4 of this standard, which deals with environmental exposure, a series of tests were performed on the power cables which included thermal aging, irradiation, post LOCA containment steam and spray exposure and voltage tests. We find these tests acceptable.

The cold reference junction box is for use in those containments which have copper conductors through containment penetrations already installed. The usage of a compensator in the junction box allows the chromel-alumel leads from the recombiner to be connected to copper leads inside

the junction box. The copper leads can then be run through a typical copper penetration to the control panel, thus eliminating the need to replace installed copper penetrations with chromel-alumel penetrations. The cold reference junction box, with the exception of the compensator, has been tested for the same range of conditions as the tests that were performed on the recombiner. The compensator itself was irradiated and placed in a steam environment for a short period of time. Since the compensator (a wire-wound resistor encapsulated in a ceramic type material) does not have temperature sensitive elements in it and since the compensator is used only to provide the operator with an approximation of the temperature of the heater inside the recombiner and has no control functions, we find the qualification tests of the cold reference junction box to be acceptable.

The automatic temperature control feature is an option which allows the power level to be controlled by feedback signal from the recombiner thermocouples. It consists of minor wiring modifications within the control panel and addition of a printed circuit card to the temperature indicator. Because the changes that would have to be made in the design of the control panel to add the automatic temperature control feature are minor, we find this concept acceptable from a qualification standpoint. However, the use of this device to control a recombiner system that also incorporates the cold reference junction box would mean that a compensator in the junction box would be relied upon for control purposes. To alleviate this problem Westinghouse has agreed not to allow the use of the automatic temperature control device except during periodic tests for those plants that choose to use the cold reference junction box. We find this approach acceptable.

Regulatory Position

Based on our review of WCAP-7709-L, we have concluded as follows:

- (1) The Westinghouse electric hydrogen recombiner, (excluding the control panel, power supply and the optional automatic temperature control and cold reference junction) meets the requirements of IEEE 323-1974.
- (2) The control panel and power supply are acceptable on the basis of high temperature exposure tests and also because there would be adequate accessibility and time for repair, if necessary, following a loss of coolant accident before they would be required to operate.
- (3) The recombiner, control panel and power supply meet the requirements of IEEE-344-1975.
- (4) Power cables meet the requirements of IEEE-383-1974.

- (5) The optional automatic temperature control feature is acceptable for use on all plants except those which use the cold reference junction box. For plants using the cold reference junction, automatic temperature control may be used for periodic tests but must be disconnected at other times during plant operation.
- (6) The cold reference junction box is acceptably qualified to provide approximate heater temperature indication to the operator; however, it is not qualified for control functions.

Westinghouse report WCAP-7709-L and Supplements 1 through 7 may be referenced in applications to support the above conclusions where the calculated accident environmental conditions and plant seismic response spectrum are enveloped by the conditions for which the recombiner is qualified. Each application referencing this topical report shall either include information to demonstrate that environmental and seismic conditions for that plant fall within the accepted envelope conditions of WCAP-7709-L, or provide further analyses or tests to demonstrate acceptability.

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Safety Evaluation Report

related to the operation of
Joseph M. Farley Nuclear Plant
Unit 2

Docket No. 50-364

Alabama Power Company
Supplement No. 6

U.S. Nuclear Regulatory
Commission

Office of Nuclear Reactor Regulation

March 1981



81-460539

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By J. Cole

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NUREG-0117
Supplement No. 6
to NUREG-75/034

Safety Evaluation Report
related to the operation of
Joseph M. Farley Nuclear Plant
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Commission

Office of Nuclear Reactor Regulation

March 1981



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1 INTRODUCTION AND GENERAL DISCUSSION

1.1 Introduction

On May 2, 1975, the Nuclear Regulatory Commission (Commission) issued its Safety Evaluation Report in the matter of Alabama Power Company's application to operate the Joseph M. Farley Plant Units 1 and 2. The Safety Evaluation Report (SER) was supplemented by Supplement Nos. 1, 2, and 3 prior to issuance of the Unit 1 operating license.

On September 30, 1980, the Commission issued Supplement No. 4 to the Safety Evaluation Report related to the issuance of a fuel-loading and low-power testing license for Farley Unit 2.

On October 23, 1980, Facility License No. NPF-8 was issued to Alabama Power Company (licensee) to permit fuel loading, criticality, and testing at power levels not to exceed five percent of rated power.

On March 19, 1981, the Commission issued Supplement No. 5 to the Safety Evaluation Report, related to the issuance of a full-power license for Farley Unit 2. The purpose of this supplement is to update our Safety Evaluation Report by providing our evaluation of outstanding issues identified in SER Supplement No. 5, and providing errata to SER Supplement No. 5 (Appendix D).

There are three items which are addressed in this supplement.

- Conclusions of the staff regarding its review of the conformance of the environmental qualification of safety-related electrical equipment to NUREG-0588. (Section 7.7.2)
- Response of the licensee to Appendix R, "Fire Protection Program," in 10 CFR Part 50 (Section 9.5).
- Findings of the Federal Emergency Management Agency on the November 9 and 20, 1980 exercise of the emergency response by the licensee and by State and local emergency organizations. (Item III.A.1.1, Section 22.3)

We conclude that the Farley Unit 2 facility may be operated safely at full power in accordance with the facility license and Technical Specifications without undue risk to the health and safety of the general public.

7 INSTRUMENTATION AND CONTROLS

7.7 Environmental and Seismic Qualification

7.7.2 Environmental Qualification of Safety-Related Electrical Equipment

In Supplement 5 to the SER, we reported the results of our evaluation of licensee's review to determine the degree of conformance of qualification documentation with NUREG-0588, "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment." We stated that as a result of our evaluation, we identified deficiencies requiring additional information or corrective action by the licensee. The preliminary results of our review are contained in an equipment evaluation report which was provided to the licensee by our letter dated March 4, 1981. In that letter, we requested the licensee to provide its overall finding supporting the safe operation of Farley 2 with regard to compliance with General Design Criterion 4, "Environmental and Missile Design Basis" taking into account the preliminary results of our review presented in the equipment evaluation report.

By letter dated March 4, 1981, licensee provided its finding, as follows:

"Alabama Power Company has reviewed the preliminary results of the NRC evaluation of the Farley Unit 2 response to NRC NUREG-0588 that was provided in your letter of March 4, 1981. Alabama Power Company has conducted a review of these potential deficiencies and has made an assessment of the impact on the safe operation of the Farley Nuclear Plant. We find that in the interim until detailed resolution, none of these potential deficiencies will significantly impact the safe operation of the Farley Nuclear Plant, and the plant continues to meet General Design Criterion 4. Based on the results of this review, we have concluded that Farley Unit 2 can operate safely.

"In accordance with the provisions of your March 4, 1981 letter, it is our intention to provide an item-by-item reevaluation in a detailed documented manner at a later date."

We have considered licensee's response in our safety evaluation of environmental qualification in which we have finalized our conclusions and requirements. Our safety evaluation is included as Appendix B to this supplement. We conclude that there is reasonable assurance of safe operation of Farley 2, pending completion of the corrective actions identified in the safety evaluation in Appendix B to this supplement. We further conclude that the licensee meets the applicable requirements of General Design Criterion 4, "Environmental and Missile Design Bases" because our interim requirements have been met. The Commission Memorandum and Order CLI-80-21 requires that compliance with all aspects of NUREG-0588 by June 30, 1982 will be required to remain in conformance with General Design Criterion 4. We will include a condition in the license requiring a description of these corrective actions within 90 days of

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licensee's receipt of this supplement and completion of these corrective actions by June 30, 1982.

9 AUXILIARY SYSTEMS

9.5 Fire Protection Systems

In Supplement 5 to the Safety Evaluation Report we concluded that the Farley 2 fire protection program will meet all the requirements of Appendix R to 10 CFR Part 50 when committed modifications have been completed. By letter dated March 19, 1981, licensee provided its response to requirements in § 50.48 and Appendix R to 10 CFR Part 50. We will include a license condition requiring the licensee to comply with Appendix R to 10 CFR Part 50 in accordance with the requirements of 10 CFR Part 50.48.

22 TMI-2 REQUIREMENTS

22.3 Full-Power Requirements

III.A.1.1 Upgrade Emergency Preparedness

In Supplement 5 to the SER, we concluded, subject to favorable Federal Emergency Management Agency (FEMA) findings, that if the licensee meets the emergency response plan requirements for a full-power license:

By letter dated March 11, 1981 from John V. McLaughlin, FEMA, to William J. Dircks, NRC, the FEMA found that subject to one condition and preparedness at and around the environs of the Farley facility provides reasonable assurance that appropriate protective measures for the public can and will be taken in the event of a radiological emergency. The condition, to require completion of the alerting and notification system by July 1, 1981, will be included as a condition in the license. The FEMA letter is included as Appendix C to this supplement.

23 CONCLUSIONS

Based on our evaluation of the application as set forth in our Safety Evaluation Report issued on May 2, 1975 and Supplement Nos. 1 through 5 and our evaluation as set forth in this supplement, we conclude, that the operating license can be issued to allow power operations at full rated power (2652 megawatts thermal) subject to license conditions which will require further Commission approval and license amendments before the stated condition can be removed.

We conclude that the construction of the facility has been completed in accordance with the requirements of Section 50.57(a)(1) of 10 CFR Part 50, and that construction of the facility has been monitored in accordance with the inspection program of the Commission's staff.

Subsequent to the issuance of the operating license for full rated power for the Joseph M. Farley Nuclear Plant, Unit 2, the facility may then be operated only in accordance with the Commission's regulations and the conditions of the operating license under the continuing surveillance of the Commission's staff.

We conclude that the activities authorized by the license can be conducted without endangering the health and safety of the public, and we reaffirm our conclusions as stated in our Safety Evaluation Report and its supplements.

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APPENDIX A
SUPPLEMENT TO THE CHRONOLOGY
OF THE
RADIOLOGICAL SAFETY REVIEW

APPENDIX A

Supplement to the Chronology
of the
Radiological Safety Review

February 18, 1981 Letter from State of Alabama Department of Public Health to NRC staff requesting assistance in developing an improved dose calculation method.

February 20, 1981 Letter from licensee providing Revision 2 to the Physical Security Plan.

February 26, 1981 Letter from licensee stating modifications resulting from SQRT review have been completed.

March 4, 1981 Letter to licensee providing preliminary results of our review of environmental qualification of safety-related electric equipment and requesting licensee's finding supporting safe operation in light of our results.

March 4, 1981 Letter from licensee confirming basis for loss of flow trip setpoint.

March 4, 1981 Letter from licensee providing results of sound measurements in control room with air handling system modifications completed.

March 6, 1981 Letter from licensee providing its finding that potential deficiencies identified by staff's preliminary report on environmental qualification would not significantly impact safe operation of Farley 2.

March 19, 1981 Letter from licensee providing its response to 10 CFR 50.48 requirements on the fire protection program.

March 20, 1981 Letter from licensee providing its commitment to modify subcooling meter display by May 31, 1981.

March 24, 1981 Letter from licensee requesting temporary change to Technical Specifications to modify service water recirculation piping.

March 25, 1981 Letter from licensee transmitting FSAR Amendment No. 77 incorporating additional information provided during the operating license review.

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APPENDIX B
SAFETY EVALUATION
OF
ENVIRONMENTAL QUALIFICATION
OF
SAFETY-RELATED
ELECTRICAL EQUIPMENT

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ENVIRONMENTAL QUALIFICATION OF SAFETY-RELATED ELECTRICAL EQUIPMENT

1 INTRODUCTION

General Design Criteria 1 and 4 specify that safety-related electrical equipment in nuclear facilities must be capable of performing its safety-related function under environmental conditions associated with all normal, abnormal, and accident plant operation. In order to ensure compliance with the criteria, the NRC staff required all licensees of operating reactors to submit a reevaluation of the qualification of safety-related electrical equipment which may be exposed to a harsh environment. The staff additionally required near-term operating license applicants to reassess and evaluate their environmental qualification documentation and/or test data for their safety-related electrical equipment.

2 BACKGROUND

By letters dated October 11, 1979 and February 19 and 21, 1980, the NRC Office of Nuclear Reactor Regulation (NRR) requested operating license applicants to review and evaluate the environmental qualification documentation for each item of safety-related electrical equipment and to identify the degree to which their qualification program complies with the staff position as described in NUREG-0588, "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment." The applicants were directed to provide a submittal reporting the results of this review.

On February 8, 1979, the NRC Office of Inspection and Enforcement (IE) issued to all licensees of operating plants (except those included in the systematic evaluation program (SEP)) IE Bulletin IEB 79-01, "Environmental Qualification of Class IE Equipment." This bulletin, together with IE Circular 78-08 (issued on May 31, 1978), required the licensees to perform reviews to assess the adequacy of their environmental qualification programs.

Subsequently, Commission Memorandum and Order CLI-80-21 (issued on May 23, 1980) states that the DOR guidelines and portions of NUREG-0588 (which were issued on January 14, 1980, as enclosures 4 and 5 to IEB-79-01B) form the requirements that licensees must meet regarding environmental qualification of safety-related electrical equipment in order to satisfy those aspects of 10 CFR 50, Appendix A, General Design Criterion (GDC)-4. This order also requires the staff to complete safety evaluation reports (SERs) for all operating plants by February 1, 1981. In addition, this order requires that the licensees have qualified safety-related equipment installed in their plants by June 30, 1982.

Supplements to IEB 79-01B were issued for further clarification and definition of the staff's needs. These supplements were issued on February 29, September 30, and October 24, 1980.

In addition, the staff issued orders dated August 29, 1980 (amended in September 1980) and October 24, 1980 to all licensees. The August order required that the licensees provide a report, by November 1, 1980, documenting the qualification of safety-related electrical equipment. The October order required the establishment of a central file location for the maintenance of all equipment-qualification records. The central file was mandated to be established by December 1, 1980. The order also required that all safety-related electrical equipment be qualified by June 30, 1982. In response, the licensee submitted information through letters dated September 12 and October 10 and 30, 1980.

2.1 Purpose

The purpose of this SER is to identify equipment whose qualification program does not provide sufficient assurance that the equipment is capable of performing the design function in hostile environments. The staff position relating to any identified deficiencies is provided in this report.

2.2 Scope

The scope of this report is limited to an evaluation of the equipment which must function in order to mitigate the consequences of a loss-of-coolant accident (LOCA) or a high-energy-line-break (HELB) accident, inside or outside containment, while subjected to the hostile environments associated with these accidents.

3 STAFF EVALUATION

The staff evaluation of the licensee's response included an onsite inspection of selected Class IE equipment, an audit of environmental qualification documentation, and an examination of the licensee's report for completeness and acceptability. The criteria described in the DOR guidelines and in NUREG-0588, in part, were used as a basis for the staff evaluation of the adequacy of the licensee's qualification program.

The NRC Office of Inspection and Enforcement performed an onsite verification inspection (December 2-5, 1980) of selected safety-related electrical equipment. Selected components in the reactor coolant, reactor cavity post-LOCA dilution, containment post-LOCA air mixing, hydrogen recombiner, chemical and volume control, and containment cooling and purge systems were inspected at Unit 2. The inspection verified proper installation of equipment, overall interface integrity, and manufacturers' nameplate data. The manufacturer's name and model number from the nameplate data were compared to information given in the component evaluation work sheets (CES) of the licensee's report. The site inspection is documented in report IE 50-364/80-49. No deficiencies were noted. For this review, the documents referenced above have been factored into the overall staff evaluation.

NRR performed audits on August 5 and 6, 1980 and December 17-19, 1980 of environmental qualification documentation and/or test data for 14 items. No

significant concerns were identified during the IE inspection or the NRC audits.

3.1 Completeness of Safety-Related Equipment

In accordance with IEB 79-01B and NUREG-0588, the licensee was directed to (1) establish a list of systems and equipment that are required to mitigate a LOCA and an HELB and (2) identify components needed to perform the function of safety-related display information, post-accident sampling and monitoring, and radiation monitoring.

The staff developed a generic master list based upon a review of plant safety analyses and emergency procedures. The instrumentation selected includes parameters to monitor overall plant performance as well as to monitor the performance of the systems on the list. The systems list was established on the basis of the functions that must be performed for accident mitigation (without regard to location of equipment relative to hostile environments). The list of safety-related systems provided by the licensee was reviewed against the staff-developed master list.

Based upon information in the licensee's submittal, the equipment location references, and in some cases subsequent conversations with the licensee, the staff has verified and determined that the systems included in the licensee's submittal are those required to achieve or support: (1) emergency reactor shutdown, (2) containment isolation, (3) reactor core cooling, (4) containment heat removal, (5) core residual heat removal, and (6) prevention of significant release of radioactive material to the environment. The staff therefore concludes that the systems identified by the licensee (listed in Appendix D) are acceptable, with the exception of those items discussed in Section 5 of this report.

Display instrumentation which provides information for the reactor operators to aid them in the safe handling of the plant was not specifically identified by the licensee. A complete list of all display instrumentation mentioned in the LOCA and HELB emergency procedures must be provided. Equipment qualification information in the form of summary sheets should be provided for all components of the display instrumentation exposed to harsh environments. Instrumentation which is not considered to be safety related but which is mentioned in the emergency procedure should appear on the list. For these instruments, (1) justification should be provided for not considering the instrument safety related and (2) assurance should be provided that its subsequent failure will not mislead the operator or adversely affect the mitigation of the consequences of the accident. The environmental qualification of post-accident sampling and monitoring and radiation monitoring equipment is closely related to the review of the TMI Lessons-Learned modifications and will be performed in conjunction with that review.

The licensee identified 661 items of equipment which were assessed by the staff.

3.2 Service Conditions

Commission Memorandum and Order CLI-80-21 requires that the DOR guidelines and the "For Comment" NUREG-0588 are to be used as the criteria for establishing the adequacy of the safety-related electrical equipment environmental qualification program. These documents provide the option of establishing a bounding pressure and temperature condition based on plant-specific analysis identified in the licensee's Final Safety Analysis Report (FSAR) or based on generic profiles using the methods identified in these documents.

The licensee has performed plant-specific analyses for the loss-of-coolant accident (LOCA) and the main steam line break (MSLB) accident. The staff has reviewed these analyses and found them acceptable (see Section 6.2.1 of the Safety Evaluation Report (SER) and Section 6.2.1 of Supplement 5 to the SER). The maximum pressure and temperature conditions for the postulated LOCA and MSLB accident from these plant-specific analyses are tabulated in Section 3.3, below.

Equipment submergence has also been addressed where the possibility exists that flooding of equipment may result from HELBs.

3.3 Temperature, Pressure, and Humidity Conditions Inside Containment

The licensee has provided the results of accident analyses as follows:

	<u>Max Temp (°F)</u>	<u>Max Press (psig)</u>	<u>Humidity (%)</u>
LOCA	300	47.5	100
MSLB	381	44.8	100

The staff concludes that there is reasonable assurance that the actual temperatures and pressures in the plant will not exceed the curves provided for locations anywhere within the containment for these postulated events. Margins for the test conditions are addressed in Section 3.9 of this evaluation.

The licensee has provided the results of the analysis, which was performed based on the NUREG-0588, to predict the equipment surface temperature during the MSLB event. Furthermore, the licensee has also provided information to show that equipment qualification temperature is higher than expected equipment surface temperature during the MSLB event. The licensee must provide supporting information for the staff to agree with this judgement. The staff needs the sample calculation including bases and assumptions and the confirmation that the temperature measured during the qualification testing was the surface temperature and not the ambient temperature. The licensee is also requested to update the Component Evaluation Worksheets to reflect the higher equipment surface temperature expected due to the MSLB event as the required temperature.

3.4 Temperature, Pressure, and Humidity Conditions Outside Containment

The licensee has provided the temperature, pressure, humidity and applicable environment associated with an HELB outside containment. The following areas outside containment have been addressed:

- (1) Auxiliary building
- (2) Main steam room

The staff has verified that the parameters identified by the licensee for the MSLB are acceptable.

3.5 Submergence

The maximum submergence levels have been established and assessed by the licensee. Unless otherwise noted, the staff assumed for this review that the methodology employed by the licensee is in accordance with the appropriate criteria as established by Commission Memorandum and Order CLI-80-21.

The licensee's values for maximum submergence are 115 ft 0 in. in the containment and 130 ft 5 in. in the main steam room. Equipment below these levels has been identified by the licensee, along with some justifications. The licensee identified 51 safety-related electrical components for Unit 2 as having the potential for becoming submerged after a postulated event.

In these instances, the licensee stated that the components in question perform their function before becoming submerged and are not required to operate after an HELB. In each of these cases, the licensee should provide an assessment of the failure modes associated with submergence. The licensee should also provide assurance that the subsequent failure of these components will not adversely affect any other safety functions or mislead an operator. Additionally, the licensee should discuss operating time, across the spectrum of events, in relation to the time of submergence. If the results of the licensee's assessment are acceptable, then these components may be exempt from the submergence parameter of qualification.

3.6 Chemical Spray

The licensee's FSAR value for the chemical concentration is 2000 ppm boric acid solution; the exact volume percent used by the vendor for qualification testing should be verified by the licensee. Therefore, for the purpose of this review, the effects of chemical spray will be considered unresolved. The staff will review the licensee's response when it is submitted and discuss the resolution in a supplemental report.

3.7 Aging

NUREG-0588 Category II delineates two aging program requirements. Valve operators committed to IEEE Standard 382-1972 and motors committed to IEEE

Standard 334-1971 must meet the Category I requirements of the NUREG. This requires the establishment of a qualified life, with maintenance/replacement schedules based on the findings. All other equipment must be subjected to an aging program which identifies aging-susceptible materials within the component. Additionally, the staff requires that the licensee

- (1) establish an ongoing program to review surveillance and maintenance records to identify potential age-related degradations;
- (2) establish component maintenance and replacement schedules which include considerations of aging characteristics of the installed components.

The licensee identified a number of equipment items for which a specified qualified life was established (for example, 5 years, 15 years, or 40 years). In its assessment of these submittals, the staff did not review the adequacy of the methodology nor the basis used to arrive at these values; the staff has assumed that the established values are based on state-of-the-art technology and are acceptable.

For this review, however, the staff requires that the licensee submit supplemental information to verify and identify the degree of conformance to the above requirements. The response should include all the equipment identified as required to maintain functional operability in harsh environments.

The licensee indicated that this phase of the response is outstanding and that the review is in progress. The staff will review the licensee's response when it is submitted and discuss its evaluation in a supplemental report.

1.8 Radiation (Inside and Outside Containment)

The licensee has provided values for the radiation levels postulated to exist following a LOCA. The application and methodology employed to determine these values were presented to the licensee as part of the NRC staff criteria contained in the DOR guidelines, in NUREG-0588, and in the guidance provided in IEB-79-01B, Supplement 2. Therefore, for this review, the staff has assumed that, unless otherwise noted, the values provided have been determined in accordance with the prescribed criteria. The staff review determined that the values to which equipment was qualified enveloped the requirements identified by the licensee.

The value required by the licensee inside containment is an integrated dose of 5×10^7 rads to 1×10^8 rads. This value envelopes the minimum requirements of NUREG-0588 and is therefore acceptable.

The licensee has not provided the range of required values outside containment used to specify limiting radiation levels within the auxiliary building. These values must be provided, and they should consider the radiation levels influenced by the source term methodology associated with post-LOCA recirculation fluid lines. The licensee must provide this range along with any corrections necessary for the associated summary sheets.

3.9 Margin

The staff in its review has determined that the licensee did not in all cases appropriately consider margin. Therefore, the licensee should review the margin requirements of NUREG-0588, Category II, and upgrade the environmental qualification submittal and component works sheets accordingly, or provide adequate justification for not considering margin.

4 QUALIFICATION OF EQUIPMENT

The following subsections present the staff's assessment, based on the licensee's submittal and related staff audits, of the qualification status of safety-related electrical equipment.

The staff has separated the safety-related equipment into three categories: (1) equipment requiring immediate corrective action, (2) equipment requiring additional qualification information and/or corrective action, and (3) equipment considered acceptable if the staff's concern identified in Section 3.7 is satisfactorily resolved.

In its assessment of the licensee's submittal, the NRC staff did not review the methodology employed to determine the values established by the licensee. However, in reviewing the data sheets, the staff made a determination as to the stated conditions presented by the licensee. Additionally, the staff has not completed its review of supporting documentation referenced by the licensee (for example, test reports). It is expected that when the review of test reports is complete, the environmental qualification data bank established by the staff will provide the means to cross reference each supporting document to the referencing licensee.

If supporting documents are found to be unacceptable, the licensee will be required to take additional corrective actions to either establish qualification or replace the item(s) of concern. This effort will begin in early 1981.

An appendix for each subsection of this report provides a list of equipment for which additional information and/or corrective action is required. Where appropriate, a reference is provided in the appendices to identify deficiencies. It should be noted, as in the Commission Memorandum and Order, that the deficiencies identified do not necessarily mean that equipment is unqualified. However, they are cause for concern and may require further case-by-case evaluation.

4.1 Equipment Requiring Immediate Corrective Action

Appendix A identifies equipment (if any) in this category. The licensee was asked to review the facility's safety-related electrical equipment. The licensee's review of this equipment has not identified any equipment requiring immediate corrective action; therefore, no licensee event reports (LERs) were submitted. In addition, in this review, the staff has not identified any safety-related electrical equipment which is not able to perform its intended safety function during the time in which it must operate.

4.2 Equipment Requiring Additional Information and/or Corrective Action

Appendix B identifies equipment in this category, including a tabulation of deficiencies. The deficiencies are noted by a letter relating to the legend (identified below), indicating that the information provided is not sufficient for the qualification parameter or condition.

Legend

R - radiation
 T - temperature
 QT - qualification time
 RT - required time
 P - pressure
 H - humidity
 CS - chemical spray
 A - material-aging evaluation; replacement schedule; ongoing equipment surveillance
 S - submergence
 M - margin
 I - HELB evaluation outside containment not completed
 QM - qualification method
 RPN - equipment relocation or replacement; adequate schedule not provided
 EXN - exempted equipment justification inadequate
 SEN - separate-effects qualification justification inadequate
 QI - qualification information being developed
 RPS - equipment relocation or replacement schedule provided

As noted in Section 4, these deficiencies do not necessarily mean that the equipment is unqualified. However, the deficiencies are cause for concern and require further case-by-case evaluation. The staff has determined that an acceptable basis to exempt equipment from qualification, in whole or part, can be established provided the following can be established and verified by the licensee:

- (1) Equipment does not perform essential safety functions in the harsh environment, and equipment failure in the harsh environment will not impact safety-related functions or mislead an operator;
- (2a) Equipment performs its function before its exposure to the harsh environment, and the adequacy for the time margin provided is adequately justified; and
- (2b) Subsequent failure of the equipment as a result of the harsh environment does not degrade other safety functions or mislead the operator;
- (3) The safety-related function can be accomplished by some other designated equipment that has been adequately qualified and satisfies the single-failure criterion;
- (4) Equipment will not be subjected to a harsh environment as a result of the postulated accident.

The licensee is, therefore, required to supplement the information presented by providing resolutions to the deficiencies identified; these resolutions should include a description of the corrective action, schedules for its completion (as applicable), and so forth. The staff will review the licensee's response, when it is submitted, and discuss the resolution in a supplemental report.

It should be noted that in cases where testing is being conducted, a condition may arise which results in a determination by the licensee that the equipment does not satisfy the qualification test requirements. For that equipment, the licensee will be required to provide the proposed corrective action, on a timely basis, to ensure that qualification can be established by June 30, 1982.

4.3 Equipment Considered Acceptable or Conditionally Acceptable

Based on the staff review of the licensee's submittal, the staff identified the equipment in Appendix C as (1) acceptable on the basis that the qualification program adequately enveloped the specific environmental plant parameters, or (2) conditionally acceptable subject to the satisfactory resolution of the staff concern identified in Section 3.7.

For the equipment identified as conditionally acceptable, the staff determined that the licensee did not clearly

- (1) state that an equipment material evaluation was conducted to ensure that no known materials susceptible to degradation because of aging have been used,
- (2) establish an ongoing program to review the plant surveillance and maintenance records in order to identify equipment degradation which may be age related, and/or
- (3) propose a maintenance program and replacement schedule for equipment identified in item 1 or equipment that is qualified for less than the life of the plant.

The licensee is, therefore, required to supplement the information presented for equipment in this category before full acceptance of this equipment can be established. The staff will review the licensee's response when it is submitted and discuss the resolution in a supplemental report.

5 DEFERRED REQUIREMENTS

ICB 79-01B, Supplement 3 has relaxed the time constraints for the submission of the information associated with cold shutdown equipment and TMI lessons-learned modifications. The staff has required that this information be provided by February 1, 1981. The staff will provide a supplemental safety evaluation addressing these concerns.

6 CONCLUSIONS

The staff has determined that the licensee's listing of safety-related systems and associated electrical equipment whose ability to function in a harsh environment following an accident is required to mitigate a LOCA or HELB is complete and acceptable, except as noted in Section 3 of this report. The staff has also determined that the environmental service conditions to be met by the electrical equipment in the harsh accident environment are appropriate, except as noted in Section 3 of this report. Outstanding information identified in Section 3 should be provided within 90 days of receipt of this SER.

The staff has reviewed the qualification of safety-related electrical equipment to the extent defined by this SER and has found no outstanding items which would require immediate corrective action to ensure the safety of plant operation. However, the staff has determined that many items of safety-related electrical equipment identified by the licensee for this review do not have adequate documentation to ensure that they are capable of withstanding the harsh environmental service conditions. This review was based on a comparison of the qualification values with the specified environmental values required by the design, which were provided in the licensee's summary sheets.

Subsection 4.2 identified deficiencies that must be resolved to establish the qualification of the equipment; the staff requires that the information lacking in this category be provided within 90 days of receipt of this SER. Within this period, the licensee should either provide documentation of the missing qualification information which demonstrates that such equipment meets the DOR guidelines or NUREG-0588 or commit to a corrective action (requalification, replacement, relocation, and so forth) consistent with the requirements to establish qualification by June 30, 1982. If the latter option is chosen, the licensee must provide justification for operation until such corrective action is complete.

Subsection 4.3 identified acceptance and conditional acceptance based on noted deficiencies. Where additional information is required, the licensee should respond within 90 days of receipt of this SER by providing assurance that these concerns will be satisfactorily resolved by June 30, 1982.

The staff issued to the licensee Sections 3 and 4 of this report and requested, by letter dated March 4, 1981, that the licensee review the deficiencies enumerated and the ramifications thereof to determine whether safe operation of the facility would be impacted in consideration of the deficiencies. The licensee has completed a preliminary review of the identified deficiencies and has determined that, after due consideration of the deficiencies and their ramifications, continued safe operation would not be adversely affected.

Based on these considerations, the staff concludes that conformance with the above requirements and satisfactory completion of the corrective actions by June 30, 1982 will ensure compliance with the Commission Memorandum and Order of May 23, 1980. The staff further concludes that there is reasonable assurance of continued safe operation of this facility pending completion of these corrective actions. This conclusion is based on the following:

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- (1) that there are no outstanding items which would require immediate corrective action to assure safety of plant operation;
- (2) some of the items found deficient have been or are being replaced or relocated, thus improving the facility's capability to function following a LOCA or HELB;
- (3) the harsh environmental conditions for which this equipment must be qualified result from low-probability events; events which might reasonably be anticipated during this very limited period would lead to less demanding service conditions for this equipment.

In addition, the staff concludes that Alabama Power Company meets the applicable requirements of General Design Criterion 4, "Environmental and Missile Design Bases," since the above interim requirements have been met. The Commission Memorandum and Order CLI-80-21 requires that compliance with all aspects of NUREG-0588 by June 30, 1982 will be required to remain in conformance with General Design Criterion 4.

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APPENDIX A

Equipment Requiring
Immediate Corrective Action

(Category 4.1)

No equipment in this category.

APPENDIX B

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Equipment Requiring Additional Information
and/or Corrective Action
(Category 4.2)

LEGEND:Designation for Deficiency

- R - Radiation
- T - Temperature
- QT - Qualification Time
- RT - Required Time
- P - Pressure
- H - Humidity
- CS - Chemical spray
- A - Material aging evaluation, replacement schedule, ongoing equipment surveillance
- S - Submergence
- M - Margin
- I - HELB evaluation outside containment not completed
- QM - Qualification method
- RPN - Equipment relocation or replacement, adequate schedule not provided
- EXN - Exempted equipment justification inadequate
- SEN - Separate effects qualification justification inadequate
- JI - Qualification information being developed
- RPS - Equipment relocation or replacement schedule provided

Equipment Description	Manufacturer	Component No.	Deficiency
Resistance Temperature Detector	Rosemount	N2B13TE412B	QT,CS,A,M
Resistance Temperature Detector	Rosemount	N2B13TE412D	QT,CS,A,M
Resistance Temperature Detector	Rosemount	N2B13TE422B	QT,CS,A,M
Resistance Temperature Detector	Rosemount	N2B13TE422D	QT,CS,A,M
Resistance Temperature Detector	Rosemount	N2B13TE432B	QT,CS,A,M
Resistance Temperature Detector	Rosemount	N2B13TE432D	QT,CS,A,M

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APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Penetration	General Electric	Q2T52B012	QT,CS,A,M
Penetration	General Electric	Q2T52B028	QT,CS,A,M
Penetration	General Electric	Q2T52B030	QT,CS,A,M
*Terminal Block	States Co.	12TR005	CS,A
Terminal Block	States Co.	12TB002	CS,A
Terminal Block	States Co.	22TB003	CS,A
Terminal Block	States Co.	22TB004	CS,A
Terminal Block	States Co.	32TB001	CS,A
Terminal Block	States Co.	32TB002	CS,A
Instrument Cables	Boston Insulated Wire	2V1V5002B,D	QT,CS,A,M
Instrument Cables	Boston Insulated Wire	2V2V5002B,D	QT,CS,A,M
Instrument Cables	Boston Insulated Wire	2V3V5002B,D	QT,CS,A,M
Pressure Transmitter	Barton	N2B21PT402	QT,CS,A,M
Pressure Transmitter	Barton	N2B21PT403	QT,CS,A,M
Resistance Temperature Detector	Rosemount	N2B21TE410	QT,CS,A,M
Resistance Temperature Detector	Rosemount	N2B21TE413	QT,CS,A,M
Resistance Temperature Detector	Rosemount	N2B21TE420	QT,CS,A,M

*Items for which NRR conducted audit of environmental qualification documentation and/or test data.

APPENDIX B (Continued)

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Equipment Description	Manufacturer	Component No.	Deficiency
Resistance Temperature Detector	Rosemount	N2B21TE423	QT,CS,A,M
Resistance Temperature Detector	Rosemount	N2B21TE430	QT,CS,A,M
Resistance Temperature Detector	Rosemount	N2B21TE433	QT,CS,A,M
Penetration	General Electric	Q2T52B040	QT,CS,A,M
Terminal Block	States Co.	12TB001	CS,A
Terminal Block	States Co.	12TB003	CS,A
Terminal Block	States Co.	12TB004	CS,A
Terminal Block	States Co.	22TB001	CS,A
Terminal Block	States Co.	22TB002	CS,A
Terminal Block	States Co.	22TB005	CS,A
Instrument Cables	Boston Insulated Wire	2VYV5031B	QT,CS,A,M
Instrument Cables	Boston Insulated Wire	2VYV5033B	QT,CS,A,M
Instrument Cables	Boston Insulated Wire	2V1V5002E,F,G	QT,CS,A,M
Instrument Cables	Boston Insulated Wire	2V2V5002E,F,G	QT,CS,A,M
Solenoid Valve	ASCO	Q2B31SV8047	CS,A
Limit Switch	NAMCO	N2B31ZS8047	CS,A
Penetration	General Electric	Q2T52B002	QT,CS,A,M
Penetration	General Electric	Q2T52B03B	QT,CS,A,M
Junction Box	General Electric	N2B31SV8047-B/JB	R,T,QT,RT,P, H,CS,A,M,QM

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APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
*Level Transmitter	Barton	Q2B31LT459	QT,A,M
Level Transmitter	Barton	Q2B31LT460	QT,A,M
Level Transmitter	Barton	Q2B31LT461	QT,A,M
Pressure Transmitter	Barton	Q2B31PT455	QT,A,M
Pressure Transmitter	Barton	Q2B31PT456	QT,A,M
Pressure Transmitter	Barton	Q2B31PT457	QT,A,M
Control Cable	Dkonite	2VBL5078C	QT,CS,A,M
Control Cable	Dkonite	2VBQ5021E	QT,CS,A,M
*Instrument Cable	Boston Insulated Wire	2VYV5031D	QT,CS,A,M
Instrument Cable	Boston Insulated Wire	2V1V5002U	QT,CS,A,M
Instrument Cables	Boston Insulated Wire	2V2V5002T,U	QT,CS,A,M
Instrument Cables	Boston Insulated Wire	2V3V5002T,U	QT,CS,A,M
Limit Switch	NAMCO	N2C22ZS0478	A,M,RPN,QT,P,H
Solenoid Valve	ASCO	N2C22SV0478A	A,M,RPN,QT,P,H
Solenoid Valve	ASCO	N2C22SV0478B	A,M,RPN,QT,P,H
Limit Switch	NAMCO	N2C22ZS0488	A,M,RPN,QT,P,H
Solenoid Valve	ASCO	N2C22SV0488A	A,M,RPN,QT,P,H
Solenoid Valve	ASCO	N2C22SV0488B	A,M,RPN,QT,P,H
Limit Switch	NAMCO	N2C22ZS0498	A,M,RPN,QT,P,H
Solenoid Valve	ASCO	N2C22SV0498A	A,M,RPN,QT,P,H

*Items for which NRR conducted audit of environmental qualification documentation and/or test data.

APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Solenoid Valve	ASCO	N2C22SV0498B	A,M,RPN,QT,P,H
Limit Switch	NAMCO	N2C22ZS0479	A,M,RPN,QT,P,H
Solenoid Valve	ASCO	N2C22SV0479A	A,M,RPN,QT,P,H
Solenoid Valve	ASCO	N2C22SV0479B	A,M,RPN,QT,P,H
Limit Switch	NAMCO	N2C22ZS0489	A,M,RPN,QT,P,H
Solenoid Valve	ASCO	N2C22SV0489A	A,M,RPN,QT,P,H
Solenoid Valve	ASCO	N2C22SV0489B	A,M,RPN,QT,P,H
Limit Switch	NAMCO	N2C22ZS0499	A,M,RPN,QT,P,H
Solenoid Valve	ASCO	N2C22SV0499A	A,M,RPN,QT,P,H
Solenoid Valve	ASCO	N2C22SV0499B	A,M,RPN,QT,P,H
Terminal Block	States Co.	N2C22SV0478A-A/JB	A,M,T
Terminal Block	States Co.	N2C22SV0488A-A/JB	A,M,T
Terminal Block	States Co.	N2C22SV0498A-A/JB	A,M,T
*Penetration	General Electric	Q2T52B010	QT,CS,A,M
Instrument Cable	Boston Insulated Wire	2V1V5002L,M,N	CS,A
Instrument Cable	Boston Insulated Wire	2V2V5002L,M,N	CS,A
Instrument Cable	Boston Insulated Wire	2V3V5002H,J,K L,M,N	CS,A
Instrument Cable	Boston Insulated Wire	2V4V5002A,B,C	CS,A
*Level Transmitter	Gems	Q2E11LT3594A	QT,CS,A,M
Level Transmitter	Gems	Q2E11LT3594B	QT,CS,A,M

*Items for which NRR conducted audit of environmental qualification documentation and/or test data.

APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Penetration	General Electric	Q2T52B006	QT,CS,A,M
Penetration	General Electric	Q2T52E020	QT,CS,A,M
*Control Cable	Okonite	2VAI5009F	QT,CS,A,M
Control Cable	Okonite	2VBI5008C	QT,CS,A,M
Motor Operated Valve	Limitorque	Q2E14V002	CS,A
Motor Operated Valve	Limitorque	Q2E14V004	CS,A
Solenoid Valve	ASCO	Q2P12SV3196	R,T,P,H,QT,CS, A,S,M,RPN
Limit Switch	NAMCO	Q2P13ZS3196	CS,A
Solenoid Valve	ASCO	Q2P13SV2867B	R,T,P,H,QT,CS, A,S,M,RPN
Limit Switch	NAMCO	Q2P13ZS2867B	CS,A
Solenoid Valve	ASCO	Q2P13SV3197	R,T,P,H,QT,CS, A,S,M,RPN
Limit Switch	NAMCO	Q2P13ZS3197	CS,A
Solenoid Valve	ASCO	Q2P13SV2866B	R,T,P,H,QT,CS, A,S,M,RPN
Limit Switch	NAMCO	Q2P13ZS2866B	CS,A
Solenoid Valve	ASCO	Q2E12SV3999A	R,T,P,H,QT,CS, A,S,M,RPN
Limit Switch	NAMCO	Q2E12ZS3999A	CS,A
Solenoid Valve	ASCO	Q2E12SV3999B	R,T,P,H,QT,CS, A,S,M,RPN
Limit Switch	NAMCO	Q2E12ZS3999B	CS,A

*Items for which NRR conducted audit of environmental qualification documentation and/or test data.

APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
*CTMT Clr. Fan Motor	Joy Mfg. Co.	Q2E12M001A	QT,CS,A,M
CTMT Clr. Fan Motor	Joy Mfg. Co.	Q2E12M001B	QT,CS,A,M
CTMT Clr. Fan Motor	Joy Mfg. Co.	Q2E12M001C	QT,CS,A,M
CTMT Clr. Fan Motor	Joy Mfg. Co.	Q2E12M001D	QT,CS,A,M
Penetration	General Electric	Q2T52B005	QT,CS,A,M
Penetration	General Electric	Q2T52B002	QT,CS,A,M
Penetration	General Electric	Q2T52B006	QT,CS,A,M
Penetration	General Electric	Q2T52B041	QT,CS,A,M
Terminal Block	States Co.	Q2P13SV3196-B/JB	CS,A
Penetration	General Electric	Q2T52B022	QT,CS,A,M
Terminal Block	States Co.	Q2P13SV2867B-B/JB	CS,A
Terminal Block	States Co.	Q2P13SV3197-B/JB	CS,A
Terminal Block	States Co.	Q2P13SV2866B-B/JB	CS,A
Terminal Block	States Co.	Q2E12SV3999A-A/JB	CS,A
Terminal Block	States Co.	Q2T52B025	CS,A
Terminal Block	States Co.	Q2E12SV3999B-B/JB	CS,A
Penetration	General Electric	Q2T52B001	QT,CS,A,M
Penetration	General Electric	Q2T52B023	QT,CS,A,M
Power Cable	Dkonite	2VAFU-R5Q	QT,CS,A,M

*Items for which NRR conducted audit of environmental qualification documentation and/or test data.

APPENDIX B (Continued)

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Equipment Description	Manufacturer	Component No.	Deficiency
Control Cable	Okonite	2VAFU-R5D	QT,CS,A,M
Control Cable	Okonite	2VA05048F	QT,CS,A,M
Control Cable	Okonite	2VXR5005H	QT,CS,A,M
Power Cable	Okonite	2VAFU-J4Q	QT,CS,A,M
Control Cable	Okonite	2VAFU-J4D	QT,CS,A,M
Control Cable	Okonite	2VAQ5009C	QT,CS,A,M
Instrument Cable	Boston Insulated Wire	2VYR5066B	RT,QT,CS,A,M
Control Cables	Okonite	2VBL5008C,D,X,L	QT,CS,A,M
Control Cable	Okonite	2VBQ5010J	QT,CS,A,M
Control Cable	Okonite	2V...735D	QT,CS,A,M
Control Cables	Okonite	2VBL5008X,W	QT,CS,A,M
Control Cable	Okonite	2VBQ5012F	QT,CS,A,M
Control Cable	Okonite	2VYR5035F	QT,CS,A,M
Control Cable	Okonite	2VAL5122C	QT,CS,A,M
Control Cable	Okonite	2VAQ5029E	QT,CS,A,M
Control Cable	Okonite	2VBL5094C	QT,CS,A,M
Control Cable	Okonite	2VBQ5029E	QT,CS,A,M
Power Cable	Okonite	2VAED15Q	QT,CS,A,M
Power Cable	Okonite	2VAED16Q	QT,CS,A,M
Power Cable	Okonite	2VBEE08Q	QT,CS,A,M
Power Cable	Okonite	2VBEE16Q	QT,CS,A,M
*H ₂ Recombiner Heater	Westinghouse	Q2E17G001A	QT,A,M

*Items for which NRR conducted audit of environmental qualification documentation and/or test data.

APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
H ₂ Recombiner Heater	Westinghouse	Q2E17G001B	QT,A,M
Penetration	General Electric	Q2T52B024	QT,CS,A,M
Penetration	General Electric	Q2T ^F 2B042	QT,CS,A,M
Power Cable	Okonite	2VAFALL3T	QT,CS,A,M
Power Cable	Okonite	2VBF8RH6T	QT,CS,A,M
Instrument Cables	Boston Insulated Wire	2VXQ5009B,D,F	QT,CS,A,M
Instrument Cables	Boston Insulated Wire	2VYQ5017B,D,F	QT,CS,A,M
Mixing Fan Motor	Joy Mfg. Co.	Q2E19M001A	QT,CS,A,M
Mixing Fan Motor	Joy Mfg. Co.	Q2E19M001B	QT,CS,A,M
Mixing Fan Motor	Joy Mfg. Co.	Q2E19M001C	QT,CS,A,M
Mixing Fan Motor	Joy Mfg. Co.	Q2E19M001D	QT,CS,A,M
Penetration	General Electric	Q2T52B014	QT,CS,A,M
Penetration	General Electric	Q2T52B015	QT,CS,A,M
Power Cable	Okonite	2VAFA-J5Q	QT,CS,A,M
Power Cable	Okonite	2VAFA-I5Q	QT,CS,A,M
Power Cable	Okonite	2VAFA-I4Q	QT,CS,A,M
Power Cable	Okonite	2VAFA-I3Q	QT,CS,A,M
Motor Operated Valve	Limitorque	Q2E21V038A	CS,A,S
Motor Operated Valve	Limitorque	Q2E21V038B	CS,A,S
Motor Operated Valve	Limitorque	Q2E21V038C	CS,A,S
Solenoid Operated Valve	ASCO	Q2E21SV8871	CS,A,S

APPENDIX B (Continued)

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Equipment Description	Manufacturer	Component No.	Deficiency
Limit Switch	NAMCO	Q2E21ZS8871	CS,A,S
Motor Operated Valve	Limatorque	Q2E21V249A	CS,A
Limit Switch	NAMCO	N2E21ZS8149A	CS,A,S
*Solenoid Valve	ASCO	Q2E21SV8149AB	CS,A,S
Limit Switch	NAMCO	N2E21ZS8149B	CS,A,S
Solenoid Valve	ASCO	Q2E21SV8149BB	CS,A,S
Limit Switch	NAMCO	N2E21ZS8149C	CS,A,S
Solenoid Valve	ASCO	Q2E21SV8149CB	CS,A,S
Penetration	General Electric	Q2T52B016	QT,CS,A,M
Penetration	General Electric	Q2T52B006	QT,CS,A,M
Penetration	General Electric	Q2T52B019	QT,CS,A,M
Junction Box	General Electric	N2E21SV8871-A/JB	R,T,QT,RT,P,H, CS,A,S,M,QM
Limit Switch	NAMCO	Q2E21ZS8808AB	CS,A,S
Limit Switch	NAMCO	Q2E21ZS8808BB	CS,A,S
Limit Switch	NAMCO	Q2E21ZS8808CB	CS,A,S
Penetration	General Electric	Q2T52B014	QT,CS,A,M
Terminal Block	States Co.	N2E21SV8149AA-A/JB	CS,A
Terminal Box	States Co.	N2E21SV8149BA-A/JB	CS,A
Terminal Block	States Co.	N2E21SV8149CA-A/JB	CS,A

*Items for which HRR conducted audit of environmental qualification documentation and/or test data.

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APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Power Cable	Okonite	2VAFU-Z2Q	QT,CS,A,M
Control Cables	Okonite	2VAFU-Z2D,G	QT,CS,A,M
Control Cable	Okonite	2VAQ5023E	QT,CS,A,M
Control Cable	Okonite	2VXKA163B	QT,CS,A,M
Power Cable	Okonite	2VBFV-S2Q	QT,CS,A,M
Control Cables	Okonite	2VBFV-S2D,G	QT,CS,A,M
Control Cable	Okonite	2VBQ5024C	QT,CS,A,M
Control Cable	Okonite	2VYKA163B	QT,CS,A,M
Power Cable	Okonite	2VAFU-Z3Q	QT,CS,A,M
Control Cables	Okonite	2VAFU-Z3D,G	QT,CS,A,M
Control Cable	Okonite	2VAQ5024E	QT,CS,A,M
Control Cable	Okonite	2VXA163D	QT,CS,A,M
Control Cable	Okonite	2VAL5049C	QT,CS,A,M
Control Cable	Okonite	2VAQ5022H	QT,CS,A,M
Power Cable	Okonite	2VAFU-T4Q	QT,CS,A,M
Control Cable	Okonite	2VAFU-T4D	QT,CS,A,M
Control Cable	Okonite	2VAQ5018E	QT,CS,A,M
Control Cable	Okonite	2VAL5042F	QT,CS,A,M
Control Cable	Okonite	2VAL5042G	QT,CS,A,M
Control Cable	Okonite	2VAQ5022F	QT,CS,A,M
Control Cable	Okonite	2VAL5043F	QT,CS,A,M
Control Cable	Okonite	2VAL5043G	QT,CS,A,M
Control Cable	Okonite	2VAQ5023C	QT,CS,A,M
Control Cable	Okonite	2VAL5044F	QT,CS,A,M

APPENDIX B (Continued)

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Equipment Description	Manufacturer	Component No.	Deficiency
Control Cable	Okonite	2VAL5044G	QT,CS,A,M
Control Cable	Okonite	2VAQ5024C	QT,CS,A,M
Dilution Fan Motor	Joy Mfg. Co.	Q2E22M001A	QT,CS,A,M
Dilution Fan Motor	Joy Mfg. Co.	Q2E22M001B	QT,CS,A,M
Motor Operated Valve	Limatorque	Q2E22V001A	CS,A
Motor Operated Valve	Limatorque	Q2E22V001B	CS,A
Penetration	General Electric	Q2T52B023	QT,CS,A,M
Power Cable	Okonite	2VAED06Q	QT,CS,A,M
Control Cable	Okonite	2VAED06E	QT,CS,A,M
Power Cable	Okonite	2VBEE09Q	QT,CS,A,M
Control Cable	Okonite	2VBEE09E	QT,CS,A,M
Motor Operated Valve	Limatorque	Q2E23V021	CS,A
Motor Operated Valve	Limatorque	Q2E23V003	CS,A
Motor Operated Valve	Limatorque	Q2E23V022A	CS,A
Motor Operated Valve	Limatorque	Q2E23V022B	CS,A
Motor Operated Valve	Limatorque	Q2E23V022C	CS,A
Motor Operated Valve	Limatorque	Q2E23V022D	CS,A
Motor Operated Valve	Limatorque	Q2E23V025A	CS,A
Motor Operated Valve	Limatorque	Q2E23V025B	CS,A
Penetration	General Electric	Q2T52B017	QT,CS,A,M
Penetration	General Electric	Q2T52B007	QT,CS,A,M
Penetration	General Electric	Q2T52B020	QT,CS,A,M

APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Power Cable	Okonite	2VAFU-W4Q	QT,CS,A,M
Power Cable	Okonite	2VBFU-N2Q	QT,CS,A,M
Control Cable	Okonite	2VAFU-W4C	QT,CS,A,M
Control Cable	Okonite	2VAED06E	QT,CS,A,M
Control Cable	Okonite	2VBFV-N2C	QT,CS,A,M
Control Cable	Okonite	2VBEE09E	QT,CS,A,M
Power Cable	Okonite	2VBFV-Y5Q	QT,CS,A,M
Control Cable	Okonite	2VBFV-Y5C	QT,CS,A,M
Power Cable	Okonite	2VBFV-Y4Q	QT,CS,A,M
Control Cable	Okonite	2VBFV-Y5C	QT,CS,A,M
Power Cable	Okonite	2VAFU-L4Q	QT,CS,A,M
Power Cable	Okonite	2VAFU-L5Q	QT,CS,A,M
Power Cable	Okonite	2VBFV-H4Q	QT,CS,A,M
Power Cable	Okonite	2VBFV-H5Q	QT,CS,A,M
Control Cable	Okonite	2VAFU-L4C	QT,CS,A,M
Control Cable	Okonite	2VAFU-L5C	QT,CS,A,M
Control Cable	Okonite	2VBFV-H4C	QT,CS,A,M
Control Cable	Okonite	2VBFV-H5C	QT,CS,A,M
Power Cable	Okonite	2VAFU-M4Q	QT,CS,A,M
Power Cable	Okonite	2VBFV-M3Q	QT,CS,A,M
Control Cable	Okonite	2VAFU-M4C	QT,CS,A,M
Control Cable	Okonite	2VBFV-M3C	QT,CS,A,M
*Solenoid Valve	ASCO	Q2G215V3376	CS,A

*Items for which NRR conducted audit of environmental qualification documentation and/or test data.

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APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Limit Switch	NAMCO	Q2G21ZS3376	CS,A,S
Limit Switch	NAMCO	N2G21ZS1003	CS,A,S
Solenoid Valve	ASCO	N2G21SV1003B	CS,A,S
Solenoid Valve	ASCO	Q2G21SV7126	CS,A
Limit Switch	NAMCO	Q2G21ZS7126	CS,A,S
Penetration	General Electric	Q2T52B038	QT,CS,A,M
Penetration	General Electric	Q2T52B041	QT,CS,A,M
Terminal Block	States Co.	Q2G21SV3376-B/JB	CS,A
Terminal Block	States Co.	N2G21SV1003A-A/JB	CS,A
Terminal Block	States Co.	N2G21SV7126-A/JB	CS,A
Control Cable	Okonite	2VBL5045C	QT,CS,A,M
Control Cable	Okonite	2VBQ5030J	QT,CS,A,M
Instrument Cable	Boston Insulated Wire	2VYR5066G	QT,CS,A,M
Control Cable	Okonite	2VAL5037D	QT,CS,A,M
Control Cable	Okonite	2VAQ5021J	QT,CS,A,M
Control Cable	Okonite	2VAL5036C	QT,CS,A,M
Limit Switch	NAMCO	Q2N11ZS3369A	R,T,QT,P,H,QM, A,S,M,RPN
Solenoid Valve	ASCO	Q2N11SV3369AA	R,T,QT,P,H,QM, A,M,RPN
Solenoid Valve	ASCO	Q2N11SV3369AC	R,T,QT,P,H,QM, A,M,RPN
Limit Switch	NAMCO	Q2N11ZS3369B	R,T,QT,P,H,QM, A,S,M,RPN

APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Solenoid Valve	ASCO	Q2N11SV3369BA	R, T, QT, P, H, QM, A, M, RPN
Solenoid Valve	ASCO	Q2N11SV3369BC	R, T, QT, P, H, QM, A, M, RPN
Limit Switch	NAMCO	Q2N11ZS3369C	R, T, QT, P, H, QM, A, S, M, RPN
Solenoid Valve	ASCO	Q2N11SV3369CA	R, T, QT, P, H, QM, A, S, M, RPN
Solenoid Valve	ASCO	Q2N11SV3369CC	R, T, QT, P, H, QM, A, S, M, RPN
Limit Switch	NAMCO	Q2N11ZS3370A	R, T, QT, P, H, QM, A, S, M, RPN
Solenoid Valve	ASCO	Q2N11SV3370AA	R, T, QT, P, H, QM, A, S, M, RPN
Solenoid Valve	ASCO	Q2N11SV3370AC	R, T, QT, P, H, QM, A, S, M, RPN
Limit Switch	NAMCO	Q2N11ZS3370B	R, T, QT, P, H, QM, A, S, M, RPN
Solenoid Valve	ASCO	Q2N11SV3370BA	R, T, QT, P, H, QM, A, S, M, RPN
Solenoid Valve	ASCO	Q2N11SV3370BC	R, T, QT, P, H, QM, A, S, M, RPN
Limit Switch	NAMCO	Q2N11ZS3370C	R, T, QT, P, H, QM, A, S, M, RPN
Solenoid Valve	ASCO	Q2N11SV3370CA	R, T, QT, P, H, QM, A, S, M, RPN
Solenoid Valve	ASCO	Q2N11SV3370CC	R, T, QT, P, H, QM, A, S, M, RPN
Limit Switch	Microswitch	Q2N11ZS3368A	R, T, QT, P, H, QM, A, M, RPN
Solenoid Valve	ASCO	Q2N11SV3368AA	R, T, QT, P, H, QM, A, M, RPN

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APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Limit Switch	Microswitch	Q2N11ZS3368B	R, T, QT, P, H, QM, A, M, RPN
Solenoid Valve	ASCO	Q2N11SV3368BA	R, T, QT, P, H, QM, A, M, RPN
Limit Switch	Microswitch	Q2N11ZS3368C	R, T, QT, P, H, QM, A, M, RPN
Solenoid Valve	ASCO	Q2N11SV3368CA	R, T, QT, P, H, QM, A, M, RPN
Solenoid Valve	ASCO	Q2N11SV3976A	R, T, QT, P, H, QM, A, M, RPN
Limit Switch	Microswitch	Q2N11ZS3976A	R, T, QT, P, H, QM, A, M, RPN
Solenoid Valve	ASCO	Q2N11SV3976B	R, T, QT, P, H, QM, A, M, RPN
Limit Switch	Microswitch	Q2N11ZS3976B	R, T, QT, P, H, QM, A, M, RPN
Solenoid Valve	ASCO	Q2N11SV3976C	R, T, QT, P, H, QM, A, M, RPN
Limit Switch	Microswitch	Q2N11ZS3976C	R, T, QT, P, H, QM, A, M, RPN
Terminal Block	States Co.	Q2N11SV3369AA-A/JB	A, M, T
Terminal Block	States Co.	Q2N11SV3369BA-A/JB	A, M, T
Terminal Block	States Co.	Q2N11SV3369CA-A/JB	A, M, T
Limit Switch	NAMCO	Q2N11ZS3369AJ	R, T, QT, P, H, QM, A, S, M, RPN
Limit Switch	NAMCO	Q2N11ZS3369BJ	R, T, QT, P, H, QM, A, S, M, RPN
Limit Switch	NAMCO	Q2N11ZS3369CJ	R, T, QT, P, H, QM, A, S, M, RPN

APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Terminal Block	States Co.	Q2N11SV3370AA-B/JB	A,M,T
Terminal Block	States Co.	Q2N11SV3370BA-B/JB	A,M,T
Terminal Block	States Co.	Q2N11SV3370CA-B/JB	A,M,T
Limit Switch	NAMCO	Q2N11ZS3370AJ	R,T,QT,P,H,QM, A,S,M,RPN
Limit Switch	NAMCO	Q2N11ZS3370BJ	R,T,QT,P,H,QM, A,S,M,RPN
Limit Switch	NAMCO	Q2N11ZS3370CJ	R,T,QT,P,H,QM, A,S,M,RPN
Terminal Block	States Co.	Q2N11SV3368AA-A/JB	A,M,T
Terminal Block	States Co.	Q2N11SV3368BA-A/JB	A,M,T
Terminal Block	States Co.	Q2N11SV3368CA-A/JB	A,M,T
Terminal Block	States Co.	Q2N11SV3976B-B/JB	A,M,T
Terminal Block	States Co.	Q2N11SV3976C-B/JB	A,M,T
Penetration	General Electric	Q2T528040	QT,CS,A,M
Instrument Cable	Boston Insulated Wire	2VXV5013L	QT,CS,A,M
Instrument Cable	Boston Insulated Wire	2VXV5014H,J	QT,CS,A,M
Terminal Block	States Co.	Q2N11SV3976A-B/JB	A,M,T

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APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Solenoid Valve	ASCO	Q2N12SV3234A	R, T, QT, P, H, A M, QM, RPN
Limit Switch	NAMCO	Q2N12ZS3234A	R, T, QT, P, H, A M, QM, RPN
Solenoid Valve	ASCO	Q2N12SV3234B	R, T, QT, P, H, A M, QM, RPN
Limit Switch	NAMCO	Q2N12ZS3234B	R, T, QT, P, H, A M, QM, RPN
Solenoid Valve	ASCO	Q2N12SV3235A	R, T, QT, P, H, A M, QM, RPN
Limit Switch	Microswitch	Q2N12ZS3235A	R, T, QT, P, H, A M, QM, RPN
Solenoid Valve	ASCO	Q2N12SV3235B	R, T, QT, P, H, A M, QM, RPN
Limit Switch	Microswitch	Q2N12ZS3235B	R, T, QT, P, H, A M, QM, RPN
Terminal Block	States Co.	Q2N12SV3234A- A/JB	A, S, M, T
Terminal Block	States Co.	Q2N12SV3234B- B/JB	A, S, M, T
Terminal Block	States Co.	Q2N12SV3235A- A/JB	A, S, M, T
Terminal Block	States Co.	Q2N12SV3235B- B/JB	A, S, M, T
Instrument Cables	Boston Insulated Wire	2VYR5064A, B	A, S
*Level Switch	Gems	Q2N21LSH2828A	QT, A, M

*Items for which NRR conducted audit of environmental qualification documentation and/or test data.

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APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Level Switch	Gems	Q2N21LSH2828B	QT,A,M
Level Switch	Gems	Q2N21LSH2828C	QT,A,M
Level Switch	Gems	Q2N21LSH2829A	QT,A,M
Level Switch	Gems	Q2N21LSH2829B	QT,A,M
Level Switch	Gems	Q2N21LSH2829C	QT,A,M
Terminal Block	States Co.	A2TB034	A,M,T
Limit Switch	NAMCO	Q2N23Z53228A	R,T,QT,P,H, A,M,QM,RPN
Solenoid Valve	ASCO	Q2N235V3228AA	R,T,QT,P,H, A,M,QM,RPN
Limit Switch	NAMCO	Q2N23Z53228B	R,T,QT,P,H, A,M,QM,RPN
Solenoid Valve	ASCO	Q2N235V3228BA	R,T,QT,P,H, A,M,QM,RPN
Limit Switch	NAMCO	Q2N23Z53228C	R,T,QT,P,H, A,M,QM,RPN
Solenoid Valve	ASCO	Q2N235V3228CA	R,T,QT,P,H, A,M,QM,RPN
Limit Switch	NAMCO	Q2N23Z53227A	R,T,QT,P,H, A,M,QM,RPN
Solenoid Valve	ASCO	Q2N235V3227AA	R,T,QT,P,H, A,M,QM,RPN
Limit Switch	NAMCO	Q2N23Z53227B	R,T,QT,P,H, A,M,QM,RPN
Solenoid Valve	ASCO	Q2N235V3227BA	R,T,QT,P,H, A,M,QM,RPN
Limit Switch	NAMCO	Q2N23Z53227C	R,T,QT,P,H, A,M,QM,RPN
Solenoid Valve	ASCO	Q2N235V3227CA	R,T,QT,P,H, A,M,QM,RPN

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APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Terminal Block	States Co.	Q2N23SV3228AA-A/JB	A,M,T
Terminal Block	States Co.	Q2N23SV3228BA-A/JB	A,M,T
Terminal Block	States Co.	Q2N23SV3228CA-A/JB	A,M,T
Terminal Block	States Co.	Q2N23SV3227AA-A/JB	A,M,T
Terminal Block	States Co.	Q2N23SV3227BA-A/JB	A,M,T
Terminal Block	States Co.	Q2N23SV3227CA-A/JB	A,M,T
Solenoid Valve	ASCO	Q2N25SV3772A	R,T,QT,P,H, A,M,QM,RPN
Limit Switch	NAMCO	Q2N25Z53772A	R,T,QT,P,H, A,M,QM,RPN
Solenoid Valve	ASCO	Q2N25SV3772B	R,T,QT,P,H, A,M,QM,RPN
Limit Switch	NAMCO	Q2N25Z53772B	R,T,QT,P,H, A,M,QM,RPN
Solenoid Valve	ASCO	Q2N25SV3772C	R,T,QT,P,H, A,M,QM,RPN
Limit Switch	NAMCO	Q2N25Z53772C	R,T,QT,P,H, A,M,QM,RPN
Terminal Block	States Co.	Q2N25SV3772A-A/JB	A,M,T
Junction Box	States Co.	Q2N25SV3772B-A/JB	A,M,T
Junction Box	States Co.	Q2N25SV3772C-A/JB	A,M,T
Solenoid Valve	ASCO	Q2P15SV3103	R,T,QT,P,H,CS, A,M,QM,RPN

APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Limit Switch	NAMCO	Q2P15ZS3103	CS,A
Solenoid Valve	ASCO	Q2P15SV3765	CS,A,M,RT
Limit Switch	NAMCO	Q2P15ZS3765	CS,A
Solenoid Valve	ASCO	Q2P15SV3766	R,T,QT,P,H,CS, A,M,QM,RPN
Limit Switch	NAMCO	Q2P15ZS3766	CS,A
Solenoid Valve	ASCO	Q2P15SV3179A	R,T,QT,P,H,CS, A,M,QM,RPN
Limit Switch	NAMCO	Q2P15ZS3179A	CS,A
Solenoid Valve	ASCO	Q2P15SV3179B	R,T,QT,P,H,CS, A,M,QM,RPN
Limit Switch	NAMCO	Q2P15ZS3179B	CS,A
Solenoid Valve	ASCO	Q2P15SV3179C	R,T,QT,P,H,CS, A,M,QM,RPN
Limit Switch	NAMCO	Q2P15ZS3179C	CS,A
Solenoid Valve	ASCO	Q2P15SV3180A	R,T,QT,P,H,CS, A,M,QM,RPN
Limit Switch	NAMCO	Q2P15ZS3180A	CS,A
Solenoid Valve	ASCO	Q2P15SV3180B	R,T,QT,P,H,CS, A,M,QM,RPN
Limit Switch	NAMCO	Q2P15ZS3180B	CS,A
Solenoid Valve	ASCO	Q2P15SV3180C	R,T,QT,P,H,CS, A,M,QM,RPN
Limit Switch	NAMCO	Q2P15ZS3180C	CS,A
Solenoid Valve	ASCO	Q2P15SV3181A	R,T,QT,P,H,CS, A,M,QM,RPN
Limit Switch	NAMCO	Q2P15ZS3181A	CS,A
Solenoid Valve	ASCO	Q2P15SV3181B	R,T,QT,P,H,CS, A,M,QM,RPN

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APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Dericiency
Limit Switch	NAMCO	Q2P15ZS3181B	CS,A
Solenoid Valve	ASCO	Q2P15SV3181C	R,T,QT,P,H,CS, A,M,QM,RPN
Limit Switch	NAMCO	Q2P15ZS3181C	CS,A
Solenoid Valve	ASCO	Q2P15SV3104	R,T,QT,P,H,CS, A,M,QM,RPN
Limit Switch	NAMCO	Q2P15ZS3104	CS,A
Penetration	General Electric	Q2T52R019	QT,CS,A,M
Terminal Block	States Co.	Q2P15SV3103-A/JB	CS,A
Junction Box	States Co.	Q2P15SV375-A/JB	CS,A
Terminal Block	States Co.	Q2P15SV3766-A/JB	CS,A
Terminal Block	States Co.	Q2P15SV3179A-A/JB	CS,A
Terminal Block	States Co.	Q2P15SV3179B-A/JB	CS,A
Terminal Block	States Co.	Q2P15SV3179C-B/JB	CS,A
Terminal Block	States Co.	Q2P15SV3180A-A/JB	CS,A
Terminal Block	States Co.	Q2P15SV3180B-A/JB	CS,A
Terminal Block	States Co.	Q2P15SV3180C-B/JB	CS,A
Terminal Block	States Co.	Q2P15SV3181A-A/JB	CS,A
Terminal Block	States Co.	Q2P15SV3181B-A/JB	CS,A
Terminal Block	States Co.	Q2P15SV3181C-A/JB	CS,A

APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Terminal Block	States Co.	Q2P155V3104-A/JB	CS,A
Control Cable	Okonite	2VAL5063B	QT,CS,A,M
Control Cable	Okonite	2VAQ5049H	QT,CS,A,M
Control Cable	Okonite	2VXR5010B	QT,CS,A,M
Control Cable	Okonite	2VAL5065B	QT,CS,A,M
Control Cable	Okonite	2VAQ5032J	QT,CS,A,M
Control Cable	Okonite	2VXR5010F	QT,CS,A,M
Control Cable	Okonite	2VAL5066A	QT,CS,A,M
Control Cable	Okonite	2VAQ5033J	QT,CS,A,M
Control Cable	Okonite	2VXR5010H	QT,CS,A,M
Control Cable	Okonite	2VAL5084B	QT,CS,A,M
Control Cable	Okonite	2VAL5085B	QT,CS,A,M
Control Cable	Okonite	2VBL5074B	QT,CS,A,M
Control Cable	Okonite	2VAL5086B	QT,CS,A,M
Control Cable	Okonite	2VAL5087B	QT,CS,A,M
Control Cable	Okonite	2VBL5075B	QT,CS,A,M
Control Cable	Okonite	2VAL5088B	QT,CS,A,M
Control Cable	Okonite	2VAL5089B	QT,CS,A,M
Control Cable	Okonite	2VBL5076B	QT,CS,A,M
Control Cable	Okonite	2VAL5064B	QT,CS,A,M
Control Cable	Okonite	2VAQ5047H	QT,CS,A,M
Control Cable	Okonite	2VXR5010D	QT,CS,A,M
Motor Operated Valve	Limitorque	Q2P16V207A	CS,A
Motor Operated Valve	Limitorque	Q2P16V207B	CS,A

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APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Motor Operated Valve	Limitorque	Q2P16V207C	CS,A
Motor Operated Valve	Limitorque	Q2P16V207D	CS,A
Motor Operated Valve	Limitorque	Q2P16V081	CS,A
Power Cable	Okonite	2VBFV-J4Q	QT,CS,A,M
Control Cable	Okonite	2VBFV-J4D	QT,CS,A,M
Control Cable	Okonite	2VBQ5007D	QT,CS,A,M
Control Cables	Okonite	2VYR4006B,D	QT,CS,A,M
Control Cables	Okonite	2VYKB164B,C	QT,CS,A,M
Power Cable	Okonite	2VBFV-J5Q	QT,CS,A,M
Control Cable	Okonite	2VBFV-J5D	QT,CS,A,M
Control Cable	Okonite	2VBQ5009D	QT,CS,A,M
Power Cable	Okonite	2VAFU-K6Q	QT,CS,A,M
Control Cable	Okonite	2VAFU-K6D	QT,CS,A,M
Control Cable	Okonite	2VAQ5007D	QT,CS,A,M
Control Cables	Okonite	2VXR5005B,D,F	QT,CS,A,M
Control Cables	Okonite	2VXKB164B,C	QT,CS,A,M
Power Cable	Okonite	2VAFU-W2Q	QT,CS,A,M
Control Cable	Okonite	2VAFU-W2D	QT,CS,A,M
Power Cable	Okonite	2VAFU-H4Q	QT,CS,A,M
Control Cable	Okonite	2VAFU-H4A	QT,CS,A,M
Control Cable	Okonite	2VAQ5002F	QT,CS,A,M
Motor Operated Valve	Limitorque	Q2P17V097	CS,A
Solenoid Valve	ASCO	Q2P17SV3184	CS,A
Limit Switch	NAMCO	Q2P17ZS3184	CS,A

APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Solenoid Valve	ASCO	Q2P17SV3443	R,T,QT,P,H,CS, A,M,QM,RPN
Limit Switch	NAMCO	Q2P17Z53443	CS,A
Terminal Block	States Co.	Q2P17SV3184-B/JB	CS,A
Penetration	General Electric	Q2T52B041	QT,CS,A,M
Terminal Block	States Co.	Q2P17SV3443-A/JB	CS,A
Power Cable	Okonite	2VBFV-C3Q	QT,CS,A,M
Control Cable	Okonite	2VBFV-C3D	QT,CS,A,M
Control Cable	Okonite	2VBQ5017C	QT,CS,A,M
Control Cable	Okonite	2VYR5006F	QT,CS,A,M
Control Cables	Okonite	2VBL5009C,D,E,F	QT,CS,A,M
Control Cable	Okonite	2VBQ5017H	QT,CS,A,M
Control Cable	Okonite	2VYR5035B	QT,CS,A,M
Control Cable	Okonite	2VAL5055C	QT,CS,A,M
Control Cable	Okonite	2VAQ5029H	QT,CS,A,M
Instrument Cable	Okonite	2VYR5064F	QT,CS,A,M

APPENDIX C

Equipment Considered Acceptable or Conditionally Acceptable
(Category 4.3)

Equipment Description	Manufacturer	Component No.	Deficiency
Control Cables	Okonite	2VAQ5008C,H	A
Control Cables	Okonite	2VXR5007G,H,J	A
Control Cable	Okonite	2VAL5076A	A
Control Cable	Okonite	2VAL5077A	A
Control Cable	Okonite	2VAL5078A	A
Control Cable	Okonite	2VAQ5030E	A
Control Cable	Okonite	2VAQ5031E	A
Control Cable	Okonite	2VAQ5032E	A
Control Cable	Okonite	2VXR5008G,H,J	A
Control Cables	Okonite	2VAFU-U4A,D	A
Control Cables	Okonite	2VAFU-U5A,D	A
Control Cables	Okonite	2VAFU-I2A,D	A
Control Cable	Okonite	2VAL5007B	A
Control Cable	Okonite	2VAL5008B	A
Control Cable	Okonite	2VAL5009B	A
Instrument Cable	Boston Insulated Wire	2VAL5007C	A
Instrument Cable	Boston Insulated Wire	2VAL5008C	A
Instrument Cables	Boston Insulated Wire	2VAL5009C	A
Control Cables	Okonite	2VAQ5010E,K	A
Control Cables	Okonite	2VAQ5012E,K	A

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APPENDIX C (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Control Cables	Okonite	2VAQ5014E,K	A
Control Cables	Okonite	2VXR5007K,L,M	A
Control Cable	Okonite	2VAL5013C	A
Control Cable	Okonite	2VAL5014C	A
Control Cable	Okonite	2VAL5015C	A
Instrument Cable	Boston Insulated Wire	2VAL5013D	A
Instrument Cable	Boston Insulated Wire	2VAL5014D	A
Instrument Cable	Boston Insulated Wire	2VAL5015D	A
Control Cables	Okonite	2VAQ5043H,K	A
Control Cables	Okonite	2VAQ5006C,H	A
Power Cable	Okonite	2VAFU-U4Q	A
Power Cable	Okonite	2VAFU-U5Q	A
Power Cable	Okonite	2VAFU-I2Q	A
Control Cable	Okonite	2VAL5120A,B,C,D	A
Control Cable	Okonite	2VBL5092A, B, C	A
Power Cable	Okonite	2VBFV-K2Q	A
Power Cable	Okonite	2VBFV-K3Q	A
Power Cable	Okonite	2VBFV-L2Q	A
Control Cable	Okonite	2VBFV-K2A	A
Control Cable	Okonite	2VBFV-K3A	A

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APPENDIX C (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Control Cable	Okonite	2VBFV-L2A	A
*Motor Operated Globe Valve	Limitorque	Q2N23V011A	A
Motor Operated Globe Valve	Limitorque	Q2N23V001B	A
Motor Operated Globe Valve	Limitorque	Q2N23V001C	A
Control Cable	Okonite	2VAL5003B	A
Control Cable	Okonite	2VAQ5011A	A
Control Cable	Okonite	2VXR5007F	A
Control Cable	Okonite	2VBL5007B	A
Control Cable	Okonite	2VBQ5013B	A
Control Cable	Okonite	2VYR5033E	A
Control Cable	Okonite	2VAL5004C	A
Control Cable	Okonite	2VAQ5010D	A
Control Cable	Okonite	2VBL5005C	A,
Control Cable	Okonite	2VBQ5011B	A,
Control Cables	Okonite	2VXKJ183C,D,G,H	A
*Motor Operated Valve	Limitorque	Q2N21V001A-B	A
Motor Operated Valve	Limitorque	Q2N21V001B-B	A
Motor Operated Valve	Limitorque	Q2N21V001C-B	A
Control Cable	Okonite	2VAL5047C	A
Control Cable	Okonite	2VAQ5017A	A
Control Cable	Okonite	2VBL5010E,D	A

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APPENDIX C (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Control Cable	Okonite	2VBL5021C	A
Control Cable	Okonite	2VBQ5013D	A
Control Cable	Okonite	2VBT0001F,G,H	A
Control Cable	Okonite	2VBL5011E,D	A
Control Cable	Okonite	2VBL5022C	A
Control Cable	Okonite	2VBQ5015D	A
Control Cable	Okonite	2VBL5012E,D	A
Control Cable	Okonite	2VBL5023C	A
Control Cable	Okonite	2VBQ5017E	A
Control Cable	Okonite	2VAL5045B	A
Control Cable	Okonite	2VAQ5013B	A
Control Cable	Okonite	2VXR5008A	A
Control Cable	Okonite	2VAL5046B	A
Control Cable	Okonite	2VAQ5015B	A
Control Cable	Okonite	2VXR5008B	A
Control Cable	Okonite	2VAL5047D	A
Control Cable	Okonite	2VAQ5017B	A
Control Cable	Okonite	2VXR5008C	A
Control Cable	Okonite	2VBL5021B	A
Control Cable	Okonite	2VBQ5013E	A
Control Cable	Okonite	2VBL5022B	A

APPENDIX C (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Control Cables	Okonite	2VAL5019E,F	A
Control Cable	Okonite	2VAL5045C	A
Control Cable	Okonite	2VAQ5015	A
Control Cable	Okonite	2VAT0001C,D,E	A
Control Cable	Okonite	2VAL5020E,F	A
Control Cable	Okonite	2VAL5046C	A
Control Cable	Okonite	2VAQ5015A	A
Control Cable	Okonite	2VAL5021E,F	A
Control Cable	Okonite	2VAL5060B	A
Control Cable	Okonite	2VBL4025B	A
Control Cable	Okonite	2VXL5071A	A
Control Cable	Okonite	2VAL5061C	A
Control Cables	Okonite	2V3L5034C,D	A
Control Cable	Okonite	2VXL5072B	A
Control Cable	Okonite	2VAL5062B	A
Control Cables	Okonite	2VBL5035B,D	A
Control Cable	Okonite	2VXL5073A	A
Level Transmitter	Barton	Q2C22LT474	A
Level Transmitter	Barton	Q2C22LT475	A
Level Transmitter	Barton	Q2C22LT476	A
Level Transmitter	Barton	Q2C22LT484	A

APPENDIX C (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Level Transmitter	Barton	Q2C22LT485	A
Level Transmitter	Barton	Q2C22LT486	A
Level Transmitter	Barton	Q2C22LT494	A
Level Transmitter	Barton	Q2C22LT495	A
Level Transmitter	Barton	Q2C22LT496	A
Flow Transmitter	Barton	Q2C22FT474	A
Flow Transmitter	Barton	Q2C22FT475	A
Flow Transmitter	Barton	Q2C22FT484	A
Flow Transmitter	Barton	Q2C22FT485	A
Flow Transmitter	Barton	Q2C22FT494	A
Flow Transmitter	Barton	Q2C22FT495	A
Control Cable	Okonite	2VBQ5015E	A
Control Cable	Okonite	2VBL5023B	A
Control Cable	Okonite	2VBQ5017F	A
Level Transmitter	Barton	Q2N11LT477	A
Level Transmitter	Barton	Q2N11LT487	A
Level Transmitter	Barton	Q2N11LT497	A

APPENDIX D

Safety-Related System List¹

Function	System
Emergency Reactor Shutdown	Reactor Protection Engineered Safeguards Actuation Reactor Coolant Chemical and Volume Control
Containment Isolation	Main Feedwater and Condensate Auxiliary Feedwater Main and Auxiliary Steam Residual Heat Removal Chemical Injection Chemical and Volume Control Liquid Waste Disposal Component Cooling Water Service Water Containment Spray Sampling Containment Cooling and Purge
Reactor Core Cooling	Chemical and Volume Control/Safety Injection Safeguards System, RHR/LHSI
Containment Heat Removal	Containment Spray Containment Cooling and Purge Residual Heat Removal
Core Residual Heat Removal	Auxiliary Feedwater Main Feedwater and Condensate Main Steam Residual Heat Removal (1) Component Cooling Water Service Water Chemical and Volume Control

¹The NRC staff recognized that there are differences in nomenclature of systems because of plant vintage and engineering design; consequently, some systems performing identical or similar functions may have different names. In those instances it was necessary to verify the system(s) function with the responsible IE regional reviewer and/or the licensee.

(1) Only equipment required to achieve hot shutdown following an accident is included in the master list submitted by licensee. Cold shutdown equipment is to be addressed later.

APPENDIX D (Continued)

Function	System
Prevention of Significant Release of Radioactive Material to Environment	Containment Spray (Iodine Removal) Containment Post-LOCA Air Mixing Reactor Cavity Post-LOCA Dilution Hydrogen Recombiner Radiation Monitoring Sampling
Supporting Systems	Emergency Power Control Room Habitability Safety Equipment Area Ventilation

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APPENDIX C
FINDINGS OF
FEDERAL EMERGENCY MANAGEMENT AGENCY

FEDERAL EMERGENCY MANAGEMENT AGENCY 053708

Washington, D.C. 20543

11 MAR 1981

Mr. William J. Dircks
Executive Director
for Operations
U.S. Nuclear Regulatory Commission
Washington, DC 20555

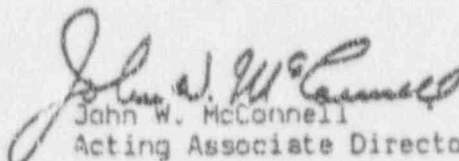
Dear Mr. Dircks:

On November 10, 1980, in accordance with the Federal Emergency Management Agency (FEMA) Rule 44 CFR 350 (proposed), the State of Alabama submitted its plan and associated local plans related to the J. M. Farley nuclear power facility to the Regional Director of FEMA Region IV for FEMA review and approval. The Regional Director forwarded his evaluation dated January 26, 1981, to me in accordance with paragraph 350.11 of the proposed Rule. His submission included a critique of the exercise conducted on November 19-20, 1980, at the Farley facility and a report of the public meeting held on November 18, 1980, to explain the site-specific aspects of the State and local plans. His evaluation also included those aspects of the Georgia State and local plans as they relate to the Farley facility.

Based on this evaluation and a review by the FEMA Headquarters staff, I find and determine that subject to the condition stated below, the plans and preparedness for the Farley facility are adequate to protect the health and safety of the public living in the vicinity of the facility by providing reasonable assurance that appropriate protective measures can and will be taken off-site in the event of a radiological emergency and are capable of being implemented.

Accordingly, I approve the Alabama State and local plans relative to the Farley facility subject to the requirement that by July 1, 1981, the public alerting and notification system meets FEMA/Nuclear Regulatory Commission criteria as stated in NUREG-0654/FEMA-REP-1, Revision 1.

Sincerely yours,


John W. McConnell
Acting Associate Director for
Plans and Preparedness

APPENDIX C

Errata to SER Supplement 5

SER Supplement 5		
<u>Page No.</u>	<u>Line No.</u>	
6-6	8	Add after indicated "based on information from the vendor,"
	9	Delete sentence "this has been confirmed by a vendor representative."
6-7	35	Delete "for our review"
	36	Change date from "July 1, 1981" to "October 1, 1981"
6-16	28	Change item (2) to read "(2) provisions (or modifications) as necessary to assure that the safety grade backup means of reactor coolant system depressurization is in accordance with Table 1 in Branch Technical Position RSB 5-1, Rev. 1, and".
22.3-3	36	Delete "for review and approval"
	39	Change "for review and approval within 60 days after burnup sufficient to produce meaningful test results and training." to "within 60 days after operation for 25,000 MW(e) - days."
	46	Delete "and approved".

NRC FORM 335 (77)		U.S. NUCLEAR REGULATORY COMMISSION BIBLIOGRAPHIC DATA SHEET		1. REPORT NUMBER (Assigned by DDC) NUREG-0117 Supplement 6	
TITLE AND SUBTITLE (Add Volume No., if applicable)				2. (Leave blank)	
Safety Evaluation Report Appended to the Operation of Joseph M. Farley Nuclear Plant, Unit 2 Supplement No. 6				3. RECIPIENT'S ACCESSION NO.	
7. AUTHOR(S)				5. DATE REPORT COMPLETED	
				MONTH YEAR March 1981	
9. PERFORMING ORGANIZATION NAME AND MAILING ADDRESS (Include Zip Code)				DATE REPORT ISSUED	
U.S. Nuclear Regulatory Commission Office of Nuclear Reactor Regulation Washington, D. C. 20555				MONTH YEAR March 1981	
				6. (Leave blank)	
				8. (Leave blank)	
12. SPONSORING ORGANIZATION NAME AND MAILING ADDRESS (Include Zip Code)				10. PROJECT/TASK/WORK UNIT NO.	
Same as 9 above				11. CONTRACT NO.	
13. TYPE OF REPORT				PERIOD COVERED (Inclusive dates)	
15. SUPPLEMENTARY NOTES				14. (Leave blank)	
Pertains to Docket No. 50-364					
16. ABSTRACT (200 words or less)					
Supplement No. 6 to the Safety Evaluation Report of Alabama Power Company's application for licenses to operate its Joseph M. Farley Nuclear Plant, Unit 2, located in Houston County, Alabama, has been prepared by the Office of Nuclear Reactor Regulation of the U. S. Nuclear Regulatory Commission. This Supplement reports on matters completed since issuance of Supplement No. 5. Supplement No. 6 supports issuance of the full power operating license.					
17. KEY WORDS AND DOCUMENT ANALYSIS				17a. DESCRIPTORS	
17b. IDENTIFIERS, OPEN-ENDED TERMS					
18. AVAILABILITY STATEMENT				19. SECURITY CLASS (This report)	
Unlimited				Unclassified	
				21. NO. OF PAGES	
				22. PRICE	
				5	