ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:8804080095 DOC.DATE: 88/03/31 NOTARIZED: NO DOCKET #
FACIL:50-315 Donald C. Cook Nuclear Power Plant, Unit 1, Indiana & 05000315
50-316 Donald C. Cook Nuclear Power Plant, Unit 2, Indiana & 05000316
AUTH.NAME AUTHOR AFFILIATION
ALEXICH,M.P. American Electric Power Co., Inc.
RECIP.NAME RECIPIENT AFFILIATION
MURLEY,T.E. Document Control Branch (Document Control Desk)

SUBJECT: Responds to NRC 880127 telcon requesting addl info re ATWS mitigation sys actuation circuitry.

DISTRIBUTION CODE: A055D COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 12
TITLE: OR/Licensing Submittal: Salem ATWS Events GL-83-28

NOTES:

	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL
	PD3-3 LA	1	0	PD3-3 PD	3	3
	STANG,J	1	1			
INTERNAL:	ARM/DAF/LFMB	1	0	NRR LASHER,D	1	1
	NRR/DEST/ESB 8D	1	1	NRR/DEST/ICSB7A	1	1
	NRR/DEST/PSB 8D	1	0	NRR/DEST/RSB 8E	1	1
	NRR/DLPQ/QAB 10	1	0	NRR/DOEA/GCB 11	1	0
	NRR/PMAS/ILRB12	1	0	OGC 15-B-18	1	0
	REG FILE 01	1	1	RES/DE/EIB	1	1
EXTERNAL:	LPDR	1	1	NRC PDR	1	1
	NSIC	1	1			

TOTAL NUMBER OF COPIES REQUIRED: LTTR 20 ENCL 13

R I D S / A D D S

R I D S / A D D S

American Electric Power
Service Corporation
1 Riverside Plaza
Columbus, OH 43215
614 223 1000

AMERICAN ELECTRIC POWER

AEP:NRC:0838AE
10 CFR 50.62

Donald C. Cook Nuclear Plant Units 1 and 2
Docket Nos. 50-315 and 50-316
License Nos. DPR-58 and DPR-74
GENERIC LETTER 83-28 ANTICIPATED TRANSIENT WITHOUT SCRAM (ATWS) MITIGATION SYSTEMS ACTUATION CIRCUITRY (AMSAC) ADDITIONAL INFORMATION

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Attn: T. E. Murley

March 31, 1988

Dear Dr. Murley:

The purpose of this letter is to respond to your staff's January 27, 1988 telephone request to provide additional information on our AMSAC plant specific design.

On January 21, 1988 your staff telecopied a list of questions concerning our AMSAC design. During a January 27, 1988 teleconference, several of the questions were resolved. The following information (numbered according to the telecopy sent by your staff on January 21, 1988) responds to the additional information requested during the January 27, 1988 teleconference.

From 11-7-86 Submittal

1. No mention of the reset of the AFW pumps or the turbine trip circuits. Need a statement regarding the manual reset.

Response: Once initiated, AMSAC will seal itself in. It requires operator action to reset the AMSAC logic circuit at the system level. The motor driven auxiliary feed pumps, the turbine driven auxiliary feed pump, and the main turbine, will be reset through their own controls. To reiterate, when AMSAC is reset at the system level, the turbine and auxiliary feed water systems are not automatically reset.

A055
1/1

From 6-25-87 Submittal

2. Attachment 1 - Appendix A

a) No mention of the MCF potential current.
b) Need make and model number of both the analog and digital isolators.
c) Need copy of test report.

Response a): For information concerning how the maximum credible fault (MCF) voltages were determined, please refer to our June 25, 1987 letter (AEP:NRC:0838Z).

To determine the MCF current associated with the 128v DC MCF voltage, three assumptions were made:

1) Power out of the power supply equals power into the power supply.

2) The 3/8-ampere instrument power supply input fuse passes a momentary current of 1.5 times its nominal rating.

3) The maximum instrument power supply voltage of 84v DC is delivered through the 1/8-ampere output fuse which does not open.

Using the above assumptions yields a MCF current of 0.80 amperes for the 128v DC MCF voltage.

To determine the MCF current associated with the 110v AC MCF voltage, two source voltages were analyzed.

1) The AMSAC analog isolation devices source voltage circuits are protected by 5-ampere fuses. Assuming that the fuse passes a momentary current of 1.5 times its nominal rating yields a current of 7.5 amperes.

2) The AC devices in the AMSAC cabinet are powered by a 250v DC to 120v 1 kVA AC inverter. This inverter has a nominal full load current rating of 10 amperes and is current limited by the inverter itself at 200%, i.e., 20 amperes. AMSAC circuits would see this 200% only if both the DC input fuses and the AC output circuit breakers fail.

20 amperes is the largest of the currents for the two source voltages analyzed, so it was selected as the MCF current associated with the 110v AC MCF voltage.

Response b): We plan to use the test GE HFA relays (Model No. 12 HFA 151A9H). These relays will function as the output isolators. The maximum credible voltage is 280v DC (When battery is on equalize).

The maximum credible current which will be present if the coil were completely shorted out is approximately 275 amps. However, the coil resistance is 415 ohms for a typical 115 VAC HFA relay. The expected current through the HFA coil is:

$$I = \frac{280v\ DC}{415\ ohms} = .67\ amps$$

Response c): We are in the process of designing and assembling our test program and will submit the test report under separate cover as agreed.

From 12-18-87 Submittal

9. Quality Assurance

a) No commitment to GL 85-06 as it applies to the AMSAC equipment that is designated non-Class 1E.

b) Compare the existing non-1E QA procedure against the guidelines presented in GL 85-06 and modify the existing procedure as necessary to bring it within the guidelines of GL 85-06.

Response a): The use of non-Class 1E AMSAC equipment will be minimal. Equipment that must be purchased non-Class 1E will be treated in accordance with GL 85-06. The applicable portions of the Quality Assurance Program as set forth in the "Updated Quality Assurance Program Description for the Donald C. Cook Nuclear Plant" (FSAR Chapter 1.7) will be applicable to those items of AMSAC equipment designated Class 1E.

Response b): The normal AEPSC engineering, design, procurement and operating practices for non-Class 1E equipment

are similar to the practices outlined in the FSAR for Class 1E equipment. We have also compared our existing non-Class 1E practices (though not necessarily proceduralized) with the criteria established in GL 85-06 and believe we meet the guidance of GL 85-06. We understand 85-06 acknowledges that non-class 1E practices may not necessarily be proceduralized.

From 12-18-87 Submittal

10. Bypasses/means for/attachment 2, 5

d) Where is the "AMSAC Test Successful" light located?

In addition, during the January 27, 1988 teleconference, your staff requested that we describe the latest annunciation scheme for AMSAC and provide a copy of the logic diagram which indicates from where the signals are coming.

Response: The Detailed Control Room Design Review (DCRDR) human factors engineering has been completed. The annunciator/alarming scheme is as follows:

a) When AMSAC is in the disable or bypass/test positions, an indicating light will illuminate.

b) The AMSAC enabled indicating light will illuminate when the power level is above 40% or in the bypass/test mode. When in the bypass/test mode, the AMSAC system is tested up to but not including the initiating relays.

c) When AMSAC is actuated, drop no. 14 on annunciator bank no. 212 on the DTU panel will illuminate stating "AMSAC Actuated." The input for this drop will be one of the AMSAC initiate relays.

d) When a loss of power to the AMSAC logic bus occurs, drop no. 15 on annunciator bank no. 212 on the DTU panel will illuminate stating "AMSAC Control Bus Abnormal." The signal will originate from a GE HGA relay which is connected across the output side (AC) of the inverter.

e) When AMSAC is in the bypass/test mode and if a low feedwater flow to 3 of 4 flow loops is simulated, the AMSAC test relay will energize and seal itself in illuminating an indicating light in the AMSAC cabinet indicating AMSAC test successful. The reset, AMSAC control switch 101-AM-1 is placed in "Reset."

f) Once AMSAC is returned to the normal mode of operation (from disable or bypass/test) the initiate relays are continuity checked with a push button switch. The push button will produce current flow through the relay coil to verify continuity and illuminate an indicating light to verify that the circuit is continuous. The indicating light will be labelled "AMSAC Available."

g) When AMSAC is in the bypass/test mode, we have the capability to test the AMSAC logic circuitry (excluding the initiate relays). If we simulate low feedwater flow and the circuit is functioning properly, we will illuminate an indicating light in the AMSAC cabinet which states "AMSAC test successful." The location of the AMSAC cabinet is in the Unit #2 control room behind the Axial Power Distribution Monitoring System.

Attachment No. 1 contains the revised AMSAC logic diagram. The revisions are described below:

1. When AMSAC is in the bypass/test mode, the AMSAC initiate relays are disabled.

2. When AMSAC is in the bypass/test mode, a simulated signal indicating above 40% power is used to test AMSAC logic.

The above mentioned revisions to the logic diagram are identified by dotted lines.

Attachment No. 2 contains the DCRDR information which has been previously submitted. Please note that we plan to use a red handle for the manual initiate switch 101-AM-1. We changed the positions on 101-AM-2 i.e., normal and bypass positions were exchanged as well as the status lights above the switch.

From 12-18-87 Submittal

12. Completion of Mitigating Action

a) This response should have been changed (C-20).

Response a): The Westinghouse Owners Group low feed flow design delays the unlocking of AMSAC (C-20 signal) for a

minimum of sixty seconds after the variable timer has timed out. WCAP-10858 P-A, Rev. 1 provided the basis for this design. Its implementation will be consistent with existing plant turbine trip and existing auxiliary feedwater control circuit requirements. Initial plant checkout testing will verify that once initiated, AMSAC will go to completion. Our design requires a deliberate action from the operator to reset the AMSAC system. The AMSAC system will be continuously monitored in the control room.

This document has been prepared following Corporate procedures which incorporate a reasonable set of controls to ensure its accuracy and completeness prior to signature by the undersigned.

Sincerely,

M. P. Alexich
Vice President

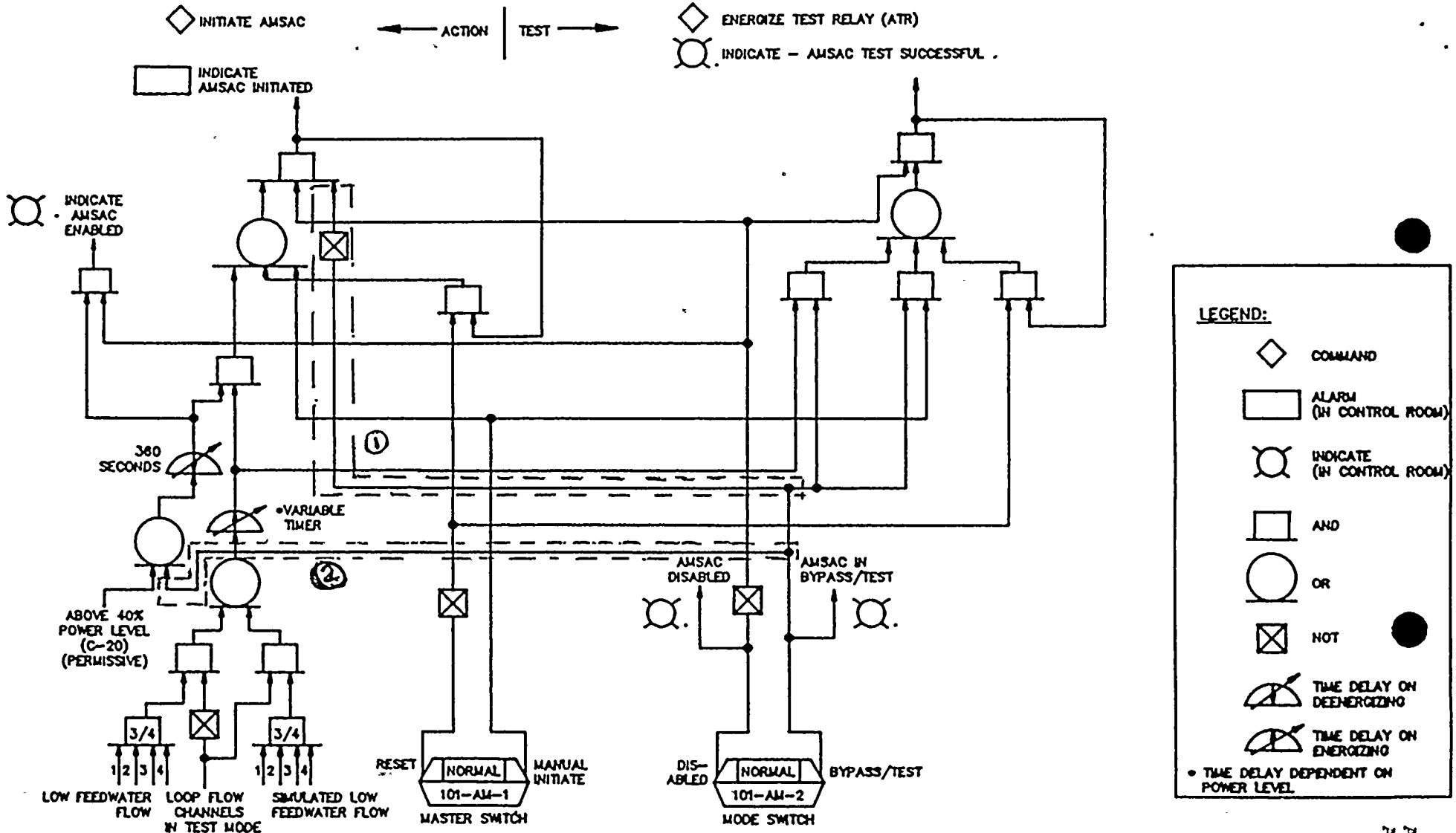
cm

Attachments

cc: D. H. Williams, Jr. (w/o attachments)
W. G. Smith, Jr. - Bridgman (w/o attachments)
R. C. Callen (w/o attachments)
G. Bruchmann (w/o attachments)
G. Charnoff (w/o attachments)
NRC Resident Inspector - Bridgman (w/attachments)
A. B. Davis - Region III (w/attachments)

bc: P. A. Barrett/K. J. Toth
S. H. Horowitz/T. O. Argenta/R. C. Carruth
J. J. Markowsky/S. H. Steinhart/P. G. Schoepf
R. W. Jurgensen
R. F. Kroeger
J. G. Feinstein
M. L. Horvath - Bridgman
J. F. Kurgan
J. B. Shinnock
J. F. Stang, NRC - Washington, D.C.
AEP:NRC:0838AE
DC-N-6015.1

AMSAC LOGIC DIAGRAM Rev. 1

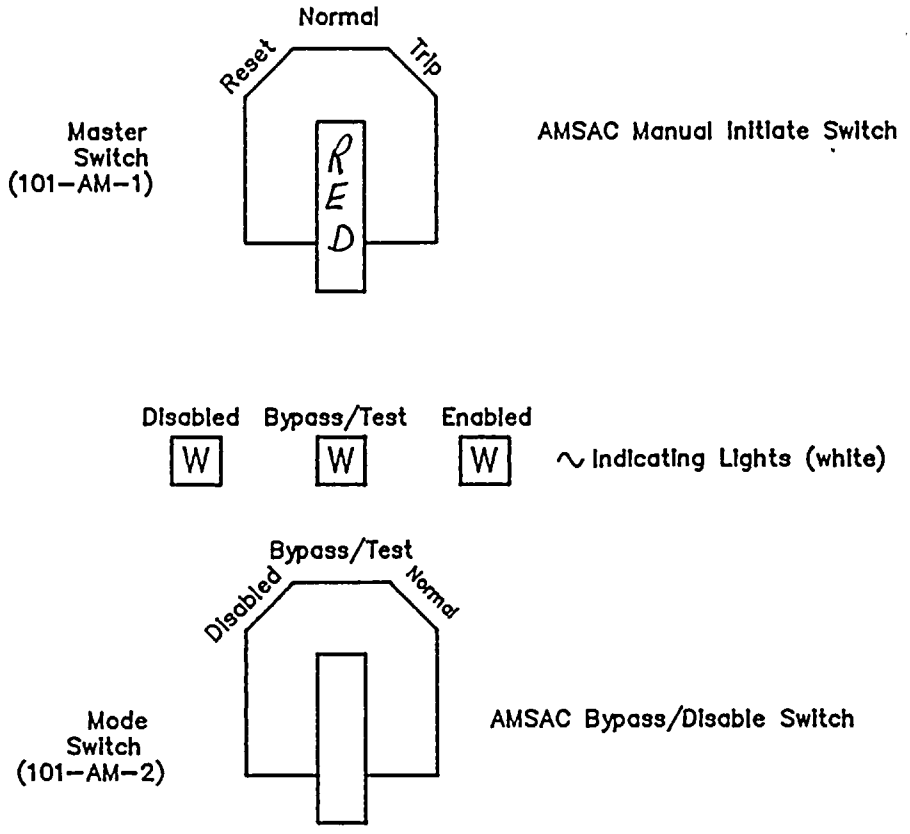


PROCESS/CONTROL

Attachment 1 to
AEP:NRC:0838AE

ATTACHMENT #3
PAGE 1 OF 3

AMSAC CONTROL SWITCHES IN THE CONTROL ROOM DTU PANEL



Note: GE Type SB-1 Switches With Pistol Grip Handles Are Used.

COOK DCRDR

ANNUNCIATOR TILE LEGENDS for AMSAC (RFC DC-02-287

Refer to the Annunciator File Legend Guidelines and procedure. Fill out the below legend blocks per the sample in the top left corner. Note that each line is divided into 13 segments, the maximum characters or spaces per line. Enter one character per space, center each line. The result should show the desired legend engraving accurately for applications that require one or three lines of text.

Unit No. 2 (30U-UAP)

Annunciator Bank No. 212 Panel DTU

SAMPLE	DROP NO. 14	DROP NO. 15
RCP MOTOR OVERLOAD TRIP	AMSAC ACTUATED	AMSAC CONTROL BUS ABNORMAL
	RED LENS COLOR	WHITE LENS COLOR

DROP NO. ____ DROP NO. ____ DROP NO. ____

DROP NO. ____ DROP NO. ____ DROP NO. ____

REVISION NO. 0

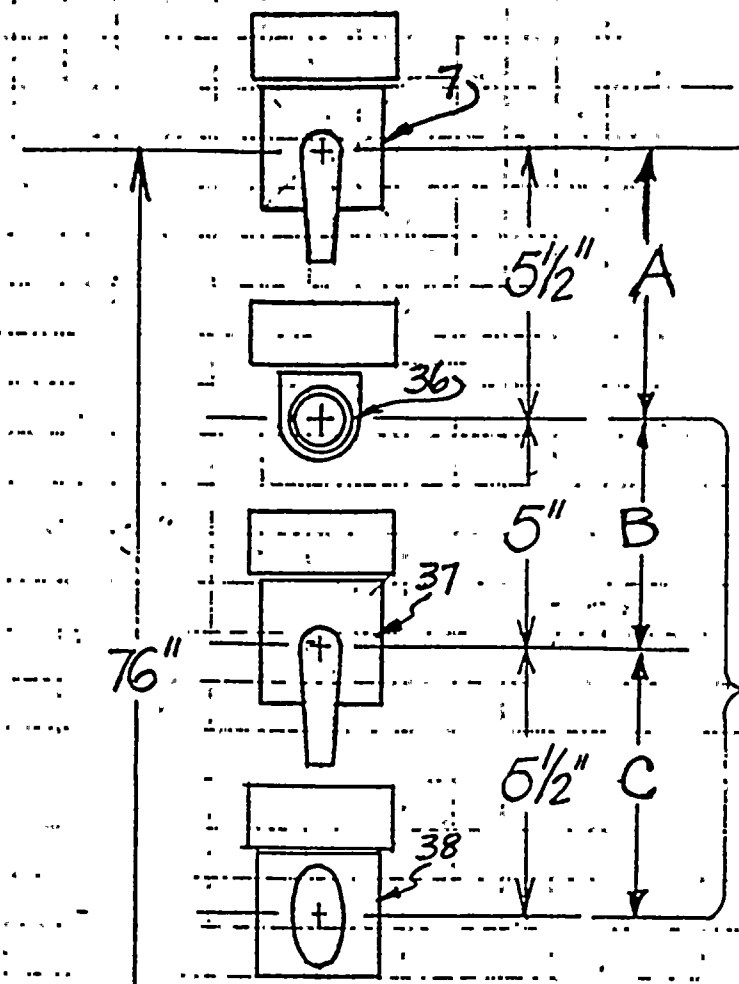
BY: [signature]

20 October 198

ATTACHMENT

Suggested AMSAC Trip-Reset Control Switch Location on DTU Panel

Ref: Dr. No. 2-5531B-0

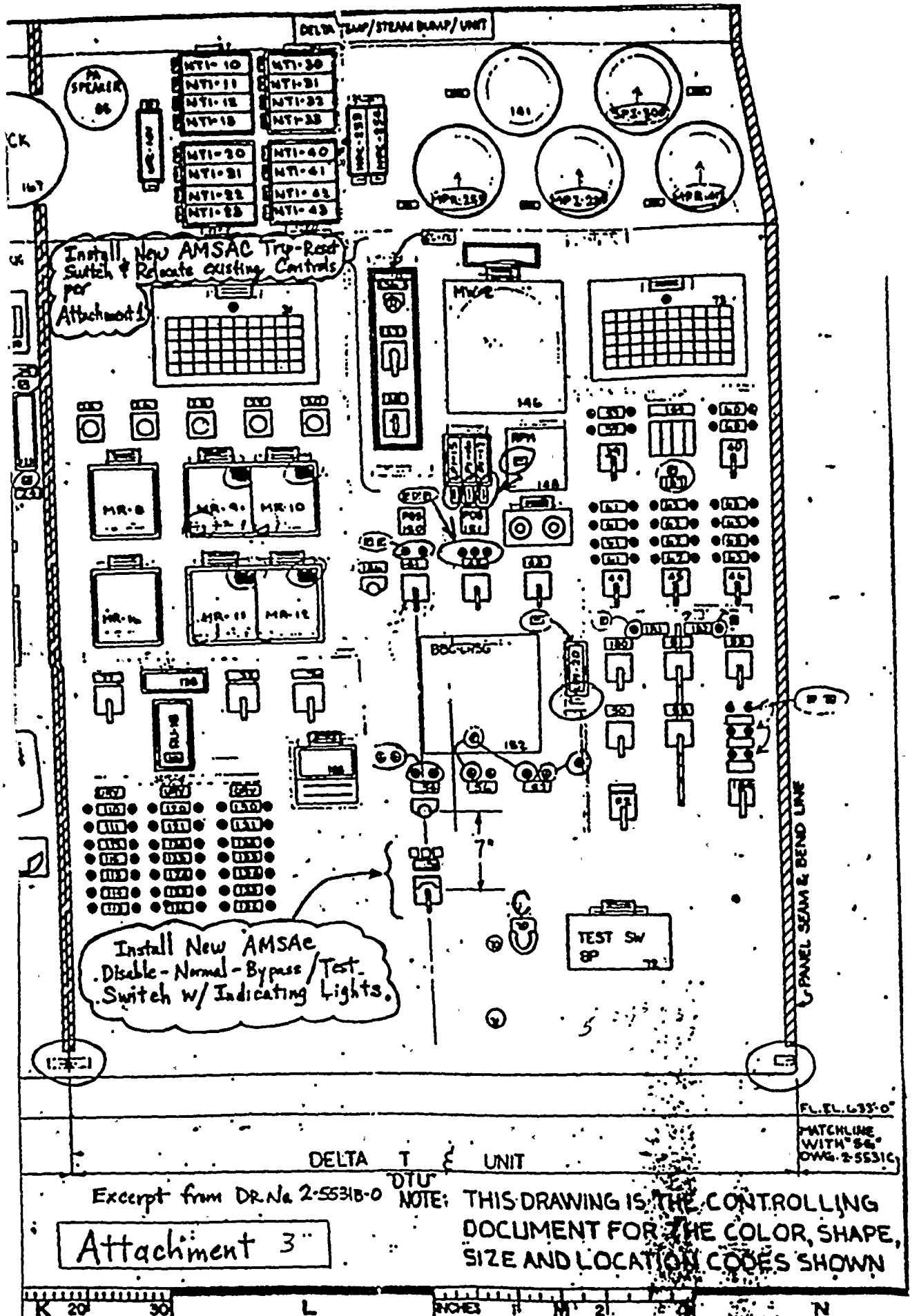


Install New AMSAC Trip-Reset SW

Relocate Main Turbine Vacuum Breaker Trip Solenoid Trip Turbine Reset Controls

Note: Spacings between Controls less than standard, but satisfactory since no indicating lamps with switches and space restrictions are acute.

Have EGS verify above dimensions physically possible.


DELTA T/STEAM PUMP/UNIT
NTI-10
NTI-11
NTI-12
NTI-13
NTI-30
NTI-31
NTI-32
NTI-33
NTI-20
NTI-21
NTI-22
NTI-23
NTI-40
NTI-41
NTI-42
NTI-43
Install New AMSAC Try-Reset Switch & Relocate existing Controls per Attachment 1
MR-8
MR-9
MR-10
MR-11
MR-12
7"
Install New AMSAC Disable-Normal-Bypass/Test Switch w/ Indicating Lights.
TEST SW
PANEL SEAM & BEND LINE
FL. EL. 633'-0"
MATCHLINE WITH "B" DWG. 2-5531C
DELTA T & UNIT
DTU
Excerpt from DR. No. 2-5531B-0
NOTE: THIS DRAWING IS THE CONTROLLING DOCUMENT FOR THE COLOR, SHAPE, SIZE AND LOCATION CODES SHOWN
Attachment 3
INCHES