

A-61
50-348/364-CIVP

2/20/92

CN No. 28E-1049 Rev. 3DOCKETED
FARLEY NUCLEAR PLANT
NUCLEAR SAFETY EVALUATION CHECK LIST
Page 1 of 1CN No. _____ Rev. _____
FSAR Change Notice
No. N/A
(if applicable)

MAR 13 P4:45

- (1) UNIT 2
- (2) CHECK LIST APPLICABLE TO: Limit Switch Submergence Test
- (3) SAFETY EVALUATION - PART A

The procedure, design change or modification to which this evaluation is applicable represents:

- (3.1) Yes _____ No ☒ A change to the plant as described in the FSAR?
- (3.2) Yes _____ No ☒ A change to procedures as described in the FSAR?
- (3.3) Yes _____ No ☒ A test or experiment not described in the FSAR?
- (3.4) Yes _____ No ☒ A change to the plant technical specifications (Appendix A to the Operating License)?

If the answer to any of the above questions is "Yes," complete Item (4) and an FSAR Change Notice. If the answer to all of the above is "No," omit Item (4) and FSAR CN.

- (4) SAFETY EVALUATION - PART B (Justification for Part B answers must be included on Page 2)
- (4.1) Yes _____ No _____ Will the probability of an accident previously evaluated in the FSAR be increased?
- (4.2) Yes _____ No _____ Will the consequences of an accident previously evaluated in the FSAR be increased?
- (4.3) Yes _____ No _____ May the possibility of an accident which is different than any already evaluated in the FSAR be created?
- (4.4) Yes _____ No _____ Will the probability of a malfunction of equipment important to safety previously evaluated in the FSAR be increased?
- (4.5) Yes _____ No _____ Will the consequences of a malfunction of equipment important to safety previously evaluated in the FSAR be increased?
- (4.6) Yes _____ No _____ May the possibility of a malfunction of equipment important to safety different than any already evaluated in the FSAR be created?
- (4.7) Yes _____ No _____ Will the margin of safety as defined in the bases to any Technical Specification be reduced?

If the answer to any of the above questions is "Yes," an unreviewed safety question is involved.

(5) REMARKS: (Attach additional pages if necessary.)

- (6) PREPARED BY: Em Langford DATE: 4-24-81
- (7) GROUP SUP: Jim Egan DATE: 4-24-81
- (8) LIC REVIEW: W. B. B. B. DATE: 4-24-81
- (9) PROJ REVIEW: James B. B. DATE: 4-24-81
- (10) PORC REVIEW: _____ DATE: _____
- (11) NORB REVIEW: _____ DATE: _____

NUCLEAR REGULATORY COMMISSION

Docket No. 50-34864-CivP Sub No. 61

In the matter of Alabama Power Company

Staff IDENTIFIED 3:40 p.m. 2/20/92
Request ✓ RECEIVED 3:41 p.m. 2/20/92
Interview REFUSED

Conf. Officer
Contractor DATE 2/20/92
Other Witness

Reporter L. Estep

CHANGE NOTICE NO 2 BE-1049-3. DATE 3/3/81

JOSEPH M. FARLEY NUCLEAR PLANT -- UNIT NO. 2 SHEET 1 OF 2 SHEETS
ORIGINATED BY T.L. CRAWLEY - APCO DIRECTED TO J.A. MOONEY (APCO)
COPIES TO BCSI & ALABAMA POWER CO., BIRMINGHAM, ALABAMA
APPLIES TO DWG. NO. _____ REV. NO. _____
TITLE OF DWG. N/A

(OR OTHER DOCUMENT)
APPROVED: BECHTEL A.A. Winters SOU. SERV. NOT REQ'D OCR NO. 2-4358
DATE 3-3-81 DATE 3-02-81
REVISIONS: 1. BMS/jer 7/3-9-81 2. BMS/jer 7/3-22-81
3. BMS/jer 7/5-23-81

PROCEED WITH CONSTRUCTION CHANGE AND PROMPT REVISION OF DRAWING OR DOCUMENT.

DOES THIS CHANGE NOTICE ADD OR REVISE HOT OR COLD SHUTDOWN CIRCUITS? No

The information requested has previously been answered by 2BE-3382 and the installation is complete.

Engineering is presently working on a test criteria that will qualify these switches for a submerged condition.

The field is to perform a test to confirm submerged operation of the limit switches in accordance with the attached procedure

Bechtel Engineering (J.E. Love/G.M. Langford) will oversee the test and document results. The field is requested to notify Engineering when fabrication of the test assembly is complete but before final assembly is started.

The test procedure is modified to include accelerated aging of the test specimen prior to performing the submergence test.

ORIG. NJB/OTG/L.P./BMS/jer

Testing of the NAMCO EA-180 limit switches was performed in accordance with the attached test procedure and was completed April 15, 1981. Test data is furnished with this revision.

A formal test report will be issued separately, documenting the test and the qualification parameters.

All test data was reviewed, and found to be acceptable. The results of this test fully qualify the limit switch for submerged operation for areas outside the containment for a period of 24 hours

095971401



CALCULATION SHEET

CALC NO. 2BE-1049 REV. NO. 3ORIGINATOR G.M. Langford DATE 3-9-81CHECKED N/A DATEPROJECT J.M. Farley Units 1 and 2JOB NO. 7597-008/20SUBJECT Limit Switch Submergence TestSHEET NO. 1

A. Purpose

The purpose of this test is to demonstrate that the NAMCO CONTROLS SNAP-LOCK Limit Switch, Model EA-180 can perform its safety function while submerged in water at a temperature of 210°F at a depth of 10 ft. as required by Reference 1.

B. Test Requirements

1. Test specimens { 3 Required

1.1 NAMCO CONTROLS SNAP-LOCK Limit Switch Model EA-180

1.2 RAYCHEM CB9-2 Cable breakout fitting

1.3 1 in. nipple

1.4 4 - 1/c #12 (J-02) cable - length as required

2. Test Equipment

2.1 Test container. Fabricated as shown in Figure 1.

2.2 Test lamps (2)

2.3 500 volt Megger

2.4 Strip heaters

2.5 Copper-Constantan Thermocouple and readout



CALCULATION SHEET

CALC. NO. 2BE-1049 REV. NO. 3

ORIGINATOR G.M. Langford DATE 3-9-81 CHECKED N/A DATE _____
PROJECT J.M. Farley - Units 1 and 2 JOB NO. 7597-008/20
SUBJECT Limit Switch Submergence SHEET NO. 2

device (Bridge). One end of T/c is brazed to T/c bracket

C. References

1. Operating Change Request No 2-4358 dated 3-2-81
2. Drawing A-177541 Sheet 23K, Rev 0

D. Procedure

1. Test Specimen preparation

1.1 Carefully remove the cover plate on the electrical side of the switch.

Caution

Use extreme care when removing cover plate to avoid damaging the gasket. Carefully remove the gasket and set aside until ready to reinstall cover plate.

1.2 Install the 1 in. nipple as shown in reference 2, using suitable thread Sealant compound.

1.3 Insert the 4 - 1/4 #12 conductors through the nipple into the electrical compartment of the switch. Connect the conductors as shown in figure 2.



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CALC. NO. 2BE-1049 REV. NO. 3

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PROJECT J.M. Farley Units 1 and 2 JOB NO. 1597-008/20
SUBJECT Limit Switch Submergence Test SHEET NO. 3

1.4 Reinstall gasket and cover plate, insuring that the gasket is placed exactly as removed. Use moderate torque on cover plate screws.

1.5 Install the Raychem CB4-2 breakout fitting as shown in reference 2.

2 1.6 Artificially age test specimens in an oven at 250°F. for 400 hours.

1.7 Measure and record the oven temperature every 24 hours during the artificial aging period.

Caution

Extreme care should be exercised when handling the test specimen after aging, being especially careful not to damage the conductor insulation.

1.8 Using a 500V megger, measure and record insulation resistance of each conductor to switch enclosure:

Conductor #1	1,000	Megohms
Conductor #2	1,000	Megohms
Conductor #3	1,000	Megohms
Conductor #4	1,000	Megohms



CALCULATION SHEET

CALC NO. 28E-1049 REV. NO. 3

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PROJECT J.M. Farley Units 1 and 2 JOB NO. 7597-008/20
SUBJECT Limit Switch Submergence Test SHEET NO. 3A

New sheet - contents
2 unchanged

2. Test Assembly Preparation (Figure 1)

2.1 Install top cap on 6 in. pipe using thread sealant and tighten

2.2 Install 10 ft long 1 in conduit into top cap using thread sealant

2.3 Mount limit switch to brackets on bottom pipe and install Thermocouple bracket

2.4 Attach piano wire to actuator arm of the switch, insuring that the switch can be operated by pulling on the wire.

2.5 Pull the four conductors, the thermocouple, and the piano wire through the conduit

Caution

Do not allow the weight of the switch assembly to be supported by the conductors at any time.

2.6 Install bottom pipe cap together with switch to 6" pipe using thread



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ORIGINATOR G.M. Langford DATE 3-9-81

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PROJECT J.M. Farley Units 1 & 2

JOB NO. 7597-00B/20

SUBJECT Limit Switch Submergence Test

SHEET NO. 4

Sealant.

2.7 Check that the switch can be actuated by pulling on piano wire at the end of the 10' conduit.

2.8 Support the test fixture such that the conduit is vertical and will not fall over.

2.9 Connect the four conductors and Thermocouple as shown in figure 2

WARNING

Insure that Test Assembly is solidly grounded to plant ground to avoid a possible electrical shock hazard.

3.0 Functional Check

3.1 Temporarily disconnect the four conductors from the test board.

3.2 Using a 500 volt megger, measure the insulation resistance to ground of each of the conductors. Record values below:

Conductor #1 1,000 Megohms

Conductor #2 1,000 Megohms



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SUBJECT Limit Switch Submergence Test SHEET NO. 5

Conductor #3 1,000 Megohms
Conductor #4 1,000 Megohms

3.3 Reconnect conductors to test board.

3.4 Apply 120V. AC to test board. Verify
Lamp #1 is on and lamp #2 is off

Lamp #1 on MTH (initial)
Lamp #2 off MTH (initial)

3.5 Actuate switch by pulling piano wire
at top of conduit. Verify that Lamp #1
is now off and lamp #2 is on.

Lamp #1 off MTH (initial)
Lamp #2 on MTH (initial)

3.6 Disconnect electrical power.

4.0 Operational Test

Caution

Since this test will be conducted at elevated temperatures, care should be exercised to avoid accidental contact with test assembly.

4.1 Fill the test assembly with potable water until overflowing at the top of the 10 ft. Conduit.



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CALC. NO. 2BE-1049 REV. NO. 3ORIGINATOR G.M. Langford DATE 3-9-81CHECKED N/A DATEPROJECT J.M. Farley - Units 1 and 2JOB NO. 7597-008/20SUBJECT Limit Switch Submergence TestSHEET NO. 6

4.2 Measure internal temperature using thermocouple and T/C Readout. Record.

Internal Temperature 150 °F

4.3 Repeat Functional Check of Section 3.0 and record:

Para. 3.2 Conductor #1 750 Megohms
Conductor #2 750 Megohms
Conductor #3 750 Megohms
Conductor #4 750 Megohms

Para 3.4 Lamp #1 on MTH (initial)
Lamp #2 off MTH (initial)

Para 3.5 Lamp #1 off MTH (initial)
Lamp #2 on MTH (initial)

4.4 Apply power to the strip heaters to heat water.

4.5 Monitor internal temperature of the test assembly using Thermocouple.

4.6 Remove power from strip heaters when internal temperature reaches 210°F

4.7 Apply power to test board and verify Lamp #1 is on and lamp #2 is off.

Lamp #1 on MTH (initial)
Lamp #2 Off MTH (initial)



CALCULATION SHEET

CALC. NO. ZBE-1049 REV. NO. 3

ORIGINATOR G. M. Langford DATE 3-9-81 CHECKED N/A DATE _____

PROJECT J.M. Farley Units 1 & 2 JOB NO. 7597-008/20

SUBJECT Unit Switch Submergence Test SHEET NO. 7

4.8 Insure internal temperature is 210°F or greater, and record:

9:00 AM
9-14-81

Internal temperature 212 °F

#1 - 750 Megohm
#2 - 500 Megohm
#3 - 500 Megohm
#4 - 750 Megohm

4.9 With internal temperature 210°F or greater, actuate switch by pulling on piano wire at top of conduit. Verify that lamp #1 is off and lamp #2 is on.

Lamp #1 off MTH (initial)
Lamp #2 on MTH (initial)

4.10 Return switch to normal.

4.11 Maintain internal temperature near 210°F for 4 hours and repeat para 4.9.

Lamp #1 off MTH (initial)
Lamp #2 on MTH (initial)

4.12 Remove power from strip heaters and test board and allow test assembly to cool to ambient.

4.13 Disassemble test assembly after draining water.

4.14 Carefully remove both cover plates on switch and inspect for moisture. If none present, reassemble and return to stock.



CALCULATION SHEET

CALC. NO. 2BE-1049 REV. NO. 3

ORIGINATOR G.M. Langford DATE 4-23-81 CHECKED N/A DATE _____

PROJECT J.M. Farley Units 1 & 2 JOB NO. 7597-000/20

SUBJECT Limit Switch Submergence Test SHEET NO. 7a 3

New Sheet added

4.11(cont) Insulation Resistance:

Conductor #1	250 Megohms
Conductor #2	250 Megohms
Conductor #3	250 Megohms
Conductor #4	250 Megohms

4.12(cont)

At 7:00 AM 4-15-81 test assembly had cooled to ambient. A functional test of Section 3.0 was performed as follows:

Para. 3.2	Conductor #1	600 megohms
	Conductor #2	600 megohms
	Conductor #3	600 megohms
	Conductor #4	600 megohms

Para 3.4	Lamp #1 on	<u>MTH</u> (initial)
	Lamp #2 off	<u>MTH</u> (initial)

Para 3.5	Lamp #1 off	<u>MTH</u> (initial)
	Lamp #2 on	<u>MTH</u> (initial)



CALCULATION SHEET

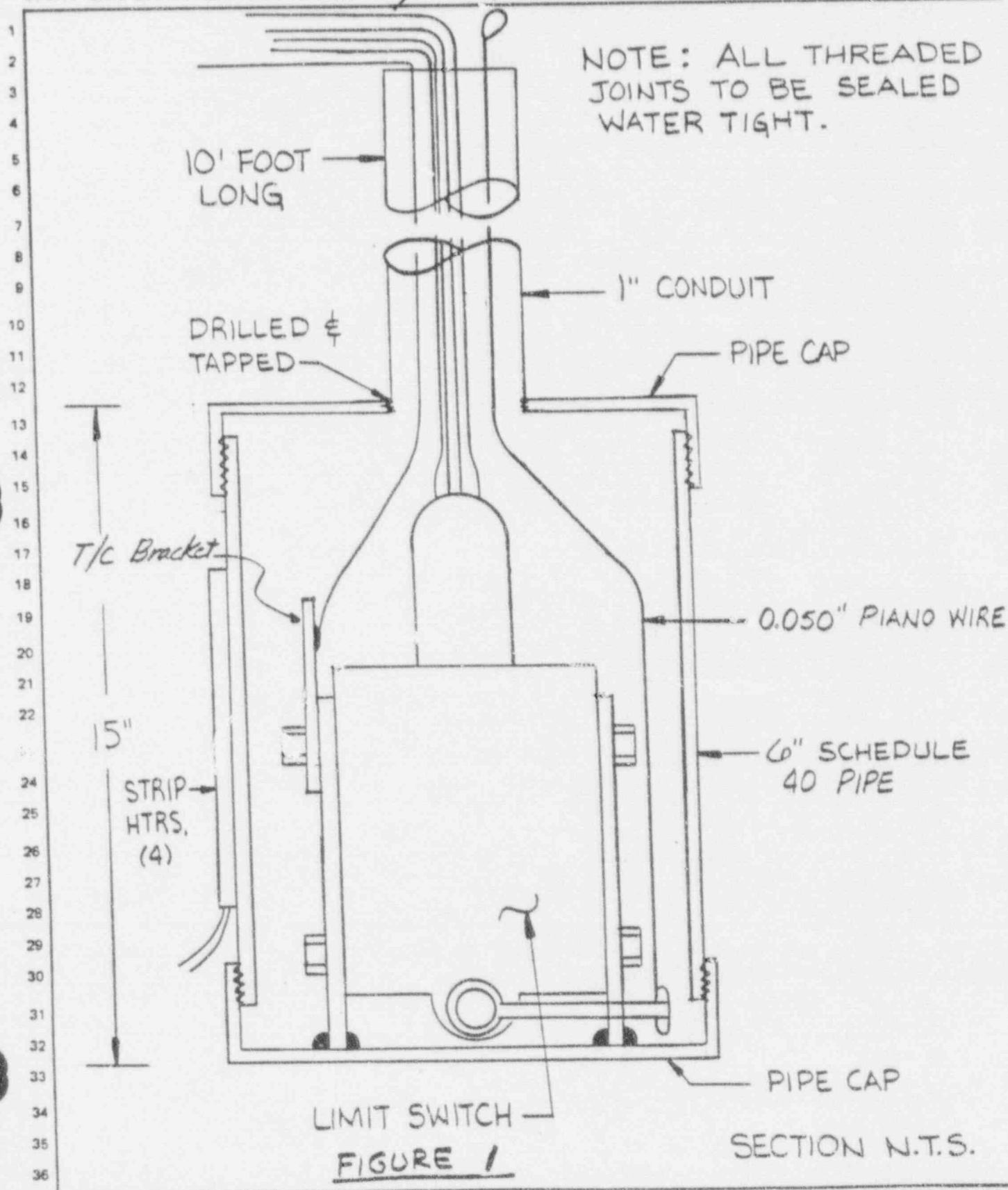
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ORIGINATOR G.M. Langford DATE 3-9-81 CHECKED N/A DATE _____

PROJECT J.M. Farley Units 1 & 2 JOB NO. 7597-008/20

SUBJECT Limit Switch Submergence Test SHEET NO. 8

NOTE: ALL THREADED JOINTS TO BE SEALED WATER TIGHT.



LIMIT SWITCH
FIGURE 1

SECTION N.T.S.



CALCULATION SHEET

CALC NO. ZBE-1049 REV. NO. 3

ORIGINATOR G.M. Langford DATE 3-9-81

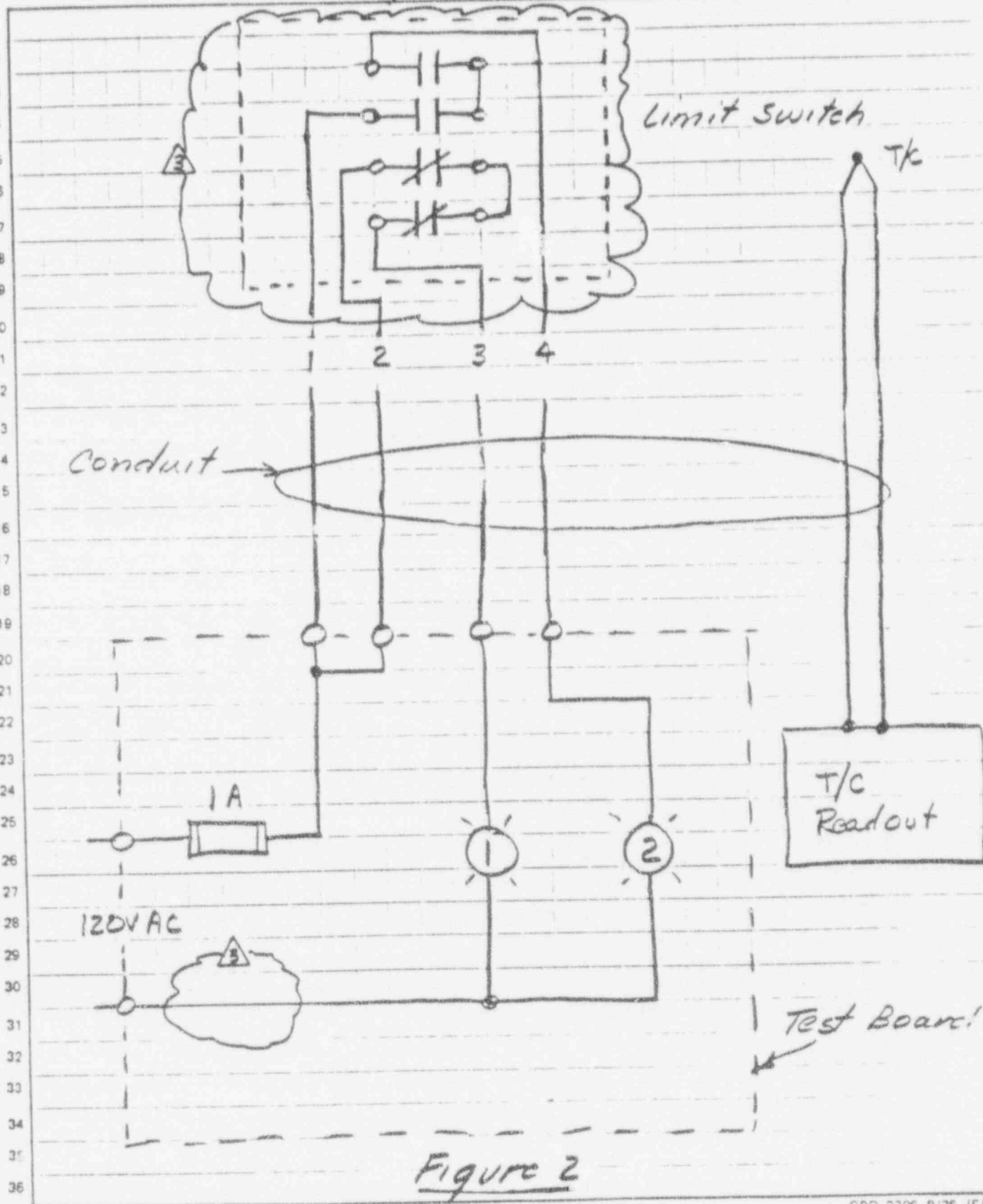
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PROJECT J.M. Farley Units 1 and 2

JOB NO. 7597-008/20

SUBJECT Limit Switch Submergence Test

SHEET NO. 9





CALCULATION SHEET

CALC. NO. 2BE-1049 REV. NO. 3

ORIGINATOR G.M. Langford DATE 3-9-81

CHECKED N/A DATE

PROJECT J.M. Farley Units 1 and 2

JOB NO. 7597-009/20

SUBJECT Limit Switch Submergence Test

SHEET NO. 9

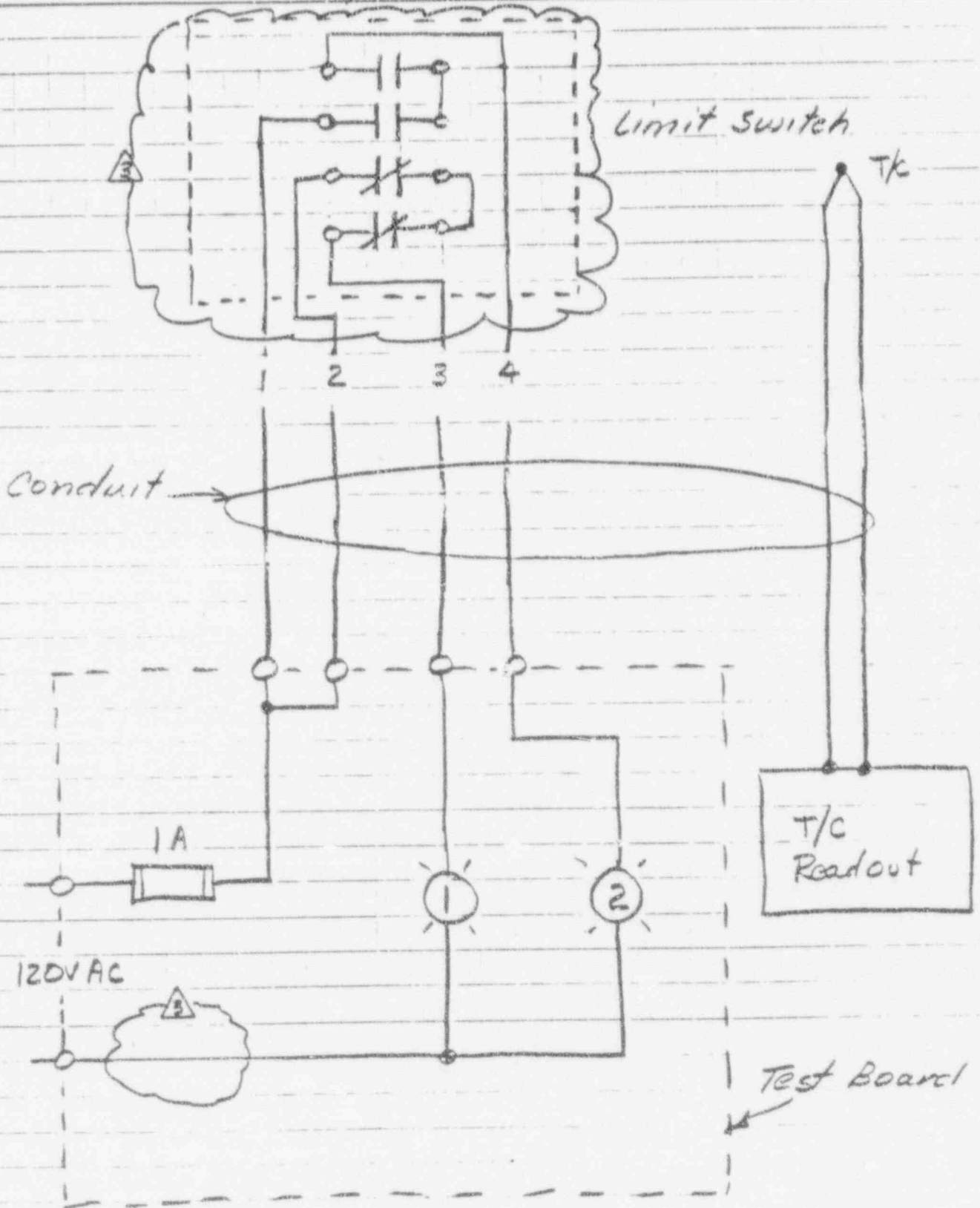


Figure 2