

copy in P.D.S.

Fax to:

RI-89-A-0072

PROCEDURE COVER SHEET

PENNSYLVANIA POWER & LIGHT CO.
SUSQUEHANNA STEAM ELECTRIC STATION

480 VOLT AND UNDER CIRCUIT BREAKER
HIGH CURRENT TESTING

EFFECTIVE DATE 1/4/88

EXPIRATION DATE 1/4

REVISED EXPIRATION DATE

PROCEDURE TYPE: (Check only one)

PORC

NON-PORC

REVIEW TYPE: (Check only one)

PORC

ALTERNATE

PORC MTG. NO. _____

(N/A if NON-PORC or ALTERN. REV.)

CONFIDENTIAL

Prepared by J. E. Collins

Date 12-8

Reviewed by J. E. Collins for AFI

Date 12-

Recommended W. H. H.
Section Head/Manager

Date 12/

Approved J. C. Blaskiewicz

Date 12/

1515

1.0 PURPOSE

This procedure specifically addresses High Current Testing of Molded Case (1) AC Circuit Breakers, Overloads and Relays (2) DC Circuit Breakers and Overloads (3) Lighting Circuit Breakers and (4) Ground Relays; on equipment rated 480 Volts and below.

2.0 REFERENCES

- 2.1 Multi-Amp, Model MS-1A, Instruction Manual.
- 2.2 Multi-Amp, Model CB 14X, Instruction Manual.
- 2.3 Multi-Amp, Model CB 7725, Instruction Manual.
- 2.4 Manufacturer's literature applicable to the particular Breaker or Motor Overload Relay being tested.
- 2.5 Manufacturer's Time/Current curves.
- 2.6 Breaker setpoint data sheets (R.S.C.N.'s or other setpoints, e.g. Tech. Specs. or per AD-QA-402).
- 2.7 Surveillance Procedure SM-106-000.
- 2.8 Technical Specifications Section 3/4.8.3.

3.0 PREREQUISITES

Operations has released equipment for testing.

4.0 PRECAUTIONS

None

5.0 PROCEDURE

NOTE (1): Main contacts of device shall be electrically monitored for position indication.

NOTE (2): Those steps of this procedure designated by an asterisk (*) immediately to the left of the step number require entries to be recorded on the Data Form.

5.1 Breaker Setup

- 5.1.1 Remove breaker from cubicle.
- 5.1.2 Document and determinate breaker leads prior to connecting breaker to test set.
- 5.1.3 Verify breaker "terminal mounting screws" are securely tightened (Reference Attachment D).

5.2 Molded case circuit breakers - Magnetic Trip.

- 5.2.1 Determine and record "As Found" minimum trip current for each individual breaker pole.

NOTE: Allow sufficient time between successive tests on each breaker pole to allow for breaker internal cooldown.

5.2.2 Adjustable Breakers:

- a. External Adjustment

Adjust breaker, if necessary, to bring trip point within tolerance of value specified in setting data and retest breaker.

- b. Internal Adjustment (if required)

- (1) Use a soldering gun or pencil to heat and unlock breaker internal adjustment screws.

- (2) Use Loc-Tite "stud-lock" #73-71 or equivalent on breaker internal adjustment screws after final adjustment.

- c. Record "As Left" minimum trip current.

- 5.2.3 Determine and Record "As Left" trip (operating) time of breaker at $> 120\%$ of set point value. Record actual test current applied.

NOTE: This value shall be $\geq 150\%$ of set point value for breakers specified in SM-106-OXX or SM-206-OXX.

- a. If trip time "instantaneous" $\leq .05$ seconds then the magnetic setting is complete.

- b. Trip time not "instantaneous" $> .05$ seconds.

NOTE: If performing SM-106-OXX or SM-206-OXX,
Section 5.2.3.b of this procedure does not
apply.

- 1) Determine and record acceptance trip curve time at
the test current value from the manufacturer's
breaker curve.

NOTE: This value must be compared to the operate
time of an interpolated curve in the range for
the specific breaker.

- 2) Determine and record if above "As Left" trip time
versus curve time meet acceptance criteria. Adjust
or replace breaker as necessary.

5.3 Molded case circuit breakers - Thermal Trip:

Determine and record operating time of each individual breaker pole at
3 times (3X) the circuit breaker rating.

NOTE: Allow sufficient time between successive tests on each
breaker pole to allow thermal element to cool.

5.4 Molded case circuit breaker - mechanical check: verify breaker can be mechanically tripped and reset.

NOTE: Reset difficulties (if any) may be due to reset lever
mechanical problems, e.g. reset lever having bent edge
(Reference Attachment E).

5.5 Motor overload relays:

Determine and record operating time of each individual relay pole at 3
times (3X) the heater current value.

5.6 Ground relay

5.6.1 Determine and record ground relay pickup current.

5.6.2 Adjust ground relay potentiometer, if necessary, to bring
trip point within tolerance of value specified in setting
data and retest breaker.

NOTE: Main contacts of breaker do not carry nor interrupt
current source. Test current source must therefore
be manually removed from circuit.

5.7 Breaker restoration

- 5.7.1 Reterminate breaker leads to breaker as per documentation in step 5.1.2. (Not required if performing SM-106-OXX or SM-206-OXX)
- 5.7.2 Reinstall breaker in cubicle. (Not required if performing SM-106-OXX or SM-206-OXX)

5.8 Operability Check

Verify breaker and associated circuitry are correct by performing equipment operability check (i.e., verify valve strokes, equipment and/or motor rotates in proper direction). (Not required if performing SM-106-OXX or SM-206-OXX)

6.0 ACCEPTANCE CRITERIA

<u>Type</u>	<u>Required Setting</u>	<u>Preferred Setting</u>
6.1 Magnetic:		
(5.2.2) Actual trip current:	$\pm 25\%$ of specified value	+25%, -0% of specified value
(5.2.3) Actual trip time:	≤ 0.05 seconds or $\pm 25\%$ of mfg curve value	+0.%, +25% of mfg within curve value
6.2 Thermal:		
Operating Time	$\pm 15\%$ of specified value	+15%, -0% of specified value
6.3 Motor Overload:		
Operating Time	$\pm 15\%$ of specified value	+15%, -0% of specified value
6.4 Ground:		
Pickup Current	$\pm 15\%$ of specified value	+15%, -0% of specified value
6.5 Operability Check Satisfactory		

TEST RECORD

A.C. MOLDED CASE BREAKERS, MOTOR OVERLOADS AND GROUND RELAYS

Syst.# _____ W.A.# _____ EM# _____ Q(), non Q ()
Breaker# _____ MFG. _____ Type _____
Print # _____ Curve# _____ Curve Date _____
Breaker: Rating _____ (amps.); Magnetic Set Point _____ (amps.)
Adjustable (from) _____ (amps.) (to) _____ (amps.)
Overload: No. _____ Setting _____
Rating (from) _____ (amps.) (to) _____ (amps.)
Test amps _____
Ground relay: Setting _____ (amps.)

5.1.2 Lead Removal Documentation:

Performed By: _____ Initials _____ Date _____ Verified By: _____ Initials _____ Date _____

5.7.1 Lead Reinstallation:

Performed By: _____ Initials _____ Date _____ Verified By: _____ Initials _____ Date _____

5.2 MAGNETIC PHASE	"AS FOUND" (5.2.1)	"AS LEFT" (5.2.2.c)		(5.2.3)
	MIN TRIP CURR. (AMPS)	MIN. TRIP CURR. (AMPS)	TRIP TEST CURR. (AMPS)	TRIP OPER TIME (SEC)
A				
B				
C				
5.2 MAGNETIC PHASE	"AS LEFT" (5.2.3.b.(1))		(5.2.3.b(2))	
	TRIP CURVE TIME (SEC)		ACCEPT. CRITERIA MET?	
A				
B				
C				

TEST RECORD

A.C. MOLDED CASE BREAKERS, MOTOR OVERLOADS AND GROUND RELAYS

SYST# _____ BREAKER# _____ WA# _____
5.3 THERMAL PHASE AS FOUND DATA AS LEFT DATA

A _____
B _____
C _____

5.5 OVERLOADS PHASE AS FOUND DATA AS LEFT DATA

A _____
B _____
C _____

GROUND PHASE AS FOUND DATA AS LEFT DATA

N _____

TEST INSTRUMENT I.D. # CALIBRATION DUE DATE

5.8 Operability Check Satisfactory. YES () NO () _____
Date

Performed by: _____, Date: _____

Reviewed by: _____, Date: _____, acceptable: _____ (yes/no)

Comments:

TEST RECORD

D.C. MOLDED CASE BREAKERS, MOTOR OVERLOADS

Syst.# _____ W.A.# _____ EM# _____ Q(), non Q ()

Breaker# _____ MFG. _____ Type _____

Print # _____ Curve# _____ Curve Date _____

Breaker: Rating _____ (amps); Magnetic Set Point _____ (amps.)

Adjustable (from) _____ (amps.) (to) _____ (amps.)

Overload: No. _____ Setting _____

Rating (from) _____ (amps.) (to) _____ (amps.)

Test amps _____

5.1.2 Lead Documentation: _____

5.2 MAGNETIC PHASE	"AS FOUND" (5.2.1)	"AS LEFT"		
	MIN TRIP CURR. (AMPS)	(5.2.2.c) MIN. TRIP CURR. (AMPS)	(5.2.3) TRIP TEST CURR. (AMPS)	TRIP OPER TIME (SEC)
A				
B				
C				

5.2 MAGNETIC PHASE	"AS LEFT"	
	(5.2.3.b.(1)) TRIP CURVE TIME (SEC)	(5.2.3.b(2)) ACCEPT. CRITERIA MET?
A		
B		
C		

TEST RECORD

LIGHTING CIRCUIT BREAKERS

Syst.# _____ W.A.# _____ EM# _____ Q(), non Q ()
Breaker# _____ MFG. _____ Type _____
Lighting/Power panel# _____ Location _____
CKT# _____ Serial# _____ Voltage _____
Print# _____ Curve# _____ Curve Date _____
Breaker: Rating _____ (amps)

5.1.2 Lead Documentation: _____

5.2 MAGNETIC PHASE	"AS FOUND"	"AS LEFT"	
	(5.2.1) MIN TRIP CURR. (AMPS)	(5.2.2.c) MIN. TRIP CURR. (AMPS)	(5.2.3) TRIP TEST CURR. (AMPS) TRIP OPER TIME (SEC)
A			
B			
C			

5.2 MAGNETIC PHASE	"AS LEFT"	
	(5.2.3.b.(1)) TRIP CURVE TIME (SEC)	(5.2.3.b(2)) ACCEPT. CRITERIA MET ?
A		
B		
C		

5.3 THERMAL	PHASE	TEST CURRENT	AS FOUND DATA	AS LEFT DATA
	A	amps.		
	B	amps.		
	C	amps.		

TEST RECORD

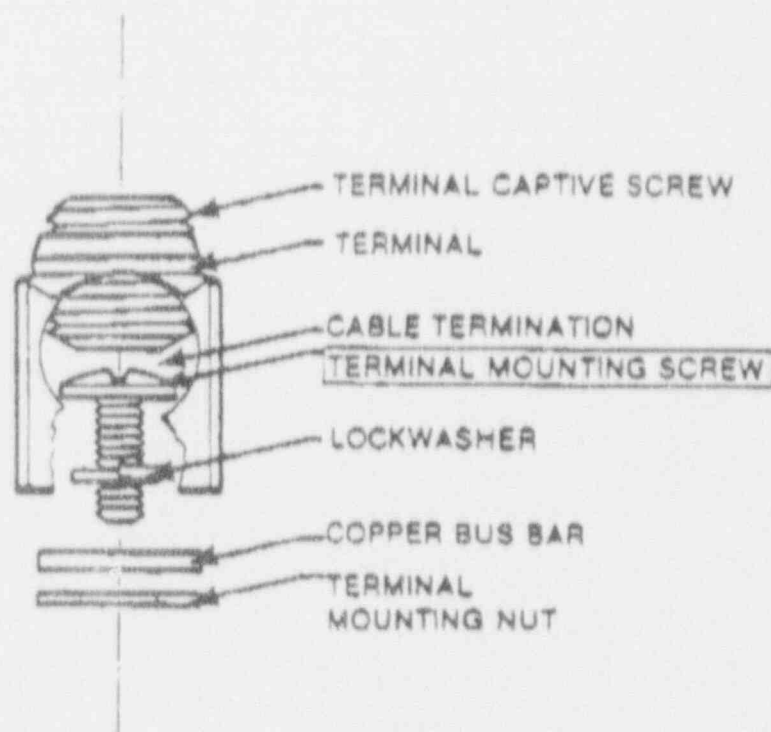
LIGHTING CIRCUIT BREAKERS

TEST INSTRUMENT	I.D.#	CALIBRATION DUE DATE

Performed by: _____, Date: _____

Reviewed by: _____, Date: _____, acceptable _____ (yes/no)

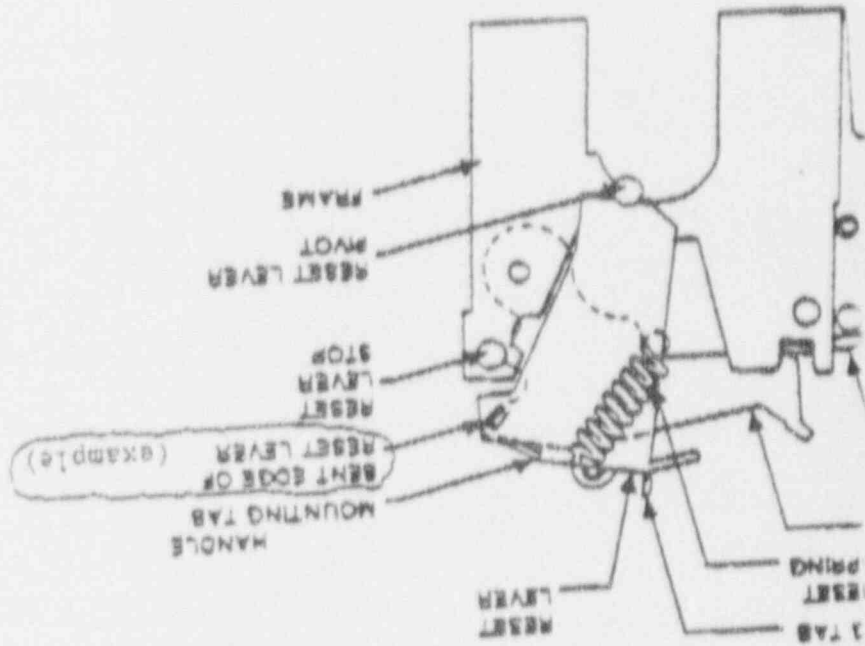
DETAIL OF BREAKER TERMINAL ASSEMBLY



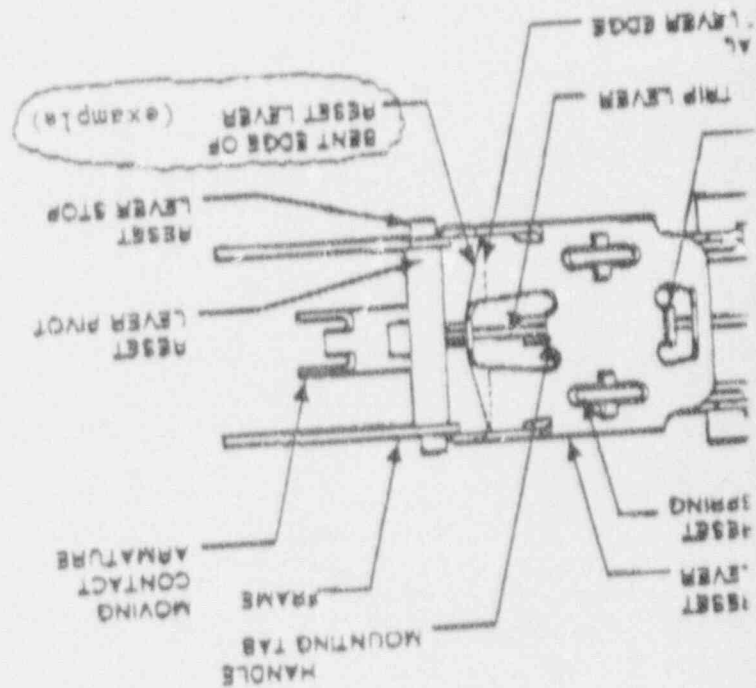
AUG 30 '89 13:22

SUSQUEHANNA P14

Front View of Trip and Reset Mechanism



Top View of Trip and Reset Mechanism



TEST RECORD

D.C. MOLDED CASE BREAKERS, MOTOR OVERLOADS

SYST# _____ BREAKER# _____ WAF# _____
5.3 THERMAL PHASE AS FOUND DATA AS LEFT DATA

POS _____

NEG _____

5.5 OVERLOADS PHASE AS FOUND DATA AS LEFT DATA

POS _____

NEG _____

TEST INSTRUMENT I.D. # CALIBRATION DUE DATE

5.8 Operability Check Satisfactory. YES () NO () _____
Date

Performed by: _____, Date: _____

Reviewed by: _____, Date: _____, acceptable: _____ (yes/no)

Comments:

ALLEGATION PANEL DECISIONS

SITE: SUSQUEHANA 1/2

ALLEGATION NO.: RZ-89-A-0072

DATE: 6/19/89 (Mtg. 1 2 3 4 5)

PRIORITY: High Medium Low

SAFETY SIGNIFICANCE: Yes No Unknown

CONCURRENCE TO CLOSEOUT: DD BC SC

CONFIDENTIALITY GRANTED: Yes No

PANEL ATTENDEES:

Chairman - S. COLLINS

Branch Chief - J. WIGGINS

Section Chief -

R. PAOLINO, DRS

M. PERKINS, M&M T ASST

ACTION:

- 1) TRACK TECHNICAL ISSUE ^{TO} DRS TO REVIEW WITH VENDOR
BRANK, NRR ON ISSUE. RECONVENE PANEL TO DISCUSS
- 2) RESULTS OF REVIEW (EOD 7/6/89).
- 3) IF NECESSARY, FOLLOWUP WITH ~~DRS~~ NEXT ON-SITE
INSPECTION.

4)

5)

6)

13/6

ALLEGATION PANEL DECISIONS

SITE: SUSQUEHANNA 1/2

PANEL ATTENDEES:

ALLEGATION NO.: RI-89-A-0072

Chairman - ~~XXXXXXXXXX~~ S. COLLINS

DATE: 6/22/89 (Mtg. 1 2 3 4 5)

Branch Chief -

PRIORITY: High Medium Low

Section Chief - R. BLOCH

SAFETY SIGNIFICANCE: Yes No Unknown

C. ANDERSON, PSS, ORS

CONCURRENCE TO CLOSEOUT: DD BC SC

R. CALINO, PSS, ORS

CONFIDENTIALITY GRANTED: Yes No

M. PERKINS, MEM T PST

ACTION:

- 1) PSS, ORS REVIEW & DISCUSSION WITH VENDOR BRANCH. FOUND NOTHING WRONG WITH LICENSEE PRACTICES.
- 2) AOC & PSS, ORS INSP. TO CONTACT ALLEGOR AND DISCUSS HIS CONCERN TO SEE IF WE HAVE ALL INFORMATION
- 3) (ECO 6/23/89).
- 4) IF NO PROBLEM AOC WILL CLOSEOUT IN MEMO (ECO 7/15/89).

5)

6)

15/17