ATTACHMENT 5

GINNA STATION
UNIT #1
COMPLETED
DATE :-
TIME :-

ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 4

PROCEDURE NO. M-32.2 REV. NO. 3

DB-50 REACTOR TRIP CIRCUIT BREAKER INSPECTION, MAINTENANCE AND TEST

TECHNICAL REVIEW

PORC REVIEW DATE 9-29-83

QC REVIEW

PLANT SUPERINTENDENT

OCT 5 1983
EFFECTIVE DATE

QA X NON-QA ______ CATEGORY 1.0

REVIEWED BY: ______________________

THIS PROCEDURE CONTAINS 6 PAGES
+ ATTACHMENTS

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M-32.2

DB-5Ø REACTOR TRIP CIRCUIT BREAKER INSPECTION, MAINTENANCE AND TEST

1.Ø **PURPOSE:**

1.1 To perform inspection, maintenance and test of DB-5Ø Reactor Trip and Reactor Trip Bypass Breakers.

2.Ø **REFERENCES:**

2.1 Westinghouse switchgear division instruction book IB-33-85Ø-3C instructions for DB-5Ø, DBF-16 and DBL-5Ø air circuit breakers.

2.2 Westinghouse Technical Bulletin NSD-TB-83-Ø2, dated March 24, 1983.

3.Ø **INITIAL CONDITIONS:**

3.1 Notify QC prior to starting. ____________

3.2 Any phase of plant operations. ____________

3.3 The Shift Supervisor and Head Control Operator shall be notified just prior to any inspection or maintenance on the reactor trip system.

Shift Supervisor ____________

Head Control Operator ____________

4.Ø **PRECAUTIONS:**

4.1 Obtain parts or supplies per A-3Ø1.

4.2 Lubrication of breaker mechanical bearing points is to be applied sparingly, if necessary, using WD-4Ø using caution to assure that dust and contamination in other form are removed prior to applying.

5.Ø **INSTRUCTIONS:**

5.1 Indicate here and on front cover of procedure the breaker to be worked on. N/A other spaces not required.

A__________ B__________ Bypass________

5.2 Remove from service.

5.2.1 At power (mark N/A if not at power).

5.2.1.1 Establish communications between Control Room, Relay Room, and Reactor Trip Breaker.

____

5.2.1.2 Electricians place reactor trip bypass breaker into position to bypass breaker under going maintenance, and rack into the "Fully Racked In" position. Verify that 2Ø AST and 2Ø ET indicating lights are illuminated at breaker panel.

____

5.2.1.3 "Close" By-pass Breaker by actuation of reset pushbutton switch in reactor logic test cabinet of the opposite train. Verify that 2Ø AST and 2Ø ET indicating lights are NOT illuminated.

____

5.2.1.4 "Trip" By-pass Breaker by actuation of pushbutton trip switch in reactor logic test cabinet of the opposite train. Verify that 2Ø AST and 2Ø ET indicating lights are illuminated.

____

5.2.1.5 "Close" By-pass Breaker by actuation of reset pushbutton switch, and verify that 2Ø AST and 2Ø ET indicating lights are not illuminated.

____

5.2.1.6 "Trip" Reactor Trip Breaker to be worked on by actuation of pushbutton trip switch switch in the reactor logic test cabinet for that train.

____

5.2.2 Hold breaker in accordance with A-14Ø1 Station Holding Rules, if applicable.

____

5.3 Perform inspection of breaker as follows and note results on the data sheet:

5.3.1 Check for presence of dust, dirt and other type of foreign substances or contaminants.

5.3.2 Check for loose, damaged, broken or distorted parts.

5.3.3 Check for wear or signs of rubbing.

5.3.4 Verify clearance between the trip tab and tripper bar on breaker positioning attachment on left hand side of breaker.

NOTE: Clearance should be 1/8" min to 3/16" maxium.

5.4 If required, (NA if not required), breaker cleaning should consist of wiping with paper towel or lint free cloths to remove dust and dirt. In some cases, brushing with a medium bristle or stiff bristle brush may be necessary. Do Not use a wire brush, or high pressure air.

5.4.1 Vacuuming may be utilized as a substitute for brushing.

5.4.2 If sticky or gummy substances are present a mild solvent may be used. Apply solvent to paper towels or lint free rags and wipe. Do Not apply solvent to coils, wires or other electrical parts. Avoid use of spray solvent.

5.4.3 If cleaning was performed, reinspect breaker per step 5.2.

5.5 Perform trouble shooting and maintenance as required and note work done on data sheet.

5.5.1 If lubrication of UV Attachment is considered necessary, lubricate using proper materials points requiring lubrication per Attachment I and II. (NA otherwise)

5.6 Maintenance Related Testing:

5.6.1 Perform manual test of the UV Attachment, by de-energizing UV Attachment but holding it in the reset position by a temporary restraint on the reset lever, the breaker is closed (either manually or electrically.) Then, the temporary restraint is slowly released, allowing the UV Attachment to perform the breaker trip function before the reset lever comes to rest.

____

5.6.1.1 Monitor for unhesitant, smooth, positive, snap-action of the UV Attachment and breaker trip, and note on data sheet.

____

5.6.1.2 Remove temporary restraint after successful completion of this test.

____

5.6.2 After inspection and maintenance, perform a final operational check of the UV Attachment and breaker trip action by closing the breaker either manually or electrically, then tripped by de-energizing of the UV Attachment. Repeat this 10 times and document on attached data sheet.

NOTE: This applies to post maintenance testing and is not associated with PT or RSSP test procedures.

____

5.6.2.1 The breaker shall be closed electrically and electrical breaker trip via shunt trip device verified at least once. Document on attached data sheet.

____

5.7 Notify Results and Test supervision of maintenance performed and the need to test the reactor trip breaker using appropriate test procedures.

____

5.7.1 Results and Test supervision has determined the applicable test procedure to be utilized: (if necessary)

Applicable steps of procedure no.________________

R&T Supervision __________

COMPLETED BY: ______________________

DATE COMPLETED: ______________________

ELECTRICIAN FOREMAN: ______________________

RESULTS & TEST SUPERVISION: ______________________

QC SUPERVISION: ______________________

POST PORC REVIEW DATE: ______________________

Device: ______________ Insp by: ______________ Date: ______________

MFR.: ______________ Type: ______________ S/N: ______________

Type of Insp: Annual: ______________ Special: ______________

Breaker Inspection (Mark Condition)

		A phase	B phase	C phase
Contacts	Alignment			
	Assembly			
	Condition			
ARC Chutes	Assembly			
	Condition			

	Specified	Found 1	Found 2	Found 3	Left 1	Left 2	Left 3
Primary contact Compression							
Arcing Contact Compression							
Make and Break (Max. Diff.)							
Otherwise N/A if not Required							

Megger Test: Test Voltage: ______________ Acceptable: ______________
If Test Not Required N/A: ______________

General: Main and Secondary Disconnecting Device: ______________
Insulators: ______________ Cubicle: ______________

All nuts, bolts, cotter pins and etc. tight and in place: ______________

Connections: Panel: ______________ Aux. SW's: ______________
Closing Relay: ______________

Clearance of trip tab to tripper bar approx. clearance 1/8" to 3/16".

Found ______________ Left ______________

Under Voltage Trip Attachment

Clearance - Triplever to trip bar. approx. 1/16" Clearance when the breaker is halfway closed. ______________

Testing: Manual test of UV Attachment ______________
UV operation verified 10 time ______________
Shunt trip operation verified ______________

Comments: ______________

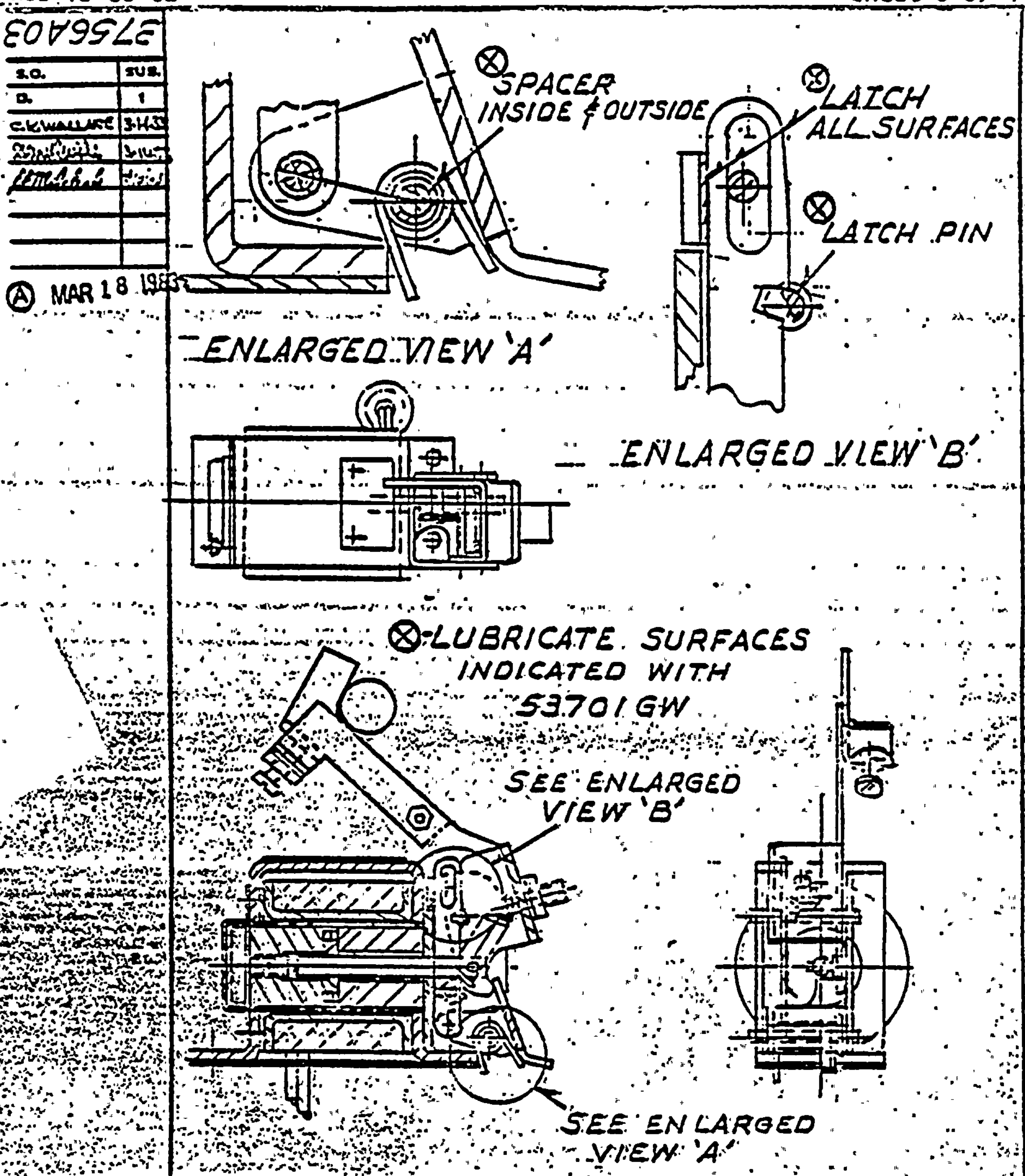
Westinghouse Nuclear Service Division

WNSD

Technical Bulletin

An advisory notice of a recent technical development pertaining to the installation or operation of Westinghouse-supplied Nuclear Plant equipment. Recipients should evaluate the information and recommendation, and initiate action where appropriate.

P.O. Box 2728, Pittsburgh, PA 15230



WESTINGHOUSE ELECTRIC CORPORATION

TITLE FIELD LUBRICATION OF DB UNDERVOLTAGE 3756A03

DIVISION SWSD PLANT LOCATION PA. PGH, PA. U.S.A.

FORM 3193T 6600X PAGE 1 OF 2

a.

Westinghouse Nuclear Service Division

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P.O. Box 2728, Pittsburgh, PA 15230

NSD-TB-83-02 Sheet 4 of 4

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MAR 18 1983

FIELD LUBRICATION OF DB BREAKER
UNDERVOLTAGE TRIP ATTACHMENT

When required, lubrication of the undervoltage trip attachment on DB Low Voltage breakers should be made with 53701GW lubricant.* This lubricant is composed of a finely ground and purified natural ore of molybdenum disulfide and iso-propyl alcohol. It is prepared by mixing 5 parts by weight of this lubricating grade molybdenum disulfide with 2 parts by weight of commercial grade iso-propyl alcohol.

Mixing by volume is not recommended. The intent of this lubricating mixture is to provide a fluid system to carry solid lubricant to the closely fitted parts. A proper mixture will leave a smooth uniform coating on the surface of a part. If the mixture does not contain enough alcohol, the lubricant does not flow well and produces a lumpy coating. Too much alcohol produces a thin, non-uniform coating. When not in use, the mixture should be kept in a sealed container to prevent evaporation of the alcohol. If sufficient alcohol has evaporated to make the lubricant viscous or pastelike, a new batch should be prepared. The mixture settles rapidly and should be mixed well before each use.

When applying the lubricant to the assembled undervoltage trip attachment, refer to the appropriate figure in the instruction book. The following items should be lubricated:

1. The pin running through the trip spring
2. The loop end of the latch
and 3. The latch pin

The lubricant can be applied using an eyedropper, small rod, or other suitable means for dispensing a single drop. One drop of lubricant should be applied to each point where the above parts come in contact with another metal part. Do not over lubricate.

* Available already mixed from William F. Nye, Inc., P.O. Box G-927, New Bedford, Mass. 02742 617-996-6721 as Ⓐ Lubricant 53701GW

WESTINGHOUSE ELECTRIC CORPORATION

TITLE FIELD LUBRICATION OF DB UNDERVOLTAGE 3756A03

DIVISION SWGR PLANT LOCATION E. PGH. PA. U.S.A.

FORM 31295 6600X PAGE 2 OF 2

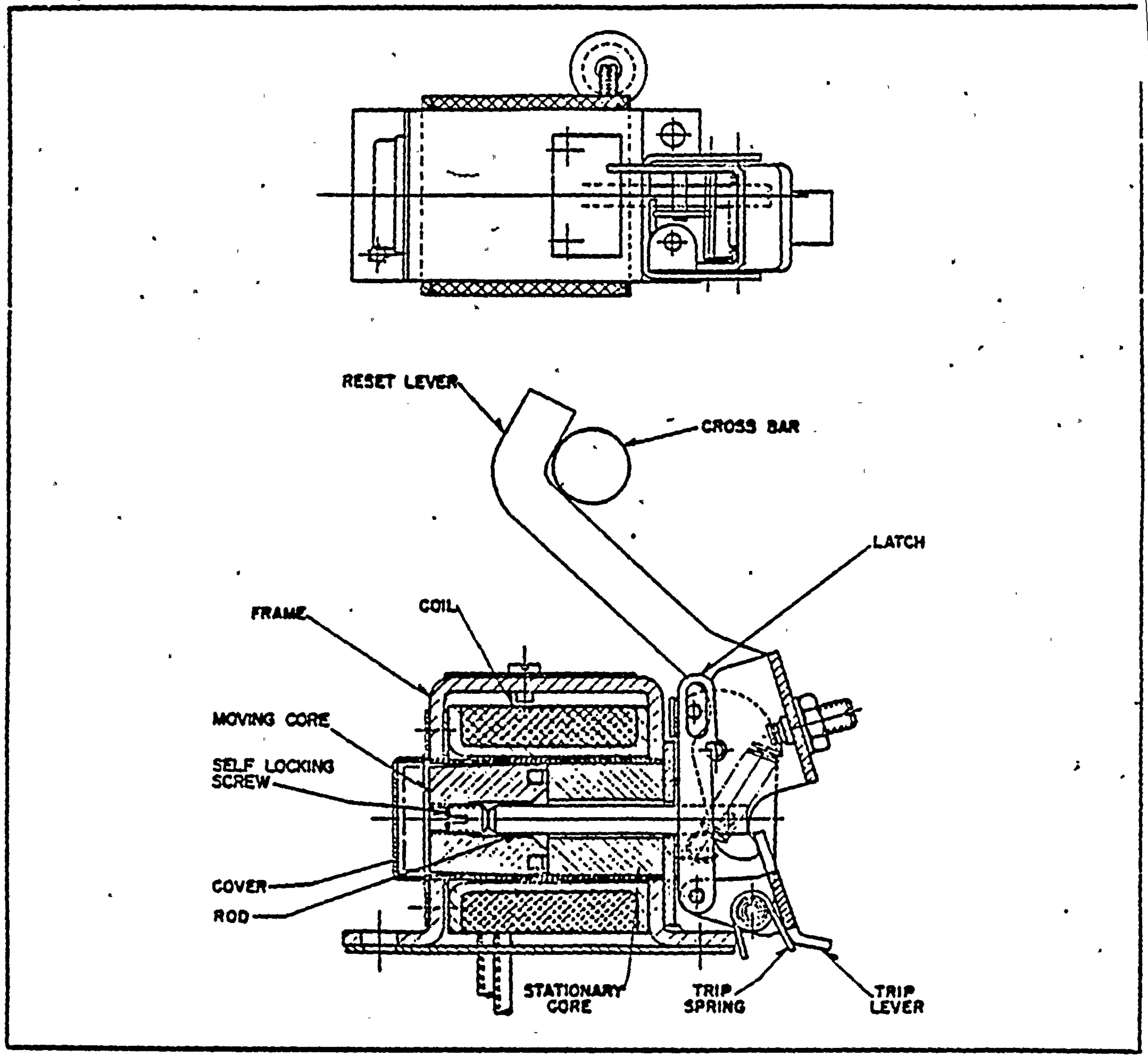

Fig. 17 - Undervoltage Trip Attachment - Construction Details

4.3 REACTOR TRIP SYSTEM RELIABILITY (AUTOMATIC ACTUATION OF SHUNT TRIP ATTACHMENT FOR WESTINGHOUSE AND B&W PLANTS)

The power distribution system for the rod drive mechanisms consists of two motor-generator sets operating from two separate non safeguards 480 volt buses. The generators are paralleled through Westinghouse type DB air circuit breakers as shown on Figure I (Attachment 6), and feed the rod power cabinets through two series connected reactor trip breakers. The series reactor trip breakers are designated as R.T.A. and R.T.B. Bypass breakers BYA and BYB are arranged so that they can be connected in parallel with the trip breakers to facilitate on line testing. Only one bypass breaker is allowed in service at a time so as to minimize the likelihood of two reactor trip breakers being bypassed at the same time (see FSAR Section 7.2-22.)

Figure I shows the existing reactor trip and power distribution scheme. The two series reactor trip breakers and the two bypass breakers are Westinghouse type DB50s and are equipped with two types of tripping features. The undervoltage trip attachment (UV) trips each breaker automatically when 125 VDC power is interrupted to the UVs. The tripping logic is formed by auxiliary relays RT1 through RT14 and requires that two contacts open to cause a valid trip condition. In addition, each reactor trip breaker will open on loss of dc logic power. Either of the two reactor trip breakers is capable of causing interruption of ac power to the rod mechanism, resulting in a reactor shutdown. The second breaker tripping feature is the shunt trip coil (STA). This is a common trip coil (TC) that upon being energized, by 125 VDC control power, will cause the breakers to trip. This STA feature is presently being used to manually trip the PT and/or BY breakers from remote locations. The shunt trip coils is not shown on Figure 1 but is shown as TC on Figure 2.

Both the trip and undervoltage attachments are electro-mechanical devices. When energized or deenergized they will operate a linkage assembly which mechanically lifts up the tripper bar, causing the breaker to trip. The mechanical parts have been maintained and, to date have not shown any signs of binding, or any other malfunction that would preclude a valid trip. However, to improve the operability of the tripper bar assembly and to minimize the likelihood of a failure of a breaker to trip, a modification is proposed.

This modification is consistent with the requirements of Generic Letter 83-28, and is shown on Figure II (Attachment 6.)

The two existing reactor trip breakers will be modified so as to use a reverse tripping logic to automatically activate the existing trip coil concurrent with the deenergization of the

undervoltage coil. This will result in two simultaneous mechanical forces acting on the tripper bar where presently only one force exists. The auxiliary relays that form the existing logic have both "a" and "b" type contacts. The "b" contacts close when the RT relays deenergize while the "a" opens. The "b" contacts will be used to form a reverse logic which will energize the trip coils. When the RT relays drop out the "a" logic contacts will open, deenergizing the undervoltage coil resulting in two simultaneous forces acting on the tripper bar assembly. The 125 V dc power for the undervoltage trip assemblies is supplied from the reactor protection cabinets and is referred to as logic power. The proposed shunt trip coils will be powered by separate 125 V dc fuses in each reactor trip breaker and is referred to as Control Power. The use of separately fused sources affords additional diversity to the tripping scheme.

This scheme as proposed is consistent with the Westinghouse generic design package of the automatic shunt trip modification as submitted to the NRC on June 14, 1983, with exception that an interfacing relay is not required. The addition of a new electromechanical relay is not required since a complete "b" reverse logic is easily formed using the existing RT relays. Another auxiliary relay would add an additional time delay to the response time associated with the shunt trip feature.

In addition to the RT logic relays tripping each reactor trip and bypass breakers, a recent modification was installed which automatically trips the reactor trip breakers using the UVA. This occurs at power levels below eight percent and with primary temperatures at or below 350°F. The design intent was to insure that the control rods are unlatched before cooling down. Since this added tripping feature is only used when the plant is heating up or cooling down, its inclusion into the reverse logic is not warranted. Specifically these low RCS temperature interlocks presently used to trip each reactor trip breaker using the UVA will not be duplicated on the shunt trip coil logic.

Testing equipment of the RT breakers will be accomplished using existing equipment. In addition, both diverse tripping features will be independently tested. This modification will be installed during the refueling outage of 1985.

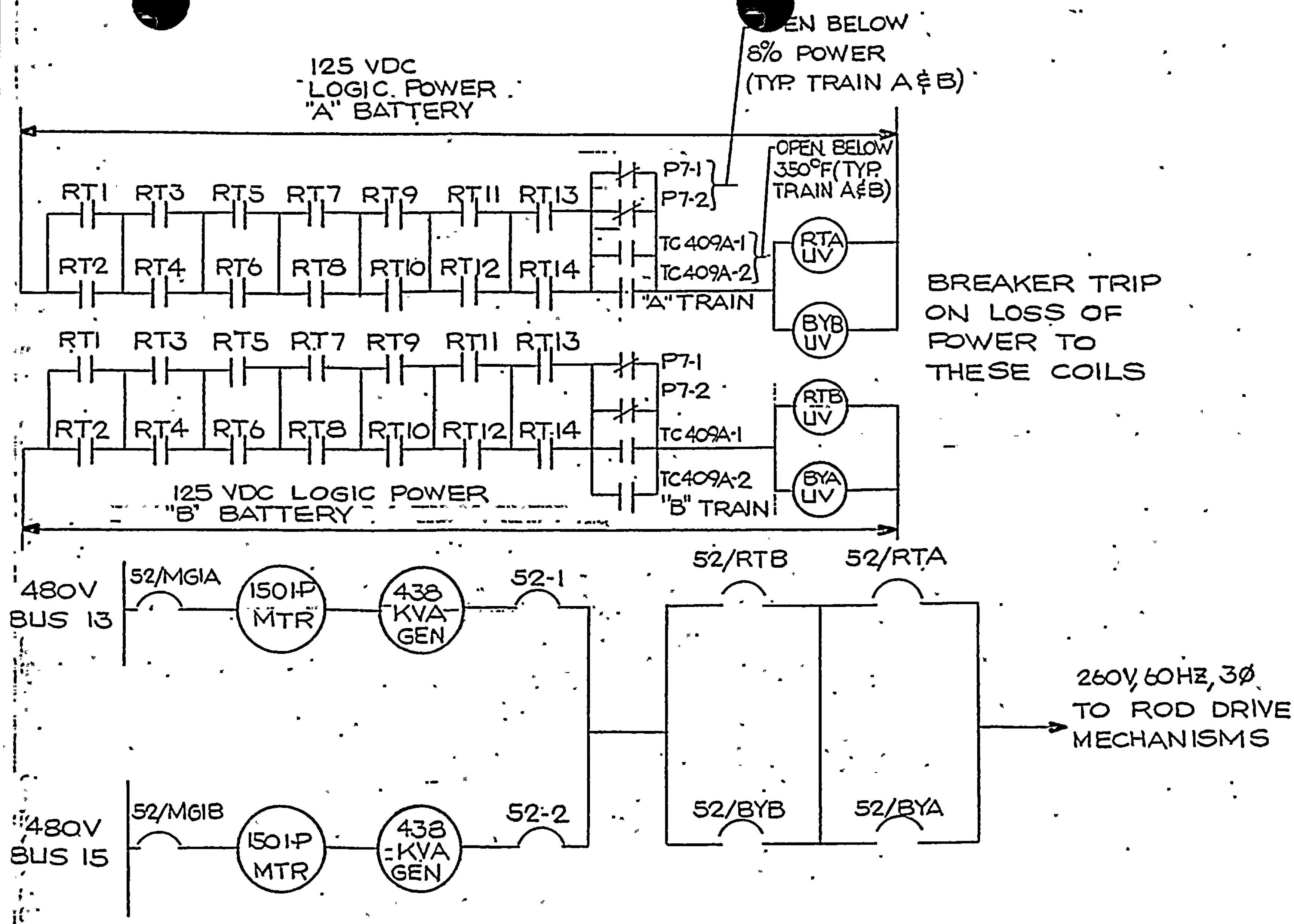

FIGURE 1

EXISTING AUTOMATIC REACTOR TRIP

ATTACHMENT 6

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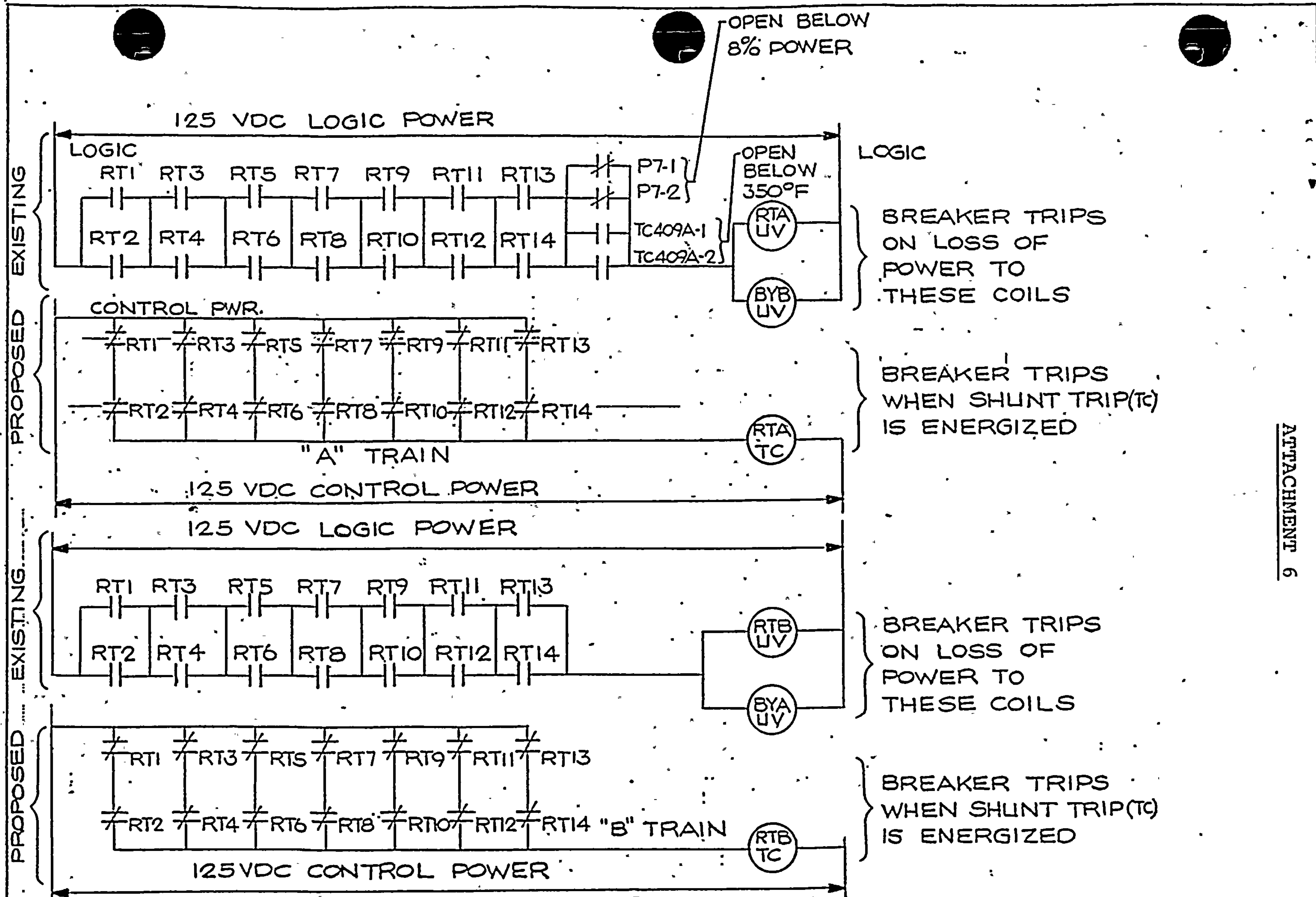

FIGURE 2

PROPOSED REACTOR TRIP SCHEME

ATTACHMENT 6

H.H.S. 19155

[illegible]

4.4 REACTOR TRIP SYSTEM RELIABILITY (IMPROVING IN MAINTENANCE AND TEST PROCEDURES FOR B&W PLANTS)

Because the nuclear steam supply system at Ginna Station was provided by Westinghouse and not B&W, this item is not applicable as a question for Ginna.

4.5 REACTOR TRIP SYSTEM RELIABILITY (SYSTEM FUNCTIONAL TESTING)

Functional testing of the reactor trip system has been performed on a yearly basis throughout the life of the plant. More extensive functional testing of the reactor trip system, including response time testing, began during the 1983 refueling outage. The test consists of measuring the trip response time of each breaker. The breakers are tripped from a remote location and the breaker's "clearing" time is recorded. This test is repeated a second time when each breaker is tripped by simulating an actual 2 out of 3 logic signal which trips each breaker through the RT relays. This testing program will be modified to independently test each of the two diverse tripping attachments. As part of the acceptance testing of the installed diverse tripping attachments, on-line functional testing of the reactor trip system will be performed before the reactor reaches 100% power. The breaker response time will be determined by deenergizing the undervoltage coil with the shunt trip coil blocked. The test will then be repeated with the undervoltage coil blocked (energized) and the trip coil activated (energized). The breaker clearing times will be recorded and trended for signs of degradation. The reactor trip breakers, to date, have exhibited response times much faster than the manufacturer's maximum recommended value. Therefore, based on this data, the functional testing will continue to be performed on an annual or refueling basis. However, should the breaker response times increase and approach the maximum value, then more frequent (on line) function testing will be performed.

[illegible]