VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

W. L. STEWART
VICE PRESIDENT
NUCLEAR OPERATIONS

August 17,1983

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
Attn: Mr. Robert A. Clark, Chief
Operating Reactors Branch No. 3
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Serial No. 449
NO/JHL:acm
Docket Nos. 50-338
50-339
License Nos. NPF-4
NPF-7

Gentlemen:

VIRGINIA ELECTRIC AND POWER COMPANY
NORTH ANNA POWER STATION UNIT NOS. 1 AND 2
RESPONSE TO THE REQUEST FOR INFORMATION CONCERNING
MAIN TRANSFORMER FAILURES AT NORTH ANNA POWER STATION

In the NRC letter dated July 25, 1983, Vepco was requested to provide additional information concerning the main transformer failures that had occurred at North Anna Unit Nos. 1 and 2. Enclosed are the responses to the questions that were provided in your July 25, 1983 letter.

Very truly yours,

W. L. Stewart

Enclosure

cc: Mr. James P. O'Reilly
Regional Administrator
Region II

Mr. M. B. Shymlock
NRC Resident Inspector
North Anna Power Station

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1/40

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ENCLOSURE

RESPONSE TO THE REQUEST FOR INFORMATION CONCERNING
MAIN TRANSFORMER FAILURES AT NORTH ANNA POWER STATION

QUESTION 1: Submit a summary of the tests performed by Vepco on each of the seven transformers prior to their failure. The summary should include type of test, test results, and test acceptance criteria (noting at what point Vepco would consider the transformer suspect). Also address all other test types which may be a part of Vepco's normal routine maintenance procedures.

ANSWER 1: Before energizatio. and after any major incident involving these transformer; the following routine tests were performed and all results were satisfactory.

Also listed is our acceptance guide. These are the values which require further investigation. They do not necessarily indicate a problem exists, but we do investigate and explain results outside of this range.

TEST	ACCEPTANCE GUIDELINE
Insulation Power Factor	Less than 1%
Bushing Insulation Power Factor	Less than 1%
Transformer Excitation	Less than 120% of previous data
Transformer Turns Ratio	Less than ±.5% deviation from previous data
Bushing Capacitance	Less than 110% of previous nameplate data
Lightning Arrestors	Doble Engineering guidelines
Oil Dielectric	*more than 26kV ASTM 1816 40 mil gap
Oil Moisture Content	*Less than 25 ppm
Oil Power Factor	*Less than .1%
Dissolved Gas-In-Oil	*Less than 240 ppm H_2 160 ppm CH_4 115 ppm C_2H_6 190 ppm C_2H_4 trace C_2H_2 580 ppm CO

*American Nuclear Insurer's Guide

In addition to the routine tests listed above induced voltage tests were performed on all units on generator #2 after the fourth failure. The tests were conducted from August 2 through August 6, 1981. Tests were performed on two Westinghouse transformers and one General Electric transformer. The maximum test voltage was 150% of the nameplate rating. We duplicated the one hour corona test as closely as field conditions allowed. All test results were satisfactory and all scheduled tests were performed with the exception of the last Westinghouse transformer serial no. 7002099. The failure of the test equipment prevented completion of the last portion of tests on this unit. Because this unit had just been factory repaired and complete factory tests performed and the test set was unavailable the remaining portion of the induced voltage tests was not required. The transformers were energized and operated satisfactorily for approximately 1 year without incident.

After the sixth failure we again decided to perform induced voltage tests. The tests were performed on the 3 transformers on Generator #1, which included one McGraw Edison transformer and two Westinghouse transformers. The maximum test voltage was 135% of the nameplate rating. Again we duplicated the one hour corona test as closely as field conditions allowed. All test results were satisfactory. After these tests the transformers were energized on backfeed and the B phase transformer failed approximately 36 hours after energization.

QUESTION 2: Westinghouse Drawing HAM 707.03 indicates the main transformer is shipped on its side. Submit a summary of Vepco's shipping procedures and practices.

ANSWER 2: The Westinghouse generator step-up transformers at North Anna Power Station were designed to be shipped on their sides. The only additional support required inside the transformer tank are the shipping braces for the bridge structure inside the tank and the internal shipping wedge retainers around the inside of the tank, Items #44 and #45 on the Drawing No. HAM 707-03. The Westinghouse Drawing No. HAM 707-75, "Inside Assembly" has instructions on installing and removing the shipping supports for the bridge structure. Whenever one of these transformers is shipped, supports are installed using the shipping bracing which came in the transformers from the factory or a shipping brace fabricated from clean kiln dried boards as specified in the manufacturers' instruction leaflet. The shipping supports and bolts are painted yellow before installation so that they can be spotted easily and removed after shipping is complete and the transformer is back in an upright position. A copy of the Drawings No. HAM 707-1, 3, and 75 are attached.

QUESTION 3: Submit a summary of the modifications to the main transformer and generator systems completed and planned as a result of the failures. The summary should also include any additions or changes in the administrative, maintenance, and fire protection procedures.

ANSWER 3: All of the Westinghouse GSU transformers at North Anna have been replaced with General Electric (Unit #2) and McGraw Edison (Unit #1) transformers. Each of the replacement GSU transformers incorporate the manufactures latest design features including their conservator tank oil preservation system. All of these transformers were delivered and installed in the first half of 1983.

The following modifications were recommended as a result of Vepco's analysis of the 22 KV main generator failure:

1. Install 24 KV surge arresters on the isolated phase bus.

2. Install stress cone terminations (15 KV minimum) on the generator neutral grounding cable. This cable should be shielded cable. It should be isolated, with foam sealant, from metallic edges. The neutral grounding transformer should have at least a 125 KV BIL rating.

3. The generator frame grounding should be equivalent to 1, 1000 MCM copper conductor at two points, terminated in compression lugs.

4. The generator frame connection to the neutral enclosure should be 1 - 2000 MCM copper conductor terminated with compression lugs.

5. Clearance between the isolated phase bus flexible elbows and the bus duct should be increased to the manufacturer's recommended value.

6. Continuous monitoring recorders should be installed to record generator and isolated phase bus electrical parameters.

Modifications 2-5 have been completed on North Anna 1. Modifications 1 and 6 are being engineered for installation.

Modifications 2-5 have been completed on North Anna 2. Modification 6 is being engineered for installation. Modification 1 is being evaluated.

Also recommended was the cleaning and inspecting of the isolated phase bus, ducts and insulators during refueling outages.

A study has been completed of possible fire protection modifications for the transformer area. The recommendations of the study include the following:

a) Raise the height of the dike which surrounds the transformer area.

b) Add firewalls at each end of the transformer area.

c) Modify the drainage system to accommodate larger flow rates.

These recommendations are being evaluated for possible installation in 1984.

No procedural changes have been recommended.

QUESTION 4: Submit a summary on the amount of shutdown time incurred as a result of the main transformer failures.

ANSWER 4:

Failure Dates	Date Replacement	Re-energized
11-29-80	12-10-80	11 days
06-19-81	07-02-81	13 days
07-03-81	07-25-81	22 days
07-25-81	08-12-81	18 days
08-22-82	08-30-82	8 days
11-16-82	12-05-82	19 days
*12-05-82	03-08-83	93 days

*The shutdown time for the December 1982 failure included time for concurrent generator repairs.

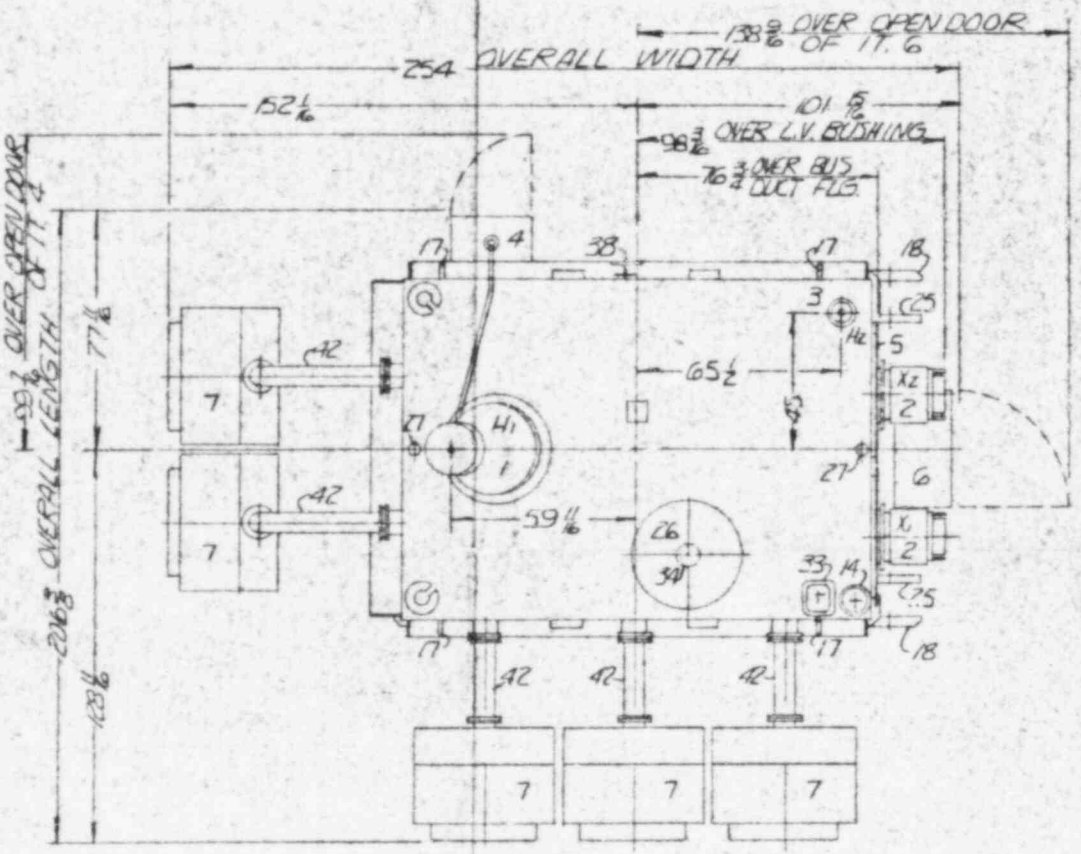
QUESTION 5: Submit the results of Vepco's investigation on the seventh main transformer failure.

ANSWER 5: This transformer was one of seven units purchased from Westinghouse in February 1971. This transformer was shipped in September 1973; installed by February 1974 serving North Anna Unit #1.

After the failure of the "C" phase unit in this bank (see #6 report) constant oil pressure system (COPS) was installed; barrel insulation cylinder around HV bushing was removed, top of transformer internals were carefully inspected, oil processed per Westinghouse cold weather re-impregnation rules, and prepared for service.

After 24 hours of energization, including 6 hours carrying load, transformer failed at 12:38 p.m., December 5, 1982.

Internal inspection disclosed two burn marks which may have been the terminals of an arc under oil. One point was on the HV bushing lead 6 1/2" below the spun copper corona shield. In the HV bushing lead there was a 1/2"-3/4" diameter hole burned through 1"-1 1/4" crepe tape. The second arc burn was on LV winding 41" from the HV burn mark. The transformer was returned to the factory for inspection and teardown. A third arc mark even more remote from the HV bushing was found on the side of the second LV coil. The factory engineers could find no reason for this failure even after the teardown inspection.



REF# 3173 S/N 7001965

~~REF# 3174 S/N 7001994~~

REF# 3175 S/N 7001995

FOR ELEVATION VIEWS

FOR SHIPPING SKET

...D TAP CHANGER OPERATING MECHANISM, WITH PROVISION FOR PADLOCK.
...FOR [illegible] FAULT GAS MONITOR RELAY.
...NSTRUCTION PLATE [illegible].
...PLATE.
...[illegible].
...COOLER [illegible];
...[illegible] TO BE REMOVED BEFORE ENERGIZING.
...[illegible] WITH [illegible], PAINTED YELLOW. TO BE REMOVED BY CUSTOMER BEFORE
... TRANSFORMER.

...TS TO CUSTOMER.

DWG HAM707-01 SUB 1&2 3

COMP. CODE	
ROUTING	DELY. TO

NOTES

SEE INSTRUCTION BOOK HAM707-11 FOR INSTALLATION AND MAINTENANCE OF THIS TRANSFORMER.

THIS OUTLINE CAN BE USED FOR ERECTION OR MOUNTING PURPOSES. IT IS NOT TO BE REGARDED AS INDICATING THE EXACT DETAILS OF CONSTRUCTION.

ALL VALVES HAVE THREADED ENDS UNLESS OTHERWISE SPECIFIED.

ALL THREADED VALVES AND FITTINGS ARE EQUIPPED WITH M.T. PLUGS.

SLING SPREADERS MUST BE USED WHEN LIFTING CORE AND COILS IN ORDER TO CLEAR THE SUPERSTRUCTURE.

BEFORE BREAKING THE SEAL ON ANY OPENING, BE SURE THE LIQUID IS LOWERED BELOW THE OPENING.

THE CASE IS BRACED FOR FILLING UNDER A FULL VACUUM.

THIS TRANSFORMER HAS A FORM-FIT CASE. THE UPPER SECTION OF THE CASE IS WELDED TO THE LOWER SECTION AS SHOWN. THE CORE AND COILS ARE BRACED IN THE TANK TO WITHSTAND HANDLING, SHIPPING AND OPERATING FORCES. THIS BRACING IS A PERMANENT PART OF THE TRANSFORMER STRUCTURE.

IF IT EVER BECOMES NECESSARY TO REMOVE THE TOP SECTION OF THE CASE, REMOVE THE LIQUID AND CUT THE WELD AT THE FLANGE D.S. 48-069-16, FIGURE 5, AND LIFT THE TOP SECTION OF THE CASE FROM THE TRANSFORMER. THIS EXPOSES THE CORE AND COILS FOR INSPECTION OR REPAIR.

AUXILIARY BRACES ARE USED TO SUPPORT THE TRANSFORMER'S SUPERSTRUCTURE FOR SHIPMENT. REMOVE THESE BRACES BEFORE FILLING THE CASE UNDER VACUUM OR ENERGIZING. SEE DETAIL.

SHIPMENT WILL BE MADE IN NITROGEN IN ITS OWN CASE. BE SURE TO REMOVE DEHYDRATING CONTAINER BEFORE FILLING WITH LIQUID. BEFORE FILLING CASE WITH LIQUID, SEE INSTRUCTION BOOK.

CHECK OPERATION OF ALL TAP CHANGER MECHANISMS BEFORE SEALING TRANSFORMER.

THE TRANSFORMER IS EQUIPPED WITH INERTAIRE.

BASES OR PEDESTALS USED TO SUPPORT THE TRANSFORMER OR ROLLERS USED TO MOVE THE TRANSFORMER MUST BE LOCATED IN OR ACROSS THE SHADED AREA. THE TRANSFORMER WEIGHT IS DISTRIBUTED AND SUPPORTED BY THE TANK WALL LOCATED AS INDICATED BY THE SHADED AREA. THE PORTION OF THE TRANSFORMER BOTTOM NOT SHADED WILL NOT SUPPORT THE TRANSFORMER.

THE FOLLOWING ITEMS ARE TO BE REMOVED FOR SHIPMENT: 1, 6, 7, 8, 11, 13, 33, 43, [illegible] 45.

RED INSTRUCTION TAGS WILL BE ATTACHED TO ANY INTERNAL PARTS REQUIRING FIELD TAPING.

[illegible] GALLONS OF LIQUID ARE REQUIRED TO COVER CORE AND COILS WITH COOLERS MOUNTED AND [illegible] GALLONS WITHOUT COOLERS.

	APPROXIMATE NET WEIGHTS (LBS.)	SHIPPING WEIGHT (LBS.)
CORE AND COILS		
MAIN UNIT	310000	310000
CASE AND FITTINGS		
MAIN UNIT	50000	42000
COOLERS	13100	
OIL		
MAIN UNIT	67400	
COOLERS	2500	
TOTAL	443000	352000

FITTINGS AND DESCRIPTIONS

ITEM

- *1 H.V. BUSHING, 1 TOTAL, STUD SIZE 2 - 12 X 2-3/4 LG., OUTLINE DWG. 469C136, INTERNAL BOTTOM CONNECTED - BOLTED TERMINAL.
- *2 L.V. BUSHING, 2 TOTAL, OUTLINE DWG. [illegible], 4 SPADE TERMINAL WITH 13/16 DIA. HOLES, 16 TOTAL PER SPADE AT 1-3/4 INCH SPACING. INTERNAL BOTTOM CONNECTED - BOLTED TERMINAL.
- *3 HI BUSHING, 1 TOTAL, STUD SIZE 1 - 12 X 2-11/16 LG., OUTLINE DWG. 675C877, LINE 4, INTERNAL BOTTOM CONNECTED - BOLTED TERMINAL.
- 4 POTENTIAL DEVICE - TYPE PBA-2, NOTE: ONLY ONE PBA AND CABLE WILL BE SUPPLIED FOR ENTIRE ORDER.
- 5 FLANGE FOR BUS DUCT CONNECTION. SEE DETAIL.
- 6 CONTROL CABINET FOR FANS AND PUMPS. UNDRILLED PLATE OVER A 10-1/2 X 15-1/4 OPENING FOR CUSTOMER'S CONNECTIONS.
- 7 FOA COOLER, 5 TOTAL. THE FAN MOTORS ARE 3 PHASE, 60 HERTZ, 480 VOLTS. TOTAL KVA REQUIRED 36.
- 8 FORCED-OIL PUMP WITH DRAIN AND VENT PLUGS, 5 TOTAL, 3 PHASE, 60 HERTZ, 480 VOLTS, TOTAL KVA REQUIRED 3[illegible].
- 9 SHUT-OFF VALVE.
- 10 OIL FLOW INDICATOR WITH ALARM CONTACTS SUITABLE FOR 600 VOLT-AMPERES AT 125, 250 AND 460 VOLTS AC OR 60 WATTS AT 125 TO 250 VOLTS DC LAMP LOAD OR 6 WATTS AT 125 TO 250 VOLTS DC RELAY LOAD.
- 11 INERTAIRE CABINET.
- 12 INERTAIRE CONNECTIONS.
- 13 NITROGEN CYLINDER.
- 14 MECHANICAL RELIEF DEVICE WITH SEMAPHORE FOR INDICATING RELIEF DEVICE TRIP AND ALARM CONTACTS FOR INDICATING RELIEF DEVICE TRIP SUITABLE FOR 1200 VOLT-AMPERES AT 125 TO 250 VOLTS AC, OR 60 WATTS NON-INDUCTIVE LOAD AT 125 TO 250 VOLTS DC, OR 6 WATTS INDUCTIVE LOAD AT 125 TO 250 VOLTS DC.
- 15 32 POINT JUNCTION BOX FOR CURRENT TRANSFORMER LEADS.
- 16 CONDUIT BOX WITH 1/8 INCH VENTILATING HOLE.
- *17 EYES FOR LIFTING TOP SECTION OF TANK ONLY. SEE D.S. 48-069-32, FIGURE 30.
- 18 HORIZONTAL LIFT EYES FOR UPRIGHTING OR LIFTING UNIT, 2 TOTAL. SEE DETAIL.
- 19 COMBINATION VERTICAL LIFT EYE, PULLING EYE AND ROCKER FOR LIFTING OR PULLING COMPLETE UNIT, 2 TOTAL. SEE DETAIL.
- 20 STABILIZING EYE FOR USE WHEN UPRIGHTING TRANSFORMER, 1 TOTAL. SEE DETAIL.
- 21 HORIZONTAL JACK PAD AND PULL EYE, 2 TOTAL. SEE DETAIL.
- 22 HORIZONTAL JACK PAD AND PULL EYE, 2 TOTAL. SEE DETAIL.
- 23 VERTICAL JACK PADS, 2 TOTAL. SEE DETAIL.
- 24 VERTICAL JACK PADS, 2 TOTAL. SEE DETAIL.
- 25 LIFT EYES, 2 TOTAL FOR LIFTING COMPLETE UNIT HORIZONTALLY OR VERTICALLY. SEE DETAIL.
- 26 MANHOLE 30 INCH DIAMETER OPENING.
- 27 1 INCH FILLING OR VACUUM PLUG, 2 TOTAL.
- *28 GROUND PAD ON CASE WALL 2 TOTAL. SEE D.S. 48-061-11, FIGURE 1.
- 29 VALVE 1-1/2 INCH FOR UPPER FILTER PRESS CONNECTIONS.
- 30 VALVE 2 INCH FOR COMBINATION LOWER FILTER PRESS CONNECTION AND COMPLETE DRAIN WITH 3/8 INCH SAMPLING DEVICE.
- 31 BARS WELDED TO CASE. SEE DETAIL.
- 32 MAGNETIC LIQUID LEVEL GAUGE. 9-1/2 DIAMETER DIAL WITH LOW LIQUID LEVEL ALARM CONTACTS SUITABLE FOR: 600 VOLT-AMPERES AT 125 TO 250 VOLTS AC, OR 60 WATTS AT 125 TO 250 VOLTS DC LAMP LOAD, OR 6 WATTS AT 125 TO 250 VOLTS DC RELAY LOAD.
- *33 SUDDEN PRESSURE RELAY. SEE I.L. 48-065-1 FOR CONTACT RATINGS, ETC.
- 34 DEHYDRATING CONTAINER - TO BE REMOVED BY CUSTOMER BEFORE FILLING CASE WITH LIQUID.
- 35 LIQUID TEMPERATURE INDICATOR - LIQUID PRESSURE DIAL TYPE - WITH MAXIMUM INDICATING HAND AND ALARM CLOSING CONTACTS SUITABLE FOR 600 VOLT-AMPERES AT 125 TO 250 VOLTS AC OR 60 WATTS AT 120 TO 250 VOLTS DC LAMP LOAD.
- 36 HOT SPOT TEMPERATURE INDICATOR - LIQUID PRESSURE DIAL TYPE - WITH MAXIMUM INDICATING HAND AND ALARM CLOSING CONTACTS SUITABLE FOR 600 VOLT-AMPERES AT 125 TO 250 VOLTS AC OR 60 WATTS AT 120 TO 250 VOLTS DC LAMP LOAD.
- 37 THERMOMETER TUBING GUARD.

SHOP ORDER HAM707, GENERAL ORDER [illegible]-17700 (ITEM 1), CUSTOMER - VIRGINIA ELECTRIC AND POWER CO.

PRC APERTURE CARD

Also Available On Aperture Card

...E HAM707-02

...DETAILS SEE HAM707-03

8308240121-01

PRINTS TO		
1	10	TOOL REF DWG
2	11	ENGRG REF DWG
3	12	
4	13	REF BK SEC
5	14	BOOK # / APPROVED
6	15	
7	16	
8	17	
9	18	

WESTINGHOUSE ELECTRIC CORPORATION

APPARATUS TRANSFORMER, CLASS FOA, SHELL FORM, OUTDOOR. 1 PHASE, KVA 130000, H.V. 500000 GRD. Y/288675, L.V. 22000, 60 HERTZ.

DIMENSIONS IN INCHES—SCALE NTS

SUB 1&2 3 Outline + Notes

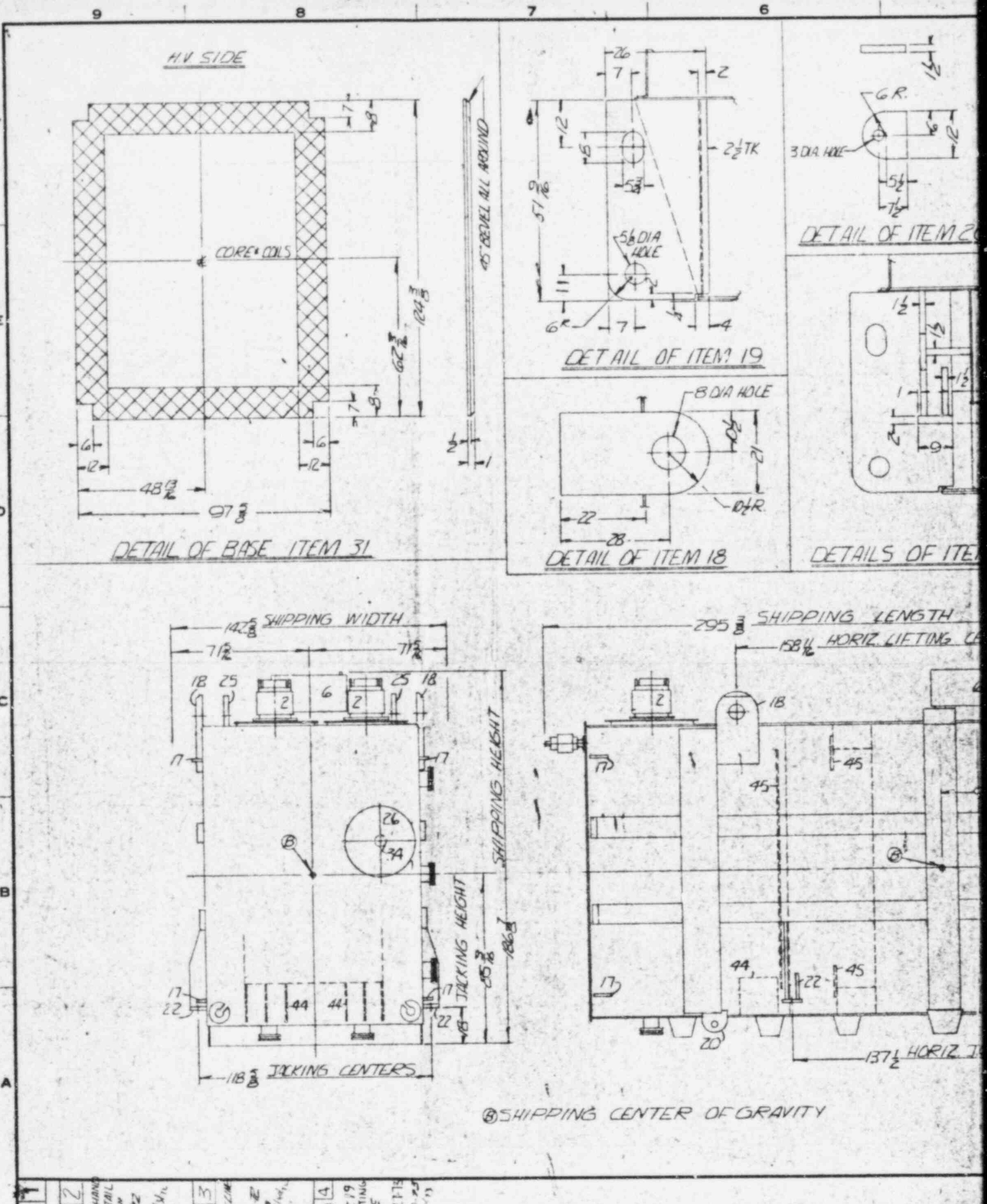
OPTM [illegible] APPD [illegible]

APPD [illegible]

CHKD [illegible] APPD [illegible]

HAM707-01

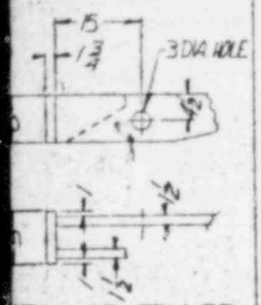
TRANSFORMER DIVISION—MUNCIE PLANT MUNCIE, IND., U.S.A.



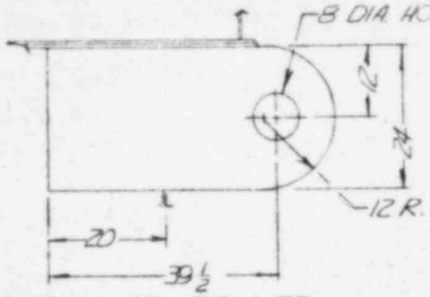
H.V. SIDE
CORE & COILS
45° BEVEL ALL AROUND
48 13/16
97 5/8
62 3/16
124 3/8
DETAIL OF BASE ITEM 31
5/8 DIA HOLE
2 1/2 TK
51 9/16
DETAIL OF ITEM 19
8 DIA HOLE
10 1/2 R.
DETAIL OF ITEM 18
3 DIA HOLE
6 R.
DETAIL OF ITEM 20
DETAILS OF ITEM
142 5/8 SHIPPING WIDTH
71 5/16
SHIPPING HEIGHT
JACKING HEIGHT
186 7/8
35 5/8
118 5/8 JACKING CENTERS
295 3/8 SHIPPING LENGTH
158 11/16 HORIZ. LIFTING
137 1/2 HORIZ.
Ⓑ SHIPPING CENTER OF GRAVITY
CHANGE
SO HAM 107
D HAM 107-09
LOWER RIGHT HAND CORNER OF DETAIL IT 31 WAS 8"
ADDED OUTLINE TO DETAIL
DETAIL OF IT 19 1 1/16 DIM LOCATING 5/8 DIA HOLE WAS 7 1/4
FARRELL

DWG. HAM707-03 SUB 1 & 4

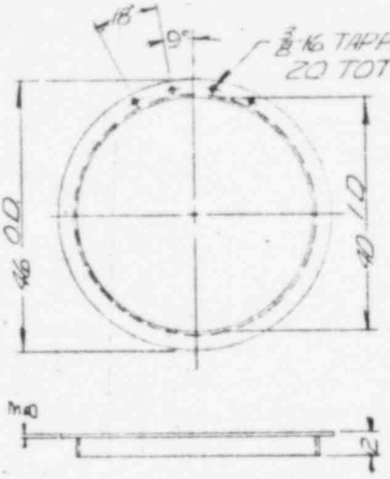
COMP CODE | ROUTING | DELV TO



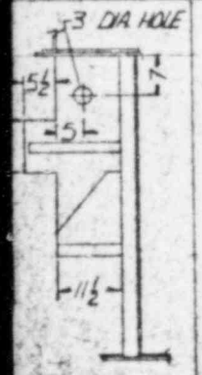
TAIL OF ITEM 22



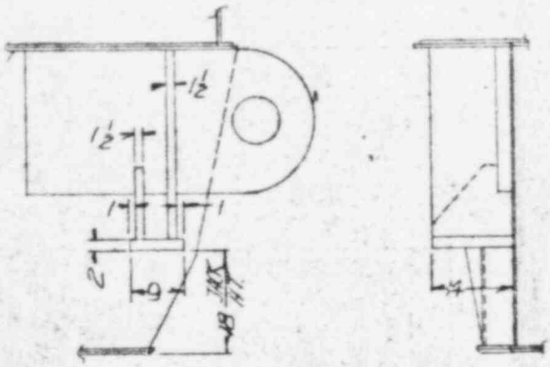
DETAIL OF ITEM 25



DETAIL OF ITEM 5



21 & 23



DETAIL OF ITEM 24

PRC
APERTURE
CARD

FOR PLAN VIEW & NOTES SEE HAM 707-01
FOR ELEVATION VIEWS SEE HAM 707-02

REF# 3173
S/N 7001965

REF# 3174
S/N 7001994 #183

REF# 3175
S/N 7001995

Also Available On
Aperture Card

8308240121-02

PRINTS TO

1		10	
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TOOL SET DWG
ENGRG SET DWG
SET BK SEL
BOOK # | APPROV'D

WESTINGHOUSE ELECTRIC CORPORATION

APPARATUS TRANSFORMER, CLASS FOA, SHELL FORM, OUTDOOR
3 PHASE, KVA 330000, H.V. 500000 SEC. 87288675, L.V. 12000, 60 HERTZ

DIMENSIONS IN INCHES—SCALE NTS | SUB 1 & 4

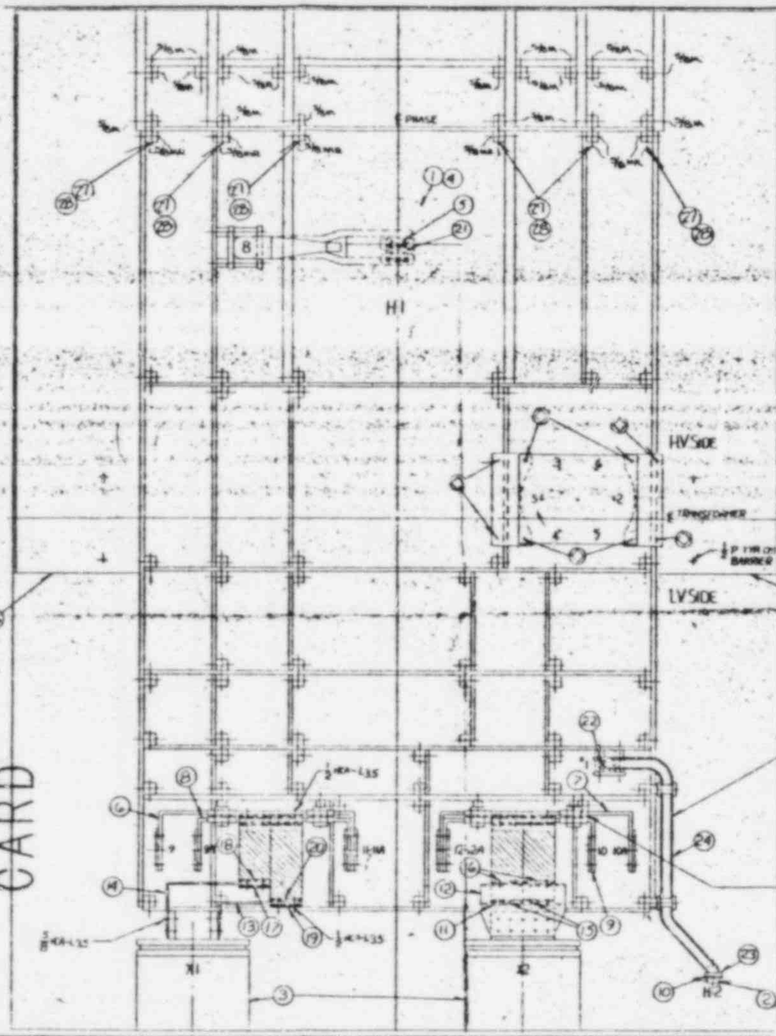
DFTM S. HARRIS 2-3-71 | APPD | APPD | APPD

CHKD | APPD

HAM 707-03

TRANSFORMER DIVISION - MUNCIE PLANT | MUNCIE, IND., U.S.A.

PRC APERTURE CARD



TAPE TO 1 1/16 DIA WITH INSULDUR TAPE #42335CMO & FINISH WITH ONE LAYER OF WHITE COTTON TAPE #41551KRO PER ASSY SPEC M347685 A20. SECURE ENDS.

TAPE BARS 1" PAST CLAMPS WITH 1/8" INSULDUR TAPE #42335CMO & FINISH WITH ONE LAYER OF WHITE COTTON TAPE #41551KRO. SECURE ENDS.

Also Available On Aperture Card

Ⓒ SHIP DETAIL. SEE NOTE 5. THIS DWG.

Ⓓ ROD TO BE CUT TO SUIT IN THE FIELD.

MINIMUM SEPARATIONS

LEAD 8 FROM ANY OTHER LEAD	15
T.C. LEAD 2 THRU 7 FROM ANY OTHER LEAD EXCEPT 8	7
T.C. LEAD 2 FROM 7 & 4 FROM 5	1
OTHER T.C. LEADS FROM EACH OTHER	0
H.V.S.C. FROM ANY OTHER LEAD	9
LEADS 9-9A, 10-10A, 11-11A, 12-12A, L.V.S.C.'s "D & E" FROM EACH OTHER	1½
H1 BUSHING FROM SMOOTH TANK WALL W/BARRIER	20
H1 BUSHING FROM SHARP GROUND W/BARRIER	40
H2 BUSHING FROM SMOOTH TANK WALL	3
H2 BUSHING FROM SHARP GROUND	3½
L.V. BUSHINGS FROM SMOOTH TANK WALL	3
L.V. BUSHINGS FROM SHARP GROUND	3½
H.V. BUSHING TO END FRAME W/BARRIER	37½

SHOP NOTES

1. ALL SHIPPING SUPPORTS MUST BE ASSEMBLED AND IN PLACE BEFORE UNIT IS LAID DOWN.
2. ALL BOLTS USED TO ASSEMBLE THE SHIPPING SUPPORTS MUST BE METAL. THESE ARE DESIGNATED BY "M" ON THE INSIDE DWGS.
3. ALL BOLTS MARKED -MR OR M ON INSIDE ASSEMBLY ARE TO HAVE THE HEADS PAINTED YELLOW. THESE SHOULD BE REMOVED IN THE FIELD.

CUSTOMER NOTES

4. "M" DESIGNATES METAL LOCKING TO BE REMOVED AFTER SHIPMENT, AND ARE NOT TO BE REPLACED.
5. "MR" DESIGNATES METAL LOCKING TO BE REPLACED WITH FIBER LOCKING AFTER SHIPMENT.
6. 108 METAL BOLTS HAVE TO BE REMOVED FROM SHIPPING BRACE AREA.

Ⓔ METAL LOCKING SHOULD NOT BE REPLACED.

DWG. HAM707-75
TITLE INSIDE ASSEMBLY

	ITEM	DESCRIPTION	PATT. NO.	QTY
Ⓐ	1	H1 BUSHING	255D500G02	
	2	H2 BUSHING	464C024G04	
	3	L.V. BUSHINGS	225C825G02	
	4	H1 STATIC SHIELD	231D661G01	
	5	H1 ADAPTER	445C069G01	
	6	CU CONN	HAM 707-81 H01	1
	7	" "	" " H02	1
	8	" "	" " H03	1
	9	" "	" " H04	1
	10	" "	" " H05	1
	11	" "	" " H06	1
	12	" "	" " H07	1
	13	" "	" " H08	1
	14	" "	" " H09	1
	15	" "	" " H10	2
	16	" "	" " H11	2
	17	" "	" " H12	1
	18	" "	" " H13	1
	19	" "	" " H14	1
	20	" "	" " H15	1
	21	" "	" " H16	1
	22	HYLUG	762C834H03	1
	23	HYLUG	762C834H04	1
	24	HOM DF 703-0377 CABLE	13435AA3	1
Ⓑ	25	BARRIER (1×11¾)	763C114G03	1
Ⓑ	26	BARRIER (1×2)	763C114G04	1
Ⓒ	27	⅝ FIBER ROD (36" LG.)	4930662H	5
Ⓒ	28	FIBER NUT	5750A215H05	10

Ⓐ REMOVE FOR SHIPMENT

Ⓑ A-82, B-64½, C-46½, E-13½, F-13½

3263 - 700###
3264 - 700###
3265 - 700###

FOR END ELEVATION SEE DWG. HAM707-76

8808240121-03

WESTINGHOUSE ELECTRIC CORPORATION

APPARATUS TRANSFORMER
INSIDE ASSEMBLY (PLAN VIEW & B/M)

HAM 707-75

TRANSFORMER DIVISION - MUNCIE PLANT — MUNCIE, IND. U.S.A.

	CHANGE
1	[illegible]
2	7280 — C 1 2 B ADDED, NOTES 1 THRU 6 ADDED, 4 5 & 6 NOTE ADDED, CONTS 4 5 & 6
3	C# 60031 — [illegible] NO. 27428