INVENTORY 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99

RC

003481
No.

THE WARD COMPANIES
TRANSFORMER DEPT.

DIV:

Purchased From:			Original Cost:
Town:		State:	Incoming Freight:
Received Via:	Date: 10-21-97	Our P.O. No.:	Total Investment:
Sold To:			Shop Order No.:
Cust. P.O. No.:		Date Billed:	Invoice No.:

TRANSFORMER DATA: Station

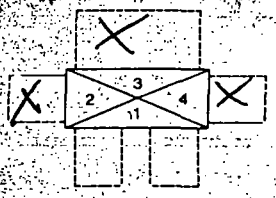
TRANSFORMER

MFG: Westinghouse	KVA: 2500		Phase: 3	Cycles: 60	Class:
PRI. Volts: 23000 Δ	°C Rise: 55	Imp: 6.5	Type: SL	Form:	Insul. Class:
SEC. Volts: 4160 Y	Pol:	H.V. Bil: 150 KV	L.V. Bil: 75 KV	Ser. No.: 37738866	
No. Taps: 4 — % Taps —	Up — 3 Down	Gals. Oil: 910	Year Built:	No.:	
H.V. Bush: ☐ Stud ☐ Eyebolt ☐ Spade ☐ Wall ☐ Cover ____ Holes	Loc: Area: top	HT. Top H.V. Bush:	Max. HT.	C. & C. Wt. 8000	
L.V. Bush: ☐ Stud ☐ Eyebolt ☐ Spade ☐ Wall ☐ Cover ____ Holes	Loc: Area: top	HT. Less H.V. Bush:	Ship. Height:	T. & F. Wt. 5400	
H.V. Terminal Enclosure: ☐ Throat ☐ Air ☐ Oil Chamber		Wide:	Ship. Width:	Oil Wt. 6775	
L.V. Terminal Enclosure: ☐ Throat ☐ Air ☐ Oil Chamber		Deep:	Ship Depth:	Total Wt. 20175	

Pothead: ☐ H.V. ☐ L.V. ☐ Top ☐ Bottom	☑ Oil Level Gauge ☐ w/c	☐ Live Front ☐ Dead Front
Tank Design: ☑ Straight ☐ Oblong ☐ Round ☐ Flat	☑ Temperature Gauge ☐ w/c	☐ Radial Feed ☐ Loop Feed
Radiators: ☐ Rd. Tubes ☐ Panels ☐ Removable	☐ Wdg. Temp. Gauge ☐ w/c	☐ Bushing Wells
☐ Welded Top ☑ Bolted Top ☐ Sealed Tank ☐ Gas-Oil-Sealed	☑ Pres./Vac. Gauge ☐ w/c	☐ Load Break Inserts
☐ Conservator (Removable ☐ Yes ☐ No) ☐ Relief Pipe	☐ Pres./Vac. Reg. Valve	☐ Load Break Bushing
☐ Auto. Gas Sealed ☐ Free Breathing	☐ Pres. Relief Device ☐ w/c	☐ LBOR Switch - POS.
☑ Oil ☐ Silicon ☐ RTemp ☐ Water-Cooled	☑ Pres. Relief Valve	☐ Dual Voltage Switch
☐ Gas - Type ____ ☐ Other ____	☐ Sudden Pres. Relay ☐ S.I. Rel.	☐ Delta - Wye Switch
9809 9812 9.805	☑ Drain Valve ☑ Lower	☐ Arresters ( ) ____ KV
	☑ Tap Changer ☑ Ext. ☐ Int.	☐ ____ Deep Compartment
LG-6,000	☑ Fans (4), ____ V., ____ PH.	☐ Fuses - Type ____
HG-30,000	☐ Fan Cont. ____ V., ____ PH.	☐ Bayonet ☐ ELSP Back-Up
HL-9,000	☐ Bushing C.T. ☐ H.V. ____ ☐ L.V. ____	☐ ARC Strangler ☐ NX ☐ Clip Style
	☐ Arrester MTGS. ☐ H.V. ☐ L.V.	☐ Loadbreak ☐ Drywell Canister ☐ Non-Loadbreak
Bushings - Scrapping Cond. Flash marks	☐ Oil Pump	☐ Internal Weak Link
	☐ TCUL	☐ ELS Bayonet
		☐ EFD

Dielectric 30-30-30

10816155



TRANSFORMER TEST DATA

KVA	PH.	CY.	PRI. V.	SEC. V.
AMBIENT TEMP. °F	TOP OIL TEMP. °C	HUMIDITY %		

INSULATION RESISTANCE:

TEST	TEST RESULTS IN MEGOHMS	TEST KV	GUARD
LOW TO GROUND &	8,000		
HIGH TO GROUND &	9,000		
HIGH TO LOW:	8,000		

WINDING RESISTANCE: (IN OHMS)

X_1-X_2	30.5	H_1-H_2	1.179
X_1-X_3	30.6	H_1-H_3	1.188
X_2-X_3	30.3	H_2-H_3	1.175
X_0-X_1	milliohms	H_0-H_1	ohms

TRANSFORMER TURNS RATIO: (POLARITY: ☐ ~~SUBTRACTIVE~~ ☐ ADDITIVE)

VOLTAGE	TAP NU.	% TAP	H – H /X – X	H – H /X – X	H – H /X – X	CALCULATED
	A		9.809	9.812	9.806	
23000	B	100%	9.570	9.572	9.567	
	C		9.329	9.332	9.327	
	D		9.088	9.092	9.086	
	E		8.848	8.851	8.846	
			out in 2" pos. 100%			

DIELECTRIC INSULATION TESTS:

APPLIED	WINDING	VOLTAGE RATING	TEST VOLTAGE APPLIED IN KV	DURATION OF TESTS IN SECS.
POTENTIAL	H	23000	37.50	60
TEST	X	4160	14.25	60

INDUCED POTENTIAL TEST: 1.5 TIMES RATED VOLTAGE ACROSS FULL WINDING: _____ KV FROM _____ KV LINE TERMINAL TO GRD; _____ CYCLES PER SEC. FOR _____ CYCLES

EXCITING CURRENT:

VOLTAGE / LINE CURRENT	A PHASE	B PHASE	C PHASE	AVERAGE
	_____ AMPS., _____ %	_____ AMPS., _____ %	_____ AMPS., _____ %	_____ %

LOSSES / IMPEDANCE:

NO LOAD LOSS WATTS	LOAD LOSS WATTS	TOTAL LOSS WATTS	% IX	% IR	% IZ	CALCULATED % IZ

OIL TEST DATA:

AVERAGE DIELECTRIC	NEUT. #	COLOR	I.F.T.	SPECIFIC GRAVITY	PCB	
— — — _____ AV.						

CHECK LIST:

H.V. BUSH. LOC:

L.V. BUSH. LOC:

DATE TESTED: 11-17-97

TESTED BY: Dawn Kinne

APPROVED BY:

- ☐ OIL LEVEL
- ☐ NO LEAKS
- ☐ PRI. BUSHINGS
- ☐ SEC. BUSHINGS
- ☐ GAUGES
- ☐ INSPECTION COVER
- ☐ BUSHINGS MARKED
- ☐ SEC. GRD. CONNECTED
- ☐ WARD LABELS

Serial No. 3773866

CUSTOMER: P.C.S. PHOSPHATES LOCATION: AURORA NC UPSI#: 00G-203

PCB CONTENT - ASTM D4059

DATE	CERTIFICATE NUMBER	1242 AROCLOR	1254 AROCLOR	1260 AROCLOR	OTHER	TOTAL CONTENT (PPM)
04/13/92	52435	4				4

DISSOLVED GAS ANALYSIS ASTM D3612 (PPM)

DATE	HYDROGEN H_2	METHANE CH_4	ETHYLENE C_2H_4	ETHANE C_2H_6	ACETYLENE C_2H_2	CARBON MONOXIDE	TOTAL COMB. GAS	CARBON DIOXIDE	NITROGEN N_2	OXYGEN O_2	TOTAL DISV. GAS%
09/01/90	17	41	7	10	0	220	295	1291	111186	2762	11.6
04/13/92	0	10	8	6	0	366	390	5600	112125	1878	12.0
08/17/93	17	11	0	0	0	440	468	2933	118589	3030	12.5
11/18/94	26	12	19	2	0	560	619	8017	117693	8164	13.2
05/03/96	0	6	7	0	0	208	221	2698	120976	6404	13.0
05/07/97	0	7	21	1	0	149	178	2972	86997	29853	12.0

COMMENT 05/97 Low level combustible gases indicate unit operating properly. Retest 1 year.

ICP METAL IN OIL ANALYSIS (PPM)

DATE	ALUMINUM	COPPER	IRON	LEAD	SILVER	TIN	ZINC
09/01/90	0	0	0	0	0	0	0
04/13/92	0	0	0	0	0	0	0
08/17/93	0	0	0	0	0	0	0
11/18/94	0	0	0	0	0	0	0
05/03/96	0	0	0	0	0	0	0
05/07/97	0	0	0	0	0	0	0

COMMENT 05/97 All values fall within normal range for oils in service and do not indicate any specific problem with unit. Detection limit 0.050 ppm.

UNITED POWER SERVICES, INC.
OIL TEST REPORT

CUSTOMER:	P.C.S. PHOSPHATES	LOCATION:	AURORA NC	UPSI #:	00G-303
SUB NAME	F-SUB	COMPANY EQUIPMENT #:	48	CUST. ID.	NC100036

NAMEPLATE DATA

MFG.:	WESTINGHOUSE	HIGH VOLT:	23000	# FANS:	4	GROUND:	X
S/N:	3773866	LOW VOLT:	4160	GAS HEADSPACE:	Yes	OUTSIDE:	X
GAL:	910	IMPED:	6.5	WATER COOLED:	No	INSIDE:	
LIQUID:	Oil	KVA:	2500	BUSHINGS T/S:	Top	PLATFORM ':	
VALVES:	2"BV 1"TV	PHASE/CYCLE:	3/60	CONS. TANK:	No	POLE ':	
DATE MFR:		WELDED LID:	No	PHYSICAL DIM.:	9X6X5	ROOF:	
EQUIP TYPE:	TRANS	# RADS:	23/10	WEIGHT:	20175	ACCESS ':	25'

VISUAL INSPECTION

DATE	OPERATING TEMP	PEAK TEMP	FLUID LEVEL	PSI VAC	PAINT	BUSHINGS	ENVIR.	LEAKS	RECOMMENDED SERVICE
09/01/90	42	65	Norm	+2	Fair	Dirty	Clean	BV Weld Tankside	Repair
04/13/92	32	65	Norm	+1 3/4	Poor	Dirty	Clean	None	Paint
08/17/93	40	64	Norm	-1	Poor	Dirty	Clean	BV threads	Repair; Paint
11/18/94	46	65	Norm	+1 1/2	Poor	Dirty	Clean	BV & TV tank side	Repair; Paint
05/03/96	46	67	Norm	+1.5	Poor	Dirty	Dirty	BV and TV tank side	Repair, Paint
05/07/97	37	67	Norm	+2	Poor	Dirty	Dirty	BV & TV tank side	Repair; Paint

LIQUID TEST DATA

DATE	D877 DIEL	D974 NN	D971 IFT	D1500 COLOR	D1524 VISUAL	D1298 SG	D924 PF25	D924 PF100	D1533 H_2O	D4768 DBPC	CLASS	RECOMMENDED SERVICE
09/01/90	52	0.036	32.0	2.0	S/Cb	0.875	0.022	0.20	26		Good	Retest 1 Year
04/13/92	53	0.030	34.0	2.0	S/Cb	0.875	0.008	0.230	16		Good	Retest 1 Year
08/17/93	50	0.022	34.4	2.0	S/Pt	0.875	0.030	0.68	28		Good	Retest 1 Year
11/18/94	47	0.034	31.1	2.0	Clear	0.880	0.010	0.78	24		Good	Retest 1 Year
05/03/96	48	0.036	27.1	2.0	Clear	0.875	0.04	0.62	30		Good	Retest 1 Year
05/07/97	50	0.034	28.3	2.0	S/Pt	0.880	0.03	0.56	25		Good	Retest 1 Year

ADDITIONAL TESTING REQUIRED DGA _____ PCB _____ ICP _____ OTHER _____

313 HILL AVENUE

800-873-8774

PCS Phosphate
PO Box 48
Aurora, NC

Attn Mr. Scott Deal

Dear Mr. Deal

This letter serves to provide our estimate for the cost of repairing the 2500 KVA oil cooled station type transformer that you shipped to us under PCS Phosphate PO number 0-10155103. Per your instructions, we were to determine the cost to relocate the high and low voltage bushings from the top of the transformer tank so that the high voltage bushings are located on ANSI wall 2 and the low voltage bushings are located on ANSI wall 4.

In order to facilitate the move, the transformer core and coils must first be untanked and the radiators on the end walls of the unit must be relocated to the front walls of the unit.. Plates holding the radiators will cut out of the end walls and then moved to the transformer's front wall. The gauges located on the front wall would either be replaced with new gauges or moved to a location where they could be read from ground level. The plates that were cut out of the ends of the tank would be replaced.

The core and coil will be cleaned with solvent and will have new copper buswork attached so that the high and low voltage leads could be extended to opposite end s of the core and coil structure. The tap changer will not have to be relocated. The completed core and coil assembly will be re-installed into the tank and new distribution class high and low voltage bushings will be installed on ANSI walls two and four. The bushings will include two-hole HV spades and four-hole LV spades. Connections between the transformer and these bushings will be made via threaded bushing lugs.

A mild steel "throat" will be manufactured and installed around the high and low voltage bushings. A mild steel box will be fabricated and installed over the low voltage bushings. The finished unit will be baked-out and vacuum dehydrated. The unit's original oil will be passed through the filter press before being re-installed into the transformer. Prior to shipment, the transformer will be tested per ANSI standards and repainted with epoxy paint.

Please note that the I-beam base that the unit is welded to is severely rusted. WARD will remove ~~or replace~~ the base [redacted] It is understood that the fans and fan controls on the unit will be removed and scrapped.

Moore Moore NEED CAD DRAWINGS

ORDER SHEET

WARD TRANSFORMER CO., INC.

1 ☐ MFG. EQUIPMENT	8 ☐ PARTS	☒ OIL	
2 ☐ USED EQUIPMENT	9 ☐ EXIDE ELECTRONICS	☐ DRY	
3 ☒ REPAIR	10 ☐ EXIDE CORP.	☐ SWITCHGEAR	
4 ☐ RENTAL	11 ☐ OEM	☐ OTHER	
5 ☐ BROKER SALE - USED	12 ☐ ROC PAD MOUNT	USE RC#	
6 ☐ BROKER SALE - NEW	13 ☐ ROC SPECIAL	3481	
7 ☐ CONSIGNMENT EQUIPMENT	14 ☐ MISCELLANEOUS		

OUR ORDER NUMBER	3143040
DATE SOLD	10/21/97
CREDIT OK	
CUSTOMER NUMBER	012970
SALESMAN	
SALES TERRITORY	
TERMS	

SOLD TO	PCS Phosphate	CUSTOMER P.O. NO.	B-10130103
ADDRESS	PO Box 48	ATTENTION	Tim Crocker / Jeff
CITY, STATE, ZIP CODE	Aurora, NC 27806	TELEPHONE NO.	919 322 4111
SHIP TO	PCS Phosphate	REFERENCE NO.	
STREET ADDRESS	Hwy 306 North	ATTENTION	
CITY, STATE ZIP CODE	Aurora, NC 27806	TELEPHONE NO.	

DATE PROMISED	INSTRUCTIONS	ROUTE VIA	
~~11/7~~ 11/7/97 ch		WARD	☐ COLLECT ☐ PREPAID ☒ PREPAID & ADD

QUAN.	DESCRIPTION	UNIT COST	TOTAL
1	Recondition and rekerate bushings and		
	radiators on western transformer		
	Serial # 3773886		
	2500 KVA, 3φ, 60Hz, 65°C rise		
	6.5070 Z		
	High voltage: 22,900 Δ, 150 kV BIL		
	Taps 2-2 12 10 A2B		
	Low voltage 4160Y/2400		
	Clean, Test, Paint (Keep up with time & material)		
	1) Remove Rads off of W2 & W4 and		
	move 'em to Wall 1.		
	2) Remove covers mounted HV & LV bushings		
	3) Put HV bushings (NEW) on W2 (2 + two hole spade) and		
	LV bushings with 4 hole spades on Wall 4.		
	4) Make sure all bushings are in-line & horizontal		
	5) Put thrails around HV & LV. - No Chamber on HV		
	6) Put Low voltage dry terminal chamber - Bottom entry		
	Mild steel on LV. Bushings - ~~Front entry~~		
	7) Re-process original oil.		
	8) Replace gaskets as need - temp. liquid level,		
	pressure vac. & Remove bands/thrails/ bottom II - Blank		