

VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

W. L. STEWART
VICE PRESIDENT
NUCLEAR OPERATIONS

August 26, 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. 457
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 REGARDING
MAIN TRANSFORMER FAILURES

Per your request for information regarding main transformer failures at North Anna Unit Nos. 1 and 2, dated July 28, 1983, enclosed is the statistical information which is part of the yearly Doble Engineering Company-client conference minutes on transformer failures.

Very truly yours,

W. L. Stewart
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

A001
1/40

8308310239 830826
PDR ADOCK 05000338
S PDR

1980 YEARLY TRANSFORMER FAILURE SURVEY

Failure No.	kV-Rated-BIL			MVA	Age-yrs.	Form*	Phase
	H	L	T				
1	161-750	19-150	-	230	26	s	-
2	161-750	17.1-150	-	170	26	s	-
3	161-	36-	-	20	10	-	-
4	140-	48-	4.8-	50	31	s	-
5	138-550	13.8-110	-	50	11	-	c
6	138-550	46-250	-	30	26	s	-
7	138-	12-	-	18	-	-	c
8	132-550	13.8-110	-	12	25	-	c
9	115-550	13.8-110	-	20	24	-	c
10	115-350	13.2-110	-	22.4	14	-	c
11	115-350	13.2-110	-	22.4	11	-	c
12	110-550	13.8-	-	13.3	37	s	-
13	110-450	13.09-110	-	12	13	-	c
14	110-450	13.09-110	-	12	8	-	c
15	110-	13.8-	-	25	-	-	c
16	69-350	13.8-95	-	10.5	17	-	c
17	69-350	4.3-95	-	3.75	18	-	c
18	69-350	13-110	2.4-75	10	26	-	c
19	69-	13.8-	2.4-	12	20	-	c
20	69-	12-	-	6	12	-	-
21	67-350	7.2-110	-	1.67	-	-	c
22	66-	34.5-	13.8-	45	29	-	-
23	63-350	12.47-110	-	7.5	22	-	c
24	46-	7.2-	-	5	12	-	c
25	34.5-200	12-110	-	5	12	-	c
26	34.4-200	13.09-110	-	10	25	-	c
27	34.5-	2.4-4.8	-	1.0	-	-	c
28	34.4-	5.04-8.72	-	0.833	-	-	c
29	34-	4-	-	6.25	-	-	-
30	34-	4-	-	4.687	-	-	-
31	26.4-	4.16-	-	3.75	-	-	c
32	25-	12-	-	20	16	-	-
33	13.2-110	11-45	0.575-	6.25	38	-	c
34	345-1050	16.2-150	-	285	8	-	c
35	115-550	33-200	-	7.5	25	-	c
36	230-900	115-550	13.8-110	150	5	-	c
37	66-350	12-110	-	7.5	12	-	c
38	66-350	8-110	-	0.25	33	-	c
39	12-	2.4-	-	1.5	56	s	-
40	69-	14.4-	-	12	3	s	-
41	500-1675	161-750	26-200	400	12	-	c
42	161-750	69-350	13.8-110	66	24	-	c
43	161-750	17.1-150	-	170	22	-	c
44	230-	118-	145-	145	1	-	c
45	138-450	69-350	12-110	15	18	-	c
46	138-	14.4-	-	21	-	-	c
47	110-450	13.09-110	-	12	6	-	c
48	69-	12-	-	15	8	-	c
49	46-	13.8-	-	5	13	-	c
50	34-	13-	-	6.25	-	-	-
51	500-	230-	-	392	14	-	c
52	500-	138-	-	392	3	-	c
53	345-	138-	13-	234	12	-	-
54	345-	22.8-	-	700	15	-	-
55	335-	138-	13.8-	234	1 m	-	c
56	230-825	24.7-150	-	800	9	-	c
57	230-650	115-350	37.5-200	168	14	-	c

*s = shell; c = core



1980 YEARLY TRANSFORMER FAILURE SURVEY

Failure No.	kV-Rated-BIL			MVA	Age-yrs.	Form*	Phase
	H	L	T				
58	154-	69-	11-	60	-	-	3
59	147.3-	13.2-	-	15	10	-	3
60	138-	69-	13.2-	20	24	-	1
61	138-450	25-200	-	7.5	13	-	1
62	118-	14.4-	-	0.70	-	-	3
63	132-550	13.8-110	-	12	24	-	3
64	115-450	44-250	2.4-110	3.3	34	-	3
65	115-	33-	-	20	-	-	3
66	115-350	13.09-110	-	24	3	-	3
67	115-350	13.09-110	-	24	3	-	3
68	110-	14.4-	-	62.5	-	-	3
69	110-450	13.8-110	-	30	21	-	3
70	110-450	13.09-110	-	20	1	-	3
71	110-450	13.8-110	-	20	10	-	3
72	110-	13.8-	46-	-	-	-	3
73	69-350	13.8-95	-	10.5	16	-	3
74	69-	13.8-	-	7.5	-	-	3
75	69-	13.09-	-	7.5	17	-	3
76	69-	12.47-	-	7.5	11	-	3
77	69-350	12-110	-	7.5	12	-	3
78	69-	12-	-	15	6	-	3
79	67-	27-	-	33.3	-	-	1
80	67-	13.09-	-	-	17	-	-
81	67-350	13.09-110	-	5.0	17	-	3
82	67-350	13.09-110	-	12	8	-	3
83	67-350	13.09-110	-	7.5	7	-	3
84	67-350	7.56-110	-	3.33	25	-	1
85	67-350	7.56-110	-	3.3	-	-	3
86	66-	12-	4-	20	-	-	1
87	66-	12-	4-	20	-	-	1
88	44-250	13.09-110	-	7.5	20	-	3
89	44-	13.09-110	-	7.5	16	-	3
90	43.8-	12.47-	-	5	-	-	3
91	34.5-200	12-110	-	2.5	8	-	3
92	32.5-	4.36-	-	6.25	25	-	3
93	34.5-	7.56-	-	3.333	-	-	3
94	34.4-	13.09-	-	5.25	19	-	3
95	34.4-	13.08-	-	12.5	16	-	3
96	34-	4-	-	6.25	-	-	3
97	13.8-	2.4-	-	2.5	-	-	3
98	4.16-	0.48-	-	1.5	8	-	3
99	500-	345-	34.5-	408	1	s	1
100	345-	230-	13.8-	400	4 m	s	3
101	345-	141-	13.8-	300	n	s	3
102	345-900	138-450	12-110	400	8	s	3
103	230-650	116-350	13.2-110	224	7	-	3
104	230-650	116-350	13.2-	74.9	12	-	1
105	230-650	115-350	13.2-110	224	1 m	-	3
106	230-650	36.5-200	-	112	11	-	3
107	230-650	16.5-200	-	84	7	-	3
108	230-650	36.5-200	-	84	6	-	3
109	161-	69-	13.2-	30	10	-	3
110	138-450	69-350	34.5-200	115	3	-	3
111	138-450	69-350	12-110	36	2	-	3
112	138-450	69-350	12-110	30	18	-	3
113	138-450	69-350	12-110	92	12	-	3
114	138-450	34.5-200	-	25	9	-	3
115	138-	26.4	-	84	7	-	3
116	138-	26.4	-	25	10	-	3

*s = shell; c = core

1980 YEARLY TRANSFORMER SURVEY

Failure No.	kV-Rated-BIL			MVA	Age-yrs.	Form*	Phase
	H	L	T				
117	69-350	34.5-200	-	25	8	- c -	3
118	69-350	12-110	-	7.5	12	- c -	3
119	26.4-	8.7-	-	14	7	- c -	3
120	26.4-	4.16-	-	2.24	1	- c -	3
121	138-630	34.5-230	-	160	18	s - -	3
122	115-	69-	13.8-	12.5	30	- c -	3
123	115-	13.2-	-	140	15	- c -	3
124	110-450	13.8-110	-	20	24	- c -	3
125	110-450	13.8-110	-	26	22	- c -	3
126	110-	13.8-	-	46	-	- c -	3
127	69-	25-	-	20	9	- - -	3
128	69-350	13-110	4-	16.8	14	- c -	3
129	69-350	13-110	4-	16.8	18	- c -	3
130	69-	12-	-	10	16	- c -	3
131	34.5-	13.2-	-	14	13	- c -	3
132	34.4-	13.2-	-	14	2	- c -	3
133	230-650	37.5-200	-	100	13	s - -	3
134	141.6-550	13.8-110	-	12	19	- c -	3
135	138-450	69-350	12-110	15	18	- c -	3
136	34.4-200	13.2-110	-	14	16	- c -	3
137	34.4-	13.2-	-	12.5	5 w	- c -	3
138	34-	13.2-	-	7.5	-	- - -	3
139	115-550	24-150	-	30	13	- c -	3
140	115-550	12-110	2.3-	5	12	- c -	3
141	66-350	7.2-110	-	0.667	13	- c 1	-
142	60-350	4.16-95	-	7.5	18	- c -	3
143	34-	13-	-	6.25	-	- - -	3
144	34-	13-	-	6.25	-	- - -	3
145	230-825	34.5-200	-	160	12	s - -	3
146	34.5-12	-	-	2.5	16	- c -	3
147	24-	12.48-	2.3-	10	38	- c -	3
148	34.5-200	12-4.16	-	5	12	- c -	3
149	138-	69-	13.2-	30	14	- c -	3
150	138-	69-	13.2-	30	10	- c -	3
151	115-450	12.47-110	-	12	26	- c -	3
152	105-450	13.8-	-	12	23	- c -	3
153	66-350	13-110	-	6.7	28	- c 1	-
154	46-	13.09-	-	30	10	- c -	3
155	46-	8.72-	-	20	15	- c -	3
156	46-	8.72-	-	10	19	- c -	3
157	500-1300	115-450	-	224	16	s - -	3
158	500-1300	22-150	-	369.6	7	s - 1	-
159	367-1050	20-150	-	685	12	s - -	3
160	352.5-	141-	-	500	8	s - -	3
161	138-450	69-350	34.5-200	75	14	s - -	3
162	230-650	115-350	13.3-110	168	3	s - -	3
163	230-650	115-350	13.2-110	224	1 m	- c -	3
164	230-	118-	-	650	11	- c -	3
165	139.2-	34.5-	-	112	3	- c -	3
166	138-	69-	13.8-	30	32	s - -	3
167	138-	34.5-	12.0-	8.33	33	s - 1	-
168	138-	27-	-	83	31	- c -	3
169	138-550	13.8-110	-	22.4	4	- c -	3
170	138-450	12-110	-	20	8	- c -	3
171	138-	12-	-	20	11	- - -	3
172	115-350	36.5-200	-	84	13	s - -	3

*s = shell; c = core



1980 YEARLY TRANSFORMER FAILURE SURVEY

Failure No.	kV-Rated-BIL		T	MVA	Age-yr.	Form*	Phase
	H	L					
173	115-350	36-200	-	44.8	5	- c -	3
174	115-	34.5-	-	40	12	s - -	3
175	115-	14.4-	-	30	9	s - -	3
176	115-450	13-110	-	22.4	15	- c -	3
177	110-450	13.1-110	-	45	9	- c -	3
178	110-450	13.09-110	-	12.5	17	- c -	3
179	69-	14.4-	-	10	7	- c -	3
180	69-	12.47-	-	7.5	12	- c -	3
181	69-	12-	-	10	8	- c -	3
182	67-350	13.09-110	-	18	15	- c -	3
183	67-	12.47-	-	10	24	- c -	3
184	66.36-	13.04-	-	4.2	15	- c -	-
185	34.4-200	12.47-110	-	7.5	8	- c -	3
186	33.5-	13.2-	-	6.25	26	- c -	3
187	33-	2.5-	-	12.5	32	- c 1	-
188	22.9-	13.09-	-	2.8	15	- c -	3
189	22-150	6.9-95	-	43	9	- c -	3
190	13.2-	13.2-	-	24	44	- c -	3
191	11-110	4.15-75	-	5	18	s - -	3
192	500-	-	-	250	-	- - -	-
193	230-	-	-	115	-	- - -	-
194	115-	-	-	1-42	-	- - -	-

*s = shell; c = core

1981 YEARLY TRANSFORMER FAILURE SURVEY

Failure No.	kV-Rated-BIL			MVA	Age-yrs.	Form*	Phase	Coil Design**	
	H	L	T						
1	220-825	69-	13.8-	200	6	s	-	3	c
2	138-650	13.8-	-	50	17	-	-	3	-
3	138-	7.56-	-	516.25	26	-	c 1	-	c
4	134-550	13.8-	-	15	-	-	c	3	c
5	132-	34.65-	138-	150	17	s	-	3	c
6	115-450	13.8-110	-	24	13	-	c	3	c
7	115-450	13.09-110	-	18	11	-	c	3	c
8	69-	12.47-	-	10	26	-	c	3	c
9	69-350	12-110	-	7.5	13	-	c	3	c
10	69-	12-	-	7.5	12	-	c	3	c
11	69-	12-	-	3.75	-	-	-	3	c
12	67-	14.4-	-	12.5	-	-	-	3	-
13	67-	12.5-	-	7.5	30	-	c	3	c
14	67-350	12.4-	-	6.5	12	-	c	3	c
15	66-	13.09-	-	7.5	23	-	c	3	c
16	46-	7.5-12.47	-	10	16	-	c	3	c
17	46-	5-8.32	-	12.5	16	-	c	3	c
18	34.4-	4.36-	-	7.5	12	-	c	3	c
19	34.4-	13.8-	-	10	35	-	c	3	c
20	34.4-	4-	-	11.2	14	-	c	3	c
21	34.4-	4-	-	11.2	14	-	c	3	c
22	34-	13.2-	-	0.5	-	-	-	-	-
23	33-200	13.8-	-	15	24	-	c	3	c
24	13.5-	4.16-	-	10	21	-	c	3	-
25	13.2-110	4.36-75	-	3.125	17	-	c	3	c
26	13.2-110	4.16-75	-	2.0	20	-	c	3	c
27	110-550	40-250	10-125	31.5	6	-	c 1	-	c
28	38-	38-	-	10	19	-	c	3	c
29	127-	88-	-	33	21	-	c 1	-	c
30	88-	20-	-	20	11	-	c 1	-	c
31	88-	13.2-	-	7.5	14	-	c	3	c
32	13.5-	4.6-	-	28	19	-	c	3	c
33	230-	28-	-	125	13	-	c	3	c
34	161-	13.8-	-	30	30	-	c 1	-	c
35	161-	13.8-	-	30	30	-	c 1	-	c
36	138-650	69-350	23-110	56	16	-	c	3	c
37	115-550	12-110	2.3-	5	5	-	c	3	c
38	13.8-	13.8-	-	30	20	-	c	3	c
39	345-1050	230-825	13.8-110	235	n	-	c	3	c
40	230-	60-	12-	75	25	s	-	3	-
41	230-	0.240-	-	0.3	25	-	c 1	-	c
42	138-550	69-350	23-150	33.5	14	-	c	3	c
43	66-350	8-110	-	0.25	32	-	c 1	-	c
44	43.8-	0.48-0.277	-	3.33	5	-	c	3	-
45	66-	13.8-	-	2	16	-	c	3	c
46	525-1425	241.5-650	34.5-200	336	7	-	c 1	-	c
47	230-	132.8-	-	60	2	-	c	3	c
48	161-	12-	7.2-	25	11	-	c	3	c
49	132-	12-	-	50	-	-	-	-	-
50	132-	12-	-	50	-	-	-	-	-
51	132-	12-	-	50	-	-	-	-	-
52	110-	13.09-	-	20	11	-	c	3	c
53	67-350	12.4-	-	12	9	-	c	3	c
54	14.4-	0.277-0.480	-	2.0	2	-	-	3	-
55	138-550	13.8-110	-	75	9	-	c	3	c
56	66-350	4.16-75	-	10	9	-	c	3	c

*s = shell; c = core

**c = circular coils; r = rectangular coils

n = new; m = months

1981 YEARLY TRANSFORMER FAILURE SURVEY

Failure No.	kV-Rated-BIL			MVA	Age-yrs.	Form*	Phase	Coil Design**
	H	L	T					
57	66-350	416-75	-	7.5	10	-	c - 3	c -
58	500-1675	20.7150	-	400	7	-	c 1 -	c -
59	38-	10-	-	2	20	-	c - 3	c -
60	38-	10-	-	1	32	-	c - 3	c -
61	132-	12-	-	50	-	-	- - -	- -
62	115-450	67-250	-	60	1	-	c - 3	c -
63	34-	416-	-	0.375	-	-	- - -	- -
64	34-	0.480-	-	0.25	-	-	- - -	- -
65	13.2-110	2.5-	-	3.75	-	-	c - 3	c -
66	525-1425	241.5-650	-	300	7	-	c 1 -	c -
67	345-	138-	13.2-	400	10	-	c - 3	c -
68	345-900	138-450	12-110	400	13	s - -	3 c -	-
69	345-	138-	33-	300	-	-	- - -	- -
70	345-	138-	-	234	4	-	- - 3	- -
71	345-	138-	-	175	5	-	- - 3	- -
72	345-	69-	-	234	8	-	- - 3	- -
73	345-	25-	-	980	-	s - -	3 c -	-
74	230-900	115-550	-	90	22	-	c - 3	c -
75	230-	69-	10.8-	28.9	46	-	c 1 -	c -
76	250-650	36.5-200	13.2-110	100	11	-	c - 3	c -
77	230-	-	-	600	7	-	- - 3	c -
78	161-	69-	13.8-	72	-	-	c - 3	c -
79	161-750	22.5-150	-	300	29	-	c - 3	c -
80	161-750	12.3-110	-	27.5	31	-	c 1 -	c -
81	142.3-550	13.2-110	-	7.5	14	-	c - 3	- -
82	138-550	69-350	14-110	168	9	-	c - 3	c -
83	138-	416-	-	5	31	-	c - 3	c -
84	138-	13.09-	-	20	8	-	c - 3	c -
85	138-	13.8-	-	50	7	-	- - 3	- -
86	134-550	13.8-	-	7.5	-	-	c - 3	c -
87	120-	14-	-	25	52	-	- - 3	- -
88	115-550	34.5-200	-	40	25	-	c - 3	c -
89	115-450	19.9-34.5	-	7.5	6	-	- - -	- -
90	115-550	13.8-	-	20	17	-	c - 3	- -
91	115-550	11.5-110	-	7.5	33	-	c 1 -	c -
92	115-550	11.5-110	-	7.5	33	-	c 1 -	c -
93	69-350	23-150	2.4-60	20	20	-	c - 3	c -
94	69-	13.2-	-	7.5	2	-	c - 3	- -
95	69-	12-	-	20	-	-	- - -	- -
96	69-	7.2-	-	7.5	10	-	c - 3	c -
97	67.2-350	12.47-110	-	7.5	21	-	c - 3	- -
98	67-350	13.8-	-	15	-	-	c - 3	c -
99	67-350	13.8-	-	15	-	-	c - 3	c -
100	67-	13.09-	-	18	8	-	c - 3	c -
101	67-	13.09-7.56	-	0.833	24	-	c 1 -	c -
102	67-250	13.09-110	-	33	27	-	c 1 -	c -
103	67-350	12.4-	-	12	19	-	c - 3	c -
104	67-350	12.4-	-	12	19	-	c - 3	c -
105	67-350	12.4-	-	2.5	28	-	c - 3	c -
106	67-	4.36-	-	8.4	8	-	c - 3	c -
107	66-350	34-	-	45	31	-	c - 3	c -
108	46-	12.5-	-	10	9	-	c - 3	c -
109	45-250	13-110	-	6.67	20	-	c 1 -	c -
110	43.8-	13.09-	-	3.75	17	-	c - 3	c -
111	34.4-	13.4-	-	13.4	2 m	-	c - 3	c -

*s = shell; c = core

**c = circular coils; r = rectangular coils

n = new; m = months

1981 YEARLY TRANSFORMER FAILURE SURVEY

Failure No.	kV-Rated-BIL			MVA	Age-yrs.	Form*	Phase	Coil Design**	
	H	L	T						
112	34.4	13.09-	-	-	26	-	c -	3	c -
113	33-	4160-	-	3.75	41	-	- -	3	c -
114	14.4-	0.277-0.480	-	2.0	6	-	- -	3	- -
115	14.4-	0.216-0.125	-	0.75	15	-	- -	3	- -
116	13.8-	4.33-	-	1.5	-	-	- -	3	- -
117	13.8-	2.4-	-	1	8	-	c -	3	c -
118	13.2-110	4.16-75	-	3.75	33	-	c -	3	c -
119	88-	13.2-	-	7.5	14	-	c -	3	c -
120	34.5-	12.47-	-	5	3	-	- -	3	- r
121	525-1425	241.5-650	-	400	10	-	c 1	-	c -
122	115-	13.09-7.2	-	15	1	-	c -	3	c -
123	34.5-	13.09-	-	7	13	-	c -	3	c -
124	115-	13.09-	-	12	5	-	c -	3	c -
125	34.4-200	13.2-110	-	5.6	12	-	c -	3	c -
126	34.4-200	13.2-110	-	9.375	12	-	c -	3	- r
127	13.8-	2.4-	-	3.75	-	-	c -	3	c -
128	345-	230-	13.8-	400	3	s	- -	3	- -
129	345-	18-	-	615	4	s	- -	3	- -
130	230-	69-	12.47-	150	9	-	c -	3	c -
131	230-650	36.5-200	-	45	6 m	-	c -	3	c -
132	230-650	36.5-200	-	84	6	-	c -	3	c -
133	230-650	36.5-200	-	112	11	-	c -	3	c -
134	230-650	36.5-200	13.2-110	168	13	-	c -	3	c -
135	230-650	25-150	-	515	7	s	- -	3	c -
136	230-	24-	-	850	4	-	c -	3	c -
137	138-	34-	-	25	-	-	- -	3	c -
138	138-550	14-110	-	33	28	-	c -	3	c -
139	138-	13.8-	-	35	9	-	- -	3	- -
140	69-350	12-110	-	12	12	-	c -	3	c -
141	34.4-	4.16-	-	3.75	9	-	c -	3	- r
142	34-	0.240-0.480	-	1	7	-	c -	3	c -
143	20-34.5	4.8-8.32	-	0.332	-	-	- 1	-	- -
144	115-350	13.2-110	-	12.5	11	-	c -	3	c -
145	115-450	12.47-110	-	12	17	-	c -	3	c -
146	66-350	0.6-45	-	2.875	18	-	c -	3	c -
147	46-	5-8.32	-	5	17	-	c -	3	c -
148	34.5-200	11.5-110	2.4-	10	11	-	c -	3	c -
149	34.4-	13.8-	-	10	17	-	c -	3	c -
150	34-	13.8-	-	30	17	-	c -	3	c -
151	525-1425	241.5-650	-	300	14	s	- 1	-	c -
152	142.3-550	13.2-110	-	25	17	-	c -	3	- -
153	136.8-650	12.47-110	-	12	25	-	c -	3	- -
154	110-450	69-350	-	15	31	-	c -	3	c -
155	34.5-200	12-110	-	5.0	27	-	c -	3	c -
156	22-150	6.9-95	-	3.3	33	-	c 1	-	c -
157	115-550	66-350	-	30	16	-	c -	3	c -
158	115-550	66-350	-	30	11	-	c -	3	c -
159	66-350	7.2-110	-	0.667	13	-	c 1	-	- r
160	66-350	7.2-110	-	0.667	13	-	c 1	-	- r
161	66-350	7.2-110	-	0.667	13	-	c 1	-	- r
162	34.5-	0.480-	-	1.5	22	-	c -	3	c -
163	13.8-	4.16-	-	3500	4	-	- -	3	c -
164	138-	13.8-	-	15	3	-	c -	3	c -
165	127-	88-	-	5	6	-	c 1	-	c -

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1981 YEARLY TRANSFORMER FAILURE SURVEY

Failure No.	kV-Rated-BIL			MVA	Age-yrs.	Form*	Phase	Coil Design**	
	H	L	T						
166	38-	10-	-	5	12	-	c -	3	c -
167	13.8-	0.48	-	0.75	12	-	- -	3	- -
168	69-350	13-110	-	12	17	-	c -	3	c -
169	67-350	12.4-	-	25	9	-	c -	3	c -
170	230-	28-	-	125	12	-	c -	3	c -
171	230-	22.6-	-	575	n	-	c -	3	c -
172	230-	13.8-	-	33	33	s	- -	3	c -
173	27.6-	-	-	15	33	-	c -	3	c -
174	500-1425	23.8-150	-	310	11	s	- 1	-	- r
175	500-1300	22-150	-	330	8	s	- 1	-	- r
176	500-1300	22-150	-	330	8	s	- 1	-	- r
177	345-1050	118-450	13.8-110	300	15	-	c -	3	c -
178	345-1050	20.3-150	-	542	10	s	- -	3	c -
179	345-1050	20.3-150	-	542	10	s	- -	3	c -
180	345-	20-	-	325	6	-	- -	3	- -
181	230-650	69-350	13.2-110	37.33	2	-	c 1	-	c -
182	230-	69-	12.47-	150	7	s	- -	3	- r
183	230-900	13.6-110	-	43	30	s	- 1	-	- r
184	220-825	36-	26.25-	75	22	s	- -	3	c -
185	139.2-	34.5-	-	60	19	-	c -	3	c -
186	138-	69-	-	100	11	-	c -	3	c -
187	138-	69-12.470	-	5	-	s	- -	3	c -
188	138-	69-	13.8-	8.33	30	s	- 1	-	- -
189	138-	13.09-	-	3.75	8	-	c -	3	c -
190	138-	23-	-	40	10	-	c -	3	c -
191	138-	13.8-	-	50	8	-	- -	3	- -
192	138-550	13.09-110	-	10	15	-	c -	3	c -
193	132-	12-	-	50	-	-	- -	-	- -
194	132-	12-	-	20	-	-	- -	-	- -
195	120-	13.2-	-	16.8	n	-	c -	3	c -
196	115-	69-	12.8-	67.2	18 m	-	c -	3	c -
197	115-450	34.5-200	-	40	12	-	c -	3	c -
198	115-	14.4-8.315	-	12	22	-	c -	3	c -
199	115-450	13.2-110	-	22.4	17	-	c -	3	c -
200	110-	13.09-	20-	15	-	-	c -	3	c -
201	110-	13.09-	-	5	16	-	c -	3	c -
202	69-	23.9-	-	30	18	-	c -	3	c -
203	69-	12.470-	-	14	-	s	- -	3	c -
204	67-250	13.09-110	-	18	14	-	c -	3	c -
205	66-	12.47-7.2	-	5	10	-	c -	3	c -
206	66-	12.47-7.2	-	5	10	-	c -	3	c -
207	66-	6.9-	-	0.833	54	-	c 1	-	c -
208	66-	13.8-	-	10	32	-	c -	3	c -
209	46-	7.9-13.8	-	24	18	-	c -	3	c -
210	46-	5-8.32	-	1.5	-	-	c -	3	c -
211	34.5-69	12.470-	-	50	-	s	- -	3	c -
212	34.5-	7.2-	-	5	-	-	c -	3	- r
213	34.5-	7.2-	-	1.5	33	-	c 1	-	c -
214	34.5-	2.4-	-	2.5	27	-	c -	3	c -
215	34.4-200	22.9-150	2.4-	18.7	24	-	c -	3	c -
216	34.4-	4.36-	-	10	14	-	c -	3	c -
217	34-	4.36-	-	0.15	-	-	- -	-	- -
218	34-	0.480-0.277	-	5	12	-	c -	3	c -

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1981 YEARLY TRANSFORMER FAILURE SURVEY

Failure No.	kV-Rated-BIL			MVA	Age-yrs.	Form*	Phase	Coil Design**	
	H	L	T						
219	33-	13.8-7.9	-	14.0	—	-	-	3	-
220	33-	4.3-	-	3.75	28	-	c	3	c
221	23-	4-	-	2.5	30	-	c	3	c
222	22.9-150	13.09-110	-	7	12	-	c	3	c
223	22.5-	2.5-	-	3.33	7 m	-	c	3	r
224	110-	69-	2.5-	25	21	-	c	3	c
225	109-	13.7-	-	37.5	26	-	c	3	c
226	69-	13.8-	-	5.6	4	-	c	3	c
227	69-	2.5-	-	1.5	16	-	c	3	c
228	66-	0.6-	-	5	7	s	-	3	c

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1982 YEARLY TRANSFORMER FAILURE SURVEY

Failure No.	kV-Rated-BIL			MVA	Age-yrs.	Form*	Phase	Coil Design	Failure Mode	
	H	L	T							
1	330-1175	135-550	13.2-110	125	27	s	-	3	c	-
2	230-	138-	13.8-	150	20	s	-	3	-	-
3	161-650	69-350	4.16-110	45	12	s	-	3	c	-
4	161-	45-	12.47-	33.3	9	-	c	3	c	-
5	139.2-	34.5-	-	15	20	-	c	3	c	-
6	132-	34.65-	13.8-	150	17	s	-	3	-	-
7	116-	20.8-	-	-	-	-	c	3	c	-
8	115-550	13.8-110	-	20	25	-	c	3	c	-
9	115-450	37.5-200	-	20	20	-	c	3	c	-
10	115-350	37.5-200	-	22.4	16	-	c	3	c	-
11	115-350	13.2-110	-	22.4	14	-	c	3	c	-
12	70.6-	13.8-	-	10	70	-	c	3	c	-
13	69-	33-	13-	45	30	s	-	3	-	-
14	69-350	24-150	4.16-	7.5	20	-	c	3	c	-
15	69-350	13.2-	-	9.3	14	-	c	3	c	-
16	69-	13.2-	-	10	10	-	c	3	c	-
17	69-350	12-110	-	3.75	13	-	c	3	c	-
18	69-350	12-110	-	12	17	-	c	3	c	-
19	69-	12-	-	20	22	-	c	3	c	-
20	67-	13.8-	-	15	14	-	c	3	c	-
21	67-	12.47-	-	12	13	-	c	3	c	-
22	67-	12.47-	-	5	16	-	c	3	c	-
23	67-	12.47-	-	7.5	13	-	c	3	c	-
24	60-350	13.2-110	-	16.8	8	-	c	3	c	-
25	46-	13-	-	10	16	-	c	3	c	-
26	38-	10-	-	10	33	-	c	3	c	-
27	38-	10-	-	5	26	-	c	3	c	-
28	38-	10-	-	5	5	-	c	3	c	-
29	34.4-200	13.2-110	-	1.5	35	-	c	3	c	-
30	34-	4-	-	3.125	-	-	-	-	-	-
31	13.8-	4.16-	-	10	8	-	c	3	c	-
32	13.2-110	4.33-75	-	1.5	35	-	c	3	c	-
33	13-110	2.4-	-	6	32	-	c	3	c	-
34	765-	345-	34.5-	500	12	-	c	1	-	-
35	525-	138-	13.8-	200	7	-	c	1	-	-
36	765-	500-	69-	5500	1	-	c	1	-	-
37	34.5-	13.8-	-	1	-	-	c	3	c	-
38	26-	4-	-	4	50	s	-	1	-	-
39	88-	15.2-	-	12	6	-	c	3	-	-
40	88-	15.2-	-	10	11	-	c	3	-	-
41	88-	15.2-	-	7.5-	22	-	c	3	-	-
42	230-	138-	13.8-	168	5	-	c	3	c	-
43	230-	60-	12-	150	26	-	c	3	c	-
44	138-	14.4-	-	75	20	-	c	3	c	-
45	23.76-	13.2-	-	6	55	-	c	3	c	-
46	230-	115-	13-	225	17	s	-	3	-	-
47	230-	115-	13-	215	25	s	-	3	-	-
48	230-	60-	12-	75	26	s	-	3	-	-
49	230-	44-	-	125	2	-	c	3	-	-
50	230-	13-	-	86	25	s	-	1	-	-
51	34.5-	4.16-	-	1	9	-	c	3	c	-
52	762-	247-	13.8-	300	4	-	c	1	-	-
53	230-	115-	13-	115	27	-	c	3	-	-
54	161-750	17.1-150	-	170	26	-	c	3	c	-
55	161-	13.2-	-	20	30	-	-	-	-	-
56	115-550	13.8-110	-	15.5	21	-	c	3	c	-

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*o = coil failure; + = core failure; # = other failure (leads, etc.)

1982 YEARLY TRANSFORMER FAILURE SURVEY

Failure No.	kV-Rated-BIL			MVA	Age-yrs.	Form*	Phase	Coil Design	Failure Mode	
	H	L	T							
57	161-	13.8-	-	18	10	-	c -	3	c -	o -
58	144-	25-	24-	10	1	-	- -	3	- -	- -
59	138-550	13.09-110	-	12	8	-	c -	3	c -	o -
60	138-	12-	-	50	-	-	- -	-	- -	- -
61	116-	12.47-	-	12	11	-	c -	3	c -	o -
62	110-	13.09-	-	20	10	-	c -	3	c -	- -
63	69-	12.47-	-	12	14	-	c -	3	c -	o -
64	62.7-350	7.2-110	-	15	11	-	c -	3	c -	o -
65	34.5-	4.8-	-	20	18	-	c -	3	c -	o -
66	13.8-	1-	-	3.027	3	-	c -	3	c -	o -
67	138-550	134-650	144-110	56.8	10	-	c 1	-	c -	- -
68	115-550	12-110	-	5	20	-	c -	3	c -	o +
69	115-550	12-110	-	5	19	-	c -	3	c -	o +
70	38-	10-	-	2	34	-	c -	3	c -	- -
71	38-	10-	-	2	32	-	c -	3	c -	- -
72	34-	48-	-	2	-	-	- -	-	- -	- -
73	33-200	12-110	-	1.5	16	-	c -	3	c -	o -
74	12-	48-	-	2.5	-	-	- -	-	- -	- -
75	500-	230-	-	392	16	-	c -	3	c -	- -
76	345-900	138-450	12-110	400	15	s	- -	3	c -	o +
77	345-	115-	13.8-	448	6	-	c -	3	c -	- -
78	289-1300	133-750	13.2-110	217	2	-	c 1	-	c -	- +
79	230-	230-	-	600	10	-	c -	3	c -	- -
80	230-650	165-200	-	84	9	-	c -	3	c -	o -
81	230-650	36.5-200	13.2-110	56	14	-	c -	3	c -	o -
82	165-	130-	-	160	25	-	c -	3	c -	o -
83	161-	69-	-	13	41	-	c 1	-	c -	- -
84	161-750	14-	-	40	38	-	- -	3	- -	- -
85	161-115	13.8-	-	20	21	-	c -	3	c -	o -
86	161-115	13.8-34.5	-	20	20	-	c -	3	c -	o -
87	161-750	12.3-250	-	27.5	34	-	c 1	-	c -	- -
88	161-750	12.3-250	-	27.5	34	-	c 1	-	c -	o -
89	138-	69-	12-	50	1	-	c -	3	c -	- -
90	138-	34.5-	-	25	10	-	c -	3	c -	o -
91	138-	13.8-	-	7.5	-	-	c -	3	c -	- -
92	132-	76.2-	34.65-	60	8	-	c -	3	- -	o -
93	132-550	34.5-200	12.47-110	30	-	-	c -	3	c -	o -
94	115-	34.5-	-	7.5	6	-	c -	3	c -	o -
95	115-350	24-150	-	30	12	-	c -	3	c -	o -
96	115-	15-	-	40	8	-	c -	-	- -	- -
97	115-550	13.8-110	-	12.5	32	-	c -	3	c -	o -
98	115-550	13.8-110	-	12.5	35	-	c -	3	c -	o -
99	115-	13.8-	-	20	2	-	c -	3	c -	- -
100	115-	13.8-	-	20	21	-	c -	3	c -	- -
101	115-	13-	-	25	17	-	c -	3	c -	- -
102	110-	46-	12.47-	30	15	-	c -	3	c -	o -
103	110-550	13.8-110	-	4	40	-	c 1	-	c -	- -
104	110-550	13.8-110	-	4	40	-	c 1	-	c -	- -
105	110-550	13.8-110	-	4	40	-	c 1	-	c -	- -
106	110-	13.2-	-	28	10	-	c -	3	c -	o +
107	69-	25-	-	10	2	-	c -	3	c -	- -
108	69-	25-	-	7.5	1	-	c -	3	c -	- -
109	69-	13.2-	-	10.5	2	-	c -	3	- r	o -
110	69-	13.2-	-	10.5	2.5	-	c -	3	- r	o -
111	69-350	13.09-110	-	7.5	25	-	c -	3	c -	o -

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1982 YEARLY TRANSFORMER FAILURE SURVEY

Failure No.	kV-Rated-BIL		T	MVA	Age-yrs.	Form*	Phase	Coil Design		Failure Mode	
	H	L									
112	69-	12.47-	-	12	18	-	c -	3	c -	o -	-
113	69-	12.47-	-	30	26	-	c -	3	c -	o -	-
114	69-	12.47-	-	7	18	-	c -	3	c -	o -	-
115	69-	4.16-	-	5.0	27	-	c -	3	c -	o +	-
116	67-	13.8-	-	15	20	-	c -	3	c -	o -	-
117	67.2-	4.16-	-	0.833	53	-	c 1	-	c -	o -	-
118	67-350	13.2-110	-	25	12	-	c -	3	c -	o -	-
119	67-	13.09-	-	1.25	27	-	c 1	-	c -	o -	-
120	67-	12.47-	-	5	19	-	c -	3	c -	o -	-
121	67-	4.16-	-	2.5	19	-	c 1	-	c -	-	#
122	66-	25-	-	10	50	-	c 1	-	c -	o -	-
123	63-350	11-110	-	7.5	50	-	c -	3	c -	-	#
124	45-	13-	-	15	23	-	c -	3	c -	o -	-
125	36-	4.16-	-	1.6	46	-	c 1	-	c -	-	-
126	34.5-200	13.09-110	-	10	2	-	c -	3	c -	o -	-
127	34.5-	12-	-	7.5	11	-	c -	3	c -	-	#
128	34.5-	12-	-	7.5	9	-	c -	-	c -	-	#
129	26-	4-	-	4	60	s	- 1	-	-	o -	-
130	22.9-115	12.47-110	-	1.5	24	-	c -	3	c -	o -	-
131	13.8-110	2.4-75	-	1.5	28	-	c -	3	c -	-	-
132	13.2-	4.36-	-	2.5	26	-	c -	3	c -	o +	-
133	4.16-	480-	-	2	-	-	c -	3	c -	o -	-
134	4.1-	480-	-	2	8	-	c -	3	-	o -	-
135	-	-	-	420	10	-	c -	3	c -	o -	-
136	88-	15.2-	-	7.5	14	-	c -	3	-	o -	-
137	20-	3.8-	-	10	39	-	c -	3	-	o -	#
138	46-	-	-	-	2	-	c -	3	c -	o -	-
139	161-	69-	10.5-	40	-	-	c -	3	c -	-	#
140	138-550	36.2-200	-	15	3	-	c -	3	c -	o -	-
141	115-350	13.2-110	-	10	8	-	c -	3	c -	-	#
142	230-750	34.5-200	-	30	8	-	c -	3	c -	o -	-
143	66-	13.8-	-	4	24	-	c -	3	c -	o -	-
144	38-	10-	-	5	18	-	c -	3	c -	-	#
145	230-650	36.5-200	-	150	12	-	c -	3	c -	o -	-
146	230-650	36.5-200	-	150	12	-	c -	3	c -	o -	-
147	230-650	36.5-200	-	84	8	-	c -	3	c -	o -	-
148	230-	22.8-	-	850	5	s	-	3	-	o -	-
149	139.2-	34.5-	-	100.8	11	-	c -	3	c -	-	#
150	139.2-	34.5-	-	67.2	18	-	c -	3	c -	-	#
151	138-550	69-350	13.2-110	30	9	-	c -	3	c -	o -	-
152	138-	34.5-	-	83	11	s	-	3	c -	o -	#
153	137-	25-	11	90	4	s	-	3	-	-	+
154	138-	69-	34.5-	115	10	-	c -	3	c -	o -	-
155	138-	34.5-	-	50	9	-	c -	3	c -	o -	-
156	115-	34.5-	13.8-	28	11	-	c -	3	c -	-	#
157	115-	14-	-	50	14	-	c -	3	c -	o -	-
158	115-	13.8-	-	30	1	-	c -	3	c -	-	#
159	110-450	69-350	-	15	32	-	c -	3	c -	-	#
160	110-	13.8-	-	33.3	12	-	c -	3	c -	o -	-
161	69-350	12-150	-	14	10	-	c -	3	c -	-	#
162	69-350	12-150	-	37.3	8	-	c -	3	c -	-	#
163	43.8-150	43.8-250	-	28	4	-	c -	3	c -	-	#
164	34.4-200	4.16-	-	5.25	10	-	-	3	c -	-	#
165	13-	11-	-	5	20	-	c -	3	c -	o -	-

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1982 YEARLY TRANSFORMER FAILURE SURVEY

Failure No.	kV-Rated-BIL			MVA	Age-yrs.	Form*	Phase	Coil Design	Failure Mode		
	H	L	T								
166	144-	72-	25-	15	10	-	-	3	-	-	#
167	144-	25-	4.16-	10	6	-	-	-	-	0	-
168	141.6-550	13.8-110	7.6-	42	21	-	c	3	c	-	#
169	141.6-550	13.8-110	7.6-	42	10	-	c	3	c	-	#
170	138-	34.5-	13.8-	160	21	-	c	3	c	-	#
171	115-550	25-150	-	24	27	-	c	3	c	0	-
172	115-	13.8-	-	24	11	-	c	3	c	-	-
173	67-350	13.2-110	-	25	15	-	c	3	c	0	-
174	67-	13.09-	-	18	15	-	c	3	c	0	-
175	67-	13.09-	-	1.66	29	-	c	1	-	0	#
176	66-350	33-200	-	3.333	34	-	c	1	-	-	-
177	66-350	33-200	-	3.333	34	-	c	1	-	-	-
178	45-	13-	-	12	17	-	c	3	c	0	-
179	43.8-	13.09-	-	7.5	14	-	c	3	c	0	#
180	36-	13.8-	-	30	18	-	c	3	-	-	#
181	35-	13-	-	.5	33	-	c	1	-	0	-
182	34.4-	13.2-	-	13.44	15	-	c	3	c	0	-
183	34.4-	13.2-	-	13.44	17	-	c	3	c	0	-
184	34.4-	4.36-	-	11.2	12	-	c	3	c	0	-
185	138-550	69-350	13.09-150	21	18	-	c	3	c	0	-
186	110-	44-	12.47-	33.3	16	s	-	3	c	0	-
187	110-	13.09-	-	7.5	13	-	c	3	c	0	-
188	69-350	23-150	-	7.5	19	-	c	3	c	0	-
189	69-	13.8-	-	30	-	-	c	3	-	-	#
190	69-350	12-110	-	20	14	-	c	3	c	0	-
191	60-350	12.5-110	-	8.4	20	-	c	3	c	0	-
192	230-	44-	-	125	10	-	c	3	-	-	#
193	66-350	23.9-150	-	6	17	-	c	3	c	-	#
194	24-150	4.16-75	-	10	22	-	c	3	c	-	-
195	13.8-50	4.16-25	-	3	7	-	c	3	c	0	-
196	138-350	34.5-150	-	18	2	-	c	3	c	0	-
197	138-350	34.5-150	-	18	18 m	-	c	3	c	0	#
198	67-350	4.16-75	-	20	1	-	c	3	c	0	-
199	23-	480-	-	3	13	-	c	3	-	0	-
200	46-	7.2-	-	1.667	8	-	-	3	-	0	-
201	230-	138-	-	250	<1	-	c	3	c	-	#
202	69-	13-	-	28	16	-	c	3	c	0	-
203	34.5-	13.8-	-	.5	-	-	c	3	c	-	#
204	34.5-	13.09-	-	7	12	-	c	3	c	0	-
205	34.4-200	4.3-200	-	9.375	15	-	c	3	c	0	-
206	120-450	13.2-110	-	8.4	9	-	c	3	c	0	#
207	13.8-110	4.16-75	-	3.5	5	-	c	3	c	-	-
208	4.16-	48-	-	.5	5	-	c	3	c	-	#
209	500-1300	230-650	-	448	4	-	c	1	-	-	-
210	34.5-	13.8-	-	5	-	-	c	3	c	-	#
211	138-550	69-350	13.2-110	60	8	-	c	3	c	0	-
212	138-550	69-350	13.2-110	60	13	-	c	3	c	0	-
213	138-550	69-350	13.2-110	60	13	-	c	3	c	0	-
214	138-550	69-350	13.2-110	30	14	-	c	3	c	0	-
215	115-	12.47-	7.2-	25	18	-	c	3	c	0	-
216	69-	12.47-	-	25	12	-	c	3	c	0	-
217	69-	12.47-	-	25	12	-	c	3	c	0	-
218	34.4-	4.36-	-	5.6	17	-	c	3	c	0	+

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1982 YEARLY TRANSFORMER FAILURE SURVEY

Failure No.	kV-Rated-BIL			MVA	Age-yrs.	Form*	Phase	Coil Design	Failure Mode		
	H	L	T								
219	34.4	4.36	-	11.2	18	-	c	3	c	o	+
220	34.4	13.2	-	10	20	-	c	3	c	o	+
221	34	4	-	7.5	-	-	-	-	-	-	-
222	765	345	34.5	500	9	s	1	-	-	o	-
223	765	345	34.5	500	9	s	1	-	-	o	-
224	500	22	-	369.6	8	s	1	-	-	o	-
225	500	22	-	369.6	9	s	1	-	-	o	-
226	500	22	-	369.6	9	s	1	-	-	o	-
227	345	118	13.8	74	17	s	-	3	c	o	-
228	345-900	23-150	-	725	14	s	-	3	c	o	-
229	161	115	13.8	187	3	-	c	3	-	-	-
230	157	69	-	30	11	-	c	3	c	-	-
231	139.2	34.5	-	5.6	17	-	c	3	c	-	-
232	138-550	13.8-110	-	12	16	s	-	3	c	o	-
233	138-550	13.09-110	-	12	14	-	c	3	c	o	-
234	120-450	13.2-110	-	16.8	24	-	c	3	c	-	-
235	120-450	13.2-110	-	16.8	-	-	c	3	c	-	-
236	120-450	13.2-110	-	16.8	24	-	c	3	c	-	-
237	115-450	57-450	12.5-110	33.3	30	s	-	3	c	o	-
238	115-550	37.5-200	13.2-110	50	26	s	-	3	-	o	-
239	115	34.5	-	40	25	s	-	3	-	o	-
240	115-450	23.5-150	-	15	17	-	c	3	c	o	-
241	115	22	-	12	12	-	c	3	c	o	-
242	115-350	13.2-110	-	5.6	11	-	c	3	c	o	-
243	115-350	13.2-110	-	7	13	-	c	3	c	o	-
244	115-450	13.2-110	-	22.4	18	-	c	3	c	o	-
245	115	4.36	-	12	18	-	c	3	c	o	-
246	113	13.8	-	12	-	-	-	3	-	-	-
247	70.6	13.8	-	7.5	56	-	c	3	c	o	-
248	69-350	24.94-150	-	7.5	15	-	c	3	c	o	-
249	69	13.8	-	.833	53	-	c	1	-	o	-
250	67-350	13.2-110	-	9.375	-	-	c	3	c	o	-
251	69	13.09	-	5.6	12	-	c	3	c	o	-
252	69	12.47	-	12	19	-	c	3	c	o	-
253	67	13	-	5	27	-	c	1	-	o	-
254	66-550	34.5	-	6.667	-	s	1	-	c	o	-
255	66-350	13.09-110	-75	28	12	-	c	3	c	o	-
256	46	13.2	-	20	14	-	c	3	c	o	-
257	46	2.4	-	1	-	-	c	1	-	o	-
258	34.5	34.5	-	120	10	-	c	3	c	-	-
259	34.5	13.09	-	10.5	9	-	c	3	c	o	-
260	34.5	12	-	5	12	-	c	3	c	o	-
261	34.5	12	-	5	14	-	c	3	c	o	-
262	34.5	12	-	5	17	-	c	3	c	o	-
263	34.5	12	-	.833	13	-	c	1	-	o	-
264	34.4	4.365	-	10	33	s	-	3	-	o	-
265	34.5	4	-	3.75	30 m	-	c	3	-	o	+
266	34.5	480	-	2.5	6 m	-	c	3	c	-	-
267	34	34	-	250	9	s	-	3	-	-	-
268	34	12	-	6.25	-	-	-	-	-	-	-
269	34	12	-	6.25	-	-	-	-	-	-	-
270	33	5	-	6.25	28	-	c	3	c	-	+
271	25.2	13.09-7.56	-	7	13	-	c	3	-	o	-
272	25	4	-	2.5	23	-	c	3	c	o	-
273	25	4	-	2.5	23	-	c	3	c	o	-
274	25	4	-	2.0	25	-	c	3	c	o	-

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1982 YEARLY TRANSFORMER FAILURE SURVEY

Failure No.	kV-Rated-BIL			MVA	Age-yrs.	Form*	Phase	Coil		Failure	
	H	L	T					Design	Mode		
275	25-	4-	-	2.5	25	-	c -	3	c -	o -	-
276	23-	12.5-	-	5.0	7	-	c -	3	c -	o -	#
277	23-	12.5-	-	3.75	20	-	c -	3	c -	o -	-
278	22.9-	12.47-	-	5	11	-	c -	3	- r	o -	-
279	16-	4.16-	-	12	10	-	c -	3	c -	- -	#
280	14.4-	480-	-	1	1	-	c -	3	- -	o -	-
281	13.8-	4.16-	-	5.25	54	-	c -	3	c -	- -	#
282	13.2-	4.4-	-	7.5	25	-	c -	3	c -	- -	-
283	11-	2.3-	-	8	35	-	c -	3	c -	- -	#

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