



OIL TESTING AND INSPECTION

CUSTOMER A JOB NUMBER A

LOCATION Minnesota SUB./EQUIP. NAME -

Manufacturer: <u>GE</u>	Single Phase or Three Phase: <u>Three Phase</u>
KVA: <u>50006250</u>	Liquid Gallon: <u>808</u>
Primary Voltage: <u>13800 Delta</u>	Type of Insulating Liquid: <u>Mineral Oil</u>
Secondary Voltage: <u>4160Y/2400</u>	Impedance: <u>6.0</u>
Serial Number: <u>-</u>	Temperature Rise: <u>65 Degrees C</u>

VISUAL INSPECTION

Liquid Level: <u>25 Degrees C</u>	Fill Valve: <u>Yes</u>	Temp. Gauge: <u>Good</u>
Temperature: <u>45 Degrees C</u>	Sample Valve: <u>Yes</u>	Level Gauge: <u>Good</u>
Vac/Pressure: <u>2 lbs. pressure</u>	Cooling Fans: <u>No</u>	Indoor/Outdoor: <u>Indoor</u>
Liquid Leaking: <u>No</u>	Bushings: <u>-</u>	Unit Weight: <u>26455</u>
Drain Valve: <u>Yes</u>	Pressure Gauge: <u>Good</u>	Pad/Foundation: <u>Fair</u>

	DATE	3/3/00		
	SAMPLE NUMBER	1		
QUALITY ANALYSIS	ACIDITY-MG-KOH/G	.016		
	INTERFACIAL TENSION-DYNE/CM	41.8		
	DIELECTRIC-KV	53		
	COLOR	1.0		
	SPECIFIC GRAVITY	.862		
	VISUAL	Clear		
	POWER FACTOR	-		
	KARL FISCHER-MOISTURE PPM	10		
	PPM PCB	-		
GAS ANALYSIS	TEMPERATURE			
	HYDROGEN	3102		
	OXYGEN	14728		
	NITROGEN	101662		
	METHANE	11940		
	CARBON MONOXIDE	934		
	CARBON DIOXIDE	8713		
	ETHANE	4336		
	ETHYLENE	14869		
	ACETYLENE	15		
	COMBUSTIBLE GASES	35196		
TOTAL GAS CONTENT	160300			

Gas concentrations are in PPM. (ND=None Detected)

ACCEPTABLE _____ QUESTIONABLE _____ UNACCEPTABLE X

COMMENTS/RECOMMENDATIONS: Recommend deenergizing, pumping down liquid level, and inspecting the top portion internally for loose connections. Tighten potential loose connections. If no loose connections found, remove from service and send to DYMAX shop for unloading, for complete inspection and repair.

TESTED BY: R. Edel DATE _____ SHEET NUMBER 1



OIL TESTING AND INSPECTION

CUSTOMER B JOB NUMBER B

LOCATION Minnesota SUB./EQUIP. NAME -

Manufacturer: RTE/Cooper SinglePhase or ThreePhase: ThreePhase

KVA: 2500/2800 Liquid Gellion: 501

Primary Voltage: 13800 Delta Type of Insulating Liquid: R-Temp

Secondary Voltage: 4160Y/2400 Impedance: 5.4%

Serial Number: - Temperature Rise: 55/65 Degrees C

VISUAL INSPECTION

Liquid Level: 25 Degrees C Fill Valve: Yes Temp. Gauge: Good

Temperature: 40 Degrees C Sample Valve: Yes Level Gauge: Good

Vac Pressure: 0 Cooling Fans: No Indoor/Outdoor: Outdoor

Liquid Leaking: No Bushings: Ok Unit Weight: 15175

Drain Valve: Yes Pressure Gauge: Good Pad/Foundation: -

	DATE	10/5/99	12/15/99	3/3/00	
	SAMPLE NUMBER	1	1	1	
QUALITY ANALYSIS	ACIDITY MG KOH/G	.020	.013	.023	
	INTERFACIAL TENSION-DYNE/CM	40.3	43.2	43.8	
	DIELECTRIC KV	45	45	51	
	COLOR	2.5	2.0	2.5	
	SPECIFIC GRAVITY	.871	.876	.871	
	VISUAL	Clear	Clear	Clear	
	POWER FACTOR	-	-	-	
	KARL FISCHER-MOISTURE PPM	8	14	11	
	PPM PCB	-	-	-	
	TEMPERATURE				
GAS ANALYSIS	HYDROGEN	89	51	114	
	OXYGEN	8802	13206	10409	
	NITROGEN	75906	64563	85573	
	METHANE	169	49	321	
	CARBON MONOXIDE	612	166	508	
	CARBON DIOXIDE	3489	970	2876	
	ETHANE	63	20	120	
	ETHYLENE	307	96	741	
	ACETYLENE	1	ND	5	
	COMBUSTIBLE GASES	1240	380	1809	
TOTAL GAS CONTENT	89438	79119	100667		

Gas concentrations are in PPM. (ND=None Detected)

ACCEPTABLE _____ QUESTIONABLE _____ UNACCEPTABLE X

COMMENTS/RECOMMENDATIONS: High combustible gases. Resample and retest promptly. If retest confirms high combustible gases, recommend taking unit out of service. Repair or replace transformer.

TESTED BY: R. Edel DATE _____ SHEET NUMBER 1



INSULATING OIL TEST RESULTS

CUSTOMER C JOB NUMBER C
 LOCATION Minnesota SUBSTATION - FEEDER -

MFG: RTE/Cooper Liquid Type: R-Temp Leaking? No
 S/N: - Liquid Gal: 501 Liquid Level? 25C
 KVA: 2500/2800 Phase: Three Phase Paint Cond? Dirty
 Pri V: 13800 Indoor: _____ Sample Valve? Yes
 Sec V: 480/277 Outdoor: Yes Other? -

		Date	9/2/98	9/2/99
Quality Analysis	Sample Number		1	1
	Acidity - MG - KOH/G		.021	.017
	Interfacial Tension - Dyne/CM		30.1	33.0
	Dielectric - KV		38.6	39
	Color		2.4	2.5
	Specific Gravity		.873	.874
	Visual		Clear	Clear
	Power Factor		-	-
	Karl Fischer - Moisture PPM		10	8
	PPM - PCB		-	-
Gas Analysis	Temperature			
	Hydrogen		ND	1205
	Oxygen		307	20449
	Nitrogen		17333	71279
	Methane		ND	7539
	Carbon Monoxide		26	295
	Carbon Dioxide		256	3973
	Ethane		ND	3231
	Ethylene		3	19297
	Acetylene		ND	114
	Propane		ND	-
	Combustible Gases		29	31681
	Total Gas Content		17926	128282
	Metal Analysis	Aluminum		
Iron				
Zinc				
Copper				
Lead				
Silver				
Tin				

Gas & Metal Analysis in PPM. (ND=None Detected)

Oil Condition For This Analysis : Acceptable _____ Questionable _____ Unacceptable X

COMMENTS/RECOMMENDATIONS: DGA indicates a substantial increase in combustible gases. Retest unit promptly. Possible low energy arc involving insulation system of local overheating. Take out of service if test confirms high combustible gases, repair or replace transformer.

TESTED BY: R. Edel DATE _____