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December 3, 2002

Utility Relay Company
16759 West Park Circle Drive
Chagrin Falls, Ohio 44023

Dear Mr. Helmut Weiher:

Enclosed you will find Retlif Testing Laboratories Report R-9699 covering the electromagnetic compatibility testing which was performed on your Zero-Hertz Protective Relay, Part Number B-203-SP2. This testing was performed and test report generated in accordance with your Purchase Order Number VRC 7272.

Thank you for the opportunity to be of service to you. Should you have any questions regarding the enclosed report or the actual testing of your sample, please do not hesitate to contact me.

Sincerely,

Retlif Testing Laboratories

M. White

Michelle White
Administrative Coordinator
nyemclab@retlif.com

Enc. (as stated)

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Electromagnetic Compatibility
Test Report

For

Zero-Hertz Protective Relay
Part Number: B-203-SP2

CUSTOMER NAME:	Utility Relay Company
CUSTOMER P.O.:	VRC 7272
DATE OF REPORT:	November 19, 2002
TEST REPORT NO.:	R-9699
TEST START DATE:	November 18, 2002
TEST FINISH DATE:	November 18, 2002
TEST TECHNICIAN:	S. Carley
TEST ENGINEER:	R. Warren
SUPERVISOR:	R. J. Reitz
REPORT PREPARED BY:	M. White

Table of Contents

Certification and Signatures

We certify that this report is a true representation of the results obtained from the tests of the equipment stated. We further certify that the measurements shown in this report were made in accordance with the procedures indicated and vouch for the qualifications of all Retlif Testing Laboratories personnel taking them.

Robert P. Warren
EMC Test Engineer

Richard J. Reitz
Laboratory Manager

Non-Warranty Provision
The testing services have been performed, findings obtained, and reports prepared in accordance with generally accepted laboratory principles and practices. This warranty is in lieu of all others, either expressed or implied.

Non-Endorsement
This test report contains only findings and results arrived at after employing the specific test procedures and standards listed herein. It is not intended to constitute a recommendation, endorsement or certification of the product or material tested. This test report may not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

Test Program Summary

Report Number:	R-9699
Customer:	Utility Relay Company
Test Sample:	Zero-Hertz Protective Relay
Part Number:	B-203-SP2
Serial Number:	14

Test Method: Test Specification:

- RF Susceptibility: Ontario Hydro Standard C-5047-77.
- Dielectric Withstand: IEEE C37.90-1989.
- Surge: Ontario Hydro Standard A28M-82.

Mode of Operation:
Powered by 120 VAC, 60 Hz, monitoring DC shunt input with simulated adjustable 45mV shunt voltage. The Test sample current limit and pick up was 750 A and the instantaneous trip setting was set to 8000 A.

Susceptibility Criteria:
During all immunity testing, the EUT was monitored for:

1. False tripping of the output trip relay.
2. Test sample shuts down or resets.
3. "Pickup" LED remains clear (not illuminated) when power input is tested.

Test Methods:
The following table depicts the test methods which were performed on the Zero-Hertz Protective Relay and the corresponding test results:

Paragraph	Test Method	Test Results
6.1	Radiated RF Susceptibility	Complied
6.2	Dielectric Withstand	Complied
6.3	Surge Immunity	Complied

Revision History

Revision	Date	Pages Affected

1.0 Scope

The purpose of this test program was to determine the compliance of a Zero-Hertz Protective Relay, Part Number B-203-SP2, to the requirements of Ontario Hydro Standard C-5047-77, IEEE C37.90-1989 and Ontario Hydro Standard A28M-82. The individual test methods performed on the Zero-Hertz Protective Relay are outlined in paragraph 6.0 of this test report.

2.0 Applicable Documents

The following documents form a part of this test report to the extent specified herein:

RCM-001, Retlif Testing Laboratories, Calibration Manual.

RQM-001, Retlif Testing Laboratories, Quality Assurance Manual.

ANSI/NCSL Z-540, Calibration Laboratories and Measuring Test Equipment – General Requirements.

MIL-STD-285, Attenuation Measurements for Enclosures, Electromagnetic Shielding for Electronic Test Purposes, Method of.

MIL-F-15733F, Filters, Radio Frequency Interference, General Specifications for.

MIL-STD-220A, Insertion Loss Measurement, Method of.

Ontario Hydro Designation Standard No. C-5047-77, Specification for testing Susceptibility of electronic equipment to radiated interference.

IEEE C37.90-1989, Dielectric Withstand.

Ontario Hydro Designation Standard No. A-28M-82, Oscillatory Transient Interference Immunity Test.

3.0 General Requirements

3.1 Test Environment

All testing was performed at the Retlif Testing Laboratories, Ronkonkoma, New York facility. Each test method was performed in the environment specified within the test standard. Where the test environment deviated from that specified, it is noted in the applicable test method.

3.1.1 Shielded Enclosures

All testing which required the use of a shielded enclosure was performed in a solid steel, double wall, modular type. The attenuation characteristics of the enclosure were in accordance with MIL-STD-285. All input power lines to the enclosure was filtered utilizing filters manufactured in accordance with MIL-F-15733F and tested in accordance with MIL-STD-220A.

3.1.2 RF Absorber Material

Test methods requiring anechoic treatment, were performed in a room treated with a combination of pyramidal carbon impregnated foam absorber and ferrite tile. The RF absorber was placed above, behind and on both sides of the EUT, and behind the radiating or receiving antenna.

3.1.3 Ground Plane

A brass ground plane, 0.5 millimeters thick, 1.0 meters square or more in area with a minimum width of 0.75 millimeters was utilized. When a shielded enclosure was employed, the ground plane was bonded to the shielded enclosure at intervals no greater than one meter and at both ends of the ground plane.

3.2 Test Instrumentation

A listing of all test instrumentation utilized is contained within each applicable test method. These listings indicate the model, manufacturer, frequency range, last calibration date and calibration due date of all instrumentation utilized. All instrumentation utilized was calibrated prior to use in accordance with the procedures set forth in Retlif Testing Laboratories standard manuals RCM-001 and RQM-001, which are in accordance with the requirements of ANSI/NCSL Z-540.

3.2.1 Grounding

Interference measuring instruments were physically grounded with only one connection. When an antenna was used, the measuring instrument was connected to ground with only the power cord ground (green wire). When a copper-bonding strap was used on either the measuring instrument or the antenna (such as the rod counterpoise), neither the power cord ground nor the instrument ground terminals were used.

3.2.2 Measurement Accuracy

The accuracy of all measurements is as follows:

- Frequency: ±2%
- Amplitude, measurement receiver: ±2 dB
- Amplitude, measurement system: ±3 dB
- Distance: ±5%
- Time (waveforms): ±5%

4.0 Test Sample Description

4.1 General

The test sample was a Zero-Hertz Protective Relay, Part Number B-203-SP2. The Zero-Hertz Protective Relay was powered by 120 VDC, 60 Hz. The test sample measured 10 centimeters long by 17 centimeters wide by 6 centimeters high and weighed 1 pound. Utility Relay Company of Chagrin Falls, Ohio, manufactured the Zero-Hertz Protective Relay.

4.2 Configuration

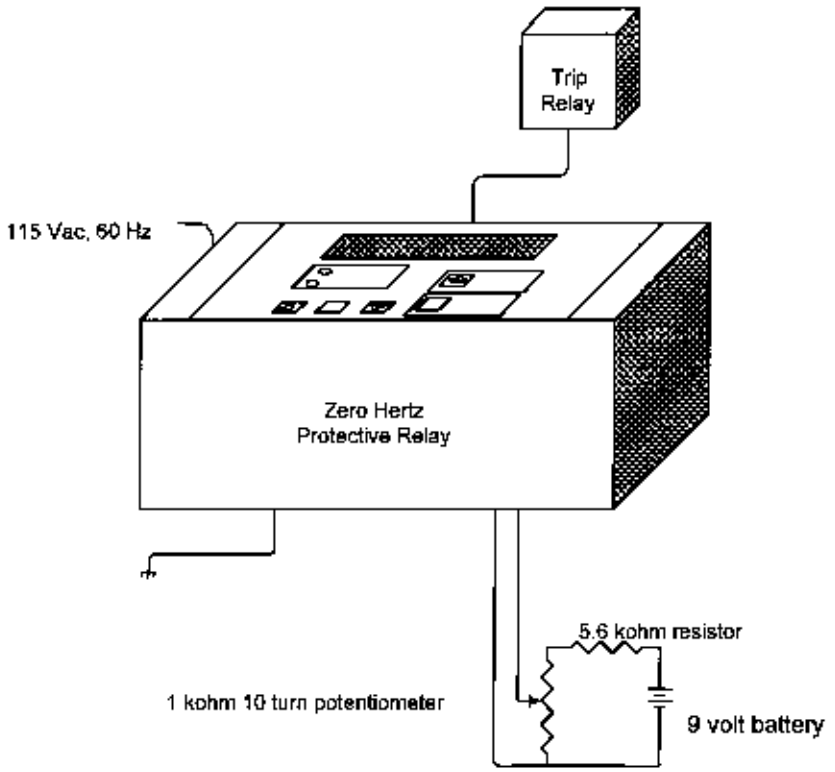
For all test methods, the Zero-Hertz Protective Relay was configured as shown in the General Test Setup drawing, Figure 3. All system cabling including cable length, routing and type were as specified in the table below:

Zero-Hertz Protective Relay Cable Configurations

EUT Port Numbers	Cable Length	Cable Type	Routed to
*DC Shunt Input	*10cm	Unshielded 18 AWG	9V Battery
Actuator Output	15cm	Unshielded 16 AWG Cable	Trip Relay
AC Power Input	1m	Unshielded 16 AWG	120 VAC, 60 Hz Mains

*Note: For the Surge test, DC Shunt Input, the battery fixture was replaced with a 7m, Unshielded 18 AWG Cable shorted at the opposite end.

Figure 3
General Test Setup



Notes:

1. The power cable was 1 meter long.
2. The DC Shunt was connected the the battery as shown except when this input was subjected to the surge test. It was than replaced with a 7 meter cable which was shorted at the end.
3. The test sample was grounded at a bottom case screw via ground strap for the surge tests.

5.0 Test Sample Parameters

5.1 Mode of Operation

During the performance of all testing specified herein, the test sample was powered by 120 VAC, 60 Hz, monitoring DC shunt input with simulated adjustable 45mV shunt voltage. The Test sample current limit and pick up was 750 A and the instantaneous trip setting was set to 8000 A.

5.1.1 Support Equipment

The following support equipment was utilized to operate and monitor the Zero-Hertz Protective Relay:

Description	Manufacturer	Model Number	Serial Number
Trip Relay	Potter & Brumfield	KRPA-11AG-6	N/A

5.2 Performance Requirements

Any false tripping of the output trip relay was considered as a sign of Susceptibility. If the test samples shut down or reset and if the "Pickup" LED illuminates when the power inputs were tested, it was also considered as a sign of susceptibility.

5.2.1 Monitoring Equipment

The Zero-Hertz Protective Relay was monitored for susceptibility utilizing the test sample LCD display and the output trip relay.

6.0 Test Methods

The following test methods were performed on the Zero-Hertz Protective Relay in accordance with Ontario Hydro Standard C-5047-77, IEEE C37.90-1989 and Ontario Hydro Standard A28M-82:

Paragraph	Test Method	Test Results
6.1	Radiated RF Susceptibility	Complied
6.2	Dielectric Withstand	Complied
6.3	Surge Immunity	Complied

See the individual test methods contained in paragraphs 6.1 through 6.3 of this test report for a full description of the procedures utilized and test results obtained.

6.1 Radiated RF Susceptibility, 450 MHz

Purpose
The purpose of this test method was to verify the ability of the Zero-Hertz Protective Relay to withstand radiated electromagnetic fields at a frequency of 450 MHz generated from a 5-watt hand held radio.

Test Parameters
The radiated susceptibility test method had characteristics as shown in the table below:

Test Frequency	Limit	Test Position	Polarization
450 MHz	5.0 Watts	Front	Vertical, Horizontal, Perpendicular
450 MHz	5.0 Watts	Back	Vertical, Horizontal, Perpendicular
450 MHz	5.0 Watts	Left	Vertical, Horizontal, Perpendicular
450 MHz	5.0 Watts	Right	Vertical, Horizontal, Perpendicular
450 MHz	5.0 Watts	Top	Vertical, Horizontal, Perpendicular
450 MHz	5.0 Watts	Bottom	Vertical, Horizontal, Perpendicular

Test Setup
The Zero-Hertz Protective Relay was configured in accordance with the General Test Setup drawing, Figure 3. The test instrumentation was configured in accordance with Figure 4 and as shown in the following photographs. The Zero-Hertz Protective Relay was configured in a shielded enclosure employing RF absorber material.

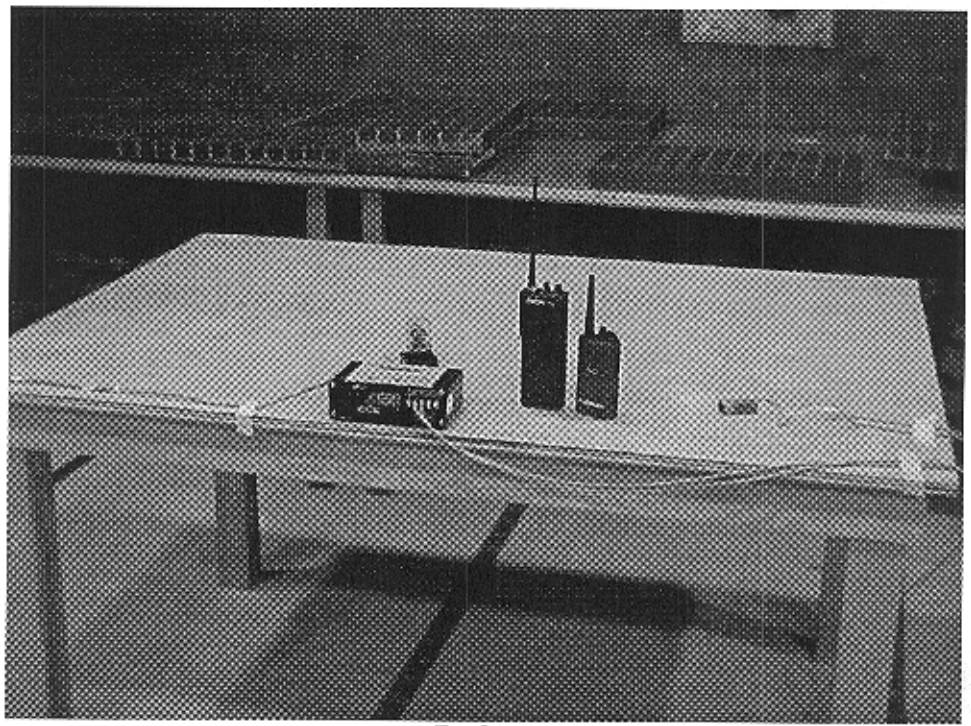
Test Procedure
With the test instrumentation and the Zero-Hertz Protective Relay configured as stated above, the following steps were performed:

1. The Zero-Hertz Protective Relay was placed inside of a shielded chamber.
2. With the Zero-Hertz Protective Relay operating as described in Paragraph 5.1 herein, the front surface of the test sample was probed with the 5-Watt Hand Held Radio.
3. The 5-Watt Hand Held Radio was maintained at a minimum distance of six inches from the surface of the Zero-Hertz Protective Relay, in both the horizontal and vertical polarities.
4. During this probing, the 5-Watt Hand Held Radio was continuously keyed up.
5. The Zero-Hertz Protective Relay was continuously monitored for susceptibility criteria as described in Paragraph 5.2 herein.
6. Steps 1 through 5 were repeated for each surface of the test sample and for the horizontal, vertical and perpendicular polarizations.

Test Results
The Zero-Hertz Protective Relay was found to comply with the specified requirements for the Radiated RF Susceptibility test method.

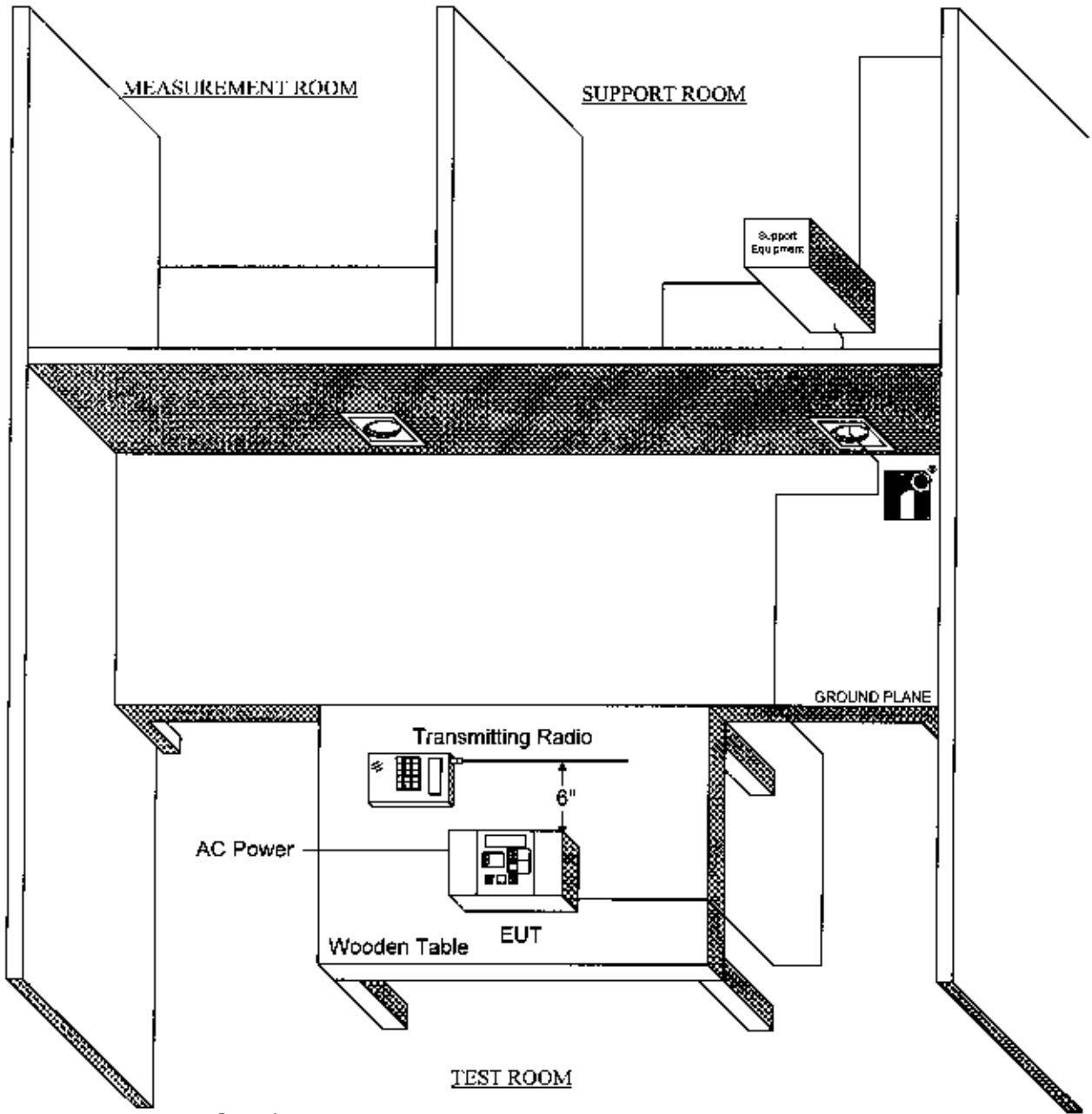
See the following single (1) data sheet for a complete presentation of the test result obtained.

Test Photograph
Radiated RF Susceptibility



Test Setup

Figure 4
Radiated RF Susceptibility, 450 MHz



1. Power Cable was 1 meter long
2. Hand Held Radio was maintained at a minimum distance of six inches from the EUT

EQUIPMENT LIST

RF Radiated Susceptibility

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due Date
224	Shielded Enc. (24x20x12)	Universal Shielding	100dB, 14kHz -	1	4/30/2002	4/30/2003
n/a	5 Watt Hand Held Radio	Ritcom	5W Radio	JBX-455	n/a	n/a

RETLIF TESTING LABORATORIES

SUSCEPTIBILITY TEST DATA SHEET

TEST METHOD:	**Radiated Susceptibility**		
CUSTOMER:	Utility Relay Company	JOB No.:	R-9699
TEST SAMPLE:	Zero Hertz Protective Relay		
MODEL No.:	Part No.: B-203-SP2	SERIAL No.:	N/A
TEST SPECIFICATION:	Ontario Hydro Standard C-5047-77 PARAGRAPH: 3.3		
OPERATING MODE:	Powered by 120 VAC, 60 Hz, monitoring DC shunt input with simulated adjustable 45mV shunt voltage. Test sample current limit and pick up was 750 A and the instantaneous trip setting was set to 8000 A.		
TECHNICIAN:	S.C	DATE:	November 18, 2002
NOTES:			

Test Frequency	Threshold	Limit	Test Position
MHz	Watts		
450.0	----------	5.0	Front (Vertical orientation)
"	"	"	Back (Vertical orientation)
"	"	"	Left (Vertical orientation)
"	"	"	Right (Vertical orientation)
"	"	"	Top (Vertical orientation)
"	"	"	Bottom (Vertical orientation)
"	"	"	
"	"	"	Front (Horizontal orientation)
"	"	"	Back (Horizontal orientation)
"	"	"	Left (Horizontal orientation)
"	"	"	Right (Horizontal orientation)
"	"	"	Top (Horizontal orientation)
"	"	"	Bottom (Horizontal orientation)
"	"	"	
"	"	"	Front (Perpendicular orientation)
"	"	"	Back (Perpendicular orientation)
"	"	"	Left (Perpendicular orientation)
"	"	"	Right (Perpendicular orientation)
"	"	"	Top (Perpendicular orientation)
450.0	----------	5.0	Bottom (Perpendicular orientation)

The test sample did not exhibit any malfunction, degradation of performance or deviation from specified indication beyond the tolerances given in the individual equipment specifications or approved test plan when tested in accordance with the above stated test method.

NOTE - All frequencies within the range of the test were scanned for malfunction or degradation of performance.

6.2 Dielectric Tests

Purpose
The purpose of this test was to determine the dielectric properties between the case of the Zero-Hertz Protective Relay and its power input leads.

Test Points

Test Points	Voltage Applied
Mains – Chassis	1500 VAC
DC Shunt – Input - Chassis	1500 VAC

Test Setup
The test instrumentation and the Zero-Hertz Protective Relay were configured as shown in the attached photograph.

Test Procedure
With the test instrumentation and the Zero-Hertz Protective Relay configured as stated above, the following steps were performed:

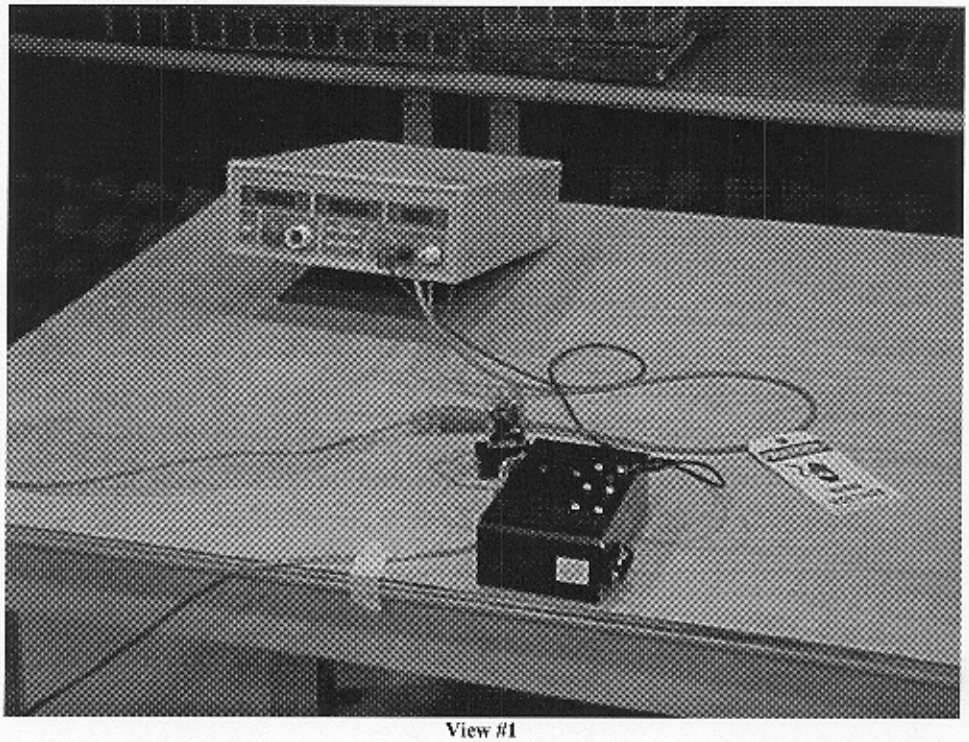
Dielectric Withstand

1. The dielectric meter was connected between the mains and chassis ground of the Zero-Hertz Protective Relay.
2. Voltage was gradually increased from 0 to 1500 VAC at a rate of 250 V/Sec.
3. Once the voltage was attained, conditions were maintained for 1 minute.
4. The Zero-Hertz Protective Relay was monitored for any degradation or dielectric breakdown.
5. The leakage current was measured and recorded in millamperes.
6. Steps 2 through 5 were repeated with the dielectric meter connected between the DC Shunt input and Chassis ground.

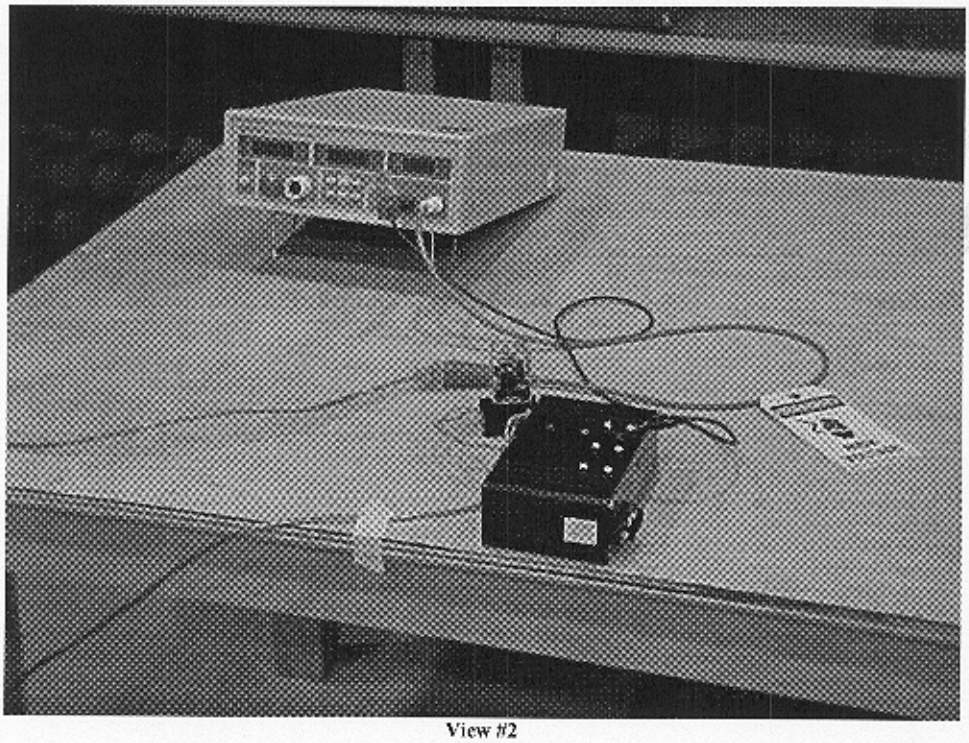
Test Results
The Zero-Hertz Protective Relay was found to comply with the specified requirements of IEEE C39.90-1989 Dielectric test method.

See the following single (1) data sheet for a complete presentation of the test results obtained.

Test Photographs
Dielectric Withstand



View #1



View #2

EQUIPMENT LIST

Dielectric Withstand Test

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due
224	Shielded Enc. (24x20x12)	Universal Shielding	100dB, 14kHz -	1	4/30/2002	4/30/2003
7012	AC/DC Hipot Tester	QuadTech	N/A	Sentry 20	5/10/2002	5/10/2003

RETLIF TESTING LABORATORIES, INC.

DIELECTRIC TEST DATA SHEET

CUSTOMER:	Utility Relay Company	**JOB NUMBER:**	R-9699
TEST SAMPLE:	Zero Hertz Protective Relay	**MODEL:**	n/a
TEST SPECIFICATION:	IEEE C37.90-1989	**SERIAL NUMBER**	n/a
		PART NUMBER	B-203-SP2
TECHNICIAN:	S. Carley	**DATE:**	November 18, 2002
PRE-CONDITIONING:	n/a	**FAULT APPLIED:**	n/a

	TEST POINT	VOLTAGE APPLIED	LEAKAGE CURRENT
1	EUT Chassis to Power Input Connector	1500 VAC	0.51 mA
2	EUT Chassis to DC Shunt Input	1500 VAC	0.06 mA
3			
4			
5			

LAB NOTES:

VOLTAGE INCREASE	TEST LOG
Dielectric Withstand	250 volts was injected between the EUT case and each of the leads listed
	above. The voltage was uniformly increased at a rate of 250 volts/sec
	to 1500 volts and maintained for a period of 1 minute. After both leads
	were tested, the test sample was verified to be working correctly.

RESULTS:

The test sample did not exhibit any malfunction, degradation of performance or deviation from specified indication beyond the tolerances given in the individual equipment specifications or approved test plan when tested in accordance with the above stated test method.

6.3 Surge Test

Purpose
The purpose of this test method was to determine if the Zero-Hertz Protective Relay was so constructed as to have an adequate level of intrinsic immunity to common and differential mode surges applied to input power leads, enabling the Zero-Hertz Protective Relay to operate as intended.

Test Parameters
The critical parameters of the applied surge waveform are shown below:

Waveform:	1 MHz Damped Sine
Voltage:	2.5 kV Differential Mode, 2.5 kV Common Mode
Pulse Repetition Rate:	120 Hz
Burst Width:	4 seconds
Pulses Applied:	3 spaced 1 minute apart
Source Impedance:	150 ohms

Leads Tested
The following leads on the Zero-Hertz Protective Relay were tested separately in order to demonstrate compliance to the above requirements:

- 120 VAC, 60 Hz - Hot to Ground
- 120 VAC, 60 Hz - Neutral to Ground
- 120 VAC, 60 Hz - Hot to Neutral
- DC Shunt Input - - Hot to Ground
- DC Shunt Input - Neutral to Ground
- DC Shunt Input - Hot to Neutral

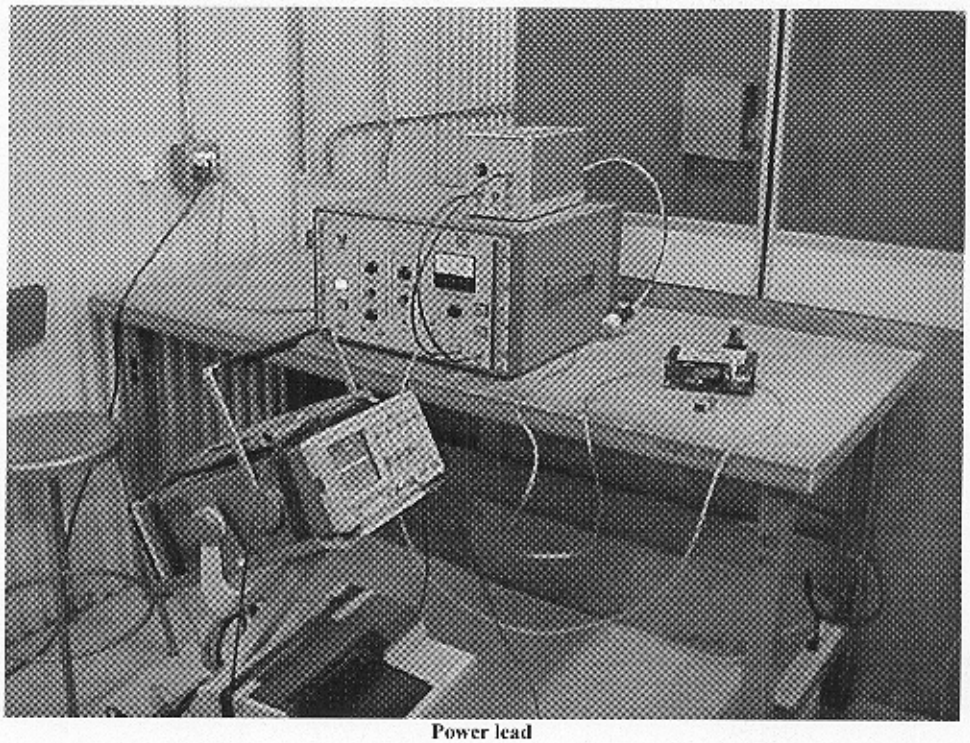
Test Setup
The test instrumentation and Zero-Hertz Protective Relay were configured as shown in the attached photographs and detailed in Paragraph 4.2 herein. This configuration was based upon the general test setup shown in Retlif Testing Laboratories Drawing Number R61000-4-5/P and the requirements of Ontario Hydro Standard A28M-82. The Zero-Hertz Protective Relay was placed on an 80 cm high wooden test stand above the test enclosure floor. The test stand was situated such that it was at least 50 cm from the enclosure wall. The power leads were routed through the internal coupling/decoupling network of the transient surge generator.

Test Procedure
After verification of the transient generator output parameters, the following steps were performed:

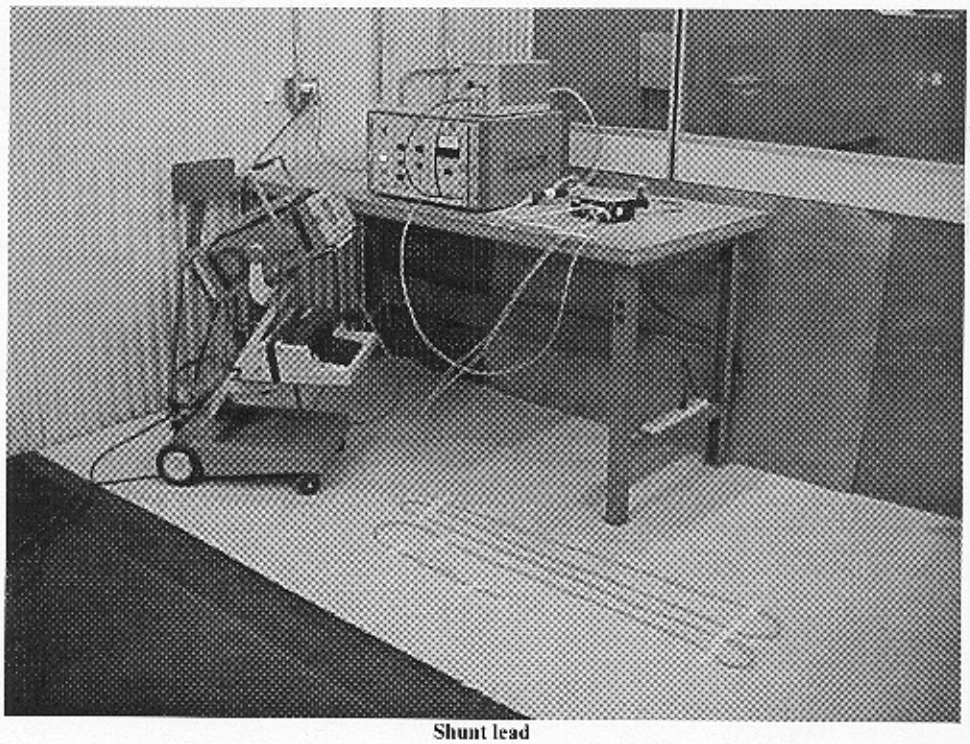
1. The Zero-Hertz Protective Relay was powered from AC line voltage, which was supplied through the surge generator.
2. The surge generator was configured to apply 2.5 kV transients.
3. Three positive 2.5 kV transients were applied to the AC leads in the coupling modes specified on the test data sheets at a repetition rate not exceeding 1 PPM.
4. The surge generator was configured to apply negative surges and step 3 was repeated.
5. Steps 1 through 4 were repeated for each AC Input of the Zero-Hertz Protective Relay and each DC Shunt Input.

Test Results
The Zero-Hertz Protective Relay complied with the requirements specified for this test method. The test sample did not exhibit any malfunction or degradation of performance beyond that allowed under Ontario Hydro Standard A28M-82 when subjected to the 2.5 kV surge specified above. See the following five (5) data sheets for a full presentation of the results obtained.

Test Setup Photograph
Surge

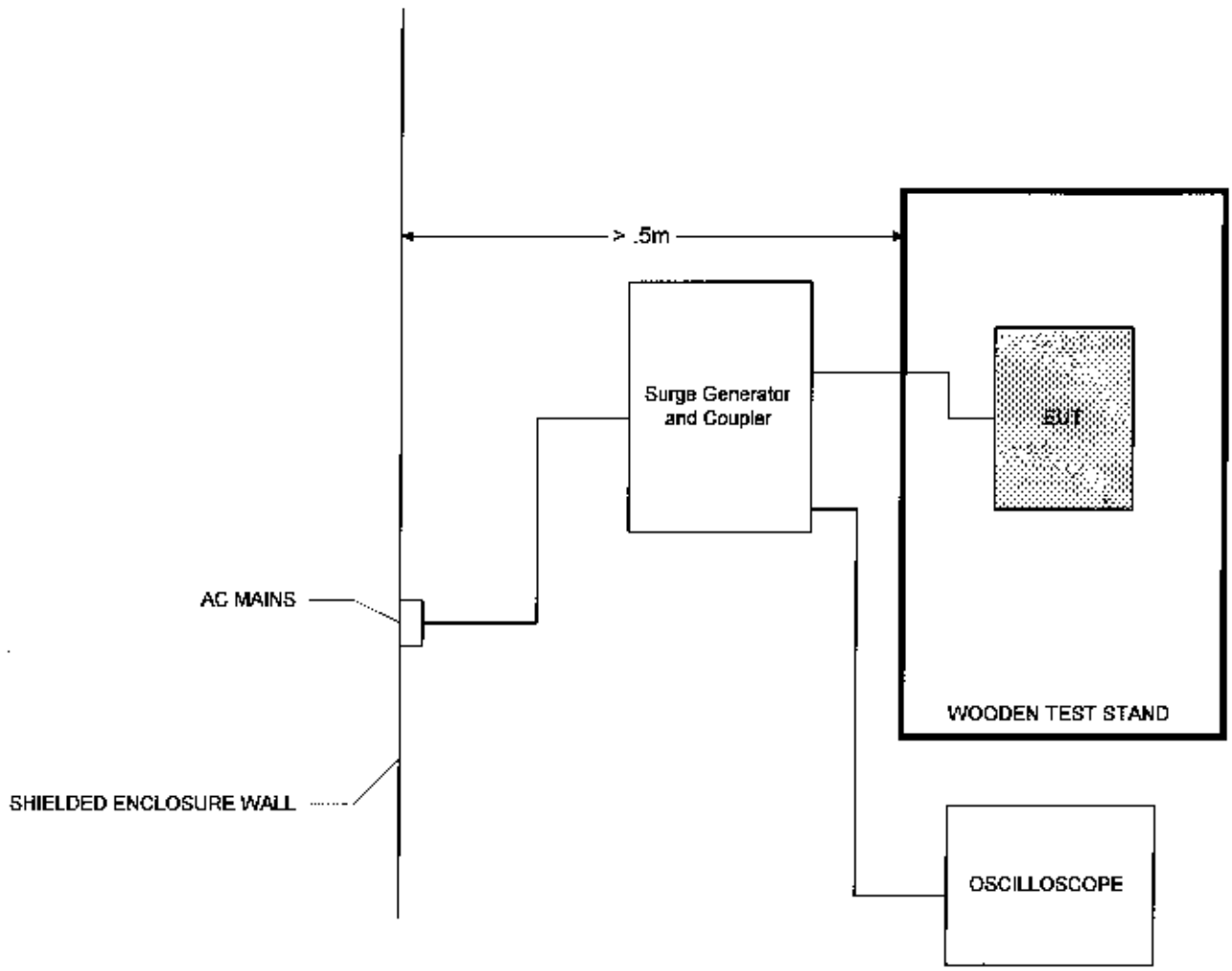


Power lead



Shunt lead

General Setup Drawing - R61000-4-5/P
Surge Test Setup



EQUIPMENT LIST

Surge Test

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due
027	Oscilloscope	Tektronix	DC - 500 MHz	2440	5/20/2002	5/20/2003
3806	Coupling/Decoupling Net	Velonex	N/A	V-2269	11/21/2001	11/21/2002
3807	Surge Transient Generator	Velonex	N/A	515	11/21/2001	11/21/2002
424	Graphics Plotter	Hewlett Packard	N/A	7470A	3/14/2002	3/14/2003

RETLIF TESTING LABORATORIES

SUSCEPTIBILITY TEST DATA SHEET

TEST METHOD:	Surge Withstand		
CUSTOMER:	Utility Relay Company	JOB No:	R-9699
TEST SAMPLE:	Zero Hertz Protective Relay		
MODEL No.:	Part No : B-203-SP2	SERIAL No:	N/A
TEST SPECIFICATION:	Ontario Hydro Standard A28M-82 PARAGRAPH: 5.0		
OPERATING MODE:	Powered by 120 VAC, 60 Hz, monitoring DC shunt input with simulated adjustable 45mV shunt voltage. Test sample current limit and pick up was 750 A, instantanious trip setting was set at 8000 A.		
TECHNICIAN:	S.Caruly	DATE:	November 18, 2002
LEAD TESTED:	120 VAC, 60Hz, as listed below		
NOTES:	A 1 MHz surge was applied at a repition rate of 120 Hz for a total duration of four seconds at a test level of 2.5 kV. This was repeated three times with in a three minute time frame. The unit was tested in it's common and differential mode.		

Repetition Rate	Threshold	Level	Lead Tested	Polarity	
ppm	Volts		Hot / Neutral / Ground	+ / -	Degrees
1.0	----------	2500	Hot to Neutral	+	
1.0	----------	2500	Hot to Neutral	-	
1.0	----------	2500	Hot to Ground	+	
1.0	----------	2500	Hot to Ground	-	
1.0	----------	2500	Neutral to Ground	+	
1.0	----------	2500	Neutral to Ground	-	
			The test sample did not exhibit any malfunction, degradation of performance or deviation from specified indication beyond the tolerances given in the individual equipment specifications or approved test plan when tested in accordance with the above stated test method.		

NOTE - All frequencies within the range of the test were scanned for malfunction or degradation of performance.

RETLIF TESTING LABORATORIES

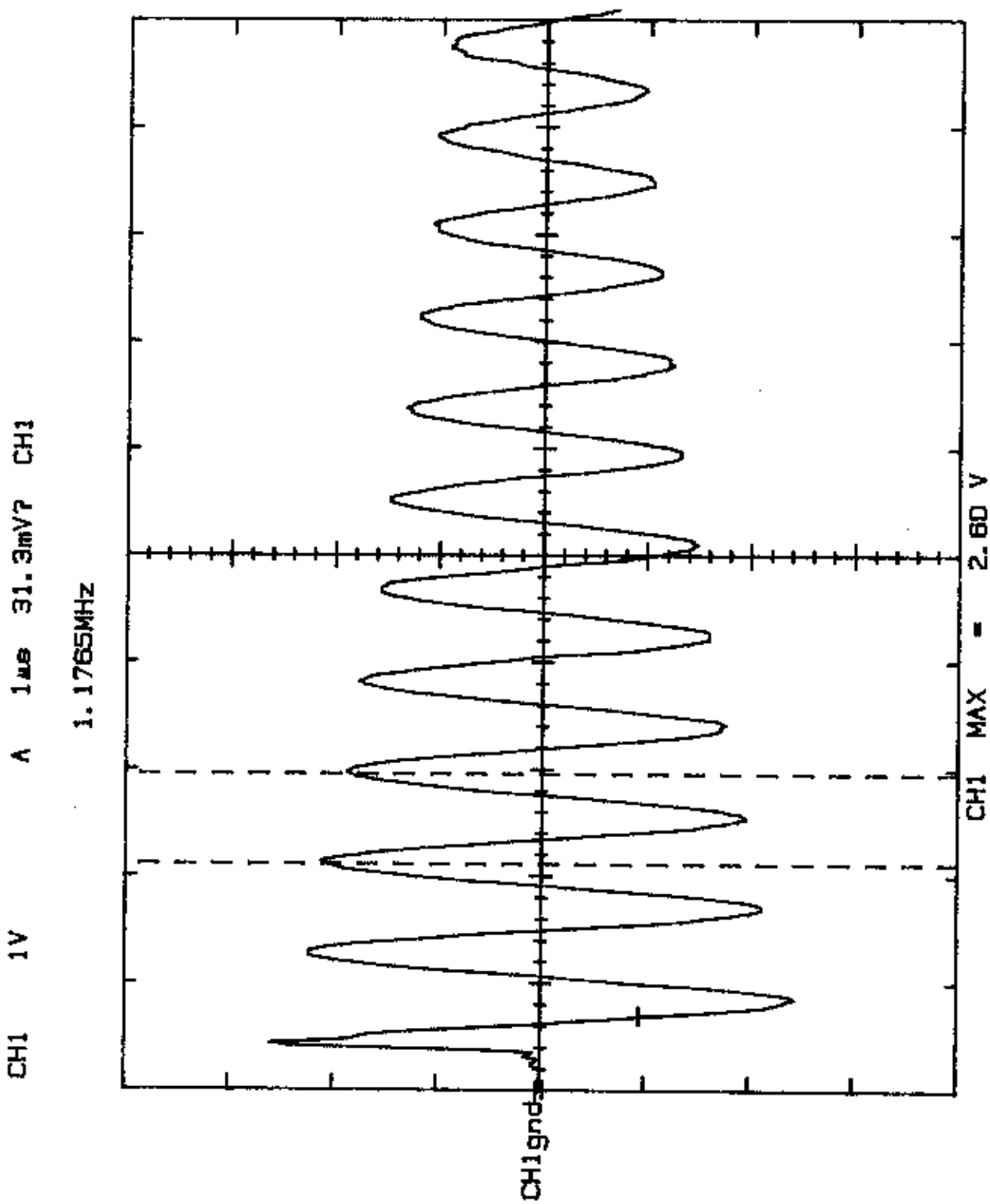
SUSCEPTIBILITY TEST DATA SHEET

TEST METHOD:	Surge Withstand
CUSTOMER:	Utility Relay Company — JOB No: R-9699
TEST SAMPLE:	Zero Hertz Protective Relay
MODEL No.:	Part No B-208-SP2 — SERIAL No: N/A
TEST SPECIFICATION:	Ontario Hydro Standard A28M-82 — PARAGRAPH: 5.0
OPERATING MODE:	Powered by 120 VAC, 60 Hz, monitoring DC shunt input with simulated adjustable 45mV shunt voltage. Test sample current limit and pick up was 750 A, instantanious trip setting was set at 8000 A.
TECHNICIAN:	S.Carely — DATE: November 18, 2002
LEAD TESTED:	DC Shunt input, as listed below
NOTES:	A 1 MHz surge was applied at a repition rate of 120 Hz for a total duration of four seconds at a test level of 2.5 kV. This was repeated three times with in a three minute time frame. The unit was tested in it's common and differential mode.

Repetition Rate	Threshold	Level	Lead Tested	Polarity	
ppm	Volts		Hot / Neutral / Ground	+ / -	Degrees
1.0	----------	2500	Hot to Neutral	+	
1.0	----------	2500	Hot to Neutral	-	
1.0	----------	2500	Hot to Ground	+	
1.0	----------	2400	Hot to Ground	-	
1.0	----------	2500	Neutral to Ground	+	
1.0	----------	2500	Neutral to Ground	-	

The test sample did not exhibit any malfunction, degradation of performance or deviation from specified indication beyond the tolerances given in the individual equipment specifications or approved test plan when tested in accordance with the above stated test method.

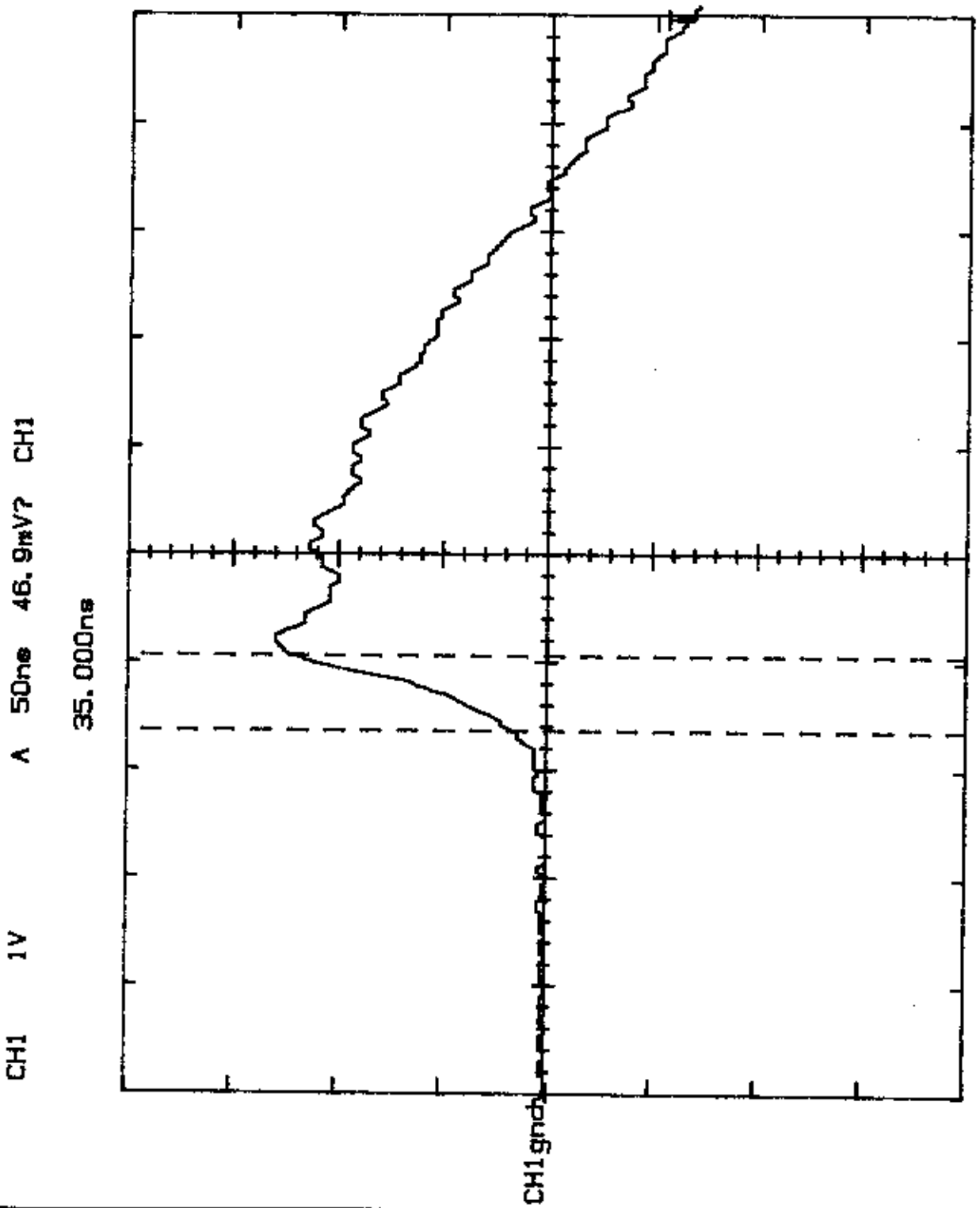
NOTE - All frequencies within the range of the test were scanned for malfunction or degradation of performance.



Customer:	Utility Relay Company
Test Sample:	Zero Hertz Protective Relay
Model No.:	Part No.: B-203-572
Test Method:	Surge Test
Notes:	Plot of a 1 MHz wave form with a peak voltage of 2620 Volts
	(1000 : 1 Probe Factor)
	1000 x 2.6 Volts = 2600 Volts
Date: November 18, 2002	Tested: SC / RPW
Sheet: 1	of: 3

Retlif Testing Laboratories

Report No. R-9699

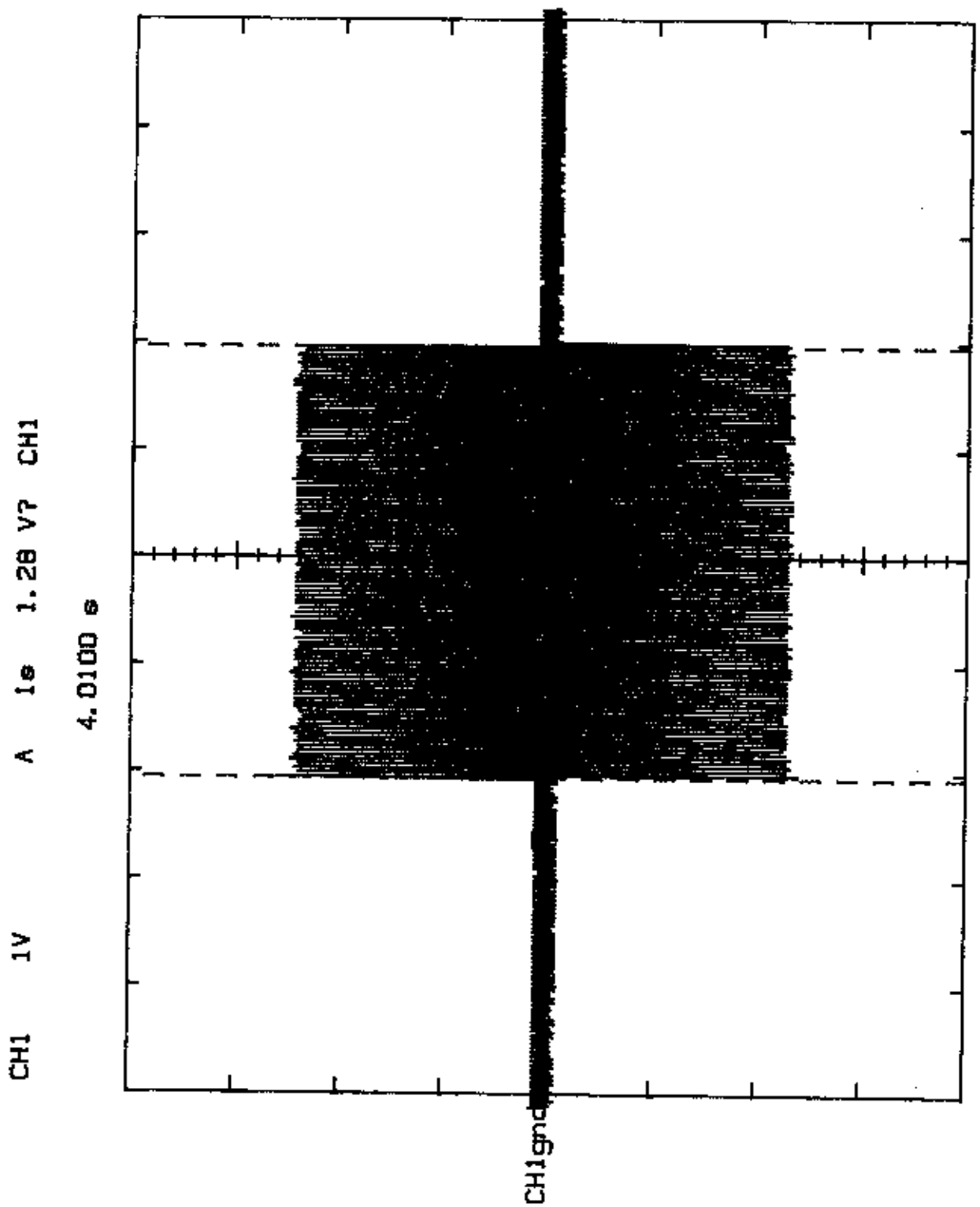


Utility Relay Company
Zero Hertz Protective Relay
Part No.: B-203-SP2
Surge Test
Plot of the 35 nanosecond rise time for a 1 Mhz waveform at 2500 Volts
(1000:1 Probe Factor)
1000 x 2.5Volts = 2500 Volts

Date: November 18, 2002 Tech: SC / RPW Page: 2 of 3

Retlif Testing Laboratories

Report No. R-9699



Customer:	Utility Relay Company
Test Sample:	Zero Hertz Protective Relay
Model No.:	Part No.: B 203-SPZ
Test Method:	Surge Test
Notes:	Plot of a 1 MHz surge with a rep rate of 120 Hz with a total duration of 4 seconds at a cal level of 2500 Volts (*050 : * Probe Factor) 1000 x 2.5 Volts = 2500 Volts
Date:	November 18, 2002
Tech:	SC / RPW
Sheet:	3 of 3

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Report No. R-9699