

**TESTING**

**ELECTRO-MAGNETIC FIELD**

**ONTARIO MINISTRY OF CITIZENSHIP**

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## TABLE OF CONTENTS

	<u>Page</u>
PROJECT PROFILE	
EXECUTIVE SUMMARY	
1.0 INTRODUCTION .....	3
2.0 SAMPLE TYPE AND LOCATIONS .....	3
3.0 METHODS AND MATERIALS .....	4
4.0 RESULTS & DISCUSSIONS .....	4
4.1 Electric Field .....	4
4.2 Magnetic Field .....	5

Appendix I: Table 1

**Environmental Testing & Consulting Services**  
**INDUSTRIAL HYGIENE DIVISION**

**PROJECT PROFILE**

Client Name: Ontario Ministry of Citizenship

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Telephone: (416) 314-7098

Contact: Serge Dillon

Survey Date: October 28, 2005

Tests Conducted: Electric and Magnetic field

## **EXECUTIVE SUMMARY**

On October 28, 2005 testing for electric and magnetic field was conducted at various PC monitors in the offices of the Ontario Ministry of Citizenship, Toronto, Ontario. One set of reading was conducted at various workstations. These are given in table 1, Appendix I.

Electric field reading ranged between 0.14-0.87 V/m, and 0.06- 0.53 V/m at 15 cm. and 30 cm. in front of the monitor respectively. The readings at rear and around the monitor ranged between 0.04-0.24 V/m. The background reading was 0.11-0.19 V/m. Currently, there are no Ontario Ministry of Labour or Canadian Standards for occupational exposure to electric field for 60 Hz, the frequency at which the monitors operate. There are guidelines limiting exposure to electromagnetic fields covering 60 Hz frequency. The Canadian occupational exposure guidelines for electromagnetic fields cover frequency of 10 kHz-1 MHz. American Conference for Governmental Industrial Hygienists (ACGIH) Standard for 60 Hz is 25,000 V/m. The readings are compared with the most stringent standard (Swedish Standard) available currently for 60 Hz frequency of 10 V/m. All the readings were all less than the more restrictive Swedish Standard of 10 V/m.

Magnetic field reading ranged between 0.68-10.11 mA/m, and 0.25-3.48 mA/m at 15 cm. and 30 cm. in front of the monitor respectively. The readings at rear and around the monitor ranged between 0.17-0.33 mA/m. The background reading was 0.25-0.66 mA/m. Currently, there are no Ontario Ministry of Labour or Canadian Standards for occupational exposure to magnetic field for 60 Hz, the frequency at which the monitors operate. There are guidelines limiting exposure to electromagnetic fields covering 60 Hz frequency. The Canadian occupational exposure guidelines for electromagnetic fields cover frequency of 10 kHz-1 MHz. American Conference for Governmental Industrial Hygienists (ACGIH) Standard for 60 Hz is 800,000 mA/m. The readings are compared with the most stringent standard (Swedish Standard) available currently for 60 Hz frequency of 160 mA/m. All the readings were all less than the more restrictive Swedish Standard of 160 mA/m. In conclusion, all the readings for the electric field, and magnetic field were less than their respective occupational exposure guidelines of Sweden.

**ONTARIO MINISTRY OF CITIZENSHIP  
ELECTRO-MAGNETIC RADIATION TESTING**

**1.0 INTRODUCTION**

Video display terminals (VDT) emit extremely low frequency electric and magnetic fields. Health concerns about VDT operation are: skin and vision problems, skin rashes, reproductive disorders, muscle strain and discomfort, and stress etc. During the mid-1970s there were reports of higher-than-expected rates of birth defects or miscarriages among clusters of pregnant VDT operators. No firm scientific evidence was found linking work with VDTs to these clusters of adverse pregnancy outcome among VDT operators. Epidemiological studies have given conflicting results regarding the possible link between VDT use and adverse pregnancy outcome. Currently, there are no official standards limiting exposure to electric or magnetic fields specifically from VDTs. But there are guidelines limiting occupational exposure to electromagnetic (EMF) fields. Exposure limits depend upon the frequency of the electric and magnetic fields. Office computer monitors usually operate at 60 Hz.

This report pertains to the testing of electric and magnetic fields at certain computer office workstations of the Ontario Ministry of Citizenship, Toronto, Ontario conducted on October 28, 2005. This was performed in response to an enquiry concerning the above by Serge Dillon, and the Joint Health and Safety Committee of the Ministry.

**2.0 SAMPLE TYPE AND LOCATIONS**

After a walk-through survey, it was decided to take a set of reading for electric and magnetic fields in front of computer monitor at distance of 15 cm. and 30 cm. at the operator level, and rear at distance of 15 cm. of the computer monitor at and around the operator level. The background readings for both the electric and magnetic field were also conducted. The results are given in table 1, Appendix I.

**3.0 METHODS AND MATERIALS**

Testing of electric and magnetic fields were conducted by means of Haladay HI 3603, S. No. 76797 VDT/VLF Radiation monitor, with Electric and Magnetic Probes.

## **4.0 RESULTS AND DISCUSSION**

### **4.1 Electric Field**

The results of the testing indicate that the electric field measured at 15 cm. in front of the monitor ranged between 0.14-0.87 V/m for the locations tested (refer table 1, Appendix I). The readings ranged between 0.06-0.53 V/m at 30 cm in front of the monitor for the locations tested. The readings were between 0.04-0.24 V/m at the rear and around the monitors. The background reading was 0.11-0.19 V/m. Currently, there are no Ontario Ministry of Labour or Canadian Standards for occupational exposure to electric field for 60 Hz frequency at which the monitors operate. There are guidelines limiting exposure to electromagnetic fields covering 60 Hz frequency. The Canadian occupational exposure guidelines for electromagnetic fields cover frequency of 10 kHz-1 MHz. American Conference for Governmental Industrial Hygienists (ACGIH) Standard for 60 Hz is 25,000 V/m. The more restrictive Swedish Standard (TCC) for ELF of 5 Hz-2 KHz is  $\leq 10$  V/m. The other Swedish Standard (MPR II) is  $\leq 25$  V/m. All the readings were less than both the ACGIH and Swedish Standards.

### **4.2 Magnetic Field**

The results of the testing indicate that the magnetic field measured at 15 cm. in front of the monitor ranged between 0.68-10.11 mA/m for the locations tested (refer table 1, Appendix I). The readings ranged between 0.25-3.48 mA/m at 30 cm in front of the monitor for the locations tested. The readings were between 0.10-1.40 mA/m at the rear and around the monitors. The background reading was 0.25-0.66 mA/m. Currently, there are no Ontario Ministry of Labour or Canadian Standards for occupational exposure to magnetic field for 60 Hz frequency at which the monitors operate. There are guidelines limiting exposure to electromagnetic fields covering 60 Hz frequency. The Canadian occupational exposure

guidelines for electromagnetic fields cover frequency of 10 kHz-1 MHz. American Conference for Governmental Industrial Hygienists (ACGIH) Standard for 60 Hz is 800,000 mA/m. The more restrictive Swedish Standard (TCC) for ELF of 5 Hz-2 KHz is  $\leq 2.5 \text{ mG} = 160 \text{ mA/m}$ . The other Swedish Standard (MPR II) is  $\leq 2.5 \text{ mG} = 200 \text{ mA/m}$ . All the readings were less than both the ACGIH and Swedish Standards.

In conclusion, all the readings for the electric field, and magnetic fields were less than their respective occupational exposure guidelines of Sweden.

**APPENDIX - I**

**Table 1  
Electric and Magnetic Field Testing**

**RESULTS OF TESTING: TABLE 1 - Electric Field and Magnetic Field**

<b>S. No.</b>	<b>Time</b> <b>(cm.)</b>	<b>Location</b>	<b>Electric Field</b> <b>(V/m)</b>	<b>Magnetic Field</b> <b>(mA/m)</b>	<b>Distance</b> <b>of monitor</b>
<b><u>Floor 6</u></b>					
1.	09:40	Micky Trimarco	0.20 0.16 0.15	7.00 2.00 1.40	15 (front) 30 (front) Rear
2.	09:45	Erica Findlay	0.87 0.53 0.17	8.75 2.05 0.75	15 (front) 30 (front) Rear
3.	09:50	Janice Bodnarchuk	0.65 0.44 0.24	8.58 2.04 0.68	15 (front) 30 (front) R e a r
4.	09:55	Susana Castiello	0.21 0.16 0.15	6.04 2.14 0.36	15 (front) 30 (front) Rear
5.	10:00	Nicole Mills	0.21 0.25 0.14	8.38 2.96 0.40	15 (front) 30 (front) Rear
<b><u>Floor 5</u></b>					
6.	10:05	Aline Neeves	0.64 0.25 0.15	10.11 3.40 0.43	15 (front) 30 (front) Rear
7.	10:10	Derwin Mak	0.46 0.25 0.05	0.68 0.45 0.14	15 (front) 30 (front) Rear
8.	10:15	Lila Singh	0.50 0.21 0.07	8.10 2.23 0.43	15 (front) 30 (front) Rear

**RESULTS OF TESTING: TABLE 1 - Electric Field and Magnetic Field**

<b>S. No.</b>	<b>Time</b>	<b>Location</b>	<b>Electric Field</b> <b>(V/m)</b>	<b>Magnetic Field</b> <b>(mA/m)</b>	<b>Distance</b> <b>of monitor</b>
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	<b>(cm.)</b>				
9.	10:20	Pat Naylor	0.16 0.06 0.04	8.13 3.39 0.23	15 (front) 30 (front) Rear
10.	10:25	Pat Adam	0.55 0.21 0.06	9.12 3.48 0.22	15 (front) 30 (front) Rear
<b><u>Floor 4</u></b>					
11.	10:30	Jane Holland	0.28 0.16 0.11	7.76 2.30 0.28	15 (front) 30 (front) Rear
12.	10:35	Leela Gurpersaud	0.36 0.16 0.10	8.62 2.80 0.37	15 (front) 30 (front) Rear
13.	10:40	Rod Sawyer	0.68 0.46 0.23	5.12 1.92 0.43	15 (front) 30 (front) Rear
14.	10:45	Christine Chmielewski	0.28 0.16 0.11	5.42 1.65 0.28	15 (front) 30 (front) Rear
15.	10:50	Maria Tsimonidis	0.52 0.33 0.12	5.80 2.15 0.38	15 (front) 30 (front) Rear
16.	10:55	Malcolm Holme	0.52 0.33 0.20	6.25 2.15 0.43	15 (front) 30 (front) Rear

**RESULTS OF TESTING: TABLE 1 - Electric Field and Magnetic Field**

<b>S. No.</b>	<b>Time</b> <b>(cm.)</b>	<b>Location</b>	<b>Electric Field</b> <b>(V/m)</b>	<b>Magnetic Field</b> <b>(mA/m)</b>	<b>Distance</b> <b>of monitor</b>
17.	11:00	Angelina	0.43	7.3	15 (front)

		French	0.34 0.15	1.7 0.27	30 (front) Rear
18.	11:05	Carol Spellacy	0.30 0.20 0.07	6.12 1.9 0.51	15 (front) 30 (front) Rear
		<b><u>Floor 3</u></b>			
19.	11:10	Genina Olechna	0.23 0.14 0.06	7.86 2.75 0.24	15 (front) 30 (front) Rear
20.	11:15	Tonya Cornellina	0.21 0.16 0.05	7.08 2.48 0.33	15 (front) 30 (front) Rear
21.	11:20	Radin Bowman	0.47 0.21 0.07	5.9 2.25 0.23	15 (front) 30 (front) Rear
22.	11:25	Maggie Mallouh	0.46 0.16 0.07	1.15 0.68 0.23	15 (front) 30 (front) Rear
23.	11:30	Jill Sawchuk	0.51 0.21 0.06	6.09 1.72 0.24	15 (front) 30 (front) Rear

**RESULTS OF TESTING: TABLE 1 - Electric Field and Magnetic Field**

<b>S. No.</b>	<b>Time (cm.)</b>	<b>Location</b>	<b>Electric Field (V/m)</b>	<b>Magnetic Field (mA/m)</b>	<b>Distance of monitor</b>
24.	11:35	Peter	0.45 0.16 0.05	6.11 1.92 0.25	15 (front) 30 (front) Rear
25.	11:40	Fausta Siu	0.31 0.16 0.05	5.32 2.60 0.25	15 (front) 30 (front) Rear
26.	11:45	Sheilla Bello	0.44 0.17 0.07	7.25 2.68 0.25	15 (front) 30 (front) R e a r
27.	11:50	Susi Viccari	0.31 0.19 0.08	8.52 3.08 0.28	15 (front) 30 (front) Rear
28.	11:55	Sergio Vazquez	0.28 0.14 0.05	5.75 2.14 0.28	15 (front) 30 (front) Rear
<b><u>Floor 2</u></b>					
29.	12:00	Bridget Goldsmith	0.31 0.20 0.14	5.10 1.80 0.29	15 (front) 30 (front) Rear
30.	12:05	Arlene Davis	0.22 0.17 0.07	8.25 2.74 0.28	15 (front) 30 (front) Rear
31.	12:10	Marco Alexander	0.15 0.12 0.07	0.78 0.65 0.23	15 (front) 30 (front) Rear

**RESULTS OF TESTING: TABLE 1 - Electric Field and Magnetic Field**

<b>S. No.</b>	<b>Time</b>	<b>Location</b>	<b>Electric Field (V/m)</b>	<b>Magnetic Field (mA/m)</b>	<b>Distance of monitor</b>
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(cm.)

32.	12:15	Susan Stewart	0.36 0.18 0.09	2.75 1.28 0.27	15 (front) 30 (front) Rear
33.	12:20	Joyce Bernado	0.24 0.15 0.07	6.12 2.18 0.25	15 (front) 30 (front) Rear
34.	12:25	Mona El Khoury	0.25 0.14 0.06	5.50 2.15 0.24	15 (front) 30 (front) Rear
35.	12:35	Kevin Burke	0.13 0.12 0.06	3.1 1.15 0.25	15 (front) 30 (front) Rear
36.	12:40	Kystyna GII	0.37 0.16 0.06	5.41 1.62 0.25	15 (front) 30 (front) Rear
37.	12:45	Florine Pinto	0.45 0.27 0.08	6.81 2.91 0.29	15 (front) 30 (front) Rear
38.	12:50	Isabelle	0.28 0.18 0.07	5.15 2.15 0.28	15 (front) 30 (front) R e a r
39.	13:00	Serge Dillon (Floor 5)	0.14 0.12 0.05	0.70 0.25 0.10	15 (front) 30 (front) Rear

