

Test Certificate

Date 06/09/2013

Client The Recycling Village Ltd
Unit 21
Duleek Business Park
Duleek
Co Meath
IRELAND

Order No. -
Certificate No. WK13-5275
Issue No. 1

Contact Nikita Coulter
Description 7 filters for CrVi

Date Received 27/08/2013
Technique Wet Chemistry

Sample No.	CrVi 001	Method
Chromium (VI)	<2 µg	M127(N)
Sample No.	CrVi 002	Method
Chromium (VI)	<2 µg	M127(N)
Sample No.	CrVi 003	Method
Chromium (VI)	<2 µg	M127(N)
Sample No.	CrVi 004	Method
Chromium (VI)	<2 µg	M127(N)
Sample No.	CrVi 005	Method
Chromium (VI)	<2 µg	M127(N)
Sample No.	CrVi 006	Method
Chromium (VI)	<2 µg	M127(N)
Sample No.	CrVi 007	Method
Chromium (VI)	<2 µg	M127(N)

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Test Certificate

Date 06/09/2013

Client The Recycling Village Ltd

Certificate No. WK13-5275

Issue No. 1

Tested By Ashley Lunt Date 05/09/2013

Approved By  Date 06/09/2013

Joanne Dewhurst
Laboratory Manager

For and on authority of RPS Laboratories Ltd.

Method Symbols (U) Analysis is UKAS Accredited
(N) Analysis is not UKAS Accredited

Concentration values (mg/m³ and ppm) are provided to assist with interpretation only, they are not covered by the scope of UKAS accreditation.

Results stated as ml are referring to the sample volume.

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Analysis carried out on samples 'as received'

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Test Certificate

Date 22/11/2013

Client The Recycling Village Ltd
Unit 21
Duleek Business Park
Duleek
Co Meath
IRELAND

Order No. -
Certificate No. WK13-6974
Issue No. 1

Contact Nikita Coulter

Date Received 05/11/2013

Description 10 filters for reweigh

Technique Gravimetric

Table with 4 columns: Sample No., Test ID, Result, Method. Contains 10 rows of reweigh data for samples 766761 through 766768.

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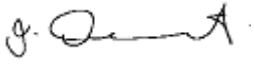


Test Certificate

Date 22/11/2013

Client	The Recycling Village Ltd		Certificate No.	WK13-6974
			Issue No.	1
Sample No.	766769	102341	Method	
Reweight	0.46 mg		D1(U)	
Sample No.	766770	102344	Method	
Reweight	0.31 mg		D1(U)	

Tested By Kirstie Davenport Date 15/11/2013

Approved By  Date 15/11/2013
Joanne Dewhurst
Laboratory Manager

For and on authority of RPS Laboratories Ltd.

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(N) Analysis is not UKAS Accredited

Concentration values (mg/m³ and ppm) are calculated on the basis of information provided by the customer.
Results stated as ml are referring to the sample volume.

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Analysis carried out on samples 'as received'

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Test Certificate

Date 09/09/2013

Client The Recycling Village Ltd
Unit 21
Duleek Business Park
Duleek
Co Meath
IRELAND

Order No. -
Certificate No. WK13-5273
Issue No. 1

Contact Nikita Coulter

Date Received 27/08/2013

Description 7 filters for TID & metals

Technique Gravimetric/ICP

Sample No.	757132	099954	Method
Total inhalable dust	0.90 mg		D1(U)
Barium	<1 µg		M24(U)
Cadmium	<0.3 µg		M24(U)
Copper	<0.3 µg		M24(U)
Iron	55 µg		M24(U)
Lead	7 µg		M24(U)
Nickel	<0.3 µg		M24(U)
Phosphorus	<1 µg		M24(U)
Zinc	8 µg		M24(U)

Sample No.	757133	099955	Method
Total inhalable dust	0.70 mg		D1(U)
Barium	<1 µg		M24(U)
Cadmium	<0.3 µg		M24(U)
Copper	<0.3 µg		M24(U)
Iron	21 µg		M24(U)
Lead	1 µg		M24(U)
Nickel	<0.3 µg		M24(U)
Phosphorus	1 µg		M24(U)
Zinc	10 µg		M24(U)

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Test Certificate

Date 09/09/2013

Client	The Recycling Village Ltd	Certificate No.	WK13-5273
		Issue No.	1

Sample No.	757134	099956	Method
Total inhalable dust	95.6 mg		D1(U)
Barium	3 µg		M24(U)
Cadmium	2 µg		M24(U)
Copper	<0.3 µg		M24(U)
Iron	20 µg		M24(U)
Lead	48 µg		M24(U)
Nickel	<0.3 µg		M24(U)
Phosphorus	<1 µg		M24(U)
Zinc	218 µg		M24(U)

Sample No.	757135	099957	Method
Total inhalable dust	6.27 mg		D1(U)
Barium	2 µg		M24(U)
Cadmium	<0.3 µg		M24(U)
Copper	<0.3 µg		M24(U)
Iron	16 µg		M24(U)
Lead	71 µg		M24(U)
Nickel	<0.3 µg		M24(U)
Phosphorus	<1 µg		M24(U)
Zinc	14 µg		M24(U)

Sample No.	757136	099958	Method
Total inhalable dust	0.56 mg		D1(U)
Barium	<1 µg		M24(U)
Cadmium	<0.3 µg		M24(U)
Copper	<0.3 µg		M24(U)
Iron	21 µg		M24(U)
Lead	3 µg		M24(U)
Nickel	<0.3 µg		M24(U)
Phosphorus	<1 µg		M24(U)
Zinc	13 µg		M24(U)

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Test Certificate

Date 09/09/2013

Client	The Recycling Village Ltd	Certificate No.	WK13-5273
		Issue No.	1

Sample No.	757137	099959	Method
Total inhalable dust	0.62 mg		D1(U)
Barium	<1 µg		M24(U)
Cadmium	<0.3 µg		M24(U)
Copper	<0.3 µg		M24(U)
Iron	22 µg		M24(U)
Lead	3 µg		M24(U)
Nickel	<0.3 µg		M24(U)
Phosphorus	<1 µg		M24(U)
Zinc	11 µg		M24(U)

Sample No.	757138	099960	Method
Total inhalable dust	0.78 mg		D1(U)
Barium	<1 µg		M24(U)
Cadmium	<0.3 µg		M24(U)
Copper	<0.3 µg		M24(U)
Iron	12 µg		M24(U)
Lead	2 µg		M24(U)
Nickel	<0.3 µg		M24(U)
Phosphorus	<1 µg		M24(U)
Zinc	10 µg		M24(U)

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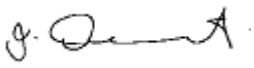


Test Certificate

Date 09/09/2013

Client The Recycling Village Ltd **Certificate No.** WK13-5273
Issue No. 1

Tested By Ashley Lunt **Date** 09/09/2013

Approved By  **Date** 09/09/2013
Joanne Dewhurst
Laboratory Manager

For and on authority of RPS Laboratories Ltd.

Method Symbols (U) Analysis is UKAS Accredited
(N) Analysis is not UKAS Accredited

Concentration values (mg/m³ and ppm) are provided to assist with interpretation only, they are not covered by the scope of UKAS accreditation.

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Analysis carried out on samples 'as received'

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THE RECYCLING VILLAGE LTD

MERCURY VAPOUR MONITORING REPORT

15 July 2013

Nikita Coulter BSc MSc EnvDip

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Background:

The Recycling Village Ltd is a specialist recycling facility which provides service to the Irish Waste Electronic and Electrical Equipment (WEEE) recycling compliance schemes for the recovery of discarded Cathode Ray Tubes (CRT) and Flat Panel Display (FPD) televisions and monitors. In addition, a comprehensive recycling service is offered for other types of electrical and electronic waste, such as PC's and Universal Power Supplies (UPS). All types of batteries, from small household to large automotive, are collected, sorted and consolidated prior to export for recycling. All material is accepted and dismantled in an environmentally sound manner. Processes have been optimised by paying attention to detail, with more than 80% recovery of the material being achieved from the dismantling and recovery process.

The company currently operates under a waste facility permit granted by Meath County Council – WFP/MH/11/0005/01. The Recycling Village Ltd have applied to the EPA to be issued with a Waste Licence and the process is currently underway.

During 2012, The Recycling Village Ltd developed and implemented an Environmental Management System (EMS) at the facility in accordance with ISO 14001. In May 2013 The Recycling Village Ltd were awarded the ISO 14001 accreditation based on the comprehensive nature of the implemented EMS.

Due to the nature of the recovery processes being carried out on site, there is the potential for employees and the greater environment to be exposed to heavy metal vapours arising from the discarded materials. One particular metal arising from the dismantling of FPD's is Mercury (Hg).

The Health and Safety Authority (HSA) of Ireland have set the Occupational Exposure Limit Value (OELV) for Mercury exposure at 20µg/m³ (equating to 0.02mg/m³) (Health and Safety Authority, 2011). The HSA define the OELVs as (Health and Safety Authority, 2004):

“The maximum concentration of an airborne substance averaged over a reference period, to which employees may be exposed under any circumstances.”

They state that:

“OELVs must not be exceeded and for substances that have been assigned an OELV, employers must reduce exposure so far as is reasonably practicable below the OELV.”

The pending WEEELABEX Standard, to which The Recycling Village Ltd will comply once in force, requires that the processing of FPD's be carried out in a controlled atmosphere fitted with suitable ventilation equipment and filters to ensure that OELV and air emission limit values on heavy metals can be complied with at all time (WEEE Forum, 2011).

Introduction:

Owing to concern over the potential impact of Mercury vapour exposure to employee's health, and potential impacts of atmospheric emissions, and in order to comply with Health and Safety standards and the requirements of WEEELABEX, a preliminary Mercury Vapour Monitoring Survey was carried out at The Recycling Village Ltd, Unit 21, Duleek Business Park, Duleek Co. Meath over a 2 day period, 1st – 2nd July 2013.

Methodology:

The survey was conducted by the Environmental Compliance Officer and the Facility Manager, using a calibrated JEROME® 431-X Mercury Vapour Analyzer, serial number: 4936, (Appendix 1, Figure 6) on loan from Irish Lamp Recycling Co Ltd, Co. Athy. The JEROME® Mercury Vapour Sensor System was calibrated on 21-June-2012 (Appendix 1, Figure 7 and attached Calibration Certificate). The Facility Manager was trained to use the sensor by the appropriate personnel from Irish Lamp Recycling Co Ltd. The Facility Manager trained the Environmental Compliance Officer to use the sensor.

Four point surveys were conducted over the course of the two days. Samples were taken at 45 locations around the site (See attached Site Plan – Emissions Monitoring, 12039-LA-05 and Ground Floor Plan, 12039-LA-04), including within the workstations, in the factory, in the materials storage areas, in the yard and in the offices (Table 1 - Results).

All results were recorded on EMS Record 4.5.1 EF 20, Mercury Vapour Monitoring Record 01-07-2013, which is stored in soft copy on The Recycling Village Ltd network server in the EMS – Working Documents folder, and in hard copy in the Working Documents Folder which is stored in the Environmental Compliance Officer's office.

Results:

		10:30 Day 1	10:30 Day 2	13:30 Day 1	15:00 Day 1	
LOCATION	CODE	mg/m ³	mg/m ³	mg/m ³	mg/m ³	Average mg/m ³
FPD Storage 1	FS1	0.009	0.003	0.003	0.004	0.00475
FPD Storage 2	FS2	0	0.003	0.003	0.004	0.0025
FPD Storage 3	FS3	0	0.004	0.003	0.004	0.00275
FPD Storage 4	FS4	0	0	0.004	0	0.001
Back light extraction area 1 (RHS)	BL1	0.008	0.004	0.005	0.004	0.00525
Back light extraction area 2 (LHS)	BL2	0.005	0.004	0.005	0.024	0.0095
Back light extraction area 3 (Floor)	BL3	0.007	0.013	0.006	0.008	0.0085
Back light extraction area 4 (Air)	BL4	0.003	0.003	0.003	0.006	0.00375
Chute to backlight container (closed)	BC1	0.006	0.009	0.004	0.008	0.00675
Chute to backlight container (open)	BC1*	0.008	0.008	0.006	0.007	0.00725
Chute to backlight container (closed)	BC1	0.008	0.01	0.005	0.008	0.00775
FPD line 1 (LHS)	F1	0.011	0.008	0.012	0.014	0.01125
FPD line 2 (Middle)	F2	0.009	0.009	0.007	0.006	0.00775
FPD line 3 (RHS)	F3	0.008	0.004	0.004	0.006	0.0055
FPD line 4 (Air)	F4	0	0.006	0	0.01	0.004
FPD Conveyor Belt	F5	0	0	0	0	0
Area around backlight containers	BC4	0	0	0	0.005	0.00125
Area around backlight containers	BC4	0	0.003	0	0.005	0.002
Area around backlight containers	BC4	0	0	0	0.004	0.001
Air emissions monitoring point	A1	0	0	0	0.004	0.001
Air emissions monitoring point	A1	0	0	0.003	0.003	0.0015
CRT line Conveyor	C1	0.004	0	0	0	0.001
CRT line LHS	C2	0.008	0.003	0	0.004	0.00375
CRT line RHS	C3	0.01	0	0	0.004	0.0035
CRT line Glass breaking area	C4	0.009	0	0	0.004	0.00325
Factory monitoring point (PC Dismantling)	FM1	0.004	0	0	0.004	0.002
Factory monitoring point (Rack E)	FM2	0.003	0	0.004	0.003	0.0025
Factory monitoring point (Car Park Exit)	FM3	0.003	0	0.004	0	0.00175
Factory monitoring point 4 (Metal Baler)	FM4	0	0	0.005	0.004	0.00225
Yard monitoring point 1	YM1	0	0	0.004	0	0.001
Yard monitoring point 2	YM2	0	0	0.006	0	0.0015
Yard monitoring point 3	YM3	0.003	0	0.003	0	0.0015
Yard monitoring point 4	YM4	0.005	0	0	0	0.00125
Office monitoring point 1 (Canteen)	OM1	0	0	0	0	0
Office monitoring point 2 (Admin)	OM2	0	0	0.004	0	0.001
Office monitoring point 3 (Boardroom)	OM3	0	0	0	0	0
Office monitoring point 4 (Storage 3)	OM4	0	0	0	0	0
Staff Welfare Facilities (Locker Room)	SW1	0	0	0	0	0
Staff Welfare Facilities (Canteen)	SW2	0	0	0	0	0
Secure Store 1	SS1	0	0	0.004	0	0.001
Secure Store 2	SS2	0	0	0.003	0	0.00075
Secure Store 5	SS5	0.005	0.006	0.005	0	0.004
Secure Store 6	SS6	0	0	0	0	0
Glass Cleaning Area 1	GC1	0	0	0.006	0	0.0015
Glass Cleaning Area 2	GC2	0	0	0.004	0	0.001

Table 1, Mercury survey sampling points, individual results and averages

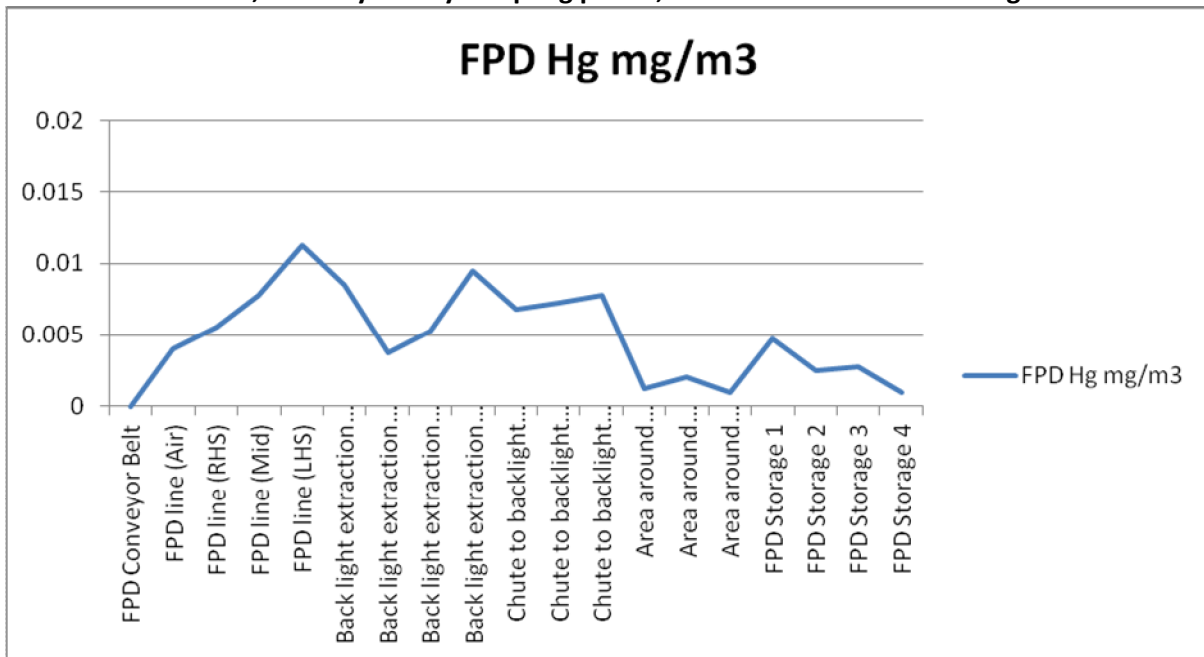


Figure 1, FPD Line Mercury survey average results (Hg mg/m³)

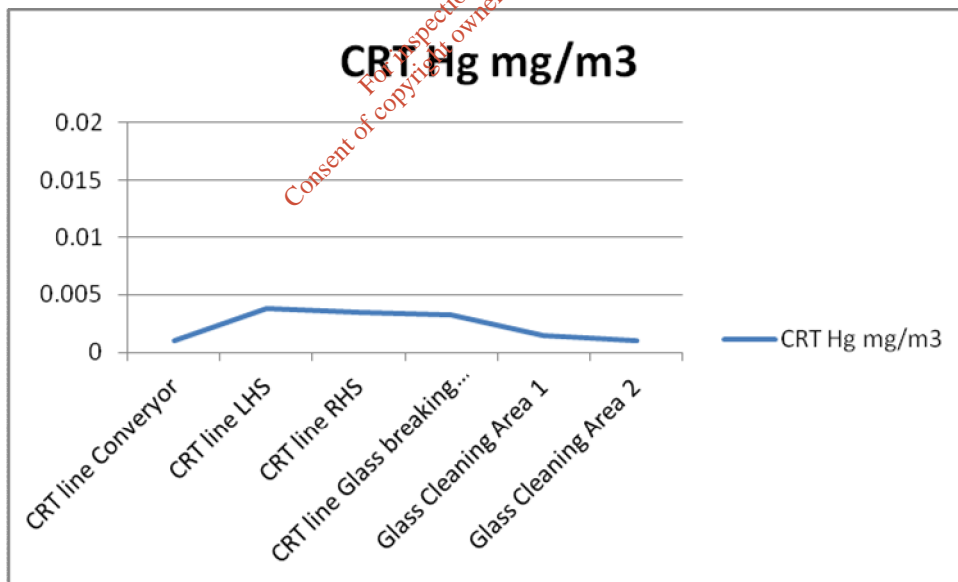


Figure 2, CRT Line Mercury survey average results (Hg mg/m³)

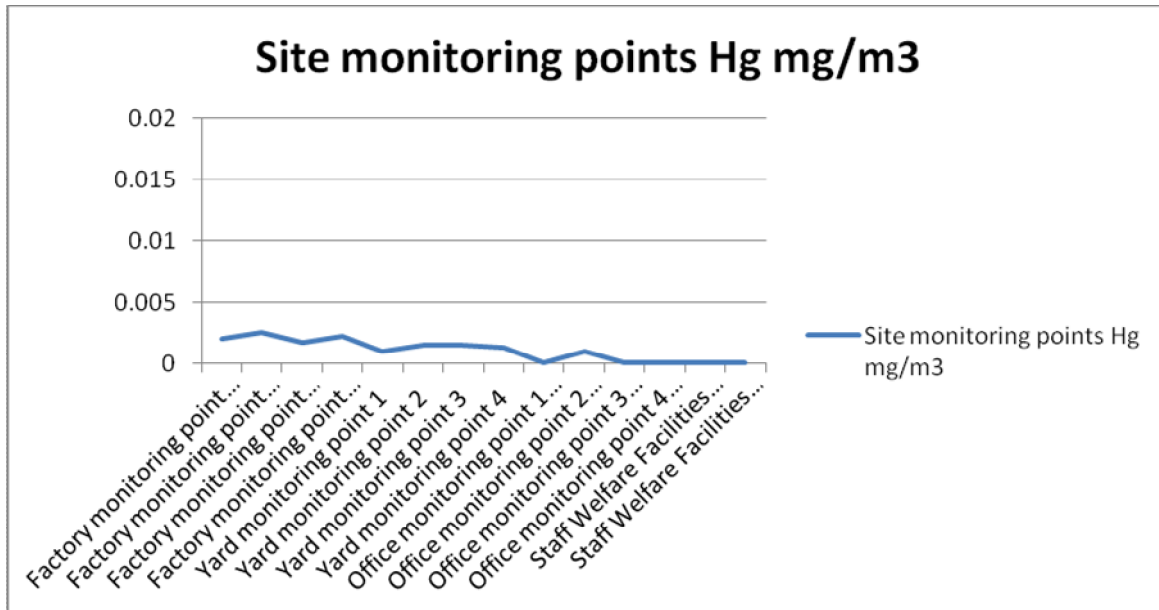


Figure 3, Site Monitoring points Mercury survey average results (Hg mg/m³)

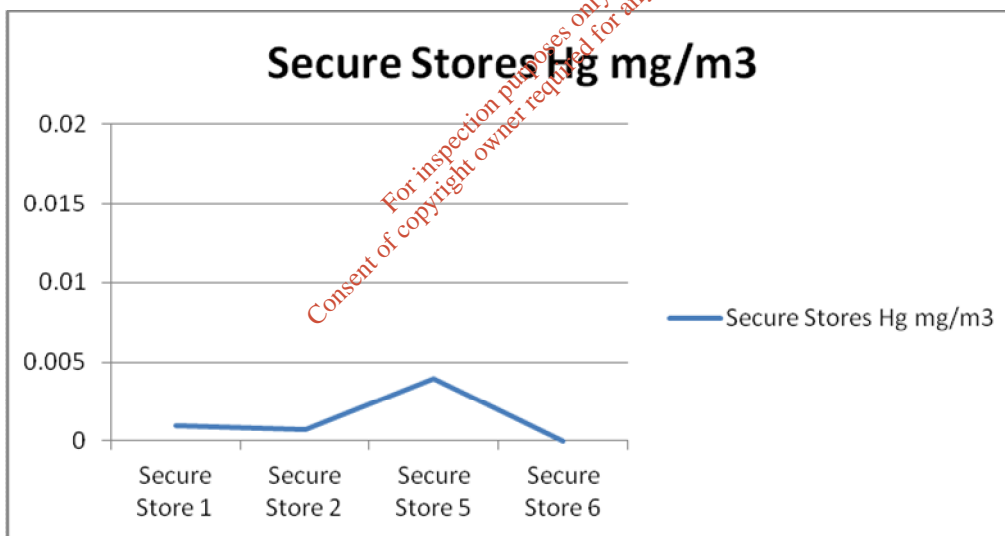


Figure 4, Secure Stores' Mercury survey average results (Hg mg/m³)

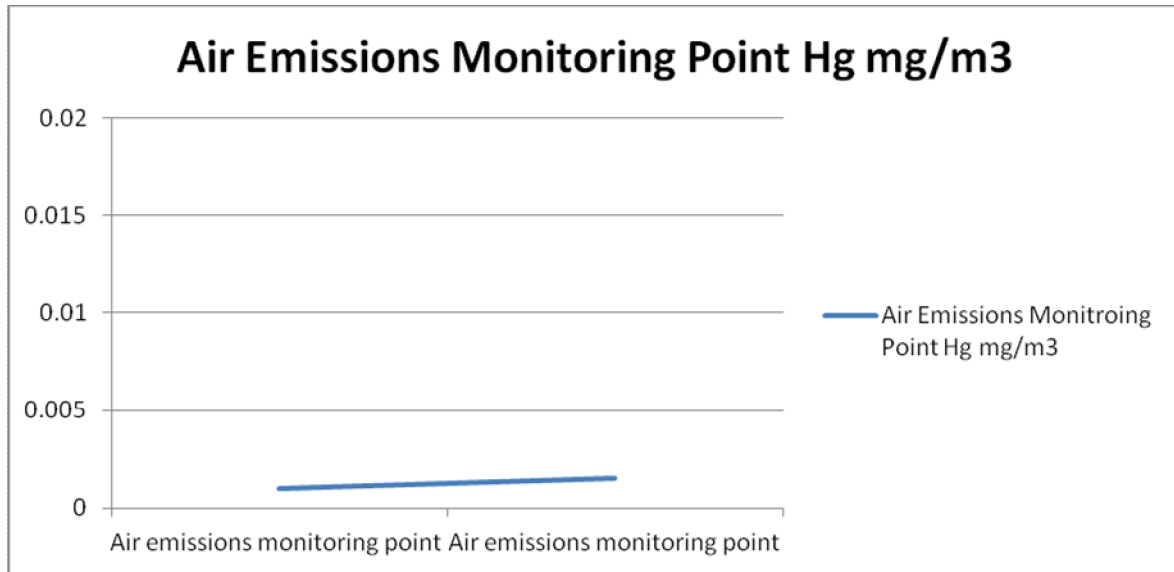


Figure 5, Air Emissions Monitoring Point Mercury survey average results (Hg mg/m³)

Discussion:

Analysis of the results from the four point surveys conducted to determine the presence of Mercury vapour onsite at The Recycling Village Ltd demonstrated that although Mercury vapour was detected at various locations, all of the locations were under the OELV of 0.02mg/m³, with Mercury vapour barely detectable below 0.005mg/m³ at over 75% of the locations (see Table 1 and associated graphs).

Mercury vapour readings were highest at the FPD line, which was expected as the FPD cold cathode fluorescent lamp (CCFL) backlights contain elemental and compound mercury. The Recycling Village Ltd have installed an isolation booth where the extraction and isolation of the CCFL backlights is carried out by a trained operative, who has been supplied with appropriate PPE – a full face mask fitted with a 3M 6096 A1 Hg P3R HEPA filter.

The lamps, once isolated, are dropped down a purpose-built chute and stored in barrels. The barrel in operational use has been fitted with a negative pressure system to eliminate the effects of suction upon opening the chute to access the barrel. The backlight barrel ventilation system is integrated into the main air extraction system for the FPD and CRT lines.

Conclusion:

The point survey carried out at The Recycling Village Ltd concludes that Mercury vapour, although detectable at certain locations, is lower than the Health and Safety Authority OELV of 0.02mg/m³ at all locations, and that the recommended abatement measures to reduce occupational exposure to Mercury Vapour have already been implemented.

References:

- *Code of Practice for the Safety, Health and Welfare at Work (Chemical Agents) Regulations 2001 (S.I. No. 619 of 2001)*, 2011, Health and Safety Authority
- *Guidelines to the Safety, Health and Welfare at Work (Chemical Agents) Regulations*, 2011, Health and Safety Authority
- *JEROME® 431-X Mercury Vapour Analyzer Operation Manual*, 2011, Arizona Instrument LLC
- *WEEELABEX Normative Document on Treatment V9.0*, 2011, WEEE Forum

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Appendix 1:



Figure 6, Serial Number

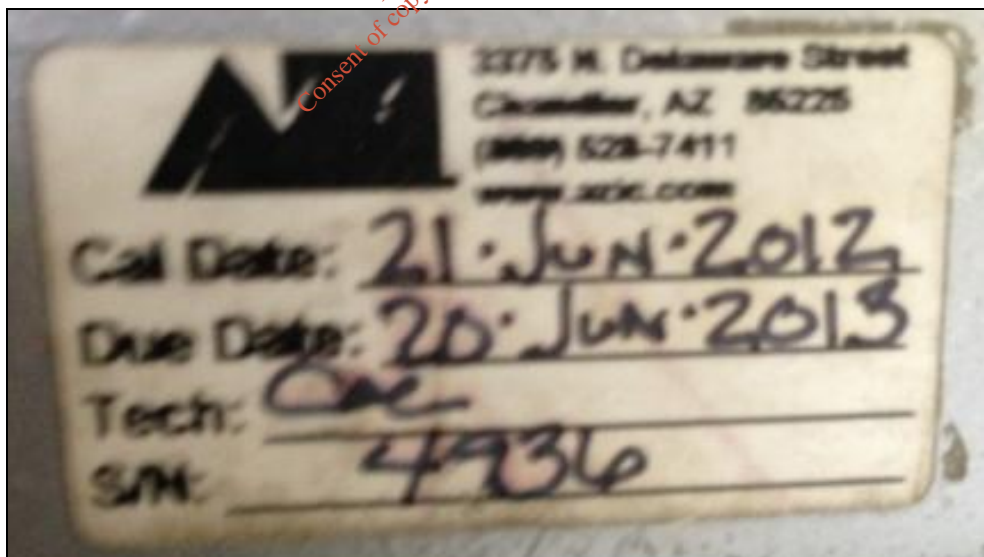
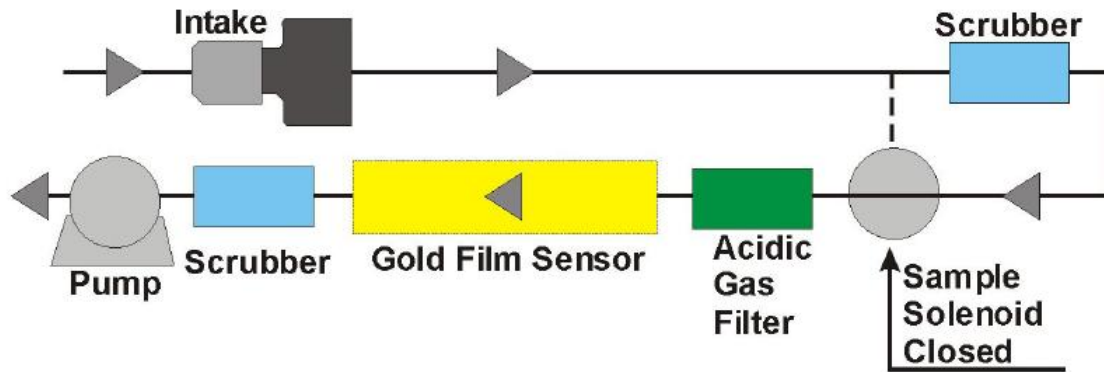


Figure 7, Calibration Date

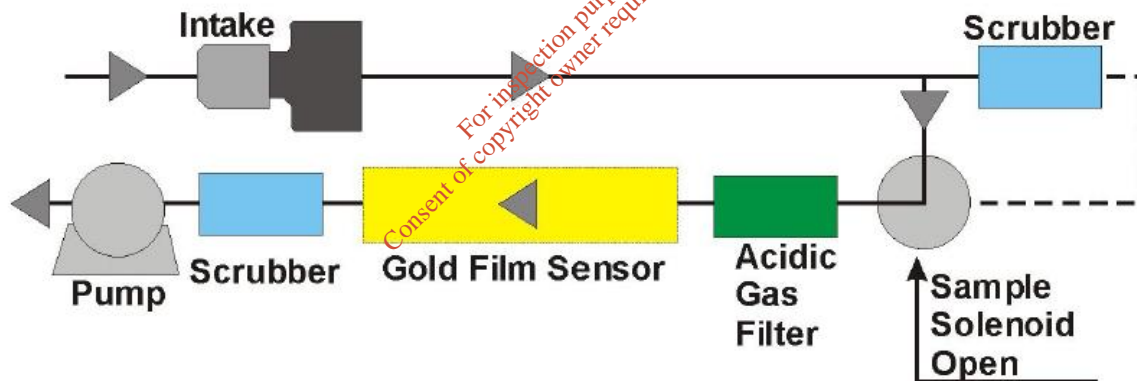
Appendix 2:

Principle of Operation of JEROME® 431-X Mercury Vapour Analyzer

A thin gold film, in the presence of Mercury Vapor, undergoes an increase in electrical resistance proportional to the mass of Mercury Vapor in the sample. When the SAMPLE button is pressed, an internal pump pulls ambient air through a scrubber filter and into the flow system.



After 2 seconds, the sample solenoid bypass opens, closing off the scrubber filter from the flow system.



The sample air passes through a filter (removing any acidic gases which interfere with the sensor's response to mercury) and is drawn over the gold film sensor. The sensor absorbs the Mercury Vapor. Nine seconds after starting, the sample solenoid bypass closes and the remainder of the sample is drawn through the scrubber filter and the flow system. The instrument determines the amount absorbed and displays the measured concentration on the digital meter in milligrams per cubic meter (mg/m³) of mercury. An internal DIP switch can be used to change the digital meter display from mg/m³ to nanograms of mercury (see page 22). The instrument's microprocessor automatically re-zeroes the digital meter at the start of each sample cycle and freezes the meter reading until the next sample cycle is activated, thus eliminating drift between samples. During the sample mode cycle, bars on the LCD represent the percentage of sensor saturation. Depending on the concentrations, approximately sixty-five samples containing 0.1 mg/m³ Hg may be taken before the sensor reaches saturation. After absorbing approximately 500 nanograms of mercury, the sensor becomes saturated and needs to be cleaned. This is accomplished by a manually activated 10-minute heat cycle, or sensor regeneration that burns the mercury from the sensor. This mercury is absorbed

on internal filters to prevent any external contamination. The solenoid bypass closes during the sensor regeneration cycle, causing the air to pass through the scrubber filter, providing clean air for the regeneration process. The flow system's final scrubber prevents contamination to the atmosphere from the desorbed mercury. The heat generated during the regeneration may cause some low level thermal drift. To ensure maximum sample accuracy, wait 30 minutes after regeneration before zeroing and using the instrument.

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THE RECYCLING VILLAGE LTD

MERCURY VAPOUR MONITORING REPORT #2

17 October 2013

Nikita Coulter BSc MSc EnvDip

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Background:

The Recycling Village Ltd is a specialist recycling facility which provides service to the Irish Waste Electronic and Electrical Equipment (WEEE) recycling compliance schemes for the recovery of discarded Cathode Ray Tubes (CRT) and Flat Panel Display (FPD) televisions and monitors. In addition, a comprehensive recycling service is offered for other types of electrical and electronic waste, such as PC's and Universal Power Supplies (UPS). All types of batteries, from small household to large automotive, are collected, sorted and consolidated prior to export for recycling. All material is accepted and dismantled in an environmentally sound manner. Processes have been optimised by paying attention to detail, with more than 80% recovery of the material being achieved from the dismantling and recovery process.

The company currently operates under a waste facility permit granted by Meath County Council – WFP/MH/11/0005/01. The Recycling Village Ltd have applied to the EPA to be issued with a Waste Licence and the process is currently underway.

During 2012, The Recycling Village Ltd developed and implemented an Environmental Management System (EMS) at the facility in accordance with ISO 14001. In May 2013 The Recycling Village Ltd were awarded the ISO 14001 accreditation based on the comprehensive nature of the implemented EMS.

Due to the nature of the recovery processes being carried out on site, there is the potential for employees and the greater environment to be exposed to heavy metal vapours arising from the discarded materials. One particular metal arising from the dismantling of FPD's is Mercury (Hg).

The Health and Safety Authority (HSA) of Ireland have set the Occupational Exposure Limit Value (OELV) for Mercury exposure at 20µg/m³ (equating to 0.02mg/m³) (Health and Safety Authority, 2011). The HSA define the OELVs as (Health and Safety Authority, 2004):

“The maximum concentration of an airborne substance averaged over a reference period, to which employees may be exposed under any circumstances.”

They state that:

“OELVs must not be exceeded and for substances that have been assigned an OELV, employers must reduce exposure so far as is reasonably practicable below the OELV.”

The pending WEEELABEX Standard, to which The Recycling Village Ltd will comply once in force, requires that the processing of FPD's be carried out in a controlled atmosphere fitted with suitable ventilation equipment and filters to ensure that OELV and air emission limit values on heavy metals can be complied with at all time (WEEE Forum, 2011).

Introduction:

Owing to concern over the potential impact of Mercury vapour exposure to employee’s health; potential impacts of Mercury emissions to the atmosphere, and in order to comply with Health and Safety standards and the requirements of WEEELABEX, the Environmental Management Team at The Recycling Village Ltd have incorporated Mercury Vapour Monitoring Surveys into the company’s Site Monitoring Programme. Surveys are carried out at 6-weekly intervals, the present survey having been carried out over a four day period – the 25th, 26th, 27th of September and the 2nd of October.

Methodology:

The survey was conducted at The Recycling Village Ltd by the Environmental Compliance Officer and the Facility Manager, using a calibrated JEROME® 431-X Mercury Vapour Analyzer, serial number: 4936, (Appendix 1, Figure 6) on loan from Irish Lamp Recycling Co Ltd, Co. Athy. The JEROME® Mercury Vapour Sensor System was calibrated on 21-June-2012 (Appendix 1, Figure 7 and attached Calibration Certificate). The Facility Manager was trained to use the sensor by the appropriate personnel from Irish Lamp Recycling Co Ltd. The Facility Manager trained the Environmental Compliance Officer to use the sensor.

Four point surveys were conducted over the course of the four days. Samples were taken at 45 locations around the site (See attached Site Plan – Emissions Monitoring, 12039-LA-05 and Ground Floor Plan, 12039-LA-04), including within the workstations, in the factory, in the materials storage areas, in the yard and in the offices (Table 1 - Results).

All results were recorded on EMS Record 4.5:1 EF 20, Mercury Vapour Monitoring Record, which is stored in soft copy on The Recycling Village Ltd network server in the EMS – Working Documents folder, and in hard copy in the Working Documents Folder which is stored in the Environmental Compliance Officer’s office.

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Results:

		25/09/13	26/09/13	27/09/13	02/10/13	
LOCATION	CODE	mg/m ³	mg/m ³	mg/m ³	mg/m ³	Average mg/m ³
FPD Storage 1	FS1	.003	.014	.013	0	.008
FPD Storage 2	FS2	.003	.013	.009	0	.006
FPD Storage 3	FS3	0	.013	.009	0	.006
FPD Storage 4	FS4	.003	.014	.007	0	.006
Back light extraction area 1 (RHS)	BL1	.010	.018	.003	0	.008
Back light extraction area 2 (LHS)	BL2	.011	.020	.004	.004	.010
Back light extraction area 3 (Floor)	BL3	.009	.020	.011	.012	.013
Back light extraction area 4 (Air)	BL4	.008	.019	.014	.003	.011
Chute to backlight container (closed)	BC1	.010	.019	.014	.004	.012
Chute to backlight container (open)	BC1*	.012	.017	.014	.004	.012
Chute to backlight container (closed)	BC1	.012	.018	.013	.003	.012
FPD line 1 (LHS)	F1	.009	.016	.008	.008	.010
FPD line 2 (Middle)	F2	.009	.014	.007	.004	.009
FPD line 3 (RHS)	F3	.008	.015	0	.003	.007
FPD line 4 (Air)	F4	.009	.008	.003	.007	.007
FPD Conveyor Belt	F5	.004	.014	0	.003	.005
Area around backlight containers	BC4	.003	.015	.008	.004	.008
Area around backlight containers	BC4	.004	.012	.010	.014	.010
Area around backlight containers	BC4	.004	.011	.011	.009	.009
Air emissions monitoring point	A1	.006	.019	.009	.014	.012
Air emissions monitoring point	A1	.006	.015	.011	.011	.011
CRT line Conveyor	C1	.005	.013	.003	.004	.006
CRT line LHS	C2	.004	.014	0	0	.005
CRT line RHS	C3	.004	.012	0	0	.004
CRT line Glass breaking area	C4	.003	.003	0	0	.002
Factory monitoring point (PC Dismantling)	FM1	.004	.013	.011	0	.007
Factory monitoring point (Rack E)	FM2	.010	.013	.011	0	.009
Factory monitoring point (Car Park Exit)	FM3	.008	.015	.003	.003	.007
Factory monitoring point 4 (Metal Baler)	FM4	.006	.014	.004	0	.006
Yard monitoring point 1	YM1	.004	.005	0	0	.002
Yard monitoring point 2	YM2	0	.004	0	0	.001
Yard monitoring point 3	YM3	0	.004	0	0	.001
Yard monitoring point 4	YM4	.003	.004	0	0	.002
Office monitoring point 1 (Canteen)	OM1	.007	.004	0	0	.003
Office monitoring point 2 (Admin)	OM2	0	.003	0	0	.001
Office monitoring point 3 (Boardroom)	OM3	.005	0	.006	0	.003
Office monitoring point 4 (Storage 3)	OM4	.006	.006	0	0	.003
Staff Welfare Facilities (Locker Room)	SW1	0	0	0	0	0
Staff Welfare Facilities (Canteen)	SW2	.003	.006	0	0	.002
Secure Store 1	SS1	0	.004	0	0	.001
Secure Store 2	SS2	0	.006	0	0	.002
Secure Store 5	SS5	0	.003	0	0	.001
Secure Store 6	SS6	0	0	0	0	0
Glass Cleaning Area 1	GC1	0	.005	0	0	.001
Glass Cleaning Area 2	GC2	0	.004	0	0	.001

Table 1, Mercury survey sampling points, individual results and averages

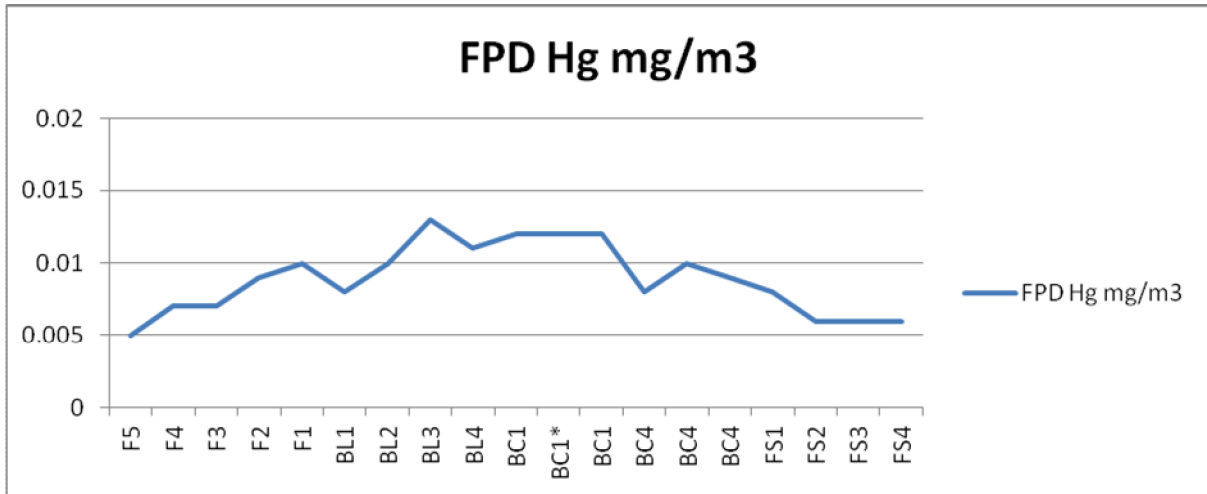


Figure 1, FPD Line Mercury survey average results (Hg mg/m³)

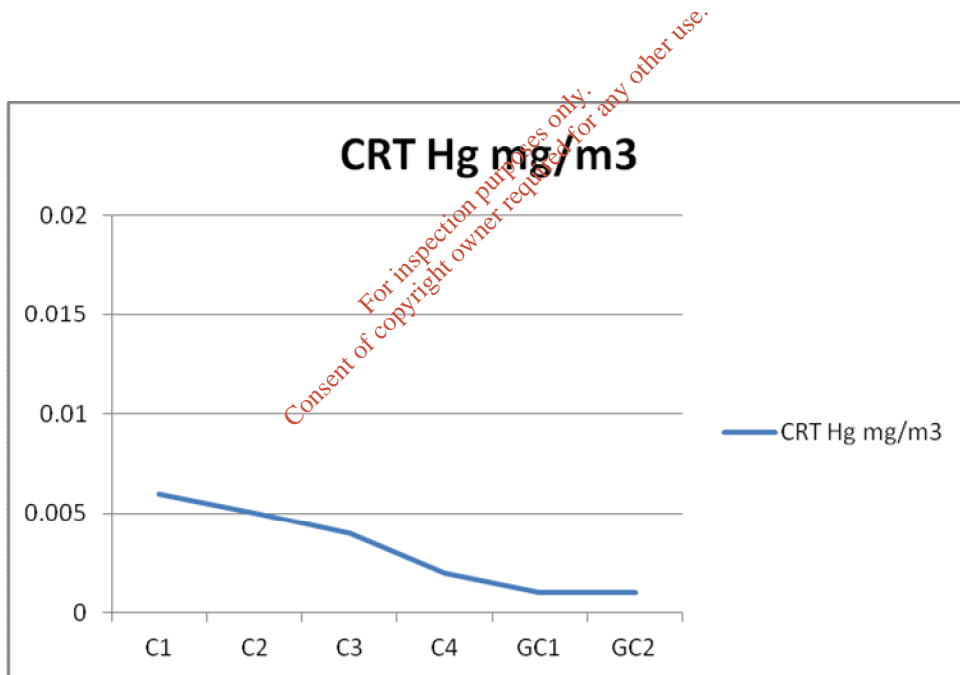


Figure 2, CRT Line Mercury survey average results (Hg mg/m³)

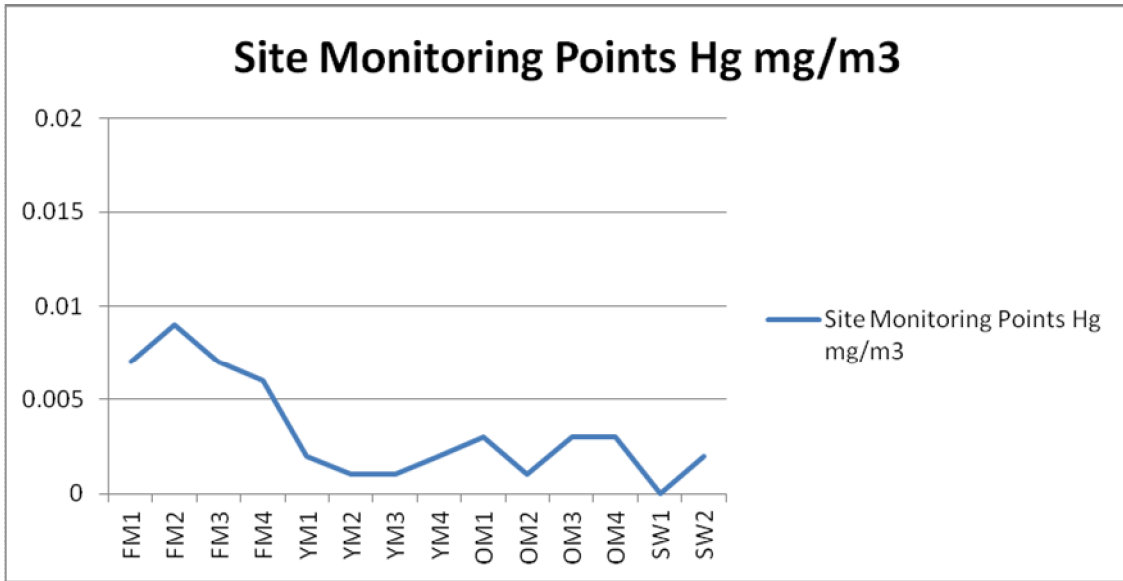


Figure 3, Site monitoring points Mercury survey average results (Hg mg/m³)

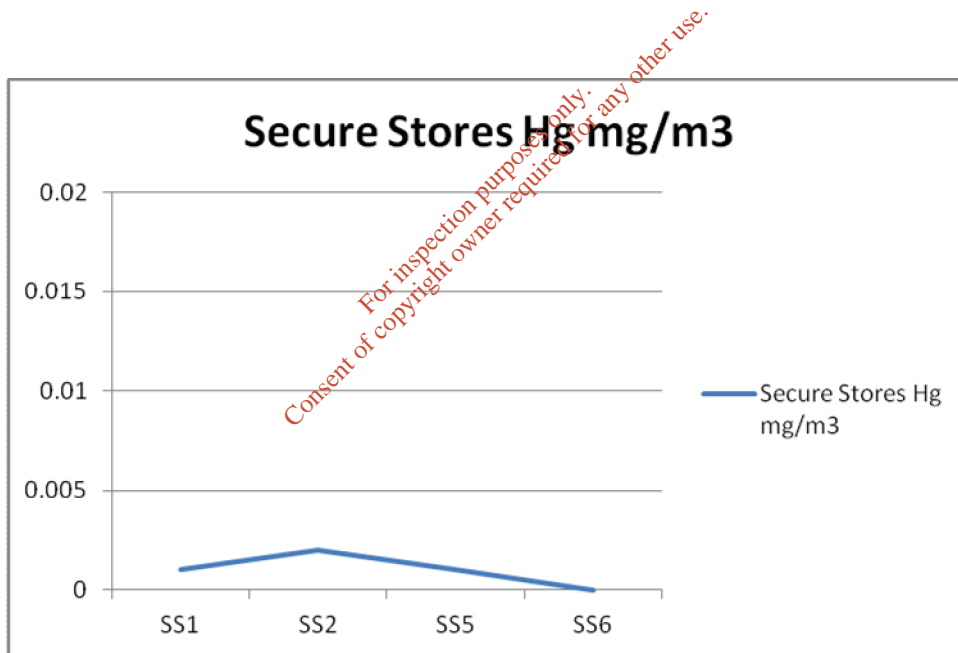


Figure 4, Secure Stores' Mercury survey average results (Hg mg/m³)

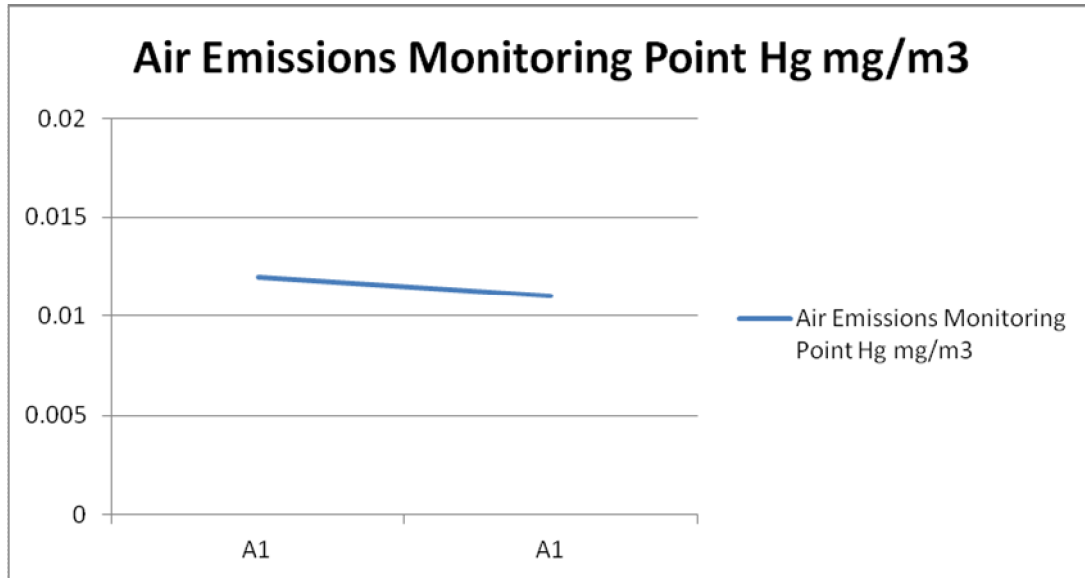


Figure 5, Air Emissions Monitoring Point Mercury survey average results (Hg mg/m³)

Discussion:

Analysis of the results from the four point surveys conducted to determine the presence of Mercury vapour onsite at The Recycling Village Ltd demonstrated that although Mercury vapour was detected at various locations, all of the locations were under the OELV of 0.02mg/m³, with Mercury vapour barely detectable below 0.005mg/m³ at 40% of the locations sampled (see Table 1 and associated graphs).

Mercury vapour readings were highest at the FPD line, which was expected as the FPD cold cathode fluorescent lamp (CCFL) backlights contain elemental and compound mercury. The Recycling Village Ltd have installed an isolation booth where the extraction and isolation of the CCFL backlights is carried out by a trained operative, who has been supplied with appropriate PPE – a full face mask fitted with a 3M 6096 A1 Hg P3R HEPA filter.

The lamps, once isolated, are dropped down a purpose-built chute and stored in barrels. The barrel in operational use has been fitted with a negative pressure system to eliminate the effects of suction upon opening the chute to access the barrel. The backlight barrel ventilation system is integrated into the main air extraction system for the FPD and CRT lines.

Conclusion:

The point survey carried out at The Recycling Village Ltd concludes that Mercury vapour, although detectable at certain locations, is lower than the Health and Safety Authority OELV of 0.02mg/m³ at all locations, and that the recommended abatement measures to reduce occupational exposure to Mercury Vapour have already been implemented.

References:

- *Code of Practice for the Safety, Health and Welfare at Work (Chemical Agents) Regulations 2001 (S.I. No. 619 of 2001)*, 2011, Health and Safety Authority
- *Guidelines to the Safety, Health and Welfare at Work (Chemical Agents) Regulations*, 2011, Health and Safety Authority
- *JEROME® 431-X Mercury Vapour Analyzer Operation Manual*, 2011, Arizona Instrument LLC
- *WEEELABEX Normative Document on Treatment V9.0*, 2011, WEEE Forum

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Appendix 1:



Figure 6, Serial Number

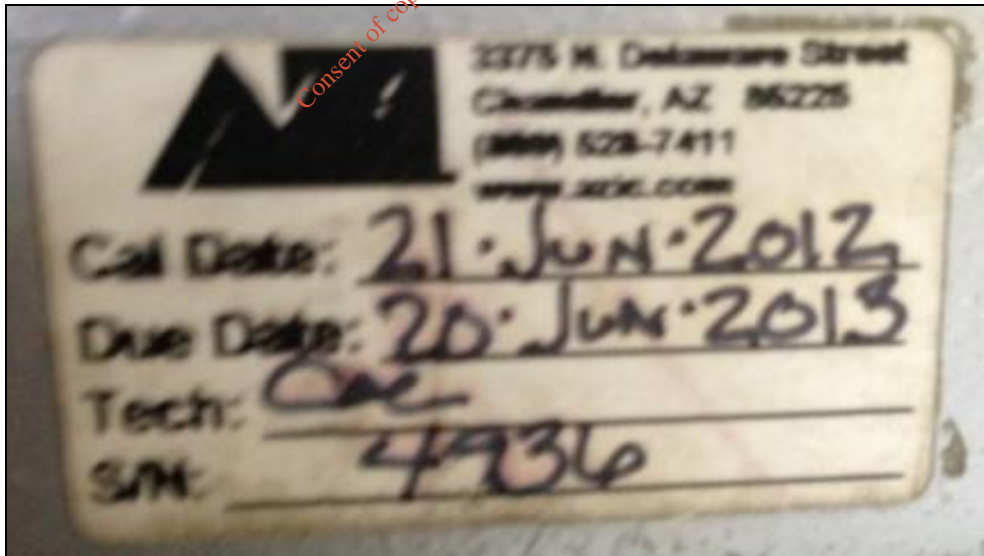
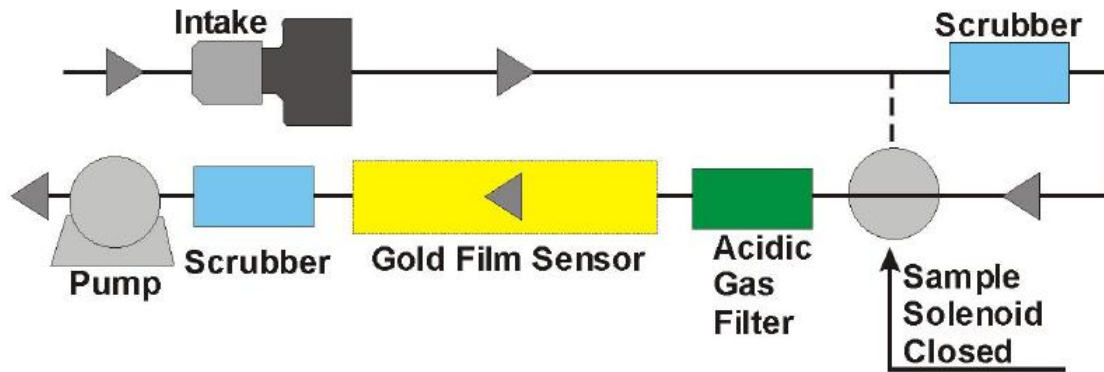


Figure 7, Calibration Date

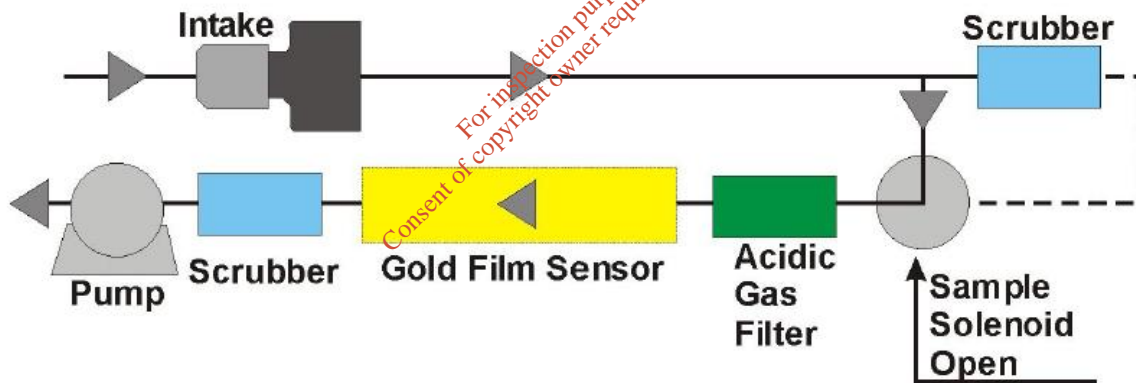
Appendix 2:

Principle of Operation of JEROME® 431-X Mercury Vapour Analyzer

A thin gold film, in the presence of Mercury Vapor, undergoes an increase in electrical resistance proportional to the mass of Mercury Vapor in the sample. When the SAMPLE button is pressed, an internal pump pulls ambient air through a scrubber filter and into the flow system.



After 2 seconds, the sample solenoid bypass opens, closing off the scrubber filter from the flow system.



The sample air passes through a filter (removing any acidic gases which interfere with the sensor's response to mercury) and is drawn over the gold film sensor. The sensor absorbs the Mercury Vapor. Nine seconds after starting, the sample solenoid bypass closes and the remainder of the sample is drawn through the scrubber filter and the flow system. The instrument determines the amount absorbed and displays the measured concentration on the digital meter in milligrams per cubic meter (mg/m³) of mercury. An internal DIP switch can be used to change the digital meter display from mg/m³ to nanograms of mercury (see page 22). The instrument's microprocessor automatically re-zeroes the digital meter at the start of each sample cycle and freezes the meter reading until the next sample cycle is activated, thus eliminating drift between samples. During the sample mode cycle, bars on the LCD represent the percentage of sensor saturation. Depending on the concentrations, approximately sixty-five samples containing 0.1 mg/m³ Hg may be taken before the sensor reaches saturation. After absorbing approximately 500 nanograms of mercury, the sensor becomes saturated and needs to be cleaned. This is accomplished by a manually activated 10-minute heat cycle, or sensor regeneration that burns the mercury from the sensor. This mercury is absorbed

on internal filters to prevent any external contamination. The solenoid bypass closes during the sensor regeneration cycle, causing the air to pass through the scrubber filter, providing clean air for the regeneration process. The flow system's final scrubber prevents contamination to the atmosphere from the desorbed mercury. The heat generated during the regeneration may cause some low level thermal drift. To ensure maximum sample accuracy, wait 30 minutes after regeneration before zeroing and using the instrument.

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Test Certificate

Date 02/09/2013

Client The Recycling Village Ltd
Unit 21
Duleek Business Park
Duleek
Co Meath
IRELAND

Order No. -
Certificate No. WK13-5272
Issue No. 1

Contact Nikita Coulter

Date Received 27/08/2013

Description 7 filters for mercury

Technique ICP

Sample No.			Method
757125	MCEUN001		
Mercury	<0.02 µg		in house(N)
757126	MCEUN002		
Mercury	<0.02 µg		in house(N)
757127	MCEUN003		
Mercury	<0.02 µg		in house(N)
757128	MCEUN004		
Mercury	<0.02 µg		in house(N)
757129	MCEUN005		
Mercury	<0.02 µg		in house(N)
757130	MCEUN006		
Mercury	<0.02 µg		in house(N)
757131	MCEUN007		
Mercury	<0.02 µg		in house(N)

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Test Certificate

Date 02/09/2013

Client The Recycling Village Ltd

Certificate No. WK13-5272

Issue No. 1

Tested By Lora McKerracher Date 30/08/2013

Approved By  Date 02/09/2013

Joanne Dewhurst
Laboratory Manager

For and on authority of RPS Laboratories Ltd.

Method Symbols (U) Analysis is UKAS Accredited
(N) Analysis is not UKAS Accredited

Concentration values (mg/m³ and ppm) are provided to assist with interpretation only, they are not covered by the scope of UKAS accreditation.

Results stated as ml are referring to the sample volume.

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Analysis carried out on samples 'as received'

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