mostardi platt

August 29, 2016

Mr. Joe Muchow
President
E. L. Foust Company
754 North Industrial Drive
Elmhurst, Illinois 60126

Re: Limited Indoor Air Quality Monitoring Program Summary Report

Dear Mr. Muchow:

The purpose of this letter is to summarize the results of the Limited Indoor Air Quality (IAQ) monitoring program conducted by Mostardi Platt for the E.L. Foust Company, Inc. The testing was done at the Dental Care facility located at 2932 Finley Road in Downers Grove, Illinois (the facility).

BACKGROUND

In June 2016, Mostardi Platt was contacted regarding the completion of an IAQ monitoring program to be performed at the facility. The purpose of the IAQ monitoring program was limited to determine ambient chemical concentrations of mercury particulate matter (PM) and vapors emitted within the facility's dental procedure rooms as summarized in **Table 1**. Potential employee exposure to no other chemicals was measured as part of this limited IAQ monitoring program.

The purpose of this IAQ monitoring program was twofold, one to compare the analytical results against the Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PEL); and two, to compare the analytical results between two separate days of testing, one using the Foust Series 400 Mercury Vapor Dental Unit and a second not using this filtration unit.

The results of this IAQ monitoring program were to be compared to established OSHA PEL for air contaminants in accordance, with the Title 29 of the Code of Federal Regulations (29 CFR) Section 1910.1000 standard.

AIR QUALITY SAMPLING PROGRAM METHODOLOGY

Mostardi Platt mobilized to the facility on August 4 and 8, 2016 to perform the IAQ monitoring program developed for the facility. The purpose of the IAQ monitoring program was to determine if the Foust Series 400 Air Purification Dental Unit, manufactured by E. L. Foust, provided adequate control of potential exposure to mercury PM and for the facility employees.

Both area and personal samples were taken during this test. Area samples are collected by placing a sample media and air pump unit in the primary work zone area. An area sample measures the air within one location for the entire sampling period and is not mobile. A personal sample is a sample media and air pump unit worn by an individual, who may be mobile, for the duration of the sampling period.

888 Industrial Drive
Elmhurst, Illinois 60126
630-993-2100

A representative sample for the job classifications in the work area, which was staffed on the days of the testing, was taken each day during this IAQ testing. The pump units were placed in the procedure room where the mercury-based dental amalgams are processed. The processing may include drilling, buffing, cleaning or the removal of the mercury-based amalgam filling and replacement with another material. In addition to the procedure room, a second area pump was also placed in the facility's patient waiting room on the days of the IAQ monitoring program. The dentist who performed all of the dental processing work within the facility was selected for placement of the personal mercury pump units.

The monitoring program also included the use of a Field Blank as a control to determine if there was any background mercury on the sample media not directly attributable to the intended measurement. Field Blanks are clean sample media taken to the sampling site, handled in every way as the air samples, except that no air is drawn through them. Field Blanks are used to estimate contamination which may occur immediately before or after sampling, during shipment or awaiting analysis in the laboratory and are used to ensure proper quality control.

The Foust Series 400 Air Purification Dental Unit is a free standing air filtration device. An air intake hose is placed upon the patient's chest within approximately twelve (12) inches of their mouth. This distance permits adequate air draw from the patient's mouth without hindering the dentist during the actual dental procedure.

It should be noted that during both days of the testing, the dentist and the hygienist assistant both wore suitable personal protective equipment. At no time were the dentist or the hygienist exposed to mercury PM or vapor without some form of protection. The purpose of the Foust Series 400 Air Purification Dental Unit would be to serve as an engineering control to eliminate the need to rely solely on PPE to prevent mercury exposure.

It should be noted that there were three (3) possible sources of error in this testing program. The first potential source of error involved the concentration of mercury found in the dental amalgams. The typical chemical composition of dental amalgams includes 30-55% mercury. So unlike a laboratory setting, the usage amounts will vary between each dental amalgam that is processed at the facility. There is no guarantee that the concentration of mercury would be the same between Day 1 and Day 2 of the IAQ monitoring program.
The second potential source of error would be the sampling time. While the process that the dentist uses to prep the patient for the procedure and actually perform the procedure may last 30-60 minutes, the amount of actual processing the mercury amalgam will vary depending the complexity of the tooth. During the course of this IAQ monitoring program, the actual processing time for mercury amalgams for each day was as indicated below:

- Day 1 – 23.39 minutes
- Day 2 – 13.55 minutes

The third possible source of error in this IAQ monitoring program was the usage of the Foust Series 400 Mercury Vapor Dental Unit itself. On Day 1, the unit, which was placed within the dental procedure room, operated continuously throughout the day; no other filtration system was in operation on either day of the testing. On Day 2 of the testing however, the filtration unit was accidentally left on for the first hour of the day. Once this was discovered, it was immediately shut off, however a portion of the potential mercury exposure time was lost.

The facility's normal operating hours during this sampling period were 6:30 am through 5:00 pm. Except for a 60 minute lunch period, the facility operates on a continuous basis during these operating hours; the employee potential exposure levels to mercury vary depending on the both the number of mercury-based amalgam fillings processed and also the actual content of the mercury found in each filling.

In order to adequately determine the 8-Hour Time Weighted Average (TWA), the length of sampling in each case was conducted for a total of 480 minutes. This duration of sampling time at the NIOSH prescribed air pump flow rate produced the appropriate representative sample in accordance with the NIOSH test method.

The air samples were sent to ALS Environmental, a laboratory accredited by the AIHA® Laboratory Accreditation Programs, LLC, for independent analysis and a report of the mercury PM and vapors present in the air within the facility's dental procedure room and waiting room areas.

Measurement – Mercury (PM and vapor)

Mercury is a highly toxic compound. Exposure to mercury may be fatal to humans if inhaled and is extremely harmful if absorbed through the skin. According to a World Health Organization (WHO) study, about 80% of the inhaled mercury vapor is absorbed to the bloodstream through the lungs. It may cause harmful effects to the nervous, digestive, respiratory, immune systems and to the kidneys, besides causing lung damage. Adverse health effects from mercury exposure can be: tremors, impaired vision and hearing, paralysis, insomnia, emotional instability, developmental deficits during fetal development, and attention deficit and developmental delays during childhood.

Dental amalgam is the most commonly used dental filling material. It is a mixture of mercury and a metal alloy. The normal composition is 45-55% mercury; approximately 30% silver and other metals such as copper, tin and zinc. In 1991, the WHO confirmed that mercury contained in dental amalgam is the greatest source of mercury vapor in non-industrialized settings, exposing the concerned population to mercury levels significantly exceeding those set for food and for air. Any work done on the mercury amalgam surfaces such as buffing, cleaning, grinding, drilling, etc. may cause the mercury PM and vapors to be emitted to the ambient air.

The dental procedures are performed solely within the procedure room by either the dentist or hygienist. Therefore, the procedure room area was selected as representative location for potential employee exposure to mercury PM and vapor.

Mostardi Platt placed one area sample pump unit inside the procedure room along the wall. A second area pump was placed within the patient waiting room. Additionally, Mostardi Platt placed one personal sample pumps on the dentist, who works within the procedure room as shown in **Table 1**. This person and two locations were selected as representative of potential employee exposure of mercury for each of these operating areas of the facility. These samples were analyzed for the following:

- Mercury (PM & Vapor) (CAS #: 7439-97-6)

The samples were collected using an SKC 226-17-1A Anasorb® C300 sample tube. The air pumps were calibrated to an average flow rate of 0.2 liters per minute and were affixed to the area location and the employee for a period of 480 minutes each in accordance with methodology recommended in the NIOSH Manual of Analytical Methods. Quantification of mercury was completed according to the NIOSH Test Method 6009. Results of the monitoring are summarized in **Table 1**.

RESULTS

ALS Environmental provided Mostardi Platt with an analytical report (enclosure) summarizing the results of the IAQ monitoring program for mercury PM and vapor at the facility.

The reported 8-hour TWA for actual employee exposure was compared to the OSHA PEL found in 29 CFR 1910.1000 for. The units of measurement are expressed in units of milligrams per cubic meter (mg/M^3) of mercury PM and vapor present in the air space. The results for the IAQ monitoring program are summarized below in **Table 1**:

Table 1 – Summary of Analytical Results; and A Comparison of Foust Series 400 Air Purification Dental Unit in Use on Day 1 vs. Not in Use on Day 2

Sample ID	Chemical	Day	Location	Type	Analytical 8-Hour TWA (mg/M^3)	OSHA PEL (mg/M^3)
01A	Mercury PM & Vapors	1	Waiting Room	Area	<0.00054	0.1
02A	Mercury PM & Vapors	1	Procedure Room	Area	<0.00054	0.1
03A	Mercury PM & Vapors	1	Dentist (Dr. Basciano)	Personal	<0.00054	0.1
04A	Mercury PM & Vapors	1	Field Blank	Area	Not Detected	0.1
05A	Mercury PM & Vapors	2	Waiting Room	Area	<0.00050	0.1
06A	Mercury PM & Vapors	2	Procedure Room	Area	<0.00050	0.1
07A	Mercury PM & Vapors	2	Dentist (Dr. Basciano)	Personal	<0.00050	0.1

CONCLUSIONS AND RECOMMENDATIONS

The analytical results indicate that the measured chemical concentrations for mercury were below the established OSHA PEL for all tested employees and areas of the facility. Despite three separate potential sources of error, the Foust Series 400 Mercury Vapor Dental Unit provided adequate protection from exposure to mercury PM and vapors. Although the concentration on Day 2 was equally low as Day 1, this may be due in part to the accidental use of the filtration unit on Day 2 and the significant decrease in mercury amalgam dental processing time (twofold greater on Day 1). The third source of potential error which played into the testing results was the unknown variability of the exact concentration of the mercury in any of the dental amalgams which were processed.

Although the facility employee inhalation exposure to mercury PM and vapors was below the OSHA PEL, the employees may continue to wear respiratory protection when handling this chemical. Suitable hand and body PPE should continue to be worn.

Pursuant to 29 CFR 1910.1020, to maintain compliance with the OSHA standard, E.L. Foust and the Dental Care facility must maintain this report in the facility compliance files for a minimum of thirty (30) years. Facility employees affected by this sampling program have the right to review the results.

If you have any questions about this report or require any further assistance, please feel free to call me at 630-993-2145. Thank you for the opportunity to assist you in this important project.

Sincerely,

MOSTARDI PLATT

David Osadjan
Senior Project Manager

Enclosure

pc: Dr. Marcia Basciano

17-Aug-2016

David Osadjan
Mostardi Platt
888 Industrial Drive
Elmhurst, IL 60126

Tel: (630) 993-2145
Fax: (630) 993-9017

Re: M163110 Work Order: **1608382**

Dear David,

ALS Environmental received 7 samples on 10-Aug-2016 12:19 PM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested.

QC sample results for this data met laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Laboratory Group. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 8.

If you have any questions regarding this report, please feel free to contact me.

Sincerely,

Rob Nieman

Electronically approved by: Rob Nieman

Rob Nieman
Project Manager

ALS Environmental

Date: 17-Aug-16

Client: Mostardi Platt
Project: M163110
Work Order: **1608382**

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
1608382-01	1126 Waiting Room	Air		8/8/2016	8/10/2016 12:19	☐
1608382-02	1131 Procedue Room	Air		8/8/2016	8/10/2016 12:19	☐
1608382-03	1240 Dentist Personal	Air		8/8/2016	8/10/2016 12:19	☐
1608382-04	1127 Field Blank	Air		8/8/2016	8/10/2016 12:19	☐
1608382-05	1124 Waiting Room	Air		8/8/2016	8/10/2016 12:19	☐
1608382-06	1129 Procedure Room	Air		8/8/2016	8/10/2016 12:19	☐
1608382-07	1236 Dentist Personal	Air		8/8/2016	8/10/2016 12:19	☐

Client:	Mostardi Platt
Project:	M163110
Work Order:	1608382

Case Narrative

The sample condition upon receipt was acceptable except where noted.

Results relate only to the items tested and are not blank corrected unless indicated.

ALS Environmental

Date: *17-Aug-16*

Client: Mostardi Platt
Project: M163110

Work Order: 1608382

Analytical Results

Lab ID: 1608382-01A
Collection Date: 8/8/2016
Client Sample ID: 1126 Waiting Room
Matrix: AIR

Analyses

MERCURY BY NIOSH 6009 MOD.		Method: **N6009**	Air Volume (L): **92**	Analyst: **VAW**
Date Analyzed: 8/16/2016		Reporting Limit		
	µg/sample	µg/sample	mg/m3	
Mercury	ND	0.050	<0.00054	

Lab ID: 1608382-02A
Collection Date: 8/8/2016
Client Sample ID: 1131 Procedue Room
Matrix: AIR

Analyses

MERCURY BY NIOSH 6009 MOD.		Method: **N6009**	Air Volume (L): **92**	Analyst: **VAW**
Date Analyzed: 8/16/2016		Reporting Limit		
	µg/sample	µg/sample	mg/m3	
Mercury	ND	0.050	<0.00054	

Lab ID: 1608382-03A
Collection Date: 8/8/2016
Client Sample ID: 1240 Dentist Personal
Matrix: AIR

Analyses

MERCURY BY NIOSH 6009 MOD.		Method: **N6009**	Air Volume (L): **92**	Analyst: **VAW**
Date Analyzed: 8/16/2016		Reporting Limit		
	µg/sample	µg/sample	mg/m3	
Mercury	ND	0.050	<0.00054	

Lab ID: 1608382-04A
Collection Date: 8/8/2016
Client Sample ID: 1127 Field Blank
Matrix: AIR

Analyses

MERCURY BY NIOSH 6009 MOD.		Method: **N6009**	Air Volume (L): **0**	Analyst: **VAW**
Date Analyzed: 8/16/2016		Reporting Limit		
	µg/sample	µg/sample	mg/m3	
Mercury	ND	0.050	NA	

Note:

ALS Environmental

Date: *17-Aug-16*

Client: Mostardi Platt
Project: M163110

Work Order: 1608382

Analytical Results

Lab ID: 1608382-05A
Client Sample ID: 1124 Waiting Room

Collection Date: 8/8/2016
Matrix: AIR

Analyses

MERCURY BY NIOSH 6009 MOD.		Method: **N6009**	Air Volume (L): **100**	Analyst: **VAW**
Date Analyzed: 8/16/2016		Reporting Limit		
	µg/sample	µg/sample	mg/m3	
Mercury	ND	0.050	<0.00050	

Lab ID: 1608382-06A
Client Sample ID: 1129 Procedure Room

Collection Date: 8/8/2016
Matrix: AIR

Analyses

MERCURY BY NIOSH 6009 MOD.		Method: **N6009**	Air Volume (L): **100**	Analyst: **VAW**
Date Analyzed: 8/16/2016		Reporting Limit		
	µg/sample	µg/sample	mg/m3	
Mercury	ND	0.050	<0.00050	

Lab ID: 1608382-07A
Client Sample ID: 1236 Dentist Personal

Collection Date: 8/8/2016
Matrix: AIR

Analyses

MERCURY BY NIOSH 6009 MOD.		Method: **N6009**	Air Volume (L): **100**	Analyst: **VAW**
Date Analyzed: 8/16/2016		Reporting Limit		
	µg/sample	µg/sample	mg/m3	
Mercury	ND	0.050	<0.00050	

Note:

ALS Environmental

Date: 17-Aug-16

Client: Mostardi Platt
Work Order: 1608382
Project: M163110

QC BATCH REPORT

Batch ID: **37703** Instrument ID: **HG1** Method: **N6009**

MBLK Sample ID: **mblk-37703-37703** Units: **µg/sample** Analysis Date: **8/16/2016**
Client ID: Run ID: **HG1_160816A** SeqNo: **1337120** Prep Date: **8/15/2016** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	ND	0.050								

LCS Sample ID: **lcs-37703-37703** Units: **µg/sample** Analysis Date: **8/16/2016**
Client ID: Run ID: **HG1_160816A** SeqNo: **1337121** Prep Date: **8/15/2016** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.525	0.050	0.5	0	105	64.7-123	0			

LCSD Sample ID: **lcsd-37703-37703** Units: **µg/sample** Analysis Date: **8/16/2016**
Client ID: Run ID: **HG1_160816A** SeqNo: **1337122** Prep Date: **8/15/2016** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.527	0.050	0.5	0	105	64.7-123	0.525	0.38	20	

The following samples were analyzed in this batch:

1608382-01A	1608382-02A	1608382-03A
1608382-04A	1608382-05A	1608382-06A
1608382-07A		

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Mostardi Platt
Project: M163110
WorkOrder: **1608382**

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL

Acronym	Description
DUP	Method Duplicate
E	EPA Method
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitaion Limit
SDL	Sample Detection Limit
SW	SW-846 Method

Units Reported	Description
µg/sample	

ALS Environmental

Sample Receipt Checklist

Client Name: **MOSTARDIPLATT-ELMHURST** Date/Time Received: **10-Aug-16 12:19**

Work Order: **1608382** Received by: **SNH**

Checklist completed by: Leeanna Fischer (eSignature) 10-Aug-16 (Date) Reviewed by: Rob Nieman (eSignature) 11-Aug-16 (Date)

Matrices:

Carrier name: UPS

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
Temperature(s)/Thermometer(s):			
Cooler(s)/Kit(s):			
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☐
Water - pH acceptable upon receipt?	Yes ☐	No ☐	N/A ☐
pH adjusted?	Yes ☐	No ☐	N/A ☐
pH adjusted by:	-		

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

CorrectiveAction:

ALS Environmental
4388 Glendale Milford Rd.
Cincinnati, Ohio 45242
Phone: (800)-458-1493 or
(513) 733-5336
Fax: (513) 733-5347

ANALYTICAL REQUEST FORM

18684

☒ REGULAR Status 1088382

☐ RUSH Status Required - ADDITIONAL CHARGE
RESULTS REQUIRED BY _____ DATE
CONTACT ALS LABORATORY GROUP PRIOR TO SENDING SAMPLES

Page: 1 of 1

Date _____ Purchase Order No. MP5298

Company Name Mostardi Platt

Address 888 Industrial Drive

Elmhurst, IL 60126
City State Zip

Send Report To David Osadjan

Email Address dosadjan@mp-mail.com

Telephone (630) 993-2145

Alt. Contact Name _____

Alt. Contact Info _____

Quote No. _____

Sampling Site _____

Date/Time of Collection 0715

Project No. M163110

Billing Address (if different)

SAME

Lab Use Only	Client Sample Number	Media Type	Sample Volume (L)/ Sample Time (min.)	ANALYSIS REQUESTED - Use Method Number if Known
01	1126 Waiting Room		92.0L	Mercury Vapor + PM (NIOSH 6009)
02	1131 Procedure Room		92.0L	
03	1240 Dentist Personal		92.0L	
04	1127 Field Blank		0.0L	
05	1124 Waiting Room		100.0L	
06	1129 Procedure Room		100.0L	
07	1236 Dentist Personal		100.0L	
	Relative Humidity was 45%			

Failure to complete all portions of this form may delay analysis. Please fill in this form *LEGIBLY*.

CHAIN OF CUSTODY

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time
	8/9/16 0920	Harrington	8/10/16 12:19
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time

ALS LAB USE ONLY

COOLER TEMP: °C pH ADJUSTMENTS:

COOLING METHOD: NONE COOLER WET ICE DRY ICE ICE PACK

DELIVERY METHOD: CLIENT DROP BOX FEDEX UPS
STD MAIL PRTY MAIL ALS COURIER OTHER _____

CUSTODY SEALS: NONE COOLER PACKAGE SAMPLES

EQUIP. RETURNED: