Appendix I

Letter from EPA Documenting Problems with Manufacturer D Device

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

May 8, 2003

Mr. Edward J. Domanico
The Hazardous Materials Specialist, Inc
3200 S. Andrews Avenue
Suite 110
Fort Lauderdale, FL 33316

Dear Mr. Domanico:

The purpose of this letter is to document EPA's observations and provide Hazardous Material Specialist, Inc. (HMS) with a copy of the sampling data collected during testing of the Hazardous Material Specialist Fluorescent Lamp Disposal and Mercury Vapor Recovery System in Ashland, Virginia on February 27, 2003 and Phoenix, Arizona on March 26, 2003. The Equipment Validation Phase I and Real World Testing tasks in the Mercury Lamps Drum Top Crushers (DTC) Study are designed to evaluate how efficiently DTC devices capture mercury vapors emitted while crushing fluorescent lamps. Airborne mercury samples were collected and measured per the Sampling and Study Plan and following the NIOSH analytical methods. Furthermore, two Jerome mercury vapor analyzers were employed to collect and measure real-time airborne concentrations. Once the data has been collected, the results of the two studies are reviewed and compared against published mercury exposure limits. The results from the DTC device study are compared against the Occupational Safety and Health Administration (OSHA) regulated Permissible Exposure Limit (PEL) for mercury of 0.10 mg/m^3, and the American Conference for Governmental Industrial Hygienists (ACGIH) recommended Threshold Limit Value (TLV) for mercury of 0.025 mg/m^3.

EPA detected elevated levels of mercury vapor during testing of the HMS machine on February 27, 2003 during the Equipment Validation Phase I testing in Ashland, VA. Jerome readings collected during the operation of the HMS device measured a continuous increase in concentration that exceeded nominal limits. The operation of the HMS device was suspended when the readings measured 0.44 mg/m^3 (after crushing approximately 25- 30 bulbs) to allow for the operator to put on respiratory protection. Operation of the HMS device continued for approximately 45 minutes, where readings increased to measurements of 0.89 mg/m^3. At this time the study was concluded. The HMS device exceeded the OSHA PEL within a short period of time from the start of the operation. Note that when comparing the Jerome reading to the analytical air sample measurements, the Jerome is providing real-time data at the specific point in time. The analytical air sample measurements are collected over a period of time at specified

locations, and represent a timed average exposure concentration. This accounts for differences in the results between the Jerome and analytical air samples.

Analysis of the analytical air sample results indicate that the HMS device was not efficient in capturing and retaining mercury vapor, and exceeded OSHA PEL and ACGIH TLV exposure limits. Out of eight samples collected during the operation of this device, one sample did not exceed the OSHA PEL, while the remaining seven samples did exceed the OSHA PEL (reference the "Ashland, VA AERC Facility Analytical Air Results February 2003" graph.)

At the conclusion of the HMS machine test in Ashland, HMS requested that EPA ship the unit back to the HMS facility in Fort Lauderdale, Florida so an evaluation into the cause of the elevated mercury readings could be determined. The unit was returned to HMS during the week of March 10, 2003. EPA requested a written report detailing the cause of the elevated mercury emissions and confirmation of the adequacy of the repairs by conducting an analysis for mercury vapors by a qualified industrial hygienist. See attached e-mail from Mr. Tad Radzinski to Mr. Ed Domanico outlining this request dated March 7, 2003. EPA had requested that HMS complete the evaluation and issue a report by March 17, 2003. However, due to shipping delays and problems reported by HMS in regard to obtaining a Jerome mercury analyzer, EPA received a fax summary of "Findings on the Malfunctioning Bulb Machine" on March 19, 2003, followed by a written report (dated December 17, 2002) on the HMS findings via fax on March 24, 2003, and a fax of Jerome Mercury Analyzer results on March 22, 2003. The Jerome data provided by HMS indicated several readings on hose connections that exceeded the OSHA PEL after processing only 30 lamps as well as elevated mercury levels from the charcoal discharge.

The HMS device that arrived to the Earth Protection Services Inc. facility in Phoenix, Arizona on March 25, 2003 was damaged. The vacuum assembly had a large crack, which appeared to be either shipping damage, or damage that occurred when the unit was packed by HMS for shipping. The unit received in Phoenix appeared to be a redesigned model from the unit originally tested in Ashland, Virginia. The unit tested in Ashland contained 24 ounces of carbon in a vacuum bag inside the activated charcoal canister. The unit received in Phoenix had an activated charcoal canister that was noticeably larger with the canister packed full of activated carbon estimated to be 40+ pounds. In addition the feed tube design appeared to be different and the drum to hand cart-mounting system was redesigned. EPA notified HMS regarding the equipment differences and the explanation was that the unit sent to Phoenix was a "field unit". EPA did not understand why HMS would send a different unit for testing and when asked for clarification, the response was that HMS had to build a unit quickly for the Ashland, Virginia test which had a different carbon system then field models.

To meet testing protocols established for this study each DTC device vendor was required to provide one machine that would be used throughout the entire test. Changing the design of the machine not only violated the testing protocol, which would make HMS ineligible to continue participation in the study, but also eliminated an opportunity to verify that repairs to the machine originally tested in Ashland, Virginia had corrected the mercury vapor release problem. Since the unit was damaged when received in Phoenix, EPA could not perform the complete "Real World" testing of the unit. However, EPA decided to take some Jerome readings and air samples of the HMS device with the cracked filter assembly. With this type of damage mercury levels

exceeded the OSHA PEL after processing only 16 lamps (see attached "Phoenix, AZ EPSI Facility Jerome Hg Vapor Analyzer Direct Reading Air Results March 2003" graph and "Phoenix, AZ EPSI Facility Analytical Air Results March 2003" graph.)

EPA recommends that HMS conduct an independent test of a machine that is identical to models that are in use in the field. This test should include processing of enough lamps to fill a drum in order to determine if the machine is operating in a manner to effectively control mercury emissions. If elevated mercury levels are detected, then HMS will need to take appropriate action to correct the problem and notify all facilities that are utilizing this equipment as outlined in Item (4) of the HMS fax from Mr. Edward Domanico to EPA (Subject: Findings on Malfunctioning Bulb Machine Tested in 1st EPA Validity Test") dated March 19, 2003.

Please contact me at 215-814-2394 if you have any questions.

Sincerely,

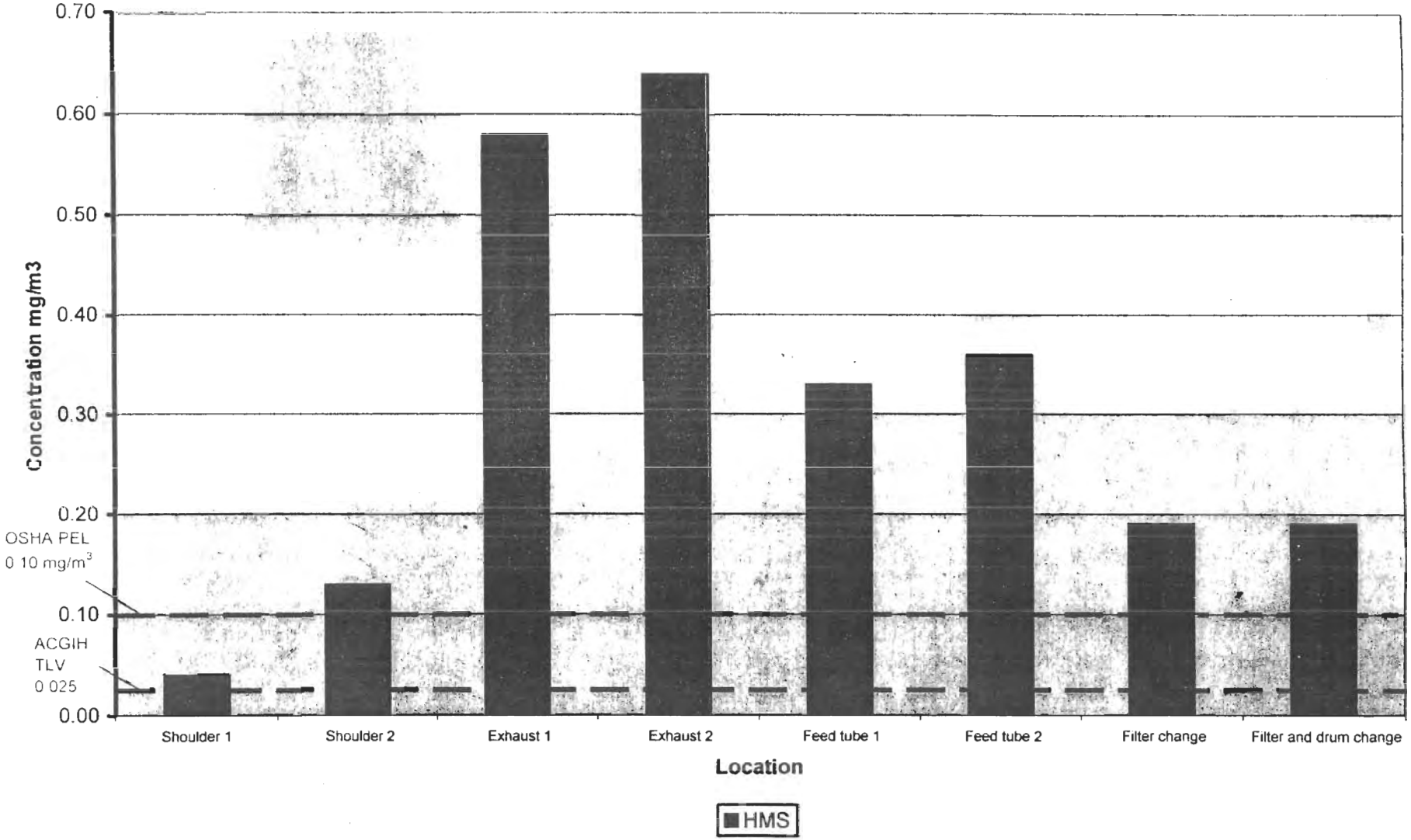
Tad Radzinski

Tad Radzinski, P.E.

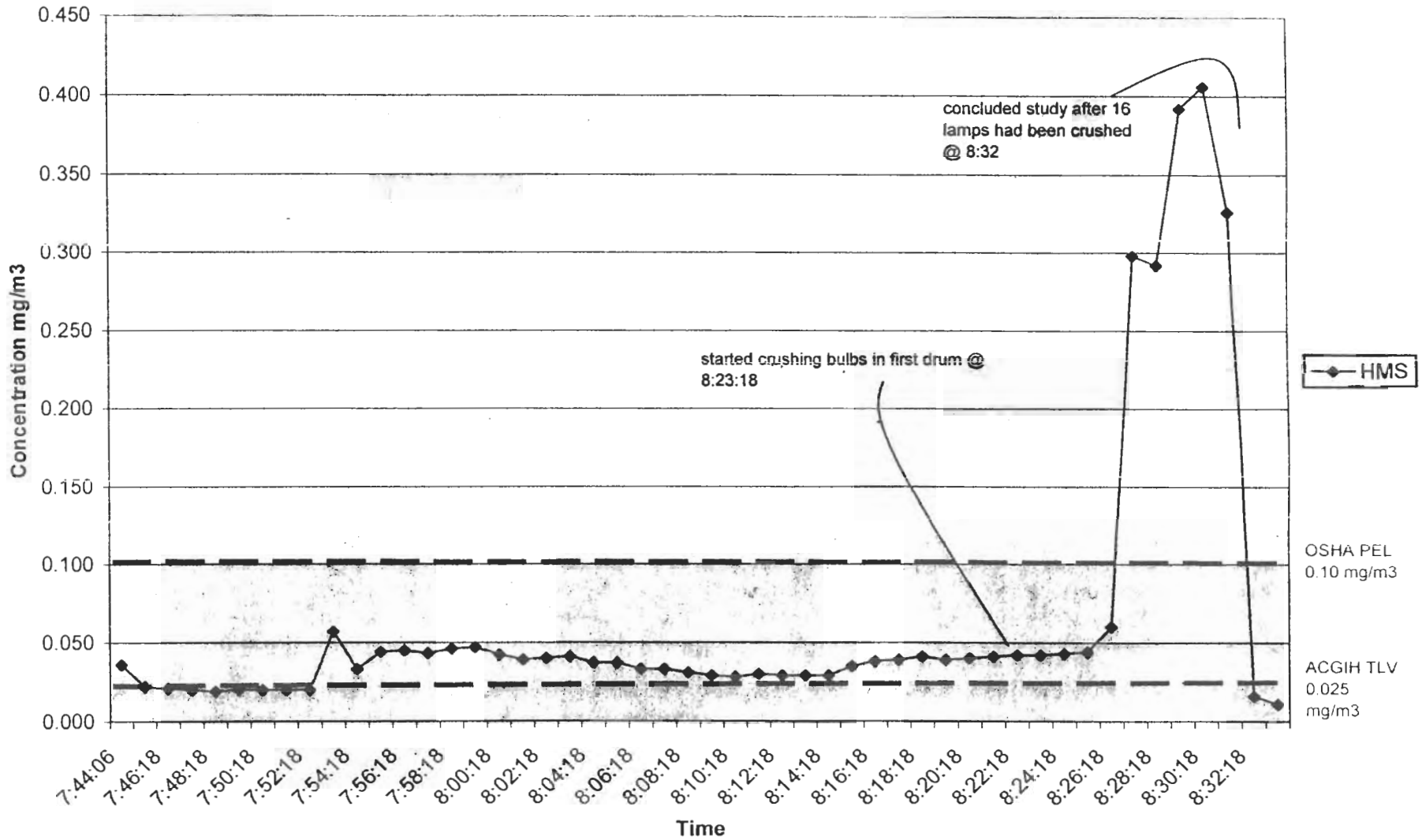
DTC Device Study Project Manager

Attachments

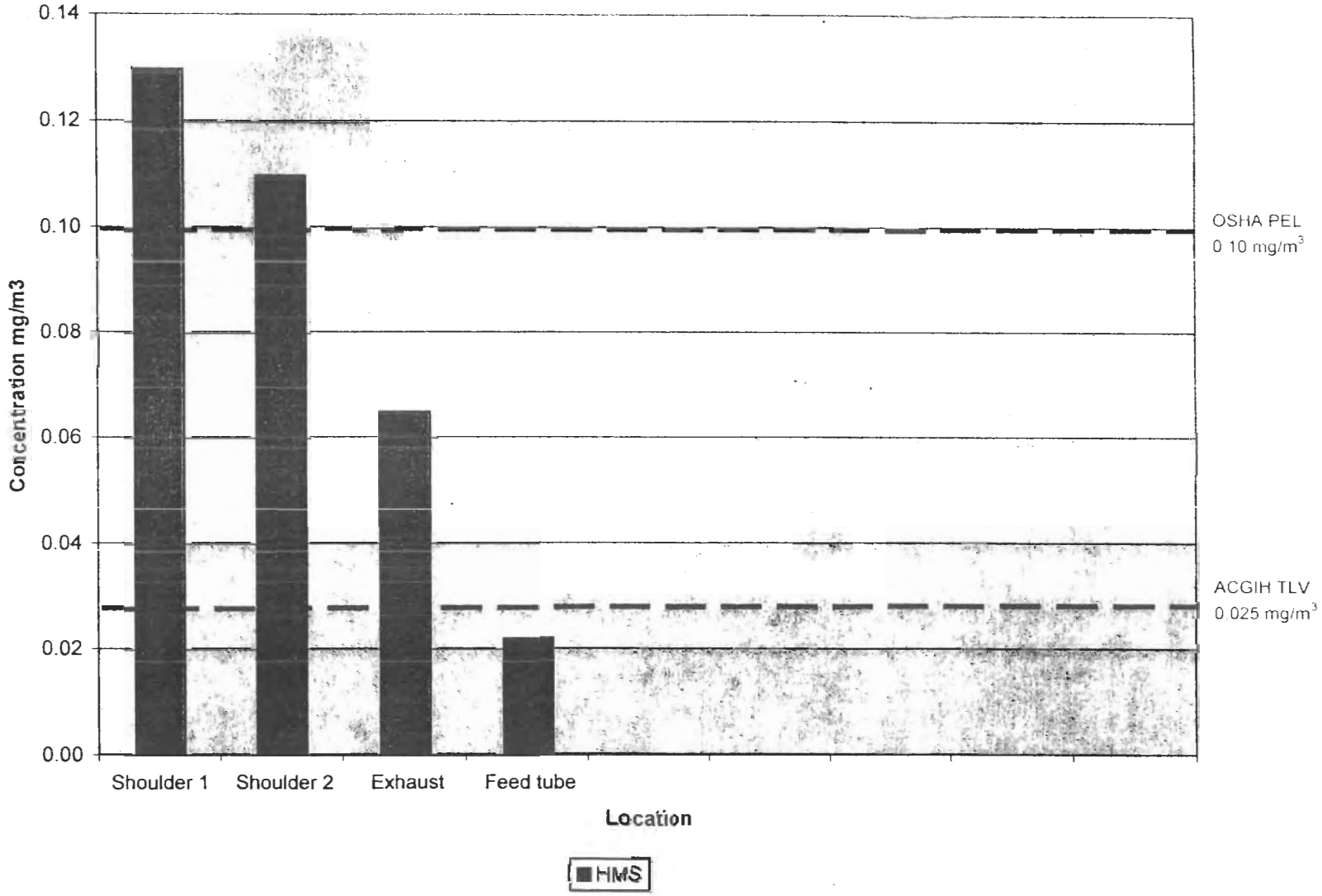
Ashland, VA AERC Facility Analytical Air Results February 2003



Phoenix, AZ EPSI Facility Jerome Hg Vapor Analyzer Direct Reading Air Results March 2003



Phoenix, AZ EPSI Facility Analytical Air Results March 2003



Tad Radzinski

03/07/2003 10:01 AM

To: hazmatspex@aol.com
cc:
Subject: Return of Your Equipment and Next Steps

Ed,

As we discussed today I have made arrangements for AERC to ship your DTC unit back to you COD via their freight company. When you receive the machine please evaluate to determine the cause of the elevated mercury emissions from your machine during the testing in Ashland, VA on February 27, 2003. I will need you to submit a written report to me with the results of your assessment. Once the machine is repaired you will need to test the machine including an analysis for mercury vapors using a Jerome or other mercury monitoring device by a qualified industrial hygienist. Please include the results of this test with your written report. We are planning to conduct the next round of testing in Phoenix, AZ during the week of March 24, 2003. I will need your report and testing results as soon as possible but no later than March 17 in order to confirm your continued particpation in this study.

The contact for the Earth Protection Services Facility in Phoenix, AZ is Mr. John Chilcott and the shipping address and phone are listed below:

10 S. 48th Ave., Suite #4
Phoenix, AZ 85063-3820
Phone: 800-414-0443 - Fax: 602-353-9285
http://www.earthpro.com/

Please let me know if you have any questions. For shipping questions please contact Mr. Tom Downing of AERC at 804-798-9295.

Thank You,

Tad Radzinski
EPA Region III
Waste Minimization Team Leader
215-814-2394

THE HAZARDOUS MATERIALS SPECIALIST, INC.

ENVIRONMENTAL TRAINING, CONSULTING AND COMPLIANCE

INDUSTRIAL • CRUISE • MARINE

December 17, 2002 ?

Mr. Tad Radzinski
Waste Minimization Team Leader
U.S. EPA Region 3
1650 Arch Street
Mail Stop 3WC11
Philadelphia, PA 19101-2029

REF: Equipment Comparison Phase I Sampling Results of THMSI Bulb Crushing Unit

Dear Tad,

Pursuant to our conversations, I apologize for the delay in providing you with this report. However, there have been several obstacles we have had to overcome. First, our unit did not arrive back here until March 13th late in the day. This was 2 full weeks from the test date in Virginia of February 27th. Once we received the unit the problem was quickly identified. However, lining up the test proved to be another challenge because of the unavailability of the Jerome 431X Meter. This combined with trucking companies not guaranteeing arrival times has made it a tough week. As you might recall, our unit did not arrive in Virginia until 1 hour before the test was to be performed. We landed at the airport when I phoned you and you said the unit had not even arrived yet and then it came in while were on the phone. Regardless of these obstacles, I am providing the following report for you and your colleagues to review.

1) At the Virginia test site, after initializing our unit it was clear to Mike and I that something was wrong. When you were feeding bulbs into the machine they were not going in smoothly and Mike determined that the feeder tube was slightly bent. Apparently, this happened during shipping or unpacking. Mike bent it back a little and the feeder tube performed more normally. It wasn't perfect but it was better. This kind of a crate for us was new and both feeder tubes will be secured in a stronger manner so this doesn't happen again.

2) Unnecessarily High Readings of Mercury. As you might recall, just prior to starting the test on our unit you and your associates switched out the drum that came

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Recieved Time Mar. 24. 10:03AM

with our unit. As explained by you, this was because we had used our unit prior to shipping it and you needed a "clean" drum for the test. In placing the unit on top of the new drum we are not clear as to whether or not the side bolts were tightened down sufficiently. We do not believe they were and I will explain why.

a) When your initial readings were coming up high we could not understand why, especially based on other tests that we did independently. At the time of the first HEPA Filter change it became obvious to us that something was wrong because the HEPA filter was almost "clean" with no powder. The bag was almost clean and light. Again, normally the bag would be filled up, especially after 150 bulbs and it would be fully expanded, which it was not.

As you continued with the test and mercury levels rose, we were almost positive there was a vacuum or seal leak in the system somewhere. At that point, we left and as you might imagine, feeling very perplexed. Tad, I'm sure you realize we spent a lot of time and money to participate in this study and feel it is very useful and necessary. I consider myself one of the pioneers regarding this technology in making it a "real world product" and in no way want you or your management to think that think this malfunction represents our standards.

3) Review of Unit Upon its Return to Florida for Evaluation. When the returned crate was opened we immediately observed the following:

a) The side set bolts were missing and the unit sitting on the drum had a good ¾" play in it. When the unit was tilted on its side, it is our finding that it slipped off the upper seal that sits on the rolled metal edge of the drum. This would cause a vacuum leak allowing the unit to draw clean air allow mercury to escape.

Corrective Action: Replace and evenly tighten unit to top of drum. Increase seal size width at inner top of unit that sits on drum. Even if the screws were not put in it could not shift far enough to split off the seal.

In addition to this, we feel that the charcoal filter my have somehow lost connection to the exhaust canister. This would account for the high readings at the exhaust point.

In addition to these corrective items we checked our CFM flow on the vacuum with and without the HEPA Filter. With the HEPA Filter removed, it is 55 cfm. With the HEPA Filter in place it drops to 30 cfm. This is considered normal. Also, the charcoal filter medium is the EPA recommended product in accordance with EPA method 245.1 specially treated charcoal #580-13.

Recieved Time Mar.24. 10:03AM

We will provide you, by fax, late this afternoon, the field test results from our unit. Also, it will be arriving in Phoenix on Monday according to Delta Freight.

If you require any additional details please advise me accordingly.

Thank you for your patience and best regards.

Edward J. Domanico
Senior Certified Hazardous Materials Manager

cc: Mike Britton

To: TAD

From: ED

Hazardous Materials Specialist, Inc.
3200 S. Andrews Avenue
Fort Lauderdale, Florida
Mercury Testing

EHE Project # 03-023
Date: March 22, 2003

Test Location: Spray Booth

Test Run Quantity: 30 Bulbs

Sample Location	Hg (mg/m3) During Process	Hg (mg/m3) After 30 Bulbs Processe with Unit running
Booth Background-	.000	.000
Charcoal Discharge-	.000-.022	.059
Hose Connections:		
Charcoal Supply-	.160	.075
Vacuum Exhaust-	.207	.159
Vacuum Suction-	.062	.059
Vacuum Hose at Drum-	.070	.052
Seals:		
Drum Seal-	.056	.055

Testing Device: Jerome 431-X Mercury Analyzer

OSHA ceiling level for Mercury is 0.1mg/m3.