

**AIR MONITORING PROGRAM (Revised 5/31/11)  
ENCYCLE DEMOLITION PROJECT  
5500 UP RIVER ROAD  
CORPUS CHRISTI, TEXAS**

ARCADIS U.S., Inc.  
711 North Carancahua  
Suite 1700  
Corpus Christi  
Texas 78401  
Tel 361 883 1353  
Fax 361 883 7565

TO: Mike Boudloche, Trustee

ENVIRONMENTAL SERVICES  
Texas Engineer License #F-533

FROM: Kenneth Brandner, P.E., P.G.

DATE: October 18, 2010; Revised 4/7/11; Revised 5/31/11

SUBJECT: Air Monitoring Program - Building and Smokestack Demolition at the former Encycle/Texas Inc. facility, 5500 Up River Road, Corpus Christi, Texas.

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The October 18, 2010 "*Air Monitoring Program*" during building and smokestack demolition activities at the former Encycle/Texas, Inc. facility at 5500 Up River Road in Corpus Christi, Texas, was approved by the U.S. Bankruptcy Court for the Southern District of Texas (Case No. 05-21304) on November 29, 2010. The Texas Commission on Environmental Quality (TCEQ) subsequently provided comments to the October 18, 2010 "*Air Monitoring Program*" in e-mails to Mike Boudloche, Trustee, on March 22, 2011; April 4, 2011; and April 5, 2011. The October 18, 2010 "*Air Monitoring Program*" was revised on April 7, 2011 to incorporate the TCEQ comments. The TCEQ subsequently provided comments to the revised April 7, 2011 "*Air Monitoring Program*" on April 28, 2011 and May 6, 2011. The April 7, 2011 "*Air Monitoring Program*" is herein revised to incorporate the TCEQ comments.

Date  
May 31, 2011

Contact:  
Kenneth Brandner

Phone:  
361-883-1353

## **1. REAL-TIME PARTICULATE AIR MONITORING**

### **1.1 General**

As detailed in Exhibit A of the Master Services Agreement between the Demolition Contractor and Mike Boudloche, Trustee, the Demolition Contractor shall undertake adequate measures to control dust during demolition activities. These dust control measures shall include water spraying/misting to control dust during demolition activities, and no wrecking balls or explosives shall be permitted to demolish any portion of the buildings, smokestack, or structures to be demolished.

Also, the Demolition Contractor shall install 10-foot-high Tarps Plus Model TP-BMT1030-1 heavy duty black polyethylene mesh tarps, or approved equal, on

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the southern side of the buildings and smokestack undergoing active asbestos abatement, hazardous waste removal, and building demolition activities. The tarps shall be positioned in an east-west direction, parallel to Up River Road, as close to the buildings as possible without impeding the safe movement of Contractor's personnel and equipment. The tarps shall extend a minimum of twenty feet beyond the western and eastern ends of the building (i.e., the tarp length shall be at least 40 feet greater than the east-west length of the building). The tarps can be removed by the Demolition Contractor when active asbestos abatement, hazardous waste removal, and demolition activities for that building have ceased.

During demolition, asbestos abatement, and hazardous waste removal activities, the Demolition Contractor shall conduct real-time particulate air monitoring using at least two on-site Met One Instruments, Inc. E-BAM portable particulate monitors. The E-BAM instruments provide real-time particulate matter (PM) measurements, including particles finer than 10 microns diameter ( $PM_{10}$ ) and particles finer than 2.5 microns diameter ( $PM_{2.5}$ ). The E-BAM detection limits meet EPA National Ambient Air Quality Standards (NAAQS), which are several orders of magnitude lower than the Occupational Safety and Health Administration (OSHA) permissible exposure level (PEL) of 5 milligrams per cubic meter of cement dust as shown on Table 1. Additional data regarding the E-BAM instruments is provided in Attachment 1.

One E-BAM instrument will be positioned along the south property boundary, between Up River Road and the area undergoing active demolition-related activities (including asbestos abatement, waste removal, and/or demolition). The second E-BAM instrument will be positioned at the upwind end of the site. For example, if the wind direction is from the north (i.e., blowing from north to south), the second E-BAM instrument will be positioned at the north property boundary adjacent to the Corpus Christi Ship Channel to obtain background particulate concentration data.

The particulate concentration measurements from the E-BAM instruments will be monitored on a continuous basis by the Demolition Contractor during each day of demolition, asbestos abatement, and/or hazardous waste removal. The E-BAM instruments will also be monitored each day that other work activities are being conducted associated with the buildings or structures at the site, such as removal of non-hazardous materials from buildings, loading of demolition debris, repositioning of demolition equipment, etc.

### 1.2 Real-Time Particulate Concentration Action Levels

The real-time particulate air monitoring will include measurement of  $PM_{2.5}$  and  $PM_{10}$  concentrations. As shown on Table 2 and Table 3, if the 30-minute average  $PM_{2.5}$  concentration in the downwind E-BAM instrument exceeds the

background PM<sub>2.5</sub> concentration by 0.035 mg/m<sup>3</sup> or more over the same time period, or if the 30-minute average PM<sub>10</sub> concentration exceeds the background PM<sub>10</sub> concentration by 0.15 mg/m<sup>3</sup> or more over the same time period, the Demolition Contractor will immediately implement increased dust suppression activities. Also, the real-time particulate concentration data will be monitored to ensure the NAAQS (24-hour average) are not exceeded. These increased dust suppression activities may include, but are not limited to the following:

- Increased wetting/misting of demolition area;
- Adding wind screens/tarps in demolition area;
- Adjusting the rate/speed and/or quantity of demolition equipment in the work area;
- Installation and/or repositioning of suction fans/blowers with particulate filters;
- Covering debris stockpiles with plastic sheeting or tarps.

### 1.3 Real-Time Particulate Concentration Stop Work Levels

As shown on Table 2 and Table 3, if the one hour (60-minute) average PM<sub>2.5</sub> concentration in the downwind E-BAM instrument exceeds the background PM<sub>2.5</sub> concentration by 0.045 mg/m<sup>3</sup> or more over the same time period, or if the one hour (60-minute) average PM<sub>10</sub> concentration exceeds the background PM<sub>10</sub> concentration by 0.15 mg/m<sup>3</sup> or more over the same time period, the Demolition Contractor will immediately stop all demolition, asbestos abatement, and hazardous waste removal work. Also, the real-time particulate concentration data will be monitored to ensure the NAAQS (24-hour average) are not exceeded. During the work stoppage period (minimum 30 minutes), the Demolition Contractor shall make dust suppression adjustments to reduce airborne particulate matter concentrations below Action Level Concentrations. The dust suppression adjustment activities may include, but are not limited to the following:

- Increased wetting/misting of demolition area;
- Adding wind screens/tarps in demolition area;
- Adjusting the rate/speed and/or quantity of demolition equipment in the work area;
- Installation and/or repositioning of suction fans/blowers with particulate filters;
- Covering debris stockpiles with plastic sheeting or tarps;
- Stopping specific dust-generating activities until wind directions and/or wind speeds are more conducive to reduced dust levels.

After the Demolition Contractor dust suppression adjustments have been implemented (minimum 30 minute period), the Demolition Contractor may resume work, and continuously monitor real-time particulate air monitoring data to ensure the dust suppression adjustments are effective. Following resumption of work, if particulate concentration Stop Work levels are again exceeded that same day, the Demolition Contractor shall immediately stop work for the remainder of that work day and design a more effective dust control program prior to resuming work the following work day.

#### 1.4 Evaluation and Adjustment of Real-Time Particulate Concentration Action Levels and Stop Work Levels

##### 1.4.1 General

In addition to collection of real-time particulate concentration data as described above, the Air Monitoring Program includes collection of air samples for speciated laboratory analyses of asbestos and metals (antimony, arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, zinc) as shown on Table 1. The analytical laboratory turnaround time to report the results of this speciated data is expedited, but ranges from 1-2 working days for asbestos, and approximately 3 working days for metals. This speciated analytical data will be correlated with the real-time particulate concentration data at least every two weeks, and when work on significant process buildings/sources (including smokestack, cell houses, Facilities 1-4) is commenced.

##### 1.4.2 Evaluation and Adjustment of Real-Time Particulate Concentration Action Levels and Stop Work Levels – Wind Direction with Northerly Component

On days when the wind has a northerly component (i.e., when the wind is blowing from Encycle toward Up River Road), the speciated analytical data (asbestos, metals) will be compared to the Action Levels and Stop Work Levels shown on Table 2. If an Action Level for asbestos or any metal exceeds the Action Level shown on Table 2, and is higher than the background (upwind) concentration for that parameter on that day, increased dust suppression/emission controls will be conducted as described below in Section 3.3.

If a Stop Work Level for asbestos or any metal exceeds the Stop Work Level shown on Table 2, and the background (upwind) concentration for that parameter on that day is also exceeded, work will be stopped for a minimum 30 minute period, and increased dust suppression/emission controls will be conducted as described below in Section 3.4. In addition, the Demolition Contractor shall immediately lower the real-time particulate PM<sub>2.5</sub> and PM<sub>10</sub> Action Levels and Stop Work Levels shown on Table 2 by an amount corresponding the Stop Work exceedance, for a minimum period of 2 weeks. For example, if the Stop Work

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level for nickel is exceeded by twice the Stop Work Level shown on Table 2, the  $PM_{2.5}$  and  $PM_{10}$  Action Levels and Stop Work Levels will be reduced by half (i.e.,  $PM_{2.5}$  and  $PM_{10}$  Action Levels will be reduced to  $0.0175 \text{ mg/m}^3$  and  $0.075 \text{ mg/m}^3$ , respectively; and the  $PM_{2.5}$  and  $PM_{10}$  Stop Work Levels will be reduced to  $0.0225 \text{ mg/m}^3$  and  $0.075 \text{ mg/m}^3$ , respectively). After the real time particulate Action Levels and Stop Work Levels have been reduced (minimum 2 week period), the Demolition Contractor shall make dust suppression adjustments, and the asbestos and metals analytical data will be evaluated during that 2 week period to determine the effectiveness of the dust suppression adjustments. If following the 2 week evaluation period, the asbestos and metal analytical data during that 2 week evaluation period did not exceed any of the Action Levels shown on Table 2, the  $PM_{2.5}$  and  $PM_{10}$  Action Levels and Stop Work Levels can be returned to the original levels shown on Table 2.

### 1.4.3 Evaluation and Adjustment of Real-Time Particulate Concentration Action Levels and Stop Work Levels – Wind Direction with Southerly Component

On days when the wind has a southerly component (i.e., when the wind is blowing from the Encycle facility toward the Corpus Christi Ship Channel), the speciated analytical data (asbestos, metals) will be compared to the Action Levels and Stop Work Levels shown on Table 3. If an Action Level for asbestos or any metal exceeds the Action Level shown on Table 3, and is higher than the background (upwind) concentration for that parameter on that day, increased dust suppression/emission controls will be conducted as described below in Section 3.3.

If a Stop Work Level for asbestos or any metal exceeds the Stop Work Level shown on Table 3, and the background (upwind) concentration for that parameter on that day is also exceeded, work will be stopped for a minimum 30 minute period, and increased dust suppression/emission controls will be conducted as described below in Section 3.4. In addition, the Demolition Contractor shall immediately lower the real-time particulate  $PM_{2.5}$  and  $PM_{10}$  Action Levels and Stop Work Levels shown on Table 3 by an amount corresponding the Stop Work exceedance, for a minimum period of 2 weeks. For example, if the Stop Work level for nickel is exceeded by twice the Stop Work Level shown on Table 3, the  $PM_{2.5}$  and  $PM_{10}$  Action Levels and Stop Work Levels will be reduced by half (i.e.,  $PM_{2.5}$  and  $PM_{10}$  Action Levels will be reduced to  $0.0175 \text{ mg/m}^3$  and  $0.075 \text{ mg/m}^3$ , respectively; and the  $PM_{2.5}$  and  $PM_{10}$  Stop Work Levels will be reduced to  $0.0225 \text{ mg/m}^3$  and  $0.075 \text{ mg/m}^3$ , respectively). After the real time particulate Action Levels and Stop Work Levels have been reduced (minimum 2 week period), the Demolition Contractor shall make dust suppression adjustments, and the asbestos and metals analytical data will be evaluated during that 2 week period to determine the effectiveness of the dust suppression adjustments. If following the 2 week evaluation period, the asbestos and metal analytical data during that 2 week evaluation period did not exceed any of the Action Levels

shown on Table 2, the PM<sub>2.5</sub> and PM<sub>10</sub> Action Levels and Stop Work Levels can be returned to the original levels shown on Table 3.

Also, provided that the NAAQS is not exceeded, when the wind direction has a southerly component from the Encycle facility toward the Corpus Christi Ship Channel, if the speciated data (asbestos, metals) concentrations consistently remain below the Action Levels during the 2 week evaluation period, the PM<sub>2.5</sub> and PM<sub>10</sub> Action Levels and Stop Work Levels may be raised by a factor of up to 3 (since the typical work period for asbestos abatement, hazardous waste removal, and asbestos abatement is 8 hours per day). For example, if the asbestos and metal concentrations during the 2 week evaluation period are all consistently less than half of the Action Levels, the PM<sub>2.5</sub> and PM<sub>10</sub> Action Levels and Stop Work Levels may be increased by a factor of 2 (provided NAAQS is not exceeded).

## **2. WIND DIRECTION AND WIND SPEED MONITORING**

### **2.1 General**

The wind direction and wind speed shall be monitored by the Demolition Contractor prior to start of work, and continuously during the work period each day of active asbestos abatement, hazardous waste removal, and/or demolition activities. The wind direction shall be monitored continuously using a combination of (1) at least one on-site wind sock (6" x 24" or larger orange airport aviation wind sock), and (2) on-line data from the TCEQ Donna Park Air Monitoring Station located within approximately 100 feet of the site on the south side of Up River Road. The wind speed shall be monitored continuously using a combination of (1) an on-site wind meter (Red Oaks Model WM-100 WindMate Wind Meter, or approved equal), and (2) the on-line data from the TCEQ Donna Park Air Monitoring Station. As shown on Attachment 2, the Donna Park Air Monitoring Station web page provides the most current hourly averaged data, including wind speed and wind direction. The Demolition Contractor will have direct access to the Dona Park Air Monitoring Station data using a computer monitor in their on-site trailer.

### **2.2 Real-Time Wind Speed and Direction Stop Work Levels**

If the wind direction has a northerly component (i.e., if the wind direction is from the Encycle facility toward Up River Road) and if the sustained wind speed (the wind speed obtained by averaging the observed values over a one minute period) exceeds 15 miles per hour, all building and structure demolition work shall cease until the sustained wind speed declines to 15 miles per hour or lower; or the wind direction shifts such that the wind direction does not have a northerly component (i.e., the wind direction is from Up River Road toward the Encycle facility).

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The demolition contractor can conduct non-dust producing activities (equipment maintenance, etc.) during these periods.

### 3. PERIMETER AIR SAMPLE COLLECTION FOR LABORATORY ANALYSES

#### 3.1 Metals Analyses

Air samples will be collected from the perimeter of the facility for laboratory analyses of metals (antimony, arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, zinc) during building demolition activities. The air samples will be collected by the Trustee's designated representative near the property boundary upwind and downwind of the facility prior to initiation of demolition activities, and at least twice weekly during active demolition, asbestos abatement, and hazardous waste removal periods. The days each week (minimum 2 days per week that work is occurring) selected for laboratory analyses of metals will be prioritized based on (1) day(s) the National Weather Service forecasts wind direction from north to south, and (2) day(s) the Demolition Contractor schedules significant building demolition work.

The air samples for metals analyses other than mercury will be 8-hour samples collected using a Gilian Model GilAir5 air sampling pump, or equal. The air sampling interval may be less than 8-hours in the event of inclement weather during the air sampling period (i.e., severe thunderstorms). The air samples will be collected by attaching laboratory-provided air sample filter cartridges (0.8-micrometer cellulose ester membrane filter cartridge) to the pump, and setting the air sample filter cartridges approximately five feet above ground level upwind and downwind of active building demolition areas. The air sample pumps for metals analyses other than mercury will be set at a flow rate of approximately 2 to 3 liters per minute for a period of 8 hours, thereby resulting in an air sample volume of approximately 960 to 1,440 liters per air sample.

The air samples for mercury analysis will be 8-hour samples collected using a Gilian Model GilAir3 air sampling pump, or equal. The air sampling interval may be less than 8-hours in the event of inclement weather during the air sampling period (i.e., severe thunderstorms). The air samples will be collected by attaching laboratory-provided air sample filter tubes (200-mg hopcalite solid sorbent tube) to the pump, and setting the air sample tube approximately five feet above ground level upwind and downwind of active building demolition areas. The air sample pumps for mercury analysis will be set at a flow rate of approximately 0.20 liters per minute for a period of 8 hours, thereby resulting in an air sample volume of approximately 96 liters per air sample.

Following air sample collection, the air sample cartridges/tubes will be securely capped, labeled, and delivered with chain of custody documentation to an

independent analytical laboratory (TestAmerica Laboratories) for metals analyses. Laboratory analyses on an expedited 3-working-day turnaround will be requested.

Metals laboratory test methods and detection limits are shown on Table 1. Metals other than mercury will be analyzed using NIOSH Method 7303, and test method details are provided in Attachment 3. Mercury will be analyzed using NIOSH Method 6009, and test method details are provided in Attachment 4.

### 3.2 Asbestos Analyses

As detailed in Exhibit A of the Master Services Agreement between the Demolition Contractor and Mike Boudloche, Trustee, the Demolition Contractor work requirements shall involve removal of the asbestos-containing materials (ACM) in the buildings and structures to be demolished by EPA-accredited asbestos abatement workers with a minimum of one on-site EPA-accredited asbestos project manager/supervisor during asbestos abatement activities.

The ACM shall be removed in accordance with applicable federal, state, and local regulations, including applicable EPA regulations given in the National Emission Standards for Hazardous Air Pollutants (NESHAPS) (40 CFR Part 61); applicable EPA regulations given in the Asbestos Hazard Emergency Response Act (AHERA) (40 CFR Part 763); applicable OSHA Regulations given in 29 CFR Parts 1910 and 1926; and applicable Texas Department of State Health Services (TDSHS) regulations given in the Texas Asbestos Health Protection Rules (TAHPR).

The Demolition Contractor shall be responsible for proper storage, loading, rigging, transportation and disposition of all friable and non-friable asbestos-containing waste generated during implementation of the building, smokestack, and structure demolition project. The ACM shall be transported to landfill(s) authorized to accept asbestos wastes.

The Demolition Contractor shall be responsible for personal air monitoring and post-abatement clearance monitoring as required by applicable Laws and Regulations. In addition, asbestos perimeter air sampling will be conducted each day of asbestos abatement. At a minimum, one perimeter air sample will be collected each day of asbestos abatement at the south property boundary between Up River Road and the building(s) undergoing asbestos abatement. The perimeter air samples for asbestos analysis will be 8-hour samples collected using a high-volume air sampling pump to obtain a detection limit of 0.001 fibers/cubic centimeter as shown on Table 1. The air sampling interval may be less than 8-hours in the event of inclement weather during the air sampling period (i.e., severe thunderstorms). The perimeter air samples will be collected by air monitoring technicians that have completed the air training requirements

of TDSHS. The perimeter air samples will be analyzed for asbestos on an expedited (1-2 day turnaround) at a TDSHS-licensed asbestos field laboratory using NIOSH Method 7400.

### 3.3 Metals and Asbestos Concentration Action Levels

Following receipt of the perimeter metals and asbestos analytical laboratory reports, the analytical data will be compared to the Action Levels shown on Tables 2 and 3. The Action Levels shown on Table 2 apply when the wind direction has a northerly component (i.e., from Encycle toward Up River Road), and the Action Levels shown on Table 3 apply when the wind direction has a southerly component (i.e., from Encycle toward the Corpus Christi Ship Channel). If the concentrations of asbestos or metals in the downwind samples exceed the Action Levels, and the background sample (upwind sample) concentration is also exceeded on that same day, the Demolition Contractor will immediately implement increased dust suppression activities. These increased dust suppression activities may include, but are not limited to the following:

- Increased wetting/misting of demolition or asbestos abatement area;
- Adding wind screens/tarps in demolition area, or adding plastic sheeting in the asbestos abatement area;
- Adjusting the rate/speed and/or quantity of demolition equipment in the work area;
- Installation and/or repositioning of suction fans/blowers with particulate filters (HEPA filters for asbestos abatement areas);
- Covering debris stockpiles with plastic sheeting or tarps.

### 3.4 Metals and Asbestos Concentration Stop Work Levels

Following receipt of the perimeter metals and asbestos analytical laboratory reports, the analytical data will be compared to the Stop Work Levels shown on Tables 2 and 3. The Stop Work Levels shown on Table 2 apply when the wind direction has a northerly component (i.e., from Encycle toward Up River Road), and the Stop Work Levels shown on Table 3 apply when the wind direction has a southerly component (i.e., from Encycle toward the Corpus Christi Ship Channel). If the concentrations of asbestos or metals in the downwind samples exceed the Stop Work Levels, and the background sample (upwind sample) concentration is also exceeded on that same day, the Demolition Contractor will immediately stop all demolition, asbestos abatement, and hazardous waste removal work. During the work stoppage period (minimum 30 minutes), the Demolition Contractor shall make dust suppression adjustments to reduce airborne particulate matter concentrations below Action Level Concentrations.

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The dust suppression adjustment activities may include, but are not limited to the following:

- Increased wetting/misting of demolition or asbestos abatement area;
- Adding wind screens/tarps in demolition area, or adding plastic sheeting in the asbestos abatement area;
- Adjusting the rate/speed and/or quantity of demolition equipment in the work area;
- Installation and/or repositioning of suction fans/blowers with particulate filters (HEPA filters for asbestos abatement areas);
- Covering debris stockpiles with plastic sheeting or tarps;
- Stopping specific dust-generating and/or asbestos abatement activities until wind directions and/or wind speeds are more conducive to reduced dust levels.

In addition to dust suppression adjustments, the Demolition Contractor shall immediately lower the real-time particulate PM<sub>2.5</sub> and PM<sub>10</sub> Action Levels and Stop Work Levels by an amount corresponding the Stop Work exceedance, for a minimum period of 2 weeks, as described above in Section 1.4. After the Demolition Contractor dust suppression adjustments have been implemented (minimum 30 minute period), the Demolition Contractor may resume work, provided the reduced real-time particulate PM<sub>2.5</sub> and PM<sub>10</sub> Stop Work Levels are not exceeded as described above in Section 1.4.

#### 4. DEMOLITION CONTRACTOR POINTS OF CONTACT

The on-site Demolition Contractor points of contact are provided in Attachment 5, including the Demolition Contractor company name, company representative, and cell phone numbers. These Demolition Contractor points of contact have the authority to implement additional dust control provisions and stop work provisions based on the air monitoring program described herein, and air monitoring data obtained by the TCEQ. The TCEQ will be contacted if changes to the points of contact in Attachment 5 are made.

Sincerely,

ARCADIS U.S., Inc



Kenneth J. Brandner, P.E., P.G.  
Geological Engineer

**Table 1. Air Monitoring Parameters (Updated 5/31/11), Encycle Demolition Project, 5500 Up River Road, Corpus Christi, Texas**

Parameter	OSHA PEL (8 hour TWA)	NAAQS	Test Method	Method		Sample Collection Frequency
				Detection	Limit <sup>g</sup>	
Asbestos <sup>a</sup>	0.1 f/cc		PCM NIOSH 7400	0.001 f/cc		During asbestos abatement activities, including daily at south property boundary and each day of building interior clearance air monitoring.
Dust/Particulates <sup>b</sup> (cement)	5 mg/m <sup>3</sup>	0.15 mg/m <sup>3</sup> (PM <sub>10</sub> )	Field Measurement (E-BAM, or equal)	0.15 mg/m <sup>3</sup> (PM <sub>10</sub> )		Continuous real-time measurements during demolition at south property boundary and at upwind end of Encycle site.
Antimony <sup>b</sup>	0.5 mg/m <sup>3</sup>	0.035 mg/m <sup>3</sup> (PM <sub>2.5</sub> )	NIOSH 7303	0.005		At least twice weekly upwind and downwind during demolition.
Arsenic <sup>c</sup>	0.01 mg/m <sup>3</sup>		NIOSH 7303	0.0001		At least twice weekly upwind and downwind during demolition.
Barium <sup>b</sup>	0.5 mg/m <sup>3</sup>		NIOSH 7303	0.00167		At least twice weekly upwind and downwind during demolition.
Cadmium <sup>d</sup>	0.005 mg/m <sup>3</sup>		NIOSH 7303	0.0000833		At least twice weekly upwind and downwind during demolition.
Chromium <sup>b</sup>	0.5 mg/m <sup>3</sup>		NIOSH 7303	0.0036		At least twice weekly upwind and downwind during demolition.
Copper <sup>b</sup>	1 mg/m <sup>3</sup>		NIOSH 7303	0.00167		At least twice weekly upwind and downwind during demolition.
Lead <sup>e</sup>	0.05 mg/m <sup>3</sup>	0.00015 mg/m <sup>3</sup> (f)	NIOSH 7303	0.00015		At least twice weekly upwind and downwind during demolition.
Mercury	0.05 mg/m <sup>3</sup>		NIOSH 6009	0.00025		At least twice weekly upwind and downwind during demolition.
Nickel <sup>b</sup>	1 mg/m <sup>3</sup>		NIOSH 7303	0.00015		At least twice weekly upwind and downwind during demolition.
Selenium <sup>b</sup>	0.2 mg/m <sup>3</sup>		NIOSH 7303	0.002		At least twice weekly upwind and downwind during demolition.
Silver <sup>b</sup>	0.01 mg/m <sup>3</sup>		NIOSH 7303	0.0001		At least twice weekly upwind and downwind during demolition.
Zinc <sup>b</sup>	15 mg/m <sup>3</sup>		NIOSH 7303	0.00833		At least twice weekly upwind and downwind during demolition.
f/cc	Fibers per cubic centimeter					
mg/m <sup>3</sup>	Milligrams per cubic meter					
PEL	Permissible exposure limit					
TWA	Time-weighted average					
NAAQS	National Ambient Air Quality Standards					
PM <sub>2.5</sub> and PM <sub>10</sub>	NAAQS particulate matter (in micrometers diameter) 24-hour average standard. Annual standard (arithmetic mean) for PM <sub>2.5</sub> is 0.015 mg/m <sup>3</sup> .					
a	29 CFR 1910.1001(c)					
b	29 CFR 1910.1000. OSHA PEL for portland cement (respirable dust) is 5 mg/m <sup>3</sup> .					
c	29 CFR 1910.1018					
d	29 CFR 1910.1027					
e	29 CFR 1910.1025					
f	NAAQS Rolling 3-Month Average; Quarterly Average is 0.0015 mg/m <sup>3</sup> .					
g	Method detection limit varies with air sample volume. Limits shown are generally maximum values.					

**Table 2. Air Monitoring Action Levels and Stop Work Levels during Encycle Demolition Project - Wind Direction with Northerly Component, 5500 Up River Road, Corpus Christi, Texas**

Parameter	OSHA PEL (8 hour TWA)	NAAQS	South Property		Sample Collection Frequency
			Boundary Action Level to Increase	South Property Boundary Stop Work Level <sup>b</sup>	
Asbestos	0.1 f/cc	0.01 f/cc	0.01 f/cc	0.01 f/cc	Daily during asbestos abatement activities.
Dust/Particulates (cement)	5 mg/m <sup>3</sup>	0.15 mg/m <sup>3</sup> (PM <sub>10</sub> ) <sup>c</sup> 0.035 mg/m <sup>3</sup> (PM <sub>2.5</sub> ) <sup>c</sup>	0.15 mg/m <sup>3</sup> (PM <sub>10</sub> ) <sup>c</sup> 0.045 mg/m <sup>3</sup> (PM <sub>2.5</sub> ) <sup>d</sup>	0.15 mg/m <sup>3</sup> (PM <sub>10</sub> ) <sup>d</sup> 0.045 mg/m <sup>3</sup> (PM <sub>2.5</sub> ) <sup>d</sup>	Continuous real-time measurements during demolition, asbestos abatement, and hazardous waste removal.
Antimony	0.5 mg/m <sup>3</sup>	0.005 mg/m <sup>3</sup> (f)	0.005 mg/m <sup>3</sup> (f)	0.005 mg/m <sup>3</sup> (f)	At least twice weekly during demolition, asbestos abatement, and hazardous waste removal.
Arsenic	0.01 mg/m <sup>3</sup>	0.0001 mg/m <sup>3</sup> (f)	0.0001 mg/m <sup>3</sup> (f)	0.0001 mg/m <sup>3</sup> (f)	At least twice weekly during demolition, asbestos abatement, and hazardous waste removal.
Barium	0.5 mg/m <sup>3</sup>	0.005 mg/m <sup>3</sup> (f)	0.005 mg/m <sup>3</sup> (f)	0.005 mg/m <sup>3</sup> (f)	At least twice weekly during demolition, asbestos abatement, and hazardous waste removal.
Cadmium	0.005 mg/m <sup>3</sup>	0.0001 mg/m <sup>3</sup> (f)	0.0001 mg/m <sup>3</sup> (f)	0.0001 mg/m <sup>3</sup> (f)	At least twice weekly during demolition, asbestos abatement, and hazardous waste removal.
Chromium	0.5 mg/m <sup>3</sup>	0.0036 mg/m <sup>3</sup> (f)	0.0036 mg/m <sup>3</sup> (f)	0.0036 mg/m <sup>3</sup> (f)	At least twice weekly during demolition, asbestos abatement, and hazardous waste removal.
Copper	1 mg/m <sup>3</sup>	0.01 mg/m <sup>3</sup> (f)	0.01 mg/m <sup>3</sup> (f)	0.01 mg/m <sup>3</sup> (f)	At least twice weekly during demolition, asbestos abatement, and hazardous waste removal.
Lead	0.05 mg/m <sup>3</sup>	0.00015 mg/m <sup>3</sup> (e)	0.00015 mg/m <sup>3</sup>	0.00015 mg/m <sup>3</sup> (e)	At least twice weekly during demolition, asbestos abatement, and hazardous waste removal.
Mercury	0.05 mg/m <sup>3</sup>	0.00025 mg/m <sup>3</sup> (f)	0.00025 mg/m <sup>3</sup> (f)	0.00025 mg/m <sup>3</sup> (f)	At least twice weekly during demolition, asbestos abatement, and hazardous waste removal.
Nickel	1 mg/m <sup>3</sup>	0.00015 mg/m <sup>3</sup> (f)	0.00015 mg/m <sup>3</sup> (f)	0.00015 mg/m <sup>3</sup> (f)	At least twice weekly during demolition, asbestos abatement, and hazardous waste removal.
Selenium	0.2 mg/m <sup>3</sup>	0.002 mg/m <sup>3</sup> (f)	0.002 mg/m <sup>3</sup> (f)	0.002 mg/m <sup>3</sup> (f)	At least twice weekly during demolition, asbestos abatement, and hazardous waste removal.
Silver	0.01 mg/m <sup>3</sup>	0.0001 mg/m <sup>3</sup> (f)	0.0001 mg/m <sup>3</sup> (f)	0.0001 mg/m <sup>3</sup> (f)	At least twice weekly during demolition, asbestos abatement, and hazardous waste removal.
Zinc	15 mg/m <sup>3</sup>	0.02 mg/m <sup>3</sup> (f)	0.02 mg/m <sup>3</sup> (f)	0.02 mg/m <sup>3</sup> (f)	At least twice weekly during demolition, asbestos abatement, and hazardous waste removal.

f/cc  
mg/m<sup>3</sup>  
PEL  
TWA  
National Ambient Air Quality Standards

NAAQS particulate matter (in micrometers diameter) 24-hour average standard. Annual standard (arithmetic mean) for PM<sub>2.5</sub> is 0.015 mg/m<sup>3</sup>.

<sup>a</sup> These Action Levels apply on days when wind direction has a northerly component (i.e., when the wind is blowing from Encycle toward Up River Road). If an Action Level is exceeded, and the background (upwind sample) concentration is also exceeded on that same day, increased dust suppression/emission controls will be conducted.

<sup>b</sup> These Stop Work Levels apply on days when wind direction has a northerly component (i.e., when the wind is blowing from Encycle toward Up River Road). If the Stop Work Level is exceeded, and the background (upwind sample) concentration is also exceeded on that same day demolition, hazardous waste removal, and asbestos abatement work will be stopped for a period of at least 30 minutes. During the work stoppage

**Table 2. Air Monitoring Action Levels and Stop Work Levels during Encycle Demolition Project - Wind Direction with Northerly Component, 5500 Up River Road, Corpus Christi, Texas**

period, the Demolition Contractor shall make dust suppression adjustments to reduce airborne particulate matter concentrations below Action Level concentrations. In addition, if the asbestos or one or more metal concentrations exceed Stop Work Levels, since these parameters are not analyzed real-time, the Demolition Contractor shall immediately lower the real-time particulate  $PM_{2.5}$  and  $PM_{10}$  Action Levels and Stop Work Levels by an amount corresponding to the Stop Work Level exceedance. For example, if the Stop Work level for nickel is exceeded by twice the Stop Work Level shown on this table, the  $PM_{2.5}$  and  $PM_{10}$  Action Levels and Stop Work Levels will be reduced by half (i.e.,  $PM_{2.5}$  and  $PM_{10}$  Action Levels will be reduced to  $0.0175 \text{ mg/m}^3$  and  $0.075 \text{ mg/m}^3$ , respectively; and the  $PM_{2.5}$  and  $PM_{10}$  Stop Work Levels will be reduced to  $0.0225 \text{ mg/m}^3$  and  $0.075 \text{ mg/m}^3$ , respectively). After the real time particulate Action Levels and Stop Work Levels have been reduced (minimum 2 week period), the Demolition Contractor shall make dust suppression adjustments, and the asbestos and metals analytical data will be evaluated every 2 weeks to determine the effectiveness of the dust suppression adjustments. If following the 2 week evaluation period, the asbestos and metal analytical data during that 2 week period show the asbestos and metals concentrations did not exceed any of the Action Levels, the  $PM_{2.5}$  and  $PM_{10}$  Action Levels and Stop Work Levels can be returned to the original levels shown on this table.

c Average over 30 minute period.  $0.015 \text{ mg/m}^3$  annual average for  $PM_{2.5}$  shall not be exceeded.

d Average over one hour period.

e NAAQS Rolling 3-Month Average; Quarterly Average is  $0.0015 \text{ mg/m}^3$ .

f Texas Effects Screening Levels (ESLs) - short term ESLs (1-hour averaging period)

**Table 3. Air Monitoring Action Levels and Stop Work Levels during Encycle Demolition Project - Wind Direction with Southerly Component, 5500 Up River Road, Corpus Christi, Texas**

Parameter	North, East and West Property		North, East and West Property Boundary		Sample Collection Frequency
	OSHA PEL (8 hour TWA)	NAAQS <sup>a</sup>	Dust Suppression/ Emission Controls <sup>b</sup>	Stop Work Level <sup>c</sup>	
Asbestos	0.1 f/cc	0.01 f/cc	0.01 f/cc	0.1 f/cc	Daily during asbestos abatement activities.
Dust/Particulates (cement)	5 mg/m <sup>3</sup>	0.15 mg/m <sup>3</sup> (PM <sub>10</sub> )	0.15 mg/m <sup>3</sup> (PM <sub>10</sub> ) <sup>d</sup>	0.15 mg/m <sup>3</sup> (PM <sub>10</sub> ) <sup>e</sup>	Continuous real-time measurements during demolition, asbestos abatement, and hazardous waste removal.
Antimony	0.5 mg/m <sup>3</sup>	0.035 mg/m <sup>3</sup> (PM <sub>2.5</sub> )	0.025 mg/m <sup>3</sup>	0.05 mg/m <sup>3</sup>	At least twice weekly during demolition, asbestos abatement, and hazardous waste removal.
Arsenic	0.01 mg/m <sup>3</sup>		0.0005 mg/m <sup>3</sup>	0.001 mg/m <sup>3</sup>	At least twice weekly during demolition, asbestos abatement, and hazardous waste removal.
Barium	0.5 mg/m <sup>3</sup>		0.025 mg/m <sup>3</sup>	0.05 mg/m <sup>3</sup>	At least twice weekly during demolition, asbestos abatement, and hazardous waste removal.
Cadmium	0.005 mg/m <sup>3</sup>		0.00025 mg/m <sup>3</sup>	0.0005 mg/m <sup>3</sup>	At least twice weekly during demolition, asbestos abatement, and hazardous waste removal.
Chromium	0.5 mg/m <sup>3</sup>		0.025 mg/m <sup>3</sup>	0.05 mg/m <sup>3</sup>	At least twice weekly during demolition, asbestos abatement, and hazardous waste removal.
Copper	1 mg/m <sup>3</sup>		0.05 mg/m <sup>3</sup>	0.1 mg/m <sup>3</sup>	At least twice weekly during demolition, asbestos abatement, and hazardous waste removal.
Lead	0.05 mg/m <sup>3</sup>	0.00015 mg/m <sup>3</sup> (f)	0.0025 mg/m <sup>3</sup>	0.005 mg/m <sup>3</sup>	At least twice weekly during demolition, asbestos abatement, and hazardous waste removal.
Mercury	0.05 mg/m <sup>3</sup>		0.0025 mg/m <sup>3</sup>	0.005 mg/m <sup>3</sup>	At least twice weekly during demolition, asbestos abatement, and hazardous waste removal.
Nickel	1 mg/m <sup>3</sup>		0.05 mg/m <sup>3</sup>	0.1 mg/m <sup>3</sup>	At least twice weekly during demolition, asbestos abatement, and hazardous waste removal.
Selenium	0.2 mg/m <sup>3</sup>		0.01 mg/m <sup>3</sup>	0.02 mg/m <sup>3</sup>	At least twice weekly during demolition, asbestos abatement, and hazardous waste removal.
Silver	0.01 mg/m <sup>3</sup>		0.0005 mg/m <sup>3</sup>	0.001 mg/m <sup>3</sup>	At least twice weekly during demolition, asbestos abatement, and hazardous waste removal.
Zinc	15 mg/m <sup>3</sup>		0.75 mg/m <sup>3</sup>	1.5 mg/m <sup>3</sup>	At least twice weekly during demolition, asbestos abatement, and hazardous waste removal.

f/cc  
mg/m<sup>3</sup>  
PEL  
TWA

Fibers per cubic centimeter  
Milligrams per cubic meter  
Permissible exposure limit  
Time-weighted average

NAAQS  
National Ambient Air Quality Standards

PM<sub>2.5</sub> and PM<sub>10</sub>  
NAAQS particulate matter (in micrometers diameter) 24-hour average standard. Annual standard (arithmetic mean) for PM<sub>2.5</sub> is 0.015 mg/m<sup>3</sup>.

<sup>a</sup> Operations at Encycle shall not contribute to NAAQS exceedences. Since the lead air sample analytical data is reported by the analytical laboratory on a 3-working-day turnaround, if the analytical laboratory data shows that the NAAQS or Stop Work Level for lead was exceeded, and the background (upwind sample) lead concentration is also exceeded on that same day, demolition, hazardous waste removal, and asbestos abatement work will be stopped for a period of at least 30 minutes to make dust suppression adjustments. In addition, the Demolition Contractor shall immediately lower the real-time particulate PM<sub>2.5</sub> and PM<sub>10</sub> Action Levels and Stop Work Levels by an amount corresponding to the Stop Work Level

### Table 3. Air Monitoring Action Levels and Stop Work Levels during Encycle Demolition Project - Wind Direction with Southerly Component, 5500 Up River Road, Corpus Christi, Texas

- b exceedance for lead.  
These Action Levels apply on days when wind direction has a southerly component (i.e., when the wind is blowing toward the Corpus Christi Ship Channel). If an Action Level is exceeded, and the background (upwind sample) concentration is also exceeded on that same day, increased dust suppression/emissions controls will be conducted.
- c These Stop Work Levels apply on days when wind direction has a southerly component (i.e., when the wind is blowing toward the Corpus Christi Ship Channel). If a Stop Work Level is exceeded, and the background (upwind sample) concentration is also exceeded on that same day, demolition, hazardous waste removal, and asbestos abatement work will be stopped for a period of at least 30 minutes. During the work stoppage period, the Demolition Contractor shall make dust suppression adjustments to reduce airborne particulate matter concentrations below Action Level concentrations. In addition, if the asbestos or one or more metal concentrations exceed Stop Work Levels, since these parameters are not analyzed real-time, the Demolition Contractor shall immediately lower the real-time particulate  $PM_{2.5}$  and  $PM_{10}$  Action Levels and Stop Work Levels by an amount corresponding to the Stop Work Level exceedance. For example, if the Stop Work level for nickel is exceeded by twice the Stop Work Level shown on this table, the  $PM_{2.5}$  and  $PM_{10}$  Action Levels and Stop Work Levels will be reduced by half (i.e.,  $PM_{2.5}$  and  $PM_{10}$  Action Levels will be reduced to  $0.0175 \text{ mg/m}^3$  and  $0.075 \text{ mg/m}^3$ , respectively; and the  $PM_{2.5}$  and  $PM_{10}$  Stop Work Levels will be reduced to  $0.0225 \text{ mg/m}^3$  and  $0.075 \text{ mg/m}^3$ , respectively). After the real time particulate Action Levels and Stop Work Levels have been reduced (minimum 2 week period), the Demolition Contractor shall make dust suppression adjustments, and the asbestos and metals analytical data will be evaluated every 2 weeks to determine the effectiveness of the dust suppression adjustments. If following the 2 week evaluation period, the asbestos and metal analytical data during that 2 week period show the asbestos and metals concentrations did not exceed any of the Action Levels, the  $PM_{2.5}$  and  $PM_{10}$  Action Levels and Stop Work Levels can be returned to the original levels shown on this table. Also, provided that the NAAQS is not exceeded, if the specified data (asbestos, metals) concentrations consistently remain below the Action Levels during the 2 week evaluation period, the  $PM_{2.5}$  and  $PM_{10}$  Action Levels and Stop Work Levels may be raised by a factor of up to 3 (since the typical work period is 8 hours per day).  
For example, if the asbestos and metal concentrations during the 2 week evaluation period are all consistently less than half the Action Levels, the  $PM_{2.5}$  and  $PM_{10}$  Action Levels and Stop Work Levels may be increased by a factor of 2 (provided NAAQS is not exceeded).
- d Average over 30 minute period.  $0.015 \text{ mg/m}^3$  annual average for  $PM_{2.5}$  shall not be exceeded.
- e Average over one hour period.
- f NAAQS Rolling 3-Month Average; Quarterly Average is  $0.0015 \text{ mg/m}^3$

**ATTACHMENT 1**

**E-BAM PORTABLE PARTICULATE MONITOR DETAILS**

# E-BAM



## E-BAM is a complete measurement system it comes with the following standard components:

- 6 Channel Datalogger
- Internal DC Vacuum Pump
- Real-Time Concentration
- PM10 Dichot Head
- Aluminum Tripod
- Ambient Temperature Sensor
- Volumetric Flow Control
- Weatherproof Enclosure
- Filter Temperature
- Filter RH
- Filter Pressure
- Calibration Membranes

## Options and Accessories

- Flow Calibrator
- WMS Impactor
- PM2.5 Sharp-Cut Cyclone
- TSP Inlet, External AC Vacuum Pump
- Power Solar Panel Array, AC Power Supply
- Sensor inputs Wind Speed Sensor,
- Wind Direction Sensor, Ambient RH,
- Ambient Pressure
- Communications Transfer Module, Modem,
- Radio Modem
- Calibration, Zero Calibration Kit, Flow Calibration Kit

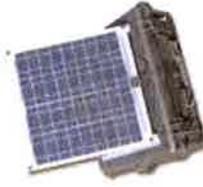
## Specifications

Range	0 - 100 mg per cubic meter
Accuracy	2.5 ug in 24 hour period
Measurement Cycle	Standard @ 60 Minutes, actual sampling time 59 Minutes
Beta Source	C14, less than 75 microcurie, Half life of 5730 years
Detector:	Scintillation probe
Analog Output	0-1V, 0-5V, 0-10V selectable, 12 bit accuracy
Filter Tape	Continuous glass fiber filter
Inlet	PM10 impactor type
Flow Rate:	16.7 liters per minute, adjustable
Flow accuracy	+/- 3% of reading, volumetric flow controlled
Sample Pump	Dual diaphragm type, internally mounted
Alarm Signals	Filter, flow, power and operation failure
Input Power	12 Volts DC @ 36 Watts, 25°C
Alarm Contact Closure	2 Amp @ 240 VAC
Operating Temperature	-30 Deg C to 40 Deg C
Enclosure	

BX-807	PM 2.5 Sharp Cut Cyclone
390062	Battery, 12VDC 100AHR
390052	Battery Charger, 12 VDC @ 4 A / .34 hold AC adaptor, 100-240 VAC in, 12VDC @ 6A,
591	Wind speed sensor
590	Wind direction sensor
592	Temperature sensor
593	Humidity sensor
	MicroMet Plus Software

## Consumables Part Number

Filter tape, roll 460130



Sensor inputs (photo of sensor array), Wind Speed Sensor.

## Met One Instruments, Inc.

Corporate Sales & Service: 1850 Washington Blvd., Grants Pass, Oregon 97526 • Tel (541) 471-7111 • Fax (541) 471-7116  
Regional Sales & Service: 3205 Main Street, Suite 109, Rowlett, Texas 75088 • Tel (972) 412-4147 • Fax (972) 412-4716

<http://www.metone.com> • [metone@metone.com](mailto:metone@metone.com)

## The Met One E-BAM is a portable real-time beta gauge traceable to US-EPA requirements for automated PM 2.5 and PM 10 measurement.

The Met One E-BAM has been built to satisfy users, regulators and those from the health community by providing truly accurate, precise, real time measurement of fine particulate matter automatically. In addition, it is rugged, portable battery operated, deployable in 15 minutes.

### The E-BAM offers the following advanced features:

1. Accuracy and precision consistent with US-EPA requirements for Class III designation for PM 2.5.
2. Real-time, accurate results regardless of season or geographic location without correction factors.
3. True ambient sampling provides accurate measurement of semi-volatile nitrates and organic compounds.
4. Lightweight, ruggedized construction may be easily mounted on a tripod in minutes.
5. Rugged all-weather construction allows for true ambient sampling.
6. Will operation for either AC or DC power, battery and solar operation available.



**Met One Instruments, Inc.**



### Continuous Monitoring

E-BAM automates particulate measurement by continuously sampling and reporting particulate concentration. Data is updated every second, and data records updated every minute. E-BAM eliminates the old process of filter collection and manual filter weighing, and eliminates the need for more expensive, high maintenance instruments. Today, with the adaptation of Beta Attenuation to ambient monitoring this process became simple streamlined and inexpensive.

### About Accuracy

Real-time accurate, reliable, and repeatable measurement of ambient fine particulate matter has been the elusive goal of environmental regulators and health professionals for many years. Met One Instruments has developed advanced particulate monitoring instrumentation which will meet or exceed all US-EPA requirements for Class-III PM2.5 designation, is reliable, and is easy to operate. It will also report results in real time and is automatic thereby eliminating the need for high levels of human intervention.

Because sampling occurs under true ambient conditions semi-volatile organic compounds and nitrates are easily detected thereby avoiding under measurement.

### Continuous Sampling

#### Mobility

E-BAM is a lightweight portable instrument that operates directly in hostile environments without exterior enclosure. E-BAM is a very robust portable sampler system that is easily installed in less than 15 minutes. No other sampler matches the portability and flexibility of the E-BAM.

#### Set up

Quick setup of the E-BAM is assured with a series of prompts instructing the installer on the sequence to follow. Then the E-BAM performs a series of self test diagnostics and alerts the installer of any corrective action, upon completion the E-BAM automatically places itself in normal operate mode.

#### Particulate size selection

Size selective concentration measurements are made using a variety of sampling inlets, the E-BAM may be supplied with TSP (Total Suspended Particulate), PM-10, PM 2.5 or PM 1 inlets. Flow dependent cut points in the size selective inlets are maintained using integral flow meter, pressure sensor and ambient temperature sensor.

The PM-10 inlet removes particles larger than 10 microns, the inlet is not affected by wind speed and wind direction. For PM 2.5 or PM 1 secondary size selection is made using a second downstream inlet.

### Construction etc.

The standard configuration of the E-BAM is a self-contained environmentally sealed aluminum enclosure placed on a rugged tripod. This system can be permanently placed on rooftops, near roads, at industrial sites or rapidly deployed to monitor emergency situations.

'E-' represents Environment Proof instrument, E-BAM has been specifically designed to work in hostile environments without additional protection.

#### Direct Field Reporting

Collecting real time or historical particulate data from a field site has never been easier. Advanced communication options include cellular phone, Line of Sight Radio, and for very remote sites satellite communications are now available. E-BAM also supports the full line of standard MET ONE options, such as data transfer module, phone modem, and direct communications to a portable computer.

E-BAM data is recorded internally and may be retrieved using one of the communication options or data may be forwarded to third party data acquisition system.

MicroMet Plus Software supports the E-BAM and provides a complete communication, data base and reporting modules with charting.

#### Digital, Analog and Alarm Outputs

The E-BAM provides both continuous digital and analog outputs, alarm output may be set for any concentration level. Analog output is selectable to either voltage or current, digital output is supplied as RS-232 or USB.

#### Reporting modes

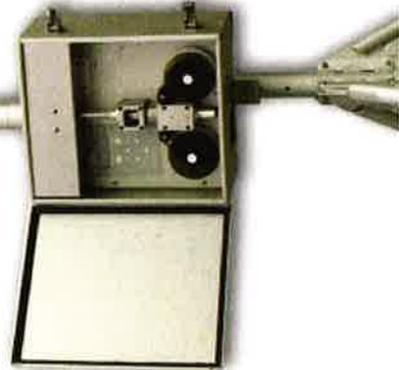
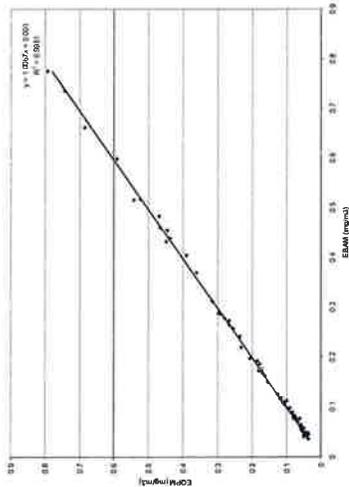
The internal data logger can store up over 200 days of concentration data at one hour sample times, and collect data from six other measurements at the same time! Both digital and analog outputs are included to enable users to connect to other data recording systems and to network with other monitors.

#### Easy to Operate

E-BAM has been programmed to operate, at all times, except during calibration verification. Current data, historical data, and status information are available at all times without interrupting normal E-BAM operation.

#### Data Validation

The operator may select various criteria for data validation, including deviation from rolling average, high value excursions, power failure and others. If an error occurs it is entered into the error log with date, time and type of error.



**ATTACHMENT 2**

**DONA PARK AIR MONITORING STATION DATA**

## Brandner, Ken

---

**From:** Omar Valdez [Omar.Valdez@tceq.texas.gov]  
**Sent:** Friday, February 11, 2011 12:06 PM  
**To:** Backens, Charmaine; Brandner, Ken; mboudloche@ch13boudloche.com; Rodriguez, Jacquelyn; Shafford, Bill  
**Subject:** Dona Park Air Monitoring Station  
**Attachments:** Omar Valdez.vcf

Good afternoon,

Per our discussion yesterday, below is the link to the Dona Park air monitoring station that displays the meteorological data.

Let me know of any questions or if you are unable to open the link.

[http://www.tceq.state.tx.us/cgi-bin/compliance/monops/daily\\_summary.pl?cams=0199](http://www.tceq.state.tx.us/cgi-bin/compliance/monops/daily_summary.pl?cams=0199)

Thanks!

Omar Valdez  
Project Manager  
Superfund/SSDAP Section  
Remediation Division  
Texas Commission on Environmental Quality  
512-239-6858



 Please consider the environment before printing this email.



**SITE SEARCH:**  
 please enter search phrase

**SUBJECT INDEX**  
 > Air > Water > Waste  
 > Search TCEQ Data  
 > Agency Organization Map

[Air Quality Maps](#)   [Data Reports](#)   [AutoGC](#)   [Water Data](#)   [Site Info](#)

### Dona Park C635/AF199/F299 Data by Site by Date (all parameters)

Use this form to retrieve hourly data collected at Dona Park C635/AF199/F299. Although this is the most current data, it is not considered official until it has been certified by the technical staff. This information is updated hourly.

This web page provides the most current hourly averaged data available. Our convention for time-tagging data is the beginning of each hour. For example, values shown for the noon hour are based on measurements taken from noon to 1:00 p.m. The noon average will not be calculated until after 1:00 p.m. The noon average will then be available on our external server from 1:15 p.m. to 1:30 p.m. This results in an apparent one-hour time lag in the data. We also present our data in Local Standard Time for each measuring site. During Daylight Savings, this introduces another apparent one-hour time lag in the data.

Use the controls below to select a different date or time format. Click on the Generate Report button once you have made your selections. Click on the Plot Data button once the tabular report has been generated to open a separate window containing data plots.

CAMS 199   Dona Park C635/AF199/F299  

Month:   Day:   Year:   Time Format:

April   6   2011   12 Hour (AM/PM)     

Highlight validated data

The table below contains hourly averages for all the pollutants and meteorological conditions measured at Dona Park C635/AF199/F299 for **Wednesday, April 6, 2011**. All times shown are in CST.

Parameter Measured	Morning										Parameter Measured	POC
	Mid	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00		
<b>Sulfur Dioxide</b>	0.1	<b>0.0</b>	0.0	0.0	0.0	0.0	0.0	<b>0.2</b>	NA	NA	<b>Sulfur Dioxide</b>	1 <sup>R</sup>
<b>Hydrogen Sulfide</b>	<b>0.09</b>	0.14	0.12	0.17	0.14	<b>0.18</b>	SPN	SPN	NA	NA	<b>Hydrogen Sulfide</b>	1 <sup>R</sup>
<b>Total Non-Methane Organic Compounds</b>	1.45	<b>1.03</b>	1.08	1.16	2.07	2.11	18.37	<b>147.95</b>	NA	NA	<b>Total Non-Methane Organic Compounds</b>	1
<b>Methane</b>	<b>1874.07</b>	1874.49	1879.06	1874.07	1884.06	1931.07	1935.23	<b>2033.85</b>	NA	NA	<b>Methane</b>	1
<b>Wind Speed</b>	4.7	4.7	<b>5.1</b>	4.5	3.9	3.5	<b>2.9</b>	3.1	NA	NA	<b>Wind Speed</b>	1
	5.3	5.0	<b>5.4</b>	5.0	4.0	3.8	2.9	<b>2.9</b>	NA	NA		2
<b>Resultant Wind Speed</b>	4.4	4.5	<b>4.8</b>	4.2	3.6	3.3	<b>2.5</b>	2.6	NA	NA	<b>Resultant Wind Speed</b>	1
	5.0	4.7	<b>5.2</b>	4.6	3.7	3.6	2.6	<b>2.3</b>	NA	NA		2
<b>Resultant Wind Direction</b>	153	144	<b>143</b>	157	159	152	164	<b>188</b>	NA	NA	<b>Resultant Wind Direction</b>	1
	151	147	<b>144</b>	155	157	151	164	<b>192</b>	NA	NA		2
<b>Maximum Wind Gust</b>	<b>11.0</b>	9.5	10.2	9.8	8.2	7.4	<b>6.9</b>	8.9	NA	NA	<b>Maximum Wind Gust</b>	1
	10.7	9.8	10.1	<b>11.5</b>	7.9	7.3	<b>6.0</b>	6.1	NA	NA		2
<b>Std. Dev. Wind Direction</b>	22	<b>17</b>	18	23	21	19	27	<b>32</b>	NA	NA	<b>Std. Dev. Wind Direction</b>	1
	20	19	<b>18</b>	22	22	20	28	<b>38</b>	NA	NA		2
<b>Outdoor Temperature</b>	61.7	61.2	61.2	61.3	61.0	<b>61.0</b>	61.5	<b>63.7</b>	NA	NA	<b>Outdoor Temperature</b>	1
	61.7	61.1	61.1	61.3	60.8	60.5	<b>59.9</b>	<b>63.1</b>	NA	NA		2
<b>Relative Humidity</b>	<b>71.1</b>	73.9	75.5	76.9	79.1	81.3	<b>83.4</b>	81.2	NA	NA	<b>Relative Humidity</b>	1
Parameter Measured	Mid	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	Parameter Measured	POC
Morning												
Maximum values for each parameter are <b>bold</b> within the table. Minimum values are <b>bold italic</b> .												
<sup>R</sup> - Data from this instrument meets EPA quality assurance criteria for regulatory purposes.												

PLEASE NOTE: This data has not been verified by the TCEQ and may change. This is the most current data, but it is not official until it has been certified by our technical staff. Data is collected from TCEQ ambient monitoring sites and may include data collected by other outside agencies. This data is updated hourly. All times shown are in Local Standard Time.

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**ATTACHMENT 3**

**METALS ANALYSES DETAILS – NIOSH METHOD 7303**

# ELEMENTS by ICP (Hot Block/HCl/HNO<sub>3</sub> Digestion)

7303

MW: Table 1

CAS: Table 2

RTECS: Table 2

**METHOD: 7303, Issue 1**

**EVALUATION: PARTIAL**

**Issue 1: 15 March 2003**

**OSHA:** Table 2

**NIOSH:** Table 2

**ACGIH:** Table 2

**PROPERTIES:** Table 1

<b>ELEMENTS:</b>	aluminum	cadmium	indium	nickel	strontium	zinc
	antimony*	calcium	iron	palladium	tellurium	
	arsenic	chromium	lead*	phosphorus	thallium	
	barium	cobalt	magnesium	platinum	tin*	
	beryllium	copper	manganese	potassium	titanium	
	bismuth*	gallium	molybdenum	selenium	vanadium	
	boron	gold	neodymium	sodium	yttrium	

\* With certain restrictions (see Table 3)

SAMPLING		MEASUREMENT	
<b>SAMPLER:</b>	FILTER (0.8-µm, cellulose ester membrane)	<b>TECHNIQUE:</b>	INDUCTIVELY COUPLED ARGON PLASMA, ATOMIC EMISSION SPECTROSCOPY
<b>FLOW RATE:</b>	1 to 4 L/min	<b>ANALYTE:</b>	See element list above
<b>VOL-MIN:</b>	Table 1	<b>REAGENTS:</b>	Conc. HCl, 1.25 mL; and conc. HNO <sub>3</sub> , 1.25 mL
<b>-MAX:</b>	Table 1	<b>FINAL SOLUTION:</b>	5% HCl and 5% HNO <sub>3</sub> , 25 mL
<b>SHIPMENT:</b>	Routine	<b>WAVELENGTH:</b>	Element and instrument specific
<b>SAMPLE STABILITY:</b>	Stable	<b>BACKGROUND CORRECTION:</b>	Spectral wavelength shift
<b>BLANKS:</b>	2 to 10 field blanks per set	<b>CALIBRATION:</b>	Elements in 5% HCl, 5% HNO <sub>3</sub>
<b>ACCURACY</b>		<b>RANGE:</b>	LOQ to 50,000 µg/sample [1]
<b>RANGE STUDIED:</b>	5,000 to 50,000 µg/sample	<b>ESTIMATED LOD:</b>	Varies with element; Table 1
<b>BIAS:</b>	Not determined	<b>PRECISION (\$):</b>	Not evaluated
<b>OVERALL PRECISION:</b>	Not determined		
<b>ACCURACY:</b>	Not determined		

**APPLICABILITY:** The working range of this method is up to 100 mg/m<sup>3</sup> for each element in a 500-L sample (the minimum range depends on the LOD for each sample; see Table 1). The analysis is not compound specific. Certain elemental compounds are known to be acceptable or unacceptable by this method (see Table 3). For unverified compounds, a test run should be conducted using a known amount of the compound in question to determine acceptability.

**INTERFERENCES:** Interferences are spectral in nature and are accounted for by choosing appropriate wavelengths, applying interelement correction factors, and background correction.

**OTHER METHODS:** Alternative, more sensitive methods exist for some elements by graphite furnace atomic absorption spectroscopy. This method is similar to NIOSH Method 7301, differing only in the use of the hot block for digestion of the sampler.

**REAGENTS:**

1. Hydrochloric acid,\* conc., ultra pure.
2. Nitric acid,\* conc., ultra pure.
3. Calibration stock solutions, 50-1000 µg/mL. Commercially available single element solutions or multielement solutions prepared as instructed by the instrument manufacturer.
4. Argon, prepurified.
5. Distilled, deionized, Type II water.
6. Diluting solution: 5% HCl : 5% HNO<sub>3</sub>. To about 600 mL of deionized water in a 1-L volumetric flask, slowly add 50 mL conc. HCl and 50 mL conc. HNO<sub>3</sub>. Dilute to the mark with deionized water.

\* See SPECIAL PRECAUTIONS

**EQUIPMENT:**

1. Sampler: cellulose ester membrane filter, 0.8-µm pore size, 37-mm diameter; in cassette filter holder.
2. Personal sampling pump, 1 to 4 L/min, with flexible connecting tubing.
3. Inductively coupled argon plasma-atomic emission spectrometer, equipped as specified by the manufacturer for analysis of elements of interest.
4. Hot block apparatus at 95 °C.
5. Digestion vessels and caps, 50-mL.
6. Watchglasses.
7. Pipettes, electronic and mechanical.
8. Regulator, two-stage, for argon.
9. Forceps.

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**SPECIAL PRECAUTIONS:** Concentrated acids are powerful oxidizers, toxic, and corrosive liquids. Wear protective clothing and work in a fume hood.

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**SAMPLING:**

1. Calibrate each personal sampling pump with a representative sampler in line.
2. Sample at an accurately known flow rate between 1 and 4 L/min for a total sample size of 200 to 2000 L for TWA measurements. Do not exceed a filter loading of approximately 2 mg total dust.

**SAMPLE PREPARATION:**

3. Open the cassette filter holder and with forceps remove the sample filter. Fold the filter into quarters taking care not to lose any sample, and transfer to a clean, 50-mL hot block digestion tube.
4. Add 1.25 mL HCl. Cover with a plastic watchglass. Place in the hot block and heat at an internal temperature of 95 °C for 15 minutes.  
NOTE: The internal temperature may vary from the digital readout. Calibrate the hot block prior to digestion.
5. Remove the sample from the hot block and cool for 5 minutes. Remove watchglass and add 1.25 mL HNO<sub>3</sub>. Replace watchglass and return to hot block at 95 °C for 15 minutes.
6. Remove the sample from the hot block and cool for at least 5 minutes. Rinse watchglass into the sample container and discard watchglass.
7. Dilute to 25-mL final volume with distilled, deionized Type II water.

**CALIBRATION AND QUALITY CONTROL:**

8. Calibrate the spectrometer according to the manufacturer's recommendations. Use standards consisting of the same 5% HCl : 5% HNO<sub>3</sub> matrix as the samples.
9. Analyze a standard every 10 samples.
10. Analyze a media blank every 20 samples, and a reagent blank every 10 samples.
11. Analyze a set of two laboratory control samples every 40 samples of a given matrix for a given analyte.
12. Check recoveries with at least two spiked media blanks per ten samples.  
NOTE: In the determination of lead, there may be a measurement interference (for example, samples with high aluminum levels). More recent instruments have a correction for this.

**MEASUREMENT:**

13. Set spectrometer to conditions specified by manufacturer.
14. Analyze standards, samples and quality control checks.

NOTE: If the elemental value for a sample is above the linear range of the element(s) in question, dilute the sample solution with 5% HCl : 5% HNO<sub>3</sub> diluting solution, reanalyze and apply the appropriate dilution factor in the calculations.

**CALCULATIONS:**

15. Obtain the solution concentrations for the sample, C<sub>s</sub> (µg/mL), and the average media blank, C<sub>b</sub> (µg/mL), from the instrument.
16. Using the solution volumes of sample, V<sub>s</sub> (mL), and media blank, V<sub>b</sub> (mL), calculate the concentration, C (mg/m<sup>3</sup>), of each element in the air volume sampled, V (L):

$$C = \frac{C_s V_s - C_b V_b}{V}, \text{mg} / \text{m}^3$$

NOTE: µg/L = mg/m<sup>3</sup>

**EVALUATION OF METHOD:**

The method was evaluated for all elements and compounds listed in Table 1 and Table 2 between 1999 and 2001 using known amounts of bulk material [4]. Evaluation is ongoing for additional elements and compounds. The limits of detection and quantitation were also determined for each element. Two ICP instruments were used in the evaluation, a Thermal Jarrell Ash Model 61E [5] and a TJA IRIS [6], operated according to the manufacturer's instructions.

**REFERENCES:**

- [1] WOHL [2001]. Metals validation using hot block digestion, Unpublished data. Wisconsin Occupational Health Laboratory, Madison, WI.
- [2] NIOSH [1994]. Method 7300: Elements by ICP, NIOSH Manual of Analytical Methods, Fourth Edition, Issue 2, Aug. 15, 1994.
- [3] WOHL [2001]. Metals Manual 2001, WOHL Internal Document, Updated Apr. 1, 2001. Wisconsin Occupational Health Laboratory, Madison, WI.
- [4] WOHL [2001]. WOHL General Operations Procedures Manual, WOHL Internal Document, Updated 2001. Wisconsin Occupational Health Laboratory, Madison, WI.
- [5] Thermal Jarrell Ash [1991]. ICAP 61E Plasma Spectrometer Operator's Manual, Thermal Jarrell Ash Corp., Part No. 128832-01, Feb., 1991.
- [6] Thermal Jarrell Ash [1997]. IRIS Plasma Spectrometer User's Guide, Thermal Jarrell Ash Corp., Part No. 135811-0, Feb. 4, 1997.

**METHOD WRITTEN BY:**

Jason Loughrin, Lyle Reichmann, Doug Smieja, Shakker Amer, Curtis Hedman  
Wisconsin Occupational Health Laboratory (WOHL).

TABLE 1: ANALYTE INFORMATION FOR VALID ELEMENTS AND COMPOUNDS

Analyte	Properties		LOD (µg/mL)	LOQ (µg/mL)	Estimated LOQ (µg/sample)*	Minimum** air vol. (L)	Maximum*** air vol. (L)
	MW	MP (°C)					
Al	26.98	660	0.111	0.37	9.25	2	10,000
As	74.92	817	0.009	0.03	0.075	8	5,000,000
Au	196.97	10.63	0.015	0.05	1.25	1	3,300
B	10.81	2177	0.0094	0.0283	0.71	1	3,300
Ba	137.34	3.51	0.0018	0.006	0.15	1	100,000
Be	9.01	2178	0.00075	0.0025	0.062	35	25,000,00
Bi	208.98	271	0.025	0.085	2.12	1	10,000
Ca	40.08	842	0.099	0.33	8.25	2	10,000
CaO	56.08	2927	0.139	0.462	11.6	3	10,000
Cd	112.4	321	0.0037	0.012	0.30	3	500,000
Co	58.93	1495	0.003	0.011	0.27	3	500,000
Cr	52.00	1890	0.009	0.03	0.75	8	500,000
Cu	63.54	1083	0.020	0.060	1.50	15	500,000
Fe	55.85	1535	0.070	0.20	5.00	1	5,000
Fe <sub>2</sub> O <sub>3</sub> (as Fe)	159.69	1462	0.070	0.20	5.00	1	5,000
Ga	69.72	29.75	0.03	0.09	2.25	1	3,300
In	114.82	156.3	0.015	0.05	1.25	15	500,000
Mg	24.31	651	0.047	0.14	3.50	1	10,000
MgO	40.32	2825	0.078	0.23	5.75	5	33,000
Mn	54.94	1244	0.0012	0.004	0.10	0.05	10,000
Mo	95.94	651	0.0072	0.024	0.60	0.5	10,000
Nd	92.906	2477	0.01	0.03	0.75	0.1	3,300
Ni	58.71	1453	0.012	0.039	0.98	1	50,000
P	30.97	44	0.3	1.0	25	250	500,000
Pb	207.19	328	0.023	0.07	1.75	35	100,000
Pd	106.4	1550	0.009	0.03	0.75	0.1	3,300
Pt	195.09	1769	0.0045	0.015	0.38	200	25,000,000
Sb	121.75	630.5	0.018	0.06	1.50	3	100,000
Se	78.96	217	0.021	0.064	1.60	8	250,000
Sn	118.69	232	0.015	0.05	1.25	1	25,000
Sr	87.62	769	0.002	0.006	0.15	300	100,000,000
Te	127.60	450	0.15	0.5	12.5	125	500,000
Ti	47.90	1675	0.005	0.016	0.40	0.1	10,000
Tl	204.37	304	0.044	0.133	3.32	35	500,000
V	50.94	1890	0.003	0.01	0.25	2.5	500,000
Y	88.91	1495	0.001	0.003	0.075	0.1	50,000
Zn	65.37	419	0.022	0.066	1.65	0.5	10,000
ZnO	81.37	1970	0.027	0.082	2.05	0.5	10,000

\* Value based on a 25-mL sample volume.

\*\* The minimum sampling volume needed to obtain the OSHA PEL at the LOQ for the element/compound at a sample digestion volume of 25 mL.

\*\*\* The maximum sampling volume for a given sample, calculated by taking 50,000 µg as the limit for the element/compound per sample.

NOTE: The LOD and LOQ values are dependent on the particular analytical instrument used. Also, LOD and LOQ values may vary for a particular element due to certain interelement interferences.

TABLE 2. EXPOSURE LIMITS, CAS #, RTECS

Element (Symbol)	CAS #	RTECS	Exposure Limits, mg/m <sup>3</sup> (Ca = carcinogen)		
			OSHA	NIOSH	ACGIH
Silver (Ag)	7440-22-4	VW3500000	0.01 (dust, fume, metal)	0.01 (metal, soluble)	0.1 (metal) 0.01 (soluble)
Aluminum (Al)	7429-90-5	BD0330000	15 (total dust) 5 (respirable)	10 (total dust) 5 (respirable fume) 2 (salts, alkyls)	10 (dust) 5 (powders, fume) 2 (salts, alkyls)
Arsenic (As)	7440-38-2	CG0525000	varies	C 0.002, Ca	0.01, Ca
Barium (Ba)	7440-39-3	CQ8370000	0.5	0.5	0.5
Beryllium (Be)	7440-41-7	DS1750000	0.002, C 0.005	0.0005, Ca	0.002, Ca
Calcium (Ca)	7440-70-2	--	varies	varies	varies
Cadmium (Cd)	7440-43-9	EU9800000	0.005	lowest feasible, Ca	0.01 (total), Ca 0.002 (respir.), Ca
Cobalt (Co)	7440-48-4	GF8750000	0.1	0.05 (dust, fume)	0.02 (dust, fume)
Chromium (Cr)	7440-47-3	GB4200000	0.5	0.5	0.5
Copper (Cu)	7440-50-8	GL5325000	1 (dust, mists) 0.1 (fume)	1 (dust) 0.1 (fume)	1 (dust, mists) 0.2 (fume)
Iron (Fe)	7439-89-6	NO4565500	10 (dust, fume)	5 (dust, fume)	5 (fume)
Potassium (K)	7440-09-7	TS6460000	--	--	--
Lanthanum	7439-91-0	--	--	--	--
Lithium (Li)	7439-93-2	--	--	--	--
Magnesium (Mg)	7439-95-4	OM2100000	15 (dust) as oxide 5 (respirable)	10 (fume) as oxide	10 (fume) as oxide
Manganese (Mn)	7439-96-5	OO9275000	C 5	1; STEL 3	5 (dust) 1; STEL 3 (fume)
Molybdenum (Mo)	7439-98-7	QA4680000	5 (soluble) 15 (total insoluble)	5 (soluble) 10 (insoluble)	5 (soluble) 10 (insoluble)
Nickel (Ni)	7440-02-0	QR5950000	1	0.015, Ca	0.1 (soluble) 1 (insoluble, metal)
Phosphorus (P)	7723-14-0	TH3500000	0.1	0.1	0.1
Lead (Pb)	7439-92-1	OF7525000	0.05	0.05	0.05
Antimony (Sb)	7440-36-0	CC4025000	0.5	0.5	0.5
Selenium (Se)	7782-49-2	VS7700000	0.2	0.2	0.2
Tin (Sn)	7440-31-5	XP7320000	2	2	2
Strontium (Sr)	7440-24-6	--	--	--	--
Tellurium (Te)	13494-80-9	WY2625000	0.1	0.1	0.1
Titanium (Ti)	7440-32-6	XR1700000	--	--	--
Thallium (Tl)	7440-28-0	XG3425000	0.1 (skin) (soluble)	0.1 (skin) (soluble)	0.1 (skin)
Vanadium (V)	7440-62-2	YW2400000	--	C 0.05	--
Tungsten	7440-33-7	--	5	5 10 (STEL)	5 10 (STEL)
Yttrium (Y)	7440-65-5	ZG2980000	1	N/A	1
Zinc (Zn)	7440-66-6	ZG8600000	--	--	--
Zirconium (Zr)	7440-67-7	ZH7070000	5	5, STEL 10	5, STEL 10

TABLE 3: VALIDATION SUMMARY

Analyte	Status <sup>1</sup>	Analyte	Status	Analyte	Status
Ag	Not Valid	CuO	Valid	S	Not Valid
Al	Valid	Fe	Valid	Sb	Partially Valid <sup>4</sup>
Al <sub>2</sub> O <sub>3</sub>	Not Valid	Fe <sub>2</sub> O <sub>3</sub>	Valid	Sb <sub>2</sub> O <sub>3</sub>	Partially Valid <sup>5</sup>
As	Valid	Ga	Valid	Se	Valid
Au	Valid	In	Valid	Si	Not Valid
B	Valid	KCl	Pending	Sn	Partially Valid <sup>6</sup>
Ba	Pending	Mg	Valid	SnO	Pending
BaO	Pending	MgO	Valid	SnO <sub>2</sub>	Pending
BaO <sub>2</sub>	Pending	Mn	Valid	Sr	Valid
BaCl <sub>2</sub>	Valid	MnO	Valid	SrCrO <sub>4</sub>	Valid (by Cr)
BaSO <sub>4</sub>	Pending	Mo	Valid	Te	Valid
Be	Valid	NaCl	Pending	Ti	Valid
Bi	Partially Valid <sup>2</sup>	Nd	Valid	Tl	Valid
Ca	Valid	Ni	Valid	V	Valid
CaCO <sub>3</sub>	Valid	P	Valid	V <sub>2</sub> O <sub>5</sub>	Valid
CaO	Valid	Pb	Partially Valid <sup>3</sup>	Y	Valid
Cd	Valid	PbCrO <sub>4</sub>	Valid (by Cr)	Zn	Valid
Co	Valid	PbO	Valid	ZnO	Valid
Cr	Valid	Pd	Valid	Zr	Not Valid
Cu	Valid	Pt	Valid	ZrO	Not Valid

<sup>1</sup> Status definitions

**Valid:** The method is suitable for samples up to at least 0.0500 g bulk material with recoveries of between 90 and 110 percent. This weight exceeds most expected levels encountered in work environments.

**Partially Valid:** The method is suitable with bulk-material recoveries of between 90 and 110 percent under certain conditions (as footnoted above).

**Not Valid:** The method procedure is not suitable for samples at any weight with recoveries of between 90 and 110 percent. An alternative method should be used.

<sup>2</sup> Valid up to 10,000 µg/sample and within 7 days of sample digestion.

<sup>3</sup> Valid up to 50,000 µg/sample and at least 24 hours after sample digestion; Valid up to 15,000 µg/sample within 24 hours of sample digestion.

<sup>4</sup> Valid up to 25,000 µg/sample and within 7 days of sample digestion.

<sup>5</sup> Valid up to 25,000 µg/sample and within 7 days of sample digestion.

<sup>6</sup> Valid up to 30,000 µg/sample and within 7 days of sample digestion.

**NOTE:** The upper limits of the method can be extended by serial dilution of the samples at the time of analyses.

**ATTACHMENT 4**

**METALS ANALYSES DETAILS – NIOSH METHOD 6009**

# MERCURY

6009

Hg MW: 200.59 CAS: 7439-97-6 RTECS: OV4550000

METHOD: 6009, Issue 2

EVALUATION: PARTIAL

Issue 1: 15 May 1989  
Issue 2: 15 August 1994

OSHA : C 0.1 mg/m<sup>3</sup> (skin)  
NIOSH: 0.05 mg/m<sup>3</sup> (skin)  
ACGIH: 0.025 mg/m<sup>3</sup> (skin)

PROPERTIES: liquid; d 13.55 g/mL @ 20 °C; BP 356 °C;  
HP -39 °C; VP 0.16 Pa (0.0012 mm Hg);  
13.2 mg/m<sup>3</sup> @ 20 °C; Vapor Density  
(air=1) 7.0

SYNONYMS: quicksilver

SAMPLING		MEASUREMENT	
<b>SAMPLER:</b>	SOLID SORBENT TUBE (Hopcalite in single section, 200 mg)	<b>TECHNIQUE:</b>	ATOMIC ABSORPTION, COLD VAPOR
<b>FLOW RATE:</b>	0.15 to 0.25 L/min	<b>ANALYTE:</b>	elemental mercury
<b>VOL-MIN:</b>	2 L @ 0.5 mg/m <sup>3</sup>	<b>DESORPTION:</b>	conc. HNO <sub>3</sub> /HCl @ 25 °C, dilute to 50 mL
<b>-MAX:</b>	100 L	<b>WAVELENGTH:</b>	253.7 nm
<b>SHIPMENT:</b>	routine	<b>CALIBRATION:</b>	standard solutions of Hg <sup>2+</sup> in 1% HNO <sub>3</sub>
<b>SAMPLE STABILITY:</b>	30 days @ 25 °C [1]	<b>RANGE:</b>	0.1 to 1.2 µg per sample
<b>FIELD BLANKS:</b>	2 to 10 field blanks per set	<b>ESTIMATED LOD:</b>	0.03 µg per sample
<b>MEDIA BLANKS:</b>	at least 3 per set	<b>PRECISION (S<sub>r</sub>):</b>	0.042 @ 0.9 to 3 µg per sample [4]
ACCURACY			
<b>RANGE STUDIED:</b>	0.002 to 0.8 mg/m <sup>3</sup> [2] (10-L samples)		
<b>BIAS:</b>	not significant		
<b>OVERALL PRECISION (S<sub>rT</sub>):</b>	not determined		
<b>ACCURACY:</b>	not determined		

**APPLICABILITY:** The working range us 0.01 to 0.5 mg/m<sup>3</sup> for a 10-L air sample. The sorbent material irreversibly collects elemental mercury. A prefilter can be used to exclude particulate mercury species from the sample. The prefilter can be analyzed by similar methodology. The method has been used in numerous field surveys [3].

**INTERFERENCES:** Inorganic and organic mercury compounds may cause a positive interference. Oxidizing gases, including chlorine, do not interfere.

**OTHER METHODS:** This replaces method 6000 and its predecessors, which required a specialized desorption apparatus [4,5,6]. This method is based on the method of Rathje and Marcero [7] and is similar to the OSHA method ID 145H [2].

**REAGENTS:**

1. Water, organics-free, deionized.
2. Hydrochloric acid (HCl), conc.
3. Nitric acid (HNO<sub>3</sub>), conc.
4. Mercuric oxide, reagent grade, dry.
5. Calibration stock solution, Hg<sup>2+</sup>, 1000 µg/mL. Commercially available or dissolve 1.0798 g of dry mercuric oxide (HgO) in 50 mL of 1:1 hydrochloric acid, then dilute to 1 L with deionized water.
6. Intermediate mercury standard, 1 µg/mL. Place 0.1 mL 1000 µg/mL stock into a 100 mL volumetric containing 10 mL deionized water and 1 mL hydrochloric acid. Dilute to volume with deionized water. Prepare fresh daily.
7. Stannous chloride, reagent grade, 10% in 1:1 HCl. Dissolve 20 g stannous chloride in 100 mL conc. HCl. Slowly add this solution to 100 mL deionized water and mix well. Prepare fresh daily.
8. Nitric acid, 1% (w/v). Dilute 14 mL conc. HNO<sub>3</sub> to 1 L with deionized water.

**EQUIPMENT:**

1. Sampler: glass tube, 7 cm long, 6-mm OD, 4-mm ID, flame sealed ends with plastic caps, containing one section of 200 mg Hopcalite held in place by glass wool plugs (SKC, Inc., Cat. #226-17-1A, or equivalent).  
NOTE: A 37-mm, cellulose ester membrane filter in a cassette preceding the sorbent may be used if particulate mercury is to be determined separately.
2. Personal sampling pump, 0.15 to 0.25 L/min, with flexible connecting tubing.
3. Atomic absorption spectrophotometer with cold vapor generation system (see Appendix) or cold vapor mercury analysis system.\*
4. Strip chart recorder, or integrator.
5. Flasks, volumetric, 50-mL, and 100-mL.
6. Pipet, 5-mL, 20-mL, others as needed.
7. Micropipet, 10- to 1000-µL.
8. Bottles, biological oxygen demand (BOD), 300-mL.

\* See SPECIAL PRECAUTIONS

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**SPECIAL PRECAUTIONS:** Mercury is readily absorbed by inhalation and contact with the skin. Operate the mercury system in a hood, or bubble vented mercury through a mercury scrubber.

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**SAMPLING:**

1. Calibrate each personal sampling pump with a representative sampler in line.
2. Break ends of sampler immediately prior to sampling. Attach sampler to pump with flexible tubing.
3. Sample at an accurately known rate of 0.15 to 0.25 L/min for a total sample size between 2 and 100 L.  
NOTE: Include a minimum of three unopened sampling tubes from the same lot as the samples for use as media blanks.
4. Cap sampler and pack securely for shipment.

**SAMPLE PREPARATION:**

5. Place the Hopcalite sorbent and the front glass wool plug from each sampler in separate 50-mL volumetric flasks.
6. Add 2.5 mL conc. HNO<sub>3</sub> followed by 2.5 mL conc. HCl.  
NOTE: The mercury must be in the oxidized state to avoid loss. For this reason, the nitric acid must be added first.
7. Allow the sample to stand for 1 h or until the black Hopcalite sorbent is dissolved. The solution will turn dark brown and may contain undissolved material.
8. Carefully dilute to 50 mL with deionized water. (Final solution is blue to blue-green).
9. Using a volumetric pipet, transfer 20 mL of the sample to a BOD bottle containing 80 mL of deionized water. If the amount of mercury in the sample is expected to exceed the standards, a smaller aliquot may be taken, and the volume of acid adjusted accordingly. The final volume in

the BOD bottle must be 100 mL. To prevent possible loss of mercury during transfer, place the pipet tip below the surface of the liquid in the BOD bottle.

**CALIBRATION AND QUALITY CONTROL:**

10. Prepare a minimum of two series (six levels each) of working standards covering the range 0.01 to 0.5 µg Hg per aliquot by adding known amounts of the intermediate standard to BOD bottles containing enough 1% nitric acid to bring the final volume to 100 mL.
11. Analyze the working standards together with the samples and blanks (steps 13 through 16). Analyze full set of standards at the beginning of the run, and a second set at the end of the run. Additional standards may be run intermediately during the analysis to confirm instrument response.
12. Prepare calibration graph (peak height vs. solution concentration, µg/sample).

**MEASUREMENT:**

13. Zero the spectrophotometer by removing the bubbler from the BOD bottle, allowing the baseline on the recorder to stabilize.
14. Place the bubbler in a BOD bottle containing 0.5 µg mercury in 100 mL 1% nitric acid. Adjust the spectrophotometer so that it will give a 75% to full-scale deflection of the recorder.
15. Vent the mercury vapor from the system.
16. Analyze standards, samples and blanks (including media blanks).
  - a. Remove the bubbler from the BOD bottle.
  - b. Rinse the bubbler with deionized water.
  - c. Allow the recorder tracing to establish a stable baseline.
  - d. Remove the stopper from the BOD bottle containing the next sample to be analyzed. Gently swirl the BOD bottle.
  - e. Quickly add 5 mL 10% stannous chloride solution.
  - f. Quickly place the bubbler into the BOD bottle.
  - g. Allow the spectrophotometer to attain maximum absorbance.
  - h. Vent the mercury vapor from the system.
  - i. Place the bubbler into an empty BOD bottle. Continue venting the mercury until a stable baseline is obtained.
  - j. Close the mercury vent.

**CALCULATIONS:**

17. Calculate the amount of mercury in the sample aliquot (W, µg) from the calibration graph.
18. Calculate the concentration C (mg/m<sup>3</sup>), of mercury in the air volume sampled, V (L):

$$C = \frac{W \cdot \frac{V_s}{V_a} - B}{V}$$

Where: V<sub>s</sub> = original sample volume (step 8; normally 50 mL)  
 V<sub>a</sub> = aliquot volume (step 9; normally 20 mL)  
 B = average amount of mercury present in the media blanks

**EVALUATION OF METHOD:**

Rathje and Marcero originally used Hopcalite (MSA, Inc.) as the sorbent material [7]. Later, Hopcalite was shown superior to other methods for the determination of mercury vapor [8]. Atmospheres of mercury vapor for the study were dynamically generated in the range 0.05 to 0.2 mg/m<sup>3</sup> and an adsorbent tube loading of 1 to 7 µg was used. The Hydrar material sometimes used is similar to Hopcalite. No significant difference in the laboratory analysis of mercury collected on the two sorbent materials was observed [9]. OSHA also validated a method for mercury using Hydrar [2]. An average 99% recovery, with  $\bar{S}_r = 0.042$ , was seen for 18 samples with known amounts (0.9 to 3 µg) of mercury added (as Hg(NO<sub>3</sub>)<sub>2</sub>) [10]. No change in recovery was seen for samples stored up to 3 weeks at room temperature or up to 3 months at -15 °C; longer storage times were not investigated [10].

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**METHOD WRITTEN BY:**

Keith R. Nicholson and Michael R. Steele, DataChem Laboratories, Inc., Salt Lake City, Utah, under NIOSH contract No. 200-87-2533.

**APPENDIX: COLD VAPOR MERCURY ANALYSIS SYSTEM**

1. The valve should direct the vented vapors to a hood or to a mercury scrubber system.
2. When the valve is opened to "Vent" the peristaltic pump should draw room air. Place a Hopcalite tube in the air intake to eliminate any mercury that may be present.
3. Adjust the peristaltic pump to a flow that will create a steady stream of bubbles in the BOD bottle, but not so great that solution droplets enter the tubing to the quartz cell.
4. If water vapor condenses in the quartz cell, heat the cell slightly above room temperature by wrapping it with a heating coil and attaching a variable transformer.
5. The bubbler consists of a glass tube with a bulb at the bottom, slightly above the bottom of the BOD bottle. The bulb contains several perforations to allow air to escape into the solution (in a stream of small bubbles). A second tube is provided to allow the exit of the vapor. The open end of the second tube is well above the surface of the liquid in the bottle. The two tubes are fixed into a stoppering device (preferably ground glass) which fits into the top of the bottle. A coarse glass frit can be used in place of the bulb on the first tube. However, it is more difficult to prevent contamination when a frit is used.
6. Replace the flexible tubing (Tygon or equivalent) used to connect the bubbler, cell, and pump periodically to prevent contamination from adsorbed mercury.

**ATTACHMENT 5**

**DEMOLITION CONTRACTOR POINTS OF CONTACT**

## Air Monitoring Program - Encycle Project Contacts

Company	Contact	Title	Phone	Mobile	Fax	Email	Address	Service
SIS	Ed Ramirez	Operations Migr	562-921-9974	562-254-0647	562-381-913	<a href="mailto:Ed@ecologyysis.com">Ed@ecologyysis.com</a>	Specializes Industrial Services LLC 14150 Vine Place Cerritos Ca 90703	
ERP	Robert Resuriz	Project Manager		713-562-6912	512-314-8699	<a href="mailto:rresuriz@aol.com">rresuriz@aol.com</a> <a href="mailto:rresuriz@energyrenewalpartners.com">rresuriz@energyrenewalpartners.com</a>	Energy Renewal Partners, LLC 2705 Bee Caves Road, Ste 340., Austin, TX 78746	
ERP	Mike Lindstrom	Regulatory/Waste Manager		720-633-7027	512-314-8699	<a href="mailto:mindstrom@energyrenewalpartners.com">mindstrom@energyrenewalpartners.com</a>	Energy Renewal Partners, LLC 2705 Bee Caves Road, Ste 340., Austin, TX 78746	
ERP	Brady Armes	QA/QC Officer		512-913-8524	512-314-8699	<a href="mailto:barnes@energyrenewalpartners.com">barnes@energyrenewalpartners.com</a>	Energy Renewal Partners, LLC 2705 Bee Caves Road, Ste 340., Austin, TX 78746	
ERP	Trisha Elizondo	Project Manager	512-314-8614	303-434-2686	512-314-8699	<a href="mailto:telizondo@energyrenewalpartners.com">telizondo@energyrenewalpartners.com</a>	Energy Renewal Partners, LLC 2705 Bee Caves Road, Ste 340., Austin, TX 78746	
ERP	Carl Jones	Project Technician				<a href="mailto:cjones@energyrenewalpartners.com">cjones@energyrenewalpartners.com</a>	Energy Renewal Partners, LLC 2705 Bee Caves Road, Ste 340., Austin, TX 78746	