Table 3. Air Monitoring Action Levels and Stop Work Levels during Encycle Soil Remediation Project - Wind Direction with Southerly Component, 5500 Up River Road, Corpus Christi, Texas (Updated 7/16/12)

Parameter	OSHA PEL (8 hour TWA)	24-Hour Average Particulate Air Concentration Limits	North, East and West Property Boundary Action Level to Increase Dust Suppression/ Emission Controls[a]	North, East and West Property Boundary Stop Work Level[b]	Sample Collection Frequency
Asbestos	0.1 f/cc		0.01 f/cc	0.1 f/cc	Daily during asbestos abatement activities.
Dust/Particulates (cement)	5 mg/m^3	0.15 mg/m^3 (PM_{10}) 0.035 mg/m^3 ($PM_{2.5}$)	0.15 mg/m^3 (PM_{10})[c] 0.035 mg/m^3 ($PM_{2.5}$)[c]	0.15 mg/m^3 (PM_{10})[d] 0.045 mg/m^3 ($PM_{2.5}$)[d]	Continuous real-time measurements of PM2.5 and PM10 during all phases of soil remediation activities.
Antimony	0.5 mg/m^3		0.025 mg/m^3	0.05 mg/m^3	At least twice weekly during soil remediation activities.
Arsenic	0.01 mg/m^3		0.0005 mg/m^3	0.001 mg/m^3	At least twice weekly during soil remediation activities.
Barium	0.5 mg/m^3		0.025 mg/m^3	0.05 mg/m^3	At least twice weekly during soil remediation activities.
Cadmium	0.005 mg/m^3		0.00025 mg/m^3	0.0005 mg/m^3	At least twice weekly during soil remediation activities.
Chromium	0.5 mg/m^3		0.025 mg/m^3	0.05 mg/m^3	At least twice weekly during soil remediation activities.
Copper	1 mg/m^3		0.05 mg/m^3	0.1 mg/m^3	At least twice weekly during soil remediation activities.
Lead	0.05 mg/m^3	0.00015 mg/m^3 (f)	0.0025 mg/m^3	0.005 mg/m^3	At least twice weekly during soil remediation activities.
Mercury	0.05 mg/m^3		0.0025 mg/m^3	0.005 mg/m^3	At least twice weekly during soil remediation activities.
Nickel	1 mg/m^3		0.05 mg/m^3	0.1 mg/m^3	At least twice weekly during soil remediation activities.
Selenium	0.2 mg/m^3		0.01 mg/m^3	0.02 mg/m^3	At least twice weekly during soil remediation activities.
Silver	0.01 mg/m^3		0.0005 mg/m^3	0.001 mg/m^3	At least twice weekly during soil remediation activities.
Zinc	15 mg/m^3		0.75 mg/m^3	1.5 mg/m^3	At least twice weekly during soil remediation activities.

f/cc Fibers per cubic centimeter

mg/m^3 Milligrams per cubic meter

PEL Permissible exposure limit

TWA Time-weighted average

$PM_{2.5}$ and PM_{10} Particulate matter (in micrometers diameter) 24-hour average standard. Annual standard (arithmetic mean) for $PM_{2.5}$ is 0.015 mg/m^3.

a 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.

Barium 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, soil remediation, wooden railroad tie removal, and O1 Landfill additional clay capping work will be stopped for a period of at least 30 minutes.

Table 3. Air Monitoring Action Levels and Stop Work Levels during Encycle Soil Remediation Project - Wind Direction with Southerly Component, 5500 Up River Road, Corpus Christi, Texas (Updated 7/16/12)

During the work stoppage period, the Contractor shall make dust suppression adjustments to reduce airborne particulate matter concentrations below Action Level concentrations. In addition, if one or more metal concentrations exceed Stop Work Levels, since these parameters are not analyzed real-time, the 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 mg/m^3 and 0.075 mg/m^3, respectively; and the $PM_{2.5}$ and PM_{10} Stop Work Levels will be reduced to 0.0225 mg/m^3 and 0.075 mg/m^3, respectively). After the real time particulate Action Levels and Stop Work Levels have been reduced (minimum 2 week period), the Contractor shall make dust suppression adjustments, and the asbestos and metals analytical data will be evaulated 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, if the speciated 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.

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

e Average over one hour period.

Table 2. Air Monitoring Action Levels and Stop Work Levels during Encycle Soil Remediation Project - Wind Direction with Northerly Component, 5500 Up River Road, Corpus Christi, Texas (Updated 7/16/12)

Parameter	OSHA PEL (8 hour TWA)	24-Hour Average Particulate Air Concentration Limits	South Property Boundary Action Level to Increase Dust Suppression/ Emission Controls[a]	South Property Boundary Stop Work Level [b]	Sample Collection Frequency
Asbestos	0.1 f/cc		0.01 f/cc	0.01 f/cc	Daily during asbestos abatement activities.
Dust/Particulates (cement)	5 mg/m^3	0.15 mg/m^3 (PM_{10}) 0.035 mg/m^3 ($PM_{2.5}$)	0.15 mg/m^3 (PM_{10})[c] 0.035 mg/m^3 ($PM_{2.5}$)[c]	0.15 mg/m^3 (PM_{10})[d] 0.045 mg/m^3 ($PM_{2.5}$)[d]	Continuous real-time measurements of PM2.5 and PM10 during all phases of soil remediation activities.
Antimony	0.5 mg/m^3		0.005 mg/m^3 (f)	0.005 mg/m^3 (f)	At least twice weekly during soil remediation activities.
Arsenic	0.01 mg/m^3		0.0001 mg/m^3 (f)	0.0001 mg/m^3 (f)	At least twice weekly during soil remediation activities.
Barium	0.5 mg/m^3		0.005 mg/m^3 (f)	0.005 mg/m^3 (f)	At least twice weekly during soil remediation activities.
Cadmium	0.005 mg/m^3		0.0001 mg/m^3 (f)	0.0001 mg/m^3 (f)	At least twice weekly during soil remediation activities.
Chromium	0.5 mg/m^3		0.0036 mg/m^3 (f)	0.0036 mg/m^3 (f)	At least twice weekly during soil remediation activities.
Copper	1 mg/m^3		0.01 mg/m^3 (f)	0.01 mg/m^3 (f)	At least twice weekly during soil remediation activities.
Lead	0.05 mg/m^3	0.00015 mg/m^3	0.00015 mg/m^3	0.00015 mg/m^3 (e)	At least twice weekly during soil remediation activities.
Mercury	0.05 mg/m^3		0.00025 mg/m^3 (f)	0.00025 mg/m^3 (f)	At least twice weekly during soil remediation activities.
Nickel	1 mg/m^3		0.00015 mg/m^3 (f)	0.00015 mg/m^3 (f)	At least twice weekly during soil remediation activities.
Selenium	0.2 mg/m^3		0.002 mg/m^3 (f)	0.002 mg/m^3 (f)	At least twice weekly during soil remediation activities.
Silver	0.01 mg/m^3		0.0001 mg/m^3 (f)	0.0001 mg/m^3 (f)	At least twice weekly during soil remediation activities.
Zinc	15 mg/m^3		0.02 mg/m^3 (f)	0.02 mg/m^3 (f)	At least twice weekly during soil remediation activities.

f/cc	Fibers per cubic centimeter
mg/m^3	Milligrams per cubic meter
PEL	Permissible exposure limit
TWA	Time-weighted average
$PM_{2.5}$ and PM_{10}	Particulate matter (in micrometers diameter) 24-hour average standard.
a	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.
b	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 period, the Contractor shall make dust suppression adjustments to reduce airborne particulate matter concentrations below Action Level

Table 2. Air Monitoring Action Levels and Stop Work Levels during Encycle Soil Remediation Project - Wind Direction with Northerly Component, 5500 Up River Road, Corpus Christi, Texas (Updated 7/16/12)

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 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 mg/m^3 and 0.075 mg/m^3, respectively; and the $PM_{2.5}$ and PM_{10} Stop Work Levels will be reduced to 0.0225 mg/m^3 and 0.075 mg/m^3, respectively). After the real time particulate Action Levels and Stop Work Levels have been reduced (minimum 2 week period), the Contractor shall make dust suppression adjustments, and the asbestos and metals analytical data will be evaulated 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 mg/m^3 annual average for $PM_{2.5}$ shall not be exceeded.

d Average over one hour period.

e 24-hour average particulate air concenration limit

f Texas Effects Screening Levels (ESLs)

Table 1. Air Monitoring Parameters (Updated 7/16/12), Encycle Soil Remediation Project, 5500 Up River Road, Corpus Christi, Texas

Parameter	OSHA PEL (8 hour TWA)	24-Hour Average Particulate Air Concentration Limits	Test Method	Method Detection Limit[g]	Sample Collection Frequency
Asbestos[a]	0.1 f/cc		PCM NIOSH 7400	0.001 f/cc	During asbestos abatement activities, including daily at south property boundary.
Dust/Particulates[b] (cement)	5 mg/m^3	0.15 mg/m^3 (PM_{10}) 0.035 mg/m^3 ($PM_{2.5}$)	Field Measurement (E-BAM, or equal)	0.15 mg/m^3 (PM_{10}) 0.035 mg/m^3 ($PM_{2.5}$)	Continuous real-time measurements during all phases of soil remediation at property boundary upwind and downwind of soil remediation activities.
Antimony[b]	0.5 mg/m^3		NIOSH 7303	0.005	At least twice weekly upwind and downwind during remediation.
Arsenic[c]	0.01 mg/m^3		NIOSH 7303	0.0001	At least twice weekly upwind and downwind during remediation.
Barium[b]	0.5 mg/m^3		NIOSH 7303	0.00167	At least twice weekly upwind and downwind during remediation.
Cadmium[d]	0.005 mg/m^3		NIOSH 7303	0.0000833	At least twice weekly upwind and downwind during remediation.
Chromium[b]	0.5 mg/m^3		NIOSH 7303	0.0036	At least twice weekly upwind and downwind during remediation.
Copper[b]	1 mg/m^3		NIOSH 7303	0.00167	At least twice weekly upwind and downwind during remediation.
Lead[e]	0.05 mg/m^3	0.00015 mg/m^3 (f)	NIOSH 7303	0.00015	At least twice weekly upwind and downwind during remediation.
Mercury	0.05 mg/m^3		NIOSH 6009	0.00025	At least twice weekly upwind and downwind during remediation.
Nickel[b]	1 mg/m^3		NIOSH 7303	0.00015	At least twice weekly upwind and downwind during remediation.
Selenium[b]	0.2 mg/m^3		NIOSH 7303	0.002	At least twice weekly upwind and downwind during remediation.
Silver[b]	0.01 mg/m^3		NIOSH 7303	0.0001	At least twice weekly upwind and downwind during remediation.
Zinc[b]	15 mg/m^3		NIOSH 7303	0.00833	At least twice weekly upwind and downwind during remediation.

f/cc	Fibers per cubic centimeter
mg/m^3	Milligrams per cubic meter
PEL	Permissible exposure limit
TWA	Time-weighted average
$PM_{2.5}$ and PM_{10}	Particulate matter (in micrometers diameter) 24-hour average standard.
a	29 CFR 1910.1001(c)
b	29 CFR 1910.1000. OSHA PEL for portland cement (respirable dust) is 5 mg/m^3.
c	29 CFR 1910.1018
d	29 CFR 1910.1027
e	29 CFR 1910.1025
f	24-hour average particulate air concentration limit
g	Method detection limit varies with air sample volume. Limits shown are generally maximum values.

AIR MONITORING PROGRAM (Revised 8/30/12)
ENCYCLE SOIL REMEDIATION PROJECT
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CORPUS CHRISTI, TEXAS

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ENVIRONMENTAL SERVICES
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TO: Mike Boudloche, Trustee

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

DATE: October 18, 2010; Revised 4/7/11; Revised 5/31/11; Revised 3/16/12; Revised 8/30/12

SUBJECT: Air Monitoring Program – Soil Remediation at the former Encycle/Texas Inc. facility, 5500 Up River Road, Corpus Christi, Texas.

Date
August 30, 2012

Contact:
Kenneth Brandner

Phone:
361-883-1353

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"* was revised on May 31, 2011 to incorporate the TCEQ comments. The TCEQ subsequently provided comments to the revised May 31, 2011 *"Air Monitoring Program"* on March 9, 2012 and June 15, 2012 in preparation for the upcoming soil remediation activities at the site. The *"Air Monitoring Program"* is herein revised to incorporate the TCEQ March 9, 2012 and June 15, 2012 comments.

1. REAL-TIME PARTICULATE AIR MONITORING

1.1 General

As detailed in Exhibit A of the Master Services Agreement between the Soil Remediation Contractor and Mike Boudloche, Trustee, the Soil Remediation Contractor shall undertake adequate measures to control dust during remediation activities. These dust control measures are described in the "*Wind Monitoring and Dust Suppression Plan – Soil Remediation Project*", and shall include water

spraying/misting to control dust during soil remediation activities, wooden railroad tie removal activities, and O1 Landfill additional clay capping activities.

Also, the Soil Remediation Contractor shall install 10-foot-high Tarps Plus Model TP-BMT1030-1 heavy duty black polyethylene mesh tarps, or approved equal, on the southern side of the soil remediation areas undergoing active soil excavation, stockpiling, loading, treatment and excavation backfilling; on the southern side of active wooden railroad tie removal areas; and on the southern side of active O1 Landfill additional clay capping areas. The tarps shall be positioned in an east-west direction, parallel to Up River Road, attached to the existing chain link fencing along the south end of the site, north of Up River Road. The tarps shall extend a minimum of twenty feet beyond the western and eastern ends of the active remediation areas (i.e., the tarp length shall be at least 40 feet greater than the east-west length of the active remediation area). The tarps can be removed by the Soil Remediation Contractor when active remediation activities in that area have ceased.

During soil remediation activities, wooden railroad tie removal activities, and O1 Landfill additional clay capping activities, the Soil Remdiation Contractor shall conduct real-time particulate air monitoring using at least four 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 the 24-hour average particulate air concentration limits, 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.

The E-BAM instruments shall be positioned along the property boundary, upwind and downwind, respectively, of the areas undergoing active remediation-related activities. For example, if the wind direction is from the north (i.e., blowing from north to south), two E-BAM instruments shall be positioned upwind of the active remediation areas adjacent to the Corpus Christi Ship Channel to obtain background particulate concentration $PM_{2.5}$ and PM_{10} data, respectively, and the other two E-BAM instruments shall be positioned downwind of the active remediation areas near the site property boundary adjacent to Up River Road, to obtain to obtain particulate concentration $PM_{2.5}$ and PM_{10} data, respectively.

The particulate concentration measurements from the E-BAM instruments will be monitored on a continuous basis by the Soil Remediation Contractor during each day of active soil remediation, wooden railroad tie removal, and O1 Landfill clay capping activities.

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 $PM_{2.5}$ concentration by 0.035 mg/m^3 or more over the same time period, or if the 30-minute average PM_{10} concentration exceeds the background PM_{10} concentration by 0.15 mg/m^3 or more over the same time period, the Soil Remediation Contractor will immediately implement increased dust suppression activities. Also, the real-time particulate concentration data will be monitored to ensure the 24-hour average particulate air concentration limits are not exceeded. These increased dust suppression activities may include, but are not limited to the following:

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

It is understood that air data collected in the community by the TCEQ attributable to onsite operations may trigger action levels and stop work levels, and that TCEQ will collect an appropriate number of field QA/QC samples (such as trip blanks) during each sampling event to adequately identify laboratory issues that may affect the air monitoring results, and that the TCEQ will collect an appropriate number of background samples during each sampling event to statistically account for "false positives" in a scientifically acceptable manner.

1.3 Real-Time Particulate Concentration Stop Work Levels

As shown on Table 2 and Table 3, if the one hour (60-minute) average $PM_{2.5}$ concentration in the downwind E-BAM instrument exceeds the background $PM_{2.5}$ concentration by 0.045 mg/m^3 or more over the same time period, or if the one hour (60-minute) average PM_{10} concentration exceeds the background PM_{10} concentration by 0.15 mg/m^3 or more over the same time period, the Soil Remediation Contractor will immediately stop all remediation work. During the work stoppage period (minimum 30 minutes), the Soil Remediation 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 remediation area;
- Adding wind screens/tarps in remediation area;

- Adjusting the rate/speed and/or quantity of remediation equipment in the work area;
- Installation and/or repositioning of suction fans/blowers with particulate filters;
- Covering material 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 Soil Remediation Contractor dust suppression adjustments have been implemented (minimum 30 minute period), the Soil Remediation 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 Soil Remediation 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.

It is understood that air data collected in the community by the TCEQ attributable to onsite operations may trigger action levels and stop work levels, and that TCEQ will collect an appropriate number of field QA/QC samples (such as trip blanks) during each sampling event to adequately identify laboratory issues that may affect the air monitoring results, and that the TCEQ will collect an appropriate number of background samples during each sampling event to statistically account for "false positives" in a scientifically acceptable manner.

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[if asbestos containing materials (ACM) will be disturbed] 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 remediation work at each solid waste management unit (SWMU) 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 Soil Remediation Contractor shall immediately lower the real-time particulate $PM_{2.5}$ and PM_{10} 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 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 mg/m^3 and 0.075 mg/m^3, respectively; and the $PM_{2.5}$ and PM_{10} Stop Work Levels will be reduced to 0.0225 mg/m^3 and 0.075 mg/m^3, respectively). After the real time particulate Action Levels and Stop Work Levels have been reduced (minimum 2 week period), the Soil Remediation Contractor shall make dust suppression adjustments, and the asbestos (if applicable) 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 Soil Remediation 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 mg/m^3 and 0.075 mg/m^3, respectively; and the $PM_{2.5}$ and PM_{10} Stop Work Levels will be reduced to 0.0225 mg/m^3 and 0.075 mg/m^3, respectively). After the real time particulate Action Levels and Stop Work Levels have been reduced (minimum 2 week period), the Soil Remediation Contractor shall make dust suppression adjustments, and the asbestos (if applicable) 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 3.

Also, 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 $PM_{2.5}$ 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 of the Action Levels, the $PM_{2.5}$ and PM_{10} Action Levels and Stop Work Levels may be increased by a factor of 2.

2. WIND DIRECTION AND WIND SPEED MONITORING

2.1 General

The Soil Remediation Contractor shall monitor wind direction and wind speed prior to start of work, and continuously during the work period each day of active remediation activities, including soil excavation, soil loading, soil stockpiling, soil treatment (stabilization), and excavation backfilling; wooden railroad tie removal and loading; and O1 Landfill clay capping. The wind speed shall be monitored real-time by the Contractor using a Red Oaks Model WM-100 WindMate Wind Meter, or Trustee approved equal. Contractor shall also monitor wind speed by accessing the on-line data from the TCEQ Donna Park Air Monitoring Station located directly south of the Site on the south side of Up River Road.

Wind direction shall be monitored real-time by the Contractor using the existing 18" orange aviation wind sock mounted at the Site by the Trustee. Contractor shall also monitor wind direction by accessing the on-line data from the TCEQ Donna Park Air Monitoring Station located directly south of the Site on the south side of Up River Road.

The wind direction and wind speed shall be recorded by the Contractor at least every 30 minutes while remediation related work is being conducted at the Site. 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 Soil Remediation Contractor shall provide direct access to the Dona Park Air Monitoring Station data using a computer monitor in their on-site trailer or work area.

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 soil remediation 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). The Soil Remediation Contractor can conduct non-dust producing activities (equipment maintenance, etc.) during these periods.

Also, if the wind direction at the Site has a northerly component of any speed, no soil stockpiling, loading, or backfilling activities shall be conducted at the Waste Pile SWMU on the Meaney Tract, the Storm Sewer System SWMU on the Southern Tract, or the West Cell House SWMU on the Southern Tract due to their relatively close proximities to Up River Road. In addition, the Soil Remediation Contractor shall not conduct any soil excavation if the wind direction has a northerly component, and soils from only one SWMU can be excavated each day.

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 soil remediation, wooden railroad tie removal, and O1 Landfill additional clay capping activities. The air samples will be collected by the Trustee's designated representative at least twice

weekly near the property boundary upwind and downwind of (1) each active soil remediation area, and (2) the Lettered Bins Building during active soil treatment activities. The days each week (minimum 2 days per week that remediation 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) when remediation work at each SWMU is commenced.

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 (1) each active soil remediation area, and (2) the Lettered Bins Building during active soil treatment activities. 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 (1) each active soil remediation area, and (2) the Lettered Bins Building during active soil treatment activities. 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 (this Section only applicable if ACM is disturbed)

As detailed in Exhibit A of the Master Services Agreement between the Soil Remediation Contractor and Mike Boudloche, Trustee, the Soil Remediation project is not anticipated to involve disturbance of ACM. This section is therefore not applicable unless ACM is disturbed by the Soil Remediation Contractor.

If ACM is disturbed during this soil remediation project, the Soil Remediation 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 area(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 Texas Department of State Health Services (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 (Note: Asbestos Concentration Action Levels not applicable if ACM is not disturbed)

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 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 remediation area;
- Adding wind screens/tarps in remediation area;
- Adjusting the rate/speed and/or quantity of remediation equipment in the work area;

- Installation and/or repositioning of suction fans/blowers with particulate filters;
- Covering material stockpiles with plastic sheeting or tarps.

3.4 Metals and Asbestos Concentration Stop Work Levels (Note: Asbestos Concentration Stop Work Levels not applicable if ACM is not disturbed)

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 Contractor will immediately stop all remediation-related work. During the work stoppage period (minimum 30 minutes), the 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 the remediation area;
- Adding wind screens/tarps in remediation area;
- Adjusting the rate/speed and/or quantity of remediation equipment in the work area;
- Installation and/or repositioning of suction fans/blowers with particulate filters;
- Covering material stockpiles;
- Stopping specific dust-generating remediation activities until wind directions and/or wind speeds are more conducive to reduced dust levels.

In addition to dust suppression adjustments, the Contractor shall immediately lower the real-time particulate $PM_{2.5}$ and PM_{10} 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 Contractor dust suppression adjustments have been implemented (minimum 30 minute period), the Contractor may resume work, provided the reduced real-time particulate $PM_{2.5}$ and PM_{10} Stop Work Levels are not exceeded as described above in Section 1.4.

4. SOIL REMEDIATION CONTRACTOR POINTS OF CONTACT

The on-site Soil Remediation Contractor points of contact shall be provided in Attachment 5, including the Soil Remediation Contractor company name, company representative, and cell phone numbers. These Soil Remediation Contractor points of contact shall 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

Wind Monitoring and Dust Suppression Plan - Soil Remediation Project

Former ASARCO/Encycle Facility
5500 Up River Road
Corpus Christi, Texas

(month) (day), 2012

(Soil Remediation Contractor Name Here)

Wind Monitoring and Dust Suppression Plan - Soil Remediation Project

Former ASARCO/Encycle Facility
5500 Up River Road
Corpus Christi, Texas

Prepared for:
ASARCO – Encycle Facility Soil Remediation Project
Corpus Christi, Texas

Prepared by:

(Soil Remediation Contractor Name and Address Here)

Ref:

Date:
(month) (day), 2012

(Soil Remediation Contractor name and signature here)

(Soil Remediation Contractor principal manager name and signature name and signature here)

Contents

Attachments

1.0 Objective

This Plan identifies the steps that will be taken to reduce particulate matter emissions (dust) during soil remediation activities, and includes site specific dust suppression and monitoring requirements. Best management practices (BMPs) are required to be implemented throughout the project. These shall include wetting active soil excavation, loading, and treatment areas; covering soil excavation areas with polyethylene sheeting; conducting soil treatment (stabilization) inside an existing building rather than outside on site grounds; minimizing or ceasing activity during periods of high wind; installing a 10-foot-high tarp on the south side of active soil excavation areas, and tarping trucks.

2.0 Background

The Facility is located at 5500 Up River Road in Corpus Christi, Texas (Site [Figure 1]). The facility was formerly a large hydrometallurgical complex, originally operated by the American Smelting and Refining Company (ASARCO). ASARCO operated the facility as a zinc smelter from 1942 through 1985. Encycle Texas Inc (Encycle) subsequently operated the facility as a metals recycling facility until operations ceased in 2003.

The project requires excavation of approximately 15,000 tons of metals-affected soil, treatment of the soil in the existing Lettered Bins Building, disposal of the soil an authorized offsite landfill, and backfilling of the soil excavations with clean select soil. The project also requires removal and disposal of approximately 330 tons of wooden railroad ties and 100 tons of cathodic protection sand, and adding approximately 400 tons of compacted clay and topsoil to the existing O1 Landfill clay cap.

3.0 Potential Sources of Fugitive Dust

Planned site activities have the potential to generate emissions in the form of fugitive dust during soil remediation activities. Possible emissions sources include:

- Soil Excavation and Loading Activities – Excavation and loading of soils is capable of producing fugitive dust.
- Soil Stockpiles – Stockpiles of excavated soils may create windborne dust emissions.
- Soil Treatment – Soil treatment by soil stabilization may create windborne dust emissions.
- Traffic – Movement of equipment and vehicular traffic on paved or unpaved roads and parking lots around the site are capable of creating fugitive dust.
- Cleanup and Grading – Grading and revegetating of soil excavation areas may produce fugitive dust.

4.0 Fugitive Dust Control Methods

Dust control methods will vary based on the activities occurring at the site. Dust control methods are summarized by source below.

Soil Excavation and Loading Activities - Dust control measures will include water spraying/misting to control dust during soil excavation and loading activities. Water to be utilized for dust suppression will be clean municipal water supplied by a fire hydrant located on Up River Road. Water to the hydrant is supplied through the City of Corpus Christi municipal water system. Water from the hydrant is routed from Up River Road onto the property to a water loading area which is located southwest of former Building 16. Water trucks are filled at the loading area and sent to active work locations for dust suppression.

During each work day, soil excavation activities will be limited to no more than one SWMU. Dust suppression shall be conducted during soil excavation activities, including use of a trailer-mounted 24-inch-diameter Dust Boss water mister with at least 24 mist nozzles, or Trustee approved equal, at each SWMU where soils are being excavated. The Dust Boss shall be positioned directly upwind of each soil excavation area and moved as needed during the day if the wind direction and/or soil excavation location changes. Additional dust suppression water shall be applied to each soil excavation area using water trucks equipped with water spray nozzles, or Trustee approved equal. Necessary measures such as BMPs and other runoff management controls as necessary shall be implemented to prevent dust suppression water from entering the storm drain system.

At the end of each work day, all areas where soils have been excavated shall be covered using 6- ml Visqeen sheeting, or Trustee approved equal. The Visqueen sheeting shall be held in place using sand bags, concrete masonry unit (CMU) blocks, or Trustee approved equal, set on top of the Visqueen at a spacing not to exceed 10 feet along each edge of each Visqueen sheet. If the width of the soil excavation area exceeds the width of the Visqueen sheet, additional rows of Visqueen sheeting shall be utilized with a minimum of five feet of overlap until the entire area where soils have been excavated is covered with Visqueen. The Visqueen cover shall remain in place, other than when soils are actively excavated or verification soil samples are actively collected, until the excavated area has been backfilled with clean fill.

A 10-foot-high heavy duty polyethylene mesh tarp shall be installed on the southern side of each active soil excavation area, and on the southern side of the Lettered Bins Building prior to conducting any work in those areas. The purpose of the tarp is to capture dust generated from equipment, vehicular activities, and soil remediation activities. The tarp shall extend at least 20 feet beyond each edge of each active soil excavation area and the Lettered Bins Building.

If the wind direction at the Site has a northerly component (i.e., wind is blowing toward the Donna Park area south of the Site) and the sustained wind speed (averaged over 1 minute) exceeds 15 miles per hour, no work shall be conducted at the Site other than equipment maintenance and administrative work that does not disturb any of the soils or railroad ties at the Site. Also, if the wind direction at the Site has a northerly component of any speed, no soil excavation shall be conducted anywhere at the Site. In addition, if the wind direction at the Site has a northerly component of any speed, no stockpiling, loading, or backfilling activities shall be conducted at the Waste Pile SWMU on the Meaney

Tract, the Storm Sewer System SWMU on the Southern Tract, or the West Cell House SWMU on the Southern Tract due to their relatively close proximities to Up River Road.

Soil Stockpiles – The excavated soils can be temporarily placed onto plastic sheeting (6 mil minimum thickness) adjacent to the excavation, misted/wetted for dust suppression, then loaded into end dump trucks or roll off boxes that same day for transport to the Lettered Bins Building. All excavated soils must be placed into the Lettered Bins Building at the end of each work day, or returned to the excavation the same day they are excavated such that none of the excavated soils are higher in elevation than original (pre-excavation) grade, and then covered using 6-millimeter (ml) polyethylene (Visqeen) sheeting. A trucks used to transport soils at the site shall be tarped prior to soil transport.

Soil Treatment – All excavated soils will be treated inside the Lettered Bins Building. The soils in the Lettered Bins Building shall be wetted/misted for dust suppression, including during soil loading, unloading, and stabilization activities. During active soil stabilization activities in the Lettered Bins Building, water shall be applied by the Contractor using a Dust Boss or Trustee approved equal.

Traffic – Material Track Out - Track-out of loose materials will be controlled using stabilized construction entrances (gravel pads) installed at the primary project access point from Up River Road to prevent tracking of sediment and mud on to public roadways. The gravel pads will be installed according to the specifications provided in the Erosion and Sediment Control provisions of the Storm Water Pollution Prevention Plan (SWP3) for the site. Any visible track-out on a paved public road at any location where vehicles exit the work site must be removed. Removal must be done using brooms, wet sweeping, a vacuum device or a combination of these BMPS as needed.

Traffic – Dust Emissions From Equipment and Vehicular Traffic on Driving Surfaces - All project vehicles will enter the construction site through gravel pads that will be located at the primary construction entrance roadway. Traffic will follow marked traffic routes to and from the designated work area(s). No off-road travel is permitted unless approved by project management. Project personnel are to obey posted speed limits to prevent wind turbulence and associated dust generated at higher vehicle and equipment velocities. Project road ways at the site will be wetted each working day to further minimize dust generation from vehicle travel.

Traffic – Off-Site Transport - All vehicles that are used to transport soils from the Site will be provided with a tarp cover. Prior to exiting the site, vehicles will be checked to ensure that they are tarped and to remove any excess material on exterior surfaces of the cargo compartment. All off-site haul trucks will access the sites via paved access roads and established gravel pads. Site personnel will be stationed at the primary project access point to monitor inflow/outflow to and from the site as necessary and will be responsible for inspecting all vehicles entering and exiting the site.

Visible Dust Crossing the Property Boundary - Adequate dust mitigation measures should be in place to address the dust at the source of the dust generating activity. If visible dust from soil remediation-related activities is observed approaching the property boundary, additional dust mitigation measures, including increased wetting, will be implemented. If the additional dust mitigation measures do not

prevent dust from approaching the property boundary, soil excavation activities in that area will stop until additional dust mitigation measures are implemented and demonstrated to reduce dust levels.

Cleaning and Grading - The soils used for backfilling the excavations will consist of clean select fill obtained from a clean offsite source such as a rural burrow pit. Prior to backfilling, the proposed clean select fill source materials will be sampled to ensure they are not contaminated. Dust suppression consisting of wetting/misting will be conducted during soil excavation backfilling and compaction.

5.0 Monitoring and Records

Wind and dust monitoring protocols are summarized below. A detailed synopsis of each monitoring protocol and the associated sampling procedures are included in the *Air Monitoring Program* included as Attachment A herein.

- The wind speed shall be monitored continuously during each work day 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. Monitoring locations will initially be established based on prevailing winds but will be adjusted if necessary to maintain the upwind and downwind locations. Monitoring will be conducted at the project boundary both up and downwind of the work zone.
- The wind direction shall be monitored continuously during each work day using a combination of (1) the on-site 18-inch-diameter orange aviation wind sock mounted north of the Up River Road security guard house entrance, and (2) the on-line data from the TCEQ Donna Park Air Monitoring Station.
- During soil excavation, stockpiling, loading, and treatment activities; railroad tie removal and loading activities; and O1 Landfill clay capping activities (collectively referred to herein as "soil remediation"), the Soil Remediation Contractor shall conduct real-time particulate air monitoring on a continuous basis using four on-site Met One Instruments, Inc. E-BAM portable particulate monitors. Monitoring for $PM_{2.5}$ and PM_{10} will be conducted at the project boundary both upwind and downwind of the work zone. Real-time particulate air monitoring data will be averaged over 30-minute intervals during each work day. If real-time particulate concentrations downwind of the soil remediation area are higher than the Air Monitoring Program action level thresholds, corrective action must be taken as described in the Air Monitoring Program. If real-time particulate concentrations downwind of the soil remediation area are higher than the Air Monitoring Program stop work level, all soil remediation-related work will stop. During the work stoppage period (minimum 30 minutes), dust suppression adjustments will be made to reduce airborne particulate concentrations below action level concentrations given in the Air Monitoring Program. If the action level concentrations are again exceeded that day, soil remediation work will stop for the remainder of that work day, and a more effective dust control program will be implemented prior to resuming work the following day. It is understood that air data collected in the community by the TCEQ attributable to onsite operations may trigger action levels and stop work levels, and that TCEQ will collect an appropriate number of

field QA/QC samples (such as trip blanks) during each sampling event to adequately identify laboratory issues that may affect the air monitoring results, and that the TCEQ will collect an appropriate number of background samples during each sampling event to statistically account for "false positives" in a scientifically acceptable manner.

- Air samples will be collected from the perimeter of the facility for laboratory analysis of metals upwind and downwind of active soil excavation areas, and active soil stabilization activities in the Lettered Bins Building at least twice weekly during soil remediation activities by the Trustee's designated representative. The air sample metals analyses will be evaluated at least twice monthly, and when soil excavation work at new SWMUs commences, and utilized to adjust real-time particulate concentration action levels and stop work levels as described in the Air Monitoring Program (Attachment A).

Records of monitoring activities and sampling results will be maintained at the on-site project office trailer. The table presented below summarizes information concerning the wind and dust monitoring team at this facility. These team members are responsible for maintenance and revisions of the plan.

Wind Monitoring and Dust Prevention Team

Employee Name	Employee Title	Designated Air Monitoring Program Responsibility
(Soil remediation contractor name here)	Project Operations Manager	Senior management authority; provide corporate support to ensure availability of necessary resources to maintain compliance with the this plan.
(Soil remediation contractor name here)	Project Manager	Qualified Individual; review and modify the plan to keep it current; ensure record keeping; ensure air monitoring program action level and stop work level requirements are implemented.
(Soil remediation contractor name(s) here)	Air Monitoring Technician	Responsible for wind speed and direction monitoring and data recordation; and setup, calibration, maintenance, monitoring, and data recordation for the E-BAM portable particulate monitors.

ATTACHMENT 1

E-BAM PORTABLE PARTICULATE MONITOR DETAILS

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

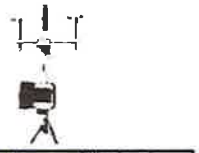
Options and Accessories

- Flow Calibrator
- WINS 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 µg 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 / .3A 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: 1600 Washington Blvd., Grants Pass, Oregon 97526 • Tel (541) 471-7111 • Fax (541) 471 7116
Regional Sales & Service: 3206 Main Street, Suite 106, Rowlett, Texas 75088 • Tel (972) 412 4747 • Fax (972) 412-4716
http://www.metone.com • metone@metone.com

E-BAM

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 operateon for either AC or DC power. Battery and solar operation available.

Met One Instruments, Inc.

Met One Instruments, Inc.

Continuous Monitoring

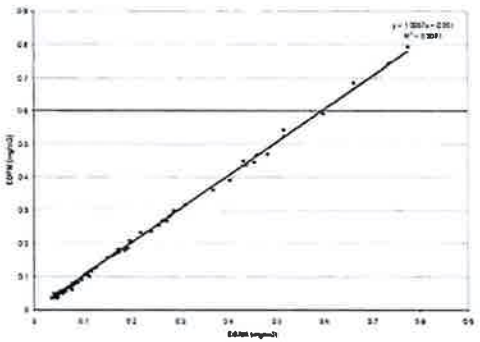
E-BAM automates particulate measurement by continuously sampling and reporting particulate concentration, data is updated every second, and data records updated every minute. E-BAM eliminates the old process of filter collection and manual filter weighing, and eliminates the need for more expensive, 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.

EPA Designated Method EQPM-0798-122 VS EBAM



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.

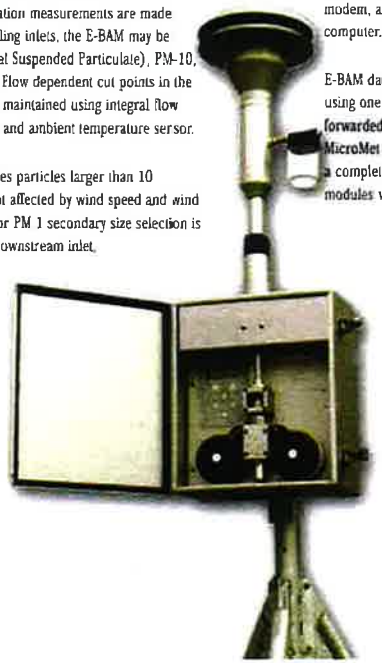
Set up

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

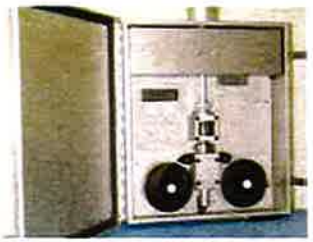
The internal data logger can store up over 200 days of concentration data at one hour sample times, and collect data from six other measurements at the same time! Both digital and analog outputs are included to enable users to connect to other data recording systems and to network with other monitors.

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

Thanks!

Omar Valdez
Project Manager
Superfund/SSDAP Section
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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 Select a different site

Month: Day: Year: Time Format:

April 6 2011 12 Hour (AM/PM) Generate Report Plot Data

☑ 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		
Sulfur Dioxide	0.1	***0.0***	0.0	0.0	0.0	0.0	0.0	**0.2**	NA	NA	Sulfur Dioxide	1 R
Hydrogen Sulfide	***0.09***	0.14	0.12	0.17	0.14	**0.18**	SPN	SPN	NA	NA	Hydrogen Sulfide	1 R
Total Non-Methane Organic Compounds	1.45	***1.03***	1.08	1.16	2.07	2.11	18.37	**147.95**	NA	NA	Total Non-Methane Organic Compounds	1
Methane	***1874.07***	1874.49	1879.06	1874.07	1884.06	1931.07	1935.23	**2033.85**	NA	NA	Methane	1
Wind Speed	4.7	4.7	**5.1**	4.5	3.9	3.5	***2.9***	3.1	NA	NA	Wind Speed	1
	5.3	5.0	**5.4**	5.0	4.0	3.8	2.9	***2.9***	NA	NA		2
Resultant Wind Speed	4.4	4.5	**4.8**	4.2	3.6	3.3	***2.5***	2.6	NA	NA	Resultant Wind Speed	1
	5.0	4.7	**5.2**	4.6	3.7	3.6	2.6	***2.3***	NA	NA		2
Resultant Wind Direction	153	144	***143***	157	159	152	164	**188**	NA	NA	Resultant Wind Direction	1
	151	147	***144***	155	157	151	164	**192**	NA	NA		2
Maximum Wind Gust	**11.0**	9.5	10.2	9.8	8.2	7.4	***6.9***	8.9	NA	NA	Maximum Wind Gust	1
	10.7	9.8	10.1	**11.5**	7.9	7.3	***6.0***	6.1	NA	NA		2
Std. Dev. Wind Direction	22	***17***	18	23	21	19	27	**32**	NA	NA	Std. Dev. Wind Direction	1
	20	19	***18***	22	22	20	28	**38**	NA	NA		2
Outdoor Temperature	61.7	61.2	61.2	61.3	61.0	***61.0***	61.5	**63.7**	NA	NA	Outdoor Temperature	1
	61.7	61.1	61.1	61.3	60.8	60.5	***59.9***	**63.1**	NA	NA		2
Relative Humidity	***71.1***	73.9	75.5	76.9	79.1	81.3	**83.4**	81.2	NA	NA	Relative Humidity	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 **bold** within the table. Minimum values are ***bold italic***.

R - 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.

ATTACHMENT 3

METALS ANALYSES DETAILS – NIOSH METHOD 7303

ELEMENTS by ICP (Hot Block/HCl/HNO_3 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

ELEMENTS:

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

SAMPLER: FILTER (0.8-µm, cellulose ester membrane)

FLOW RATE: 1 to 4 L/min

VOL-MIN: Table 1
-MAX: Table 1

SHIPMENT: Routine

SAMPLE STABILITY: Stable

BLANKS: 2 to 10 field blanks per set

ACCURACY

RANGE STUDIED: 5,000 to 50,000 µg/sample

BIAS: Not determined

OVERALL PRECISION: Not determined

ACCURACY: Not determined

MEASUREMENT

TECHNIQUE: INDUCTIVELY COUPLED ARGON PLASMA, ATOMIC EMISSION SPECTROSCOPY

ANALYTE: See element list above

REAGENTS: Conc. HCl, 1.25 mL; and conc. HNO_3, 1.25 mL

FINAL SOLUTION: 5% HCl and 5% HNO_3, 25 mL

WAVELENGTH: Element and instrument specific

BACKGROUND CORRECTION: Spectral wavelength shift

CALIBRATION: Elements in 5% HCl, 5% HNO_3

RANGE: LOQ to 50,000 µg/sample [1]

ESTIMATED LOD: Varies with element; Table 1

PRECISION ($\bar{S}$): Not evaluated

APPLICABILITY: The working range of this method is up to 100 mg/m³ 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_3. To about 600 mL of deionized water in a 1-L volumetric flask, slowly add 50 mL conc. HCl and 50 mL conc. HNO3. 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.

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

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_3. 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_3 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_3 diluting solution, reanalyze and apply the appropriate dilution factor in the calculations.

CALCULATIONS:

15. Obtain the solution concentrations for the sample, C_s (µg/mL), and the average media blank, C_b (µg/mL), from the instrument.
16. Using the solution volumes of sample, V_s (mL), and media blank, V_b (mL), calculate the concentration, C (mg/m^3), of each element in the air volume sampled, V (L):

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

NOTE: µg/L ≡ mg/m^3

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:

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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_2O_3 (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^3 (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	YW240000	--	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[1]	Analyte	Status	Analyte	Status
Ag	Not Valid	CuO	Valid	S	Not Valid
Al	Valid	Fe	Valid	Sb	Partially Valid[4]
Al_2O_3	Not Valid	Fe_2O_3	Valid	Sb_2O_3	Partially Valid[6]
As	Valid	Ga	Valid	Se	Valid
Au	Valid	In	Valid	Si	Not Valid
B	Valid	KCl	Pending	Sn	Partially Valid[6]
Ba	Pending	Mg	Valid	SnO	Pending
BaO	Pending	MgO	Valid	SnO_2	Pending
BaO_2	Pending	Mn	Valid	Sr	Valid
$BaCl_2$	Valid	MnO	Valid	$SrCrO_4$	Valid (by Cr)
$BaSO_4$	Pending	Mo	Valid	Te	Valid
Be	Valid	NaCl	Pending	Ti	Valid
Bi	Partially Valid[2]	Nd	Valid	Tl	Valid
Ca	Valid	Ni	Valid	V	Valid
$CaCO_3$	Valid	P	Valid	V_2O_5	Valid
CaO	Valid	Pb	Partially Valid[3]	Y	Valid
Cd	Valid	$PbCrO_4$	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

[1] 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.

[2] Valid up to 10,000 µg/sample and within 7 days of sample digestion.

[3] 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.

[4] Valid up to 25,000 µg/sample and within 7 days of sample digestion.

[5] Valid up to 25,000 µg/sample and within 7 days of sample digestion.

[6] 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^3 (skin)
NIOSH: 0.05 mg/m^3 (skin)
ACGIH: 0.025 mg/m^3 (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^3) @ 20 °C; Vapor Density (air=1) 7.0

SYNONYMS: quicksilver

SAMPLING

SAMPLER: SOLID SORBENT TUBE (Hopcalite in single section, 200 mg)

FLOW RATE: 0.15 to 0.25 L/min

VOL-MIN: 2 L @ 0.5 mg/m^3
-MAX: 100 L

SHIPMENT: routine

SAMPLE STABILITY: 30 days @ 25 °C [1]

FIELD BLANKS: 2 to 10 field blanks per set

MEDIA BLANKS: at least 3 per set

ACCURACY

RANGE STUDIED: 0.002 to 0.8 mg/m^3 [2] (10-L samples)

BIAS: not significant

OVERALL PRECISION ($\hat{S}_{rT}$): not determined

ACCURACY: not determined

MEASUREMENT

TECHNIQUE: ATOMIC ABSORPTION, COLD VAPOR

ANALYTE: elemental mercury

DESORPTION: conc. HNO_3/HCl @ 25 °C, dilute to 50 mL

WAVELENGTH: 253.7 nm

CALIBRATION: standard solutions of Hg^{2+} in 1% HNO_3

RANGE: 0.1 to 1.2 µg per sample

ESTIMATED LOD: 0.03 µg per sample

PRECISION (S_r): 0.042 @ 0.9 to 3 µg per sample [4]

APPLICABILITY: The working range us 0.01 to 0.5 mg/m^3 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_3), conc.
4. Mercuric oxide, reagent grade, dry.
5. Calibration stock solution, Hg^{2+}, 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_3 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

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.

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_3 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

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 ^{3} 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 $Hg(NO_3)_2$) [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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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

SOIL REMEDIATION

(TO BE ADDED BY SOIL REMEDIATION CONTRACTOR)