PERIMETER AIR MONITORING PLAN

for

Response Actions

at

Class 2 Non-Hazardous Waste Landfill
Exide Technologies, Inc.
Frisco, Texas

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&

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Reviewed by:

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1.0 INTRODUCTION

The purpose of the air monitoring and dust control plans are to identify the measures that will be taken to monitor and minimize emissions associated with remediation activities at Exide Technologies' Class 2 Landfill (Site). Specifically, this *Perimeter Air Monitoring Plan* outlines the requirements and methods for monitoring ambient air quality during planned slag excavation and treatment activities for particulate matter (dust), lead and cadmium. This plan works in conjunction with the *Dust Control Plan,* which describes operational controls to reduce dust emissions during slag excavation and treatment activities.

As described in the *Response Action Work Plan*, the objective of the proposed response action is to remove discrete areas of waste containing concentrations of lead and/or cadmium that exceed the Universal Treatment Standard (UTS), re-treat the excavated material until laboratory analysis indicates regulatory compliance (below the UTS), redeposit it in the cells, and collect confirmation samples of the in-place treated slag to ensure that excavation has removed all wastes that exceed the UTS and no land ban or hazardous wastes remain in the cells. Excavated material will be re-treated within the boundaries of the active landfill. Approximately 4,000 cubic yards of lead and cadmium-impacted slag will be excavated and re-treated on-site. If, based upon sampling results, additional materials require treatment, such materials will be treated in the same manner as the initial quantities of slag. Air quality monitoring will consist of exposure monitoring by NIOSH Method 7300 for on-site workers, addressed in the *Site Safety and Health Plan*, and ambient air monitoring to measure off-property impacts, addressed in this Plan. Air quality will be monitored by Remediation Services, Inc. (RSI).

The primary objectives of the perimeter air monitoring are to:

- Develop a relationship between particulate (dust) levels and concentrations of lead and cadmium, so that the particulate measurements can be used as a surrogate;
- Determine if concentrations of lead and cadmium and particulate emissions are in excess of air Take Action or Stop Work Levels established for the Site; and
- Ensure that engineering controls and work practices help minimize potential off-site impacts. The monitoring plan will help ensure that RSI reacts quickly and makes appropriate changes to dust control measures as needed.

Air quality will be measured and documented at air quality monitoring stations during excavation and treatment activities in accordance with this plan.

2.0 ORGANIZATION OF PLAN

This plan addresses continuous perimeter monitoring for particulates (PM_{10}), explains how the relationship between particulate, lead, and cadmium will be established and describes how the "Take Action" and "Stop Work" Levels will be identified and implemented for particulates. In addition, the plan describes how samples will be collected to directly measure lead and cadmium and how that data will be used.

3.0 PARTICULATE MONITORING

3.1 Equipment

Real-time particulate air monitors (e.g., E-BAM Particulate Monitor or equivalent) equipped with an omni-directional air intake device and a "PM_{10}" impactor head will be used at the Site to monitor dust levels at or near the property boundaries during remediation activities that could generate dust. Real-time data from the downwind particulate monitors is evaluated in 30-minute and 60-minute averaged blocks to

provide immediate comparison to Take Action and Stop Work Level criteria. If there is a calm wind condition (i.e. less than 1 mile per hour wind averaged over a 30-minute period), the upwind monitor will be treated as a downwind monitor. The data collection and reporting system which utilizes data generated by this equipment is described further in Section 3.5. Attachment 1 provides specific information regarding the E-BAM Particulate Monitors that will be utilized at the Site.

3.2 Monitoring Locations

One upwind and three downwind monitoring locations will be established each day and monitors placed at or near the property line for each location to ensure adequate coverage to minimize the potential for off-site impacts. In the event that multiple activities are being conducted concurrently (i.e., other demolition activities), the downwind monitoring network will be used to monitor all activities. If "Take Action" or "Stop Work" criteria are exceeded, dust mitigation procedures outlined in the *Perimeter Air Monitoring Plan* and *Dust Control Plan* applicable to each activity will be implemented. RSI will utilize National Weather Service forecasts and review current conditions and recent trends from an onsite meteorological station to position the monitors each morning prior to start of work. Monitor locational information will be determined by GPS and recorded. Wind speed and direction will be recorded and the data sent to onsite personnel as described in Section 3.5. If there is a 90 degree change in the prevailing wind direction averaged over a 30-minute period during the work day, the downwind monitors will be appropriately relocated and waste disturbing work will be suspended until the monitors resume operation or the work may be temporarily stopped.

3.3 Take Action and Stop Work Levels Using Particulates as a Surrogate for Lead and Cadmium

The 2008 National Ambient Air Quality Standards (NAAQS) standard for lead has been utilized to establish Take Action and Stop Work Levels for real-time particulate monitoring based on lead (AL^{Pb}) that will help minimize off-site property impacts associated with Site remediation activities. Take Action and Stop Work Levels for real-time particulate monitoring based on cadmium (AL^{Cd}) will also be established. The lead and cadmium-based PM_{10} surrogate levels will be calculated based upon correlations derived from project monitoring data and the more stringent of the two surrogate levels will be used to establish the ongoing Take Action and Stop Work Levels for PM_{10}.

3.3.1 Establishing Particulate Take Action and Stop Action Levels for Lead

The target level for lead on a one-hour basis, TPb, has been derived from the current (2008) NAAQS for Pb, 0.15 $\mu g/m^3$, which is expressed as a three-month rolling average. The AL^{Pb} derived from the NAAQS will be implemented on the basis of 30-minute and 60-minute block-averaged particulate readings. The particulate Take Action Level notification will be based on a 30-minute downwind block average (TAL^{PM-30}). The particulate Stop Work Level will be set on 30-minute (SWL^{PM-30}) and 60-minute (SWL^{PM-60}) downwind block averages.

According to Appendix D, "Averaging Period Concentration Estimates" in EPA-454/R-92-024 "Workbook of Screening Techniques for Assessing Impacts of Toxic Air Pollutants (Revised)" December 1992, the appropriate multiplying factor in converting one-hour averaged concentrations to three-month averages is 0.1. Therefore, to set an equivalent one-hour allowable concentration consistent with the three-month averaged Pb NAAQS, the NAAQS value of 0.15 $\mu g/m^3$ is divided by 0.1, yielding 1.5 $\mu g/m^3$ = 0.0015 mg/m^3 Pb = TPb. Until the AL^{Pb} is established as described below, the default TAL^{PM-30} will be 0.1 mg/m^3, and the SWL^{PM-30} will be 0.2 mg/m^3 (two times the default TAL^{PM-30}). The default SWL^{PM-60} will be 0.1 mg/m^3.

The AL^{Pb} will be calculated by the following method:

The lead content fraction (FPb), taking into account downwind air sampling stations, will be determined from project-collected particulate and lead concentration data based upon the following relationship in the measured downwind particulate monitor data. Any sample results for lead which are reported from the laboratory as being below the detection limits will be entered into this calculation as ½ of the reported detection limit rather than as zero. The calculation of FPb will be completed for the averaged data from each of the three downwind particulate monitor and air sampler pairs.

$\frac{\text{Pb mg/m}^3}{\text{PM}_{10}\text{ mg/m}^3}$	=	FPb (unitless)

The highest of the calculated values from the three downwind particulate monitor and air sampler pairs will be the FPb. The AL^{Pb} for the particulate monitors for the action levels described above will then be calculated as follows:

$\frac{\text{TPb mg/m}^3}{\text{FPb (unitless)}}$	=	AL^{Pb} mg/m^3 (as particulates, PM_{10})

3.3.2 Establishing Particulate Take Action and Stop Work Levels for Cadmium

The Texas Commission on Environmental Quality (TCEQ) short-term Effects Screening Level (ESL) for cadmium is 0.0001 mg/m^3. Until the AL^{Cd} is established as described below, the default TAL^{PM-30} will be 0.1 mg/m^3, and the default SWL^{PM-30} will be 0.2 mg/m^3 (two times the default TAL^{PM-30}). The default SWL^{PM-60} will be 0.1 mg/m^3.

In order to derive a comparable PM_{10} Take Action Level, the AL for cadmium based upon the content of cadmium in the measured dust (FCd) is determined from the downwind project-collected particulate and cadmium concentration data by the following equations. Any sample results for cadmium which are reported from the laboratory as being below the detection limits will be entered into this calculation as ½ of the reported detection limit rather than as zero. The calculation of FCd will be completed for the averaged data from each of the three downwind particulate monitor and air sampler pairs.

$\frac{\text{Cd mg /m}^3}{\text{PM}_{10}\text{ mg/m}^3}$	=	FCd (unitless)

The highest of the calculated values from the three downwind particulate monitor and air sampler pairs will be the FCd. The AL^{Cd} for the dust monitors for the action levels described above will then be calculated as follows:

$\frac{\text{(ESL Cd 0.0001) mg/m}^3}{\text{FCd (unitless)}}$	=	AL^{Cd} mg/m^3 (as particulates, PM_{10})

3.3.3 Take Action and Stop Work Levels for PM_{10} as Surrogate

The TAL^{PM-30} (i.e., 30-minute block average Take Action Level) and SWL^{PM-60} (i.e., 60-minute block average Stop Work Level) for PM_{10} be the LOWER of the calculated AL^{Pb} and AL^{Cd}. In no event will the TAL^{PM-30} and the SWL^{PM-60} be greater than 0.15 mg/m^3. The SWL^{PM-30} (i.e., 30-minute block average Stop Work Level) will be two times the TAL^{PM-30}.

During the pilot study work described in Section 6, TAL^{PM-30} and SWL^{PM-60} will be 0.1 mg/m,^{3} a level more conservative than the NAAQS for PM_{10} (0.15 mg/m3). Site-specific data regarding the relationship between PM_{10}, Pb, and Cd concentrations in the air related to this remediation project will be used after the results of the initial pilot test have been verified to set the TAL^{PM-30}, SWL^{PM-30} and the SWL^{PM-60} and to update them weekly based upon the a two-week rolling average of site-specific measured relationships, provided air sampling results are timely received, and at a minimum every two weeks. Extenuating circumstances may be addressed by changes to, or accommodations within, this plan made in consultation with and upon approval of the TCEQ Executive Director.

3.4 Stop Work Level for Wind

A wind speed Stop Work Level notification will be set on a one-minute block average using data from the on-site meteorological station. If the sustained wind speed (the wind speed obtained by averaging the measured values over a one minute period) exceeds 20 miles per hour, all waste-disturbing activities must cease until the sustained wind speed declines to 20 miles per hour or lower for at least 15 consecutive minutes. Non-dust producing activities (equipment maintenance, etc.) may still be conducted during these periods.

3.5 Particulate Monitors and Wind Data Monitoring and Notifications

3.5.1 Particulate Monitors

The data obtained from the particulate monitors will be monitored at a remote location by Field Data Solutions (FDS). FDS hosts and manages a computer based monitoring system which will provide Take Action and Stop Work Level notifications to both field and management personnel on a real time basis as well as provide real time access to values from each instrument. Each of the E-BAM monitors will be equipped with a wireless modem. Cellular communication gateways will be installed at the site to act as central communication hubs.

3.5.2 Wind Speed and Direction Data Monitoring

Wind speed and direction will be monitored using the onsite weather system. The data will be transmitted to FDS directly via telemetry. This data will be integrated with the FDS monitoring system to provide Stop Work Level notifications to both field and management personnel on a real time basis as well as provide real time access to the current wind direction.

3.5.3 Notifications

Notifications of exceedances of the particulate or wind speed Take Action or Stop Work Levels at the downwind monitors will be sent via text message to field personnel. Notifications to the field office (RSI) will be sent via email. The notifications will be sent to RSI's site onsite Project Manager, Dust Control Technician, and the W & M Environmental Group, Inc. Onsite Oversight Person. The notifications will be sent as a Take Action Level notification or a Stop Work Level notification. The Dust Control Technician will be the primary individual responsible for monitoring the notifications and ordering implementation of response actions. However, all of these individuals will have the authority to order implementation of the response actions, if needed.

3.5.4 Stop Work Criteria for Monitors

If the signal from either the downwind particulate monitors or the onsite weather system is lost for five minutes or more, all waste-disturbing activities will be suspended until the downwind particulate monitors and the on-site weather system are operational and the signal to the Field Data Solutions system is re-established.

3.6 Dust Suppression Measures

3.6.1 Particulate Take Action Levels

If the 30-minute average PM_{10} concentration at a downwind monitor exceeds the Take Action Levels presented in Table 1 (TAL^{PM-30}), RSI will immediately implement increased dust suppression activities. These increased dust suppression adjustment activities may include, but are not limited to the following:

- Increased wetting/misting of work area
- Adding surfactant to the water used for dust control
- Applying temporary cover (paper mulch with tackifier) to areas not being actively worked
- Adjusting the rate/speed and/or quantity of equipment in the work area
- Covering active stockpiles with plastic sheeting or tarps

3.6.2 Particulate Stop Work Levels

If the one-hour (60-minute) average or thirty-minute (30-minute) average PM_{10} concentration at a downwind monitor exceeds the applicable Stop Work Level (SWL^{PM-60} or SWL^{PM-30}) presented in Table 1, RSI will immediately stop all waste-disturbing work. During the work stoppage period (minimum 15 minutes), RSI must make dust suppression adjustments to reduce airborne particulate matter concentrations below the Take Action Level concentration for particulates. The dust suppression adjustment activities may include, but are not limited to the following:

- Increased wetting/misting of demolition area
- Adding surfactant to the water used for dust control
- Applying temporary cover (paper mulch with tackifier) to areas not being actively worked
- Adjusting the rate/speed and/or quantity of equipment in the work area
- Covering active 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
- Mobilize additional dust suppression equipment and initiate its use

After dust suppression adjustments have been implemented (minimum 15-minute period), the work may resume. During the first 30 minutes after resumption of work activities, the air monitoring technician will continuously monitor the dust levels utilizing the real time data sent to the onsite computer to ensure the dust suppression adjustments are effective. Adjustments to dust suppression activities will be made if needed. If particulate concentration Stop Work Levels are exceeded at a downwind particulate monitor twice in one work day, RSI must immediately stop work for the remainder of that work day and design and implement a more effective dust control program prior to resuming work the following work day. During this period, equipment maintenance and other non dust-producing activities may be performed.

3.6.3 Visible Dust

If visible dust is present in the active work zone, increased wetting of the area using water trucks and spray misters will be implemented. If visible dust is observed leaving the active work zone, work will stop until additional dust control measures are implemented. These additional dust control measures may include:

- Increased wetting/misting of work area
- Adding surfactant to the water used for dust control
- Adjusting the rate/speed and/or quantity of equipment in the work area

4.0 PERIMETER AIR SAMPLES COLLECTED FOR LABORATORY ANALYSES

4.1 Metals Analyses

Air samples will be collected upwind and downwind at the property boundaries (at the same location as the E-BAM monitors) for laboratory analyses of both lead and cadmium during waste-disturbing activities using a low volume particulate air sampler. This analytical data will be correlated with the real-time particulate concentration data collected by the E-BAM monitors on a weekly basis, provided validated sampling results are received in a timely manner, and at a minimum every two weeks. Two weeks of analytical data will be correlated with the corresponding real-time particulate concentration data collected by the E-BAM monitors to establish a two-week rolling average. The lowest correlated particulate Take Action Level for cadmium and lead calculated from the averaged data from each of the three downwind particulate monitor and air sampler pairs will be utilized for the dust monitors AL^{PM} until the next correlation is performed.

Air samples for these metals analyses will be collected by RSI at least three times weekly (every other day) during active waste disturbing activities. Samples will not be collected on days when waste disturbing activities are not occurring. If milling and waste treatment activities occur during a given week, that week's sampling will include each activity. For example, if milling occurs during only two days of a six day period, one of the samples collected will be during that two day period.

Air samples for metals analyses will be collected over a full working shift (typically eight – ten hours) using a Gilian Model GilAir5 air sampling pump, or equal. The intakes of the filter cassettes are positioned adjacent to the inlet of the colocated E-Bam air inlet. The inlet port of the filter is in a downward position. The air sampling interval may be less than eight hours in the event of inclement weather during the air sampling period (such as severe thunderstorms). Air samples will be collected by attaching laboratory-provided air sample filter cartridges (0.8- micrometer mixed cellulose ester membrane filter cartridge) to the pump, and setting the air sample filter cartridges approximately five feet above ground level at the E-BAM monitor locations, which are at or near the property lines both upwind and downwind. When the downwind air samplers are relocated with the E-BAM monitors due to a 90 degree change in the prevailing wind direction, averaged over a 30-minute period, the air samplers will be shut off during the relocation and started in the new location without a filter change. The air sample pumps will be set at a flow rate of approximately three to four liters per minute, thereby resulting in an air sample volume of approximately 1800 – 2400 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 ALS Laboratory Group, in Salt Lake City, Utah for analysis of lead and cadmium. ALS is accredited by the TCEQ for analysis of environmental samples and is accredited by the American Industrial Hygiene Association (AIHA) for analysis of air samples and lead in soil, dust, paint and air. Laboratory analyses on an expedited 24-hour turnaround will be requested. Metals will be analyzed using NIOSH Method 7303. Test method details are provided in Attachment 2. This method is specifically accredited by the AIHA.

Laboratory data will be validated by Exide's consultant (W&M Environmental Group, Inc.) and provided to the TCEQ within two business days of receipt of validated analytical results, excluding the day that the results are received. If data are received that cannot be validated, an email notification will be provided to the TCEQ within two business days with a brief description of the issue(s). Upon receipt of the corrected data from the laboratory, Exide's consultant will validate and provide to TCEQ as described above.

4.2 Metals Concentrations Take Action Levels

Following receipt of the lead and cadmium analytical laboratory reports, the analytical data from the downwind air samplers will be compared to the lead and cadmium Take Action Levels shown on Table 1. If either concentration in the downwind samples exceeds the relevant Take Action Level, RSI will immediately implement increased dust suppression activities. These increased dust suppression adjustment activities may include, but are not limited to the following:

- Increased wetting/misting of work area
- Adding surfactant to the water used for dust control
- Applying temporary cover (paper mulch with tackifier) to areas not being actively worked
- Adjusting the rate/speed and/or quantity of equipment in the work area
- Covering active stockpiles with plastic sheeting or tarps
- Mobilizing additional dust suppression equipment and initiating its use

4.3 Metals Concentrations Stop Work Levels

Following receipt of the lead and cadmium analytical laboratory reports, the analytical data from the downwind air samplers will be compared to the Stop Work Levels shown on Table 1. The Stop Work Level for lead has been derived from the current (2008) NAAQS for Pb, adjusted as appropriate to address the differences in averaging periods. According to Appendix D "Averaging Period Concentration Estimates" in EPA-454/R-92-024 "Workbook of Screening Techniques for Assessing Impacts of Toxic Air Pollutants (Revised)" December 1992, the appropriate multiplying factor in converting eight-hour averaged concentrations to three-month averages is 0.14. Accordingly, the NAAQS value of 0.15 µg/m^3 is divided by 0.14, yielding 1.05 µg/m^3 average concentration as the lead Stop Work Level. For cadmium, the TCEQ short term ESL of 0.1 µg/m^3 average concentration is the Stop Work Level. The Take Action Levels for the lead and cadmium sample results are set at 75% of the Stop Work Levels.

If the lead or cadmium Stop Work Levels are exceeded by results from a downwind air sampler, RSI will immediately stop all waste disturbing activities and design and implement a more effective dust control program prior to resuming work. The additional dust suppression activities may include but are not limited to the following:

- Increased wetting/misting of work area
- Adding surfactant to the water used for dust control
- Applying temporary cover (paper mulch with tackifier) to areas not being actively worked
- Adjusting the rate/speed and/or quantity of equipment in the work area
- Covering active 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
- Mobilizing additional dust control equipment

Table 1 provides, in chart form, the initial action levels and responses for particulates, lead and cadmium. Table 1 will be updated based upon the relationship of dust and lead concentrations utilizing the formulas in Section 3.3.1 and based upon the dust and cadmium concentrations utilizing the formulas in Section 3.3.2 once the initial pilot waste treatment in Section 6 has been completed and weekly thereafter, provided sampling results are received in a timely manner, and at least every two weeks, based upon the relationship between dust and measured metals concentrations.

TABLE 1

Initial Action Levels and Response

Contaminant of Concern	Monitoring Method	Frequency of Monitoring	Take Action Level to Increase Dust Suppression / Emission Controls	Stop Work Level
Particulate Matter	Visual		Visible dust within the active Work Zone – Implement additional dust control measures.	Dust leaving the Work Zone perimeter – Stop Work. Implement additional dust control measures.
	PM_{10} Downwind Particulate Monitors	30-minute block average	$PM_{10} > TAL^{PM-30}$ Default TAL^{PM-30} - 0.1 mg/m^3 average 30-minute concentration – Implement additional dust control measures.	$PM_{10} > SWL^{PM-30}$ Default SWL^{PM-30} (two times TAL^{PM-30}) - 0.2 mg/m^3 average 30-minute concentration Stop Work. Implement additional dust control measures.
	PM_{10} Downwind Particulate Monitors	60-minute block average		$PM_{10} > SWL^{PM-60}$ Default SWL^{PM-60}- 0.1 mg/m^3 average hourly concentration Stop Work. Implement additional dust control measures.
Lead	Low Volume Particulate Samplers	Three days per week	0.78 $\mu g/m^3$ – Implement additional dust control measures.	1.05 $\mu g/m^3$ average concentration.
Cadmium	Low Volume Particulate Samplers	Three days per week	0.075 $\mu g/m^3$ – Implement additional dust control measures.	0.1 $\mu g/m^3$ average concentration (TCEQ short term Cd ESL).

5.0 REPORTS

5.1 Daily Dust Concentration and Wind Speed and Direction Summary Reports

Daily Dust Concentration (PM_{10}) and Wind Speed and Direction summary reports will be prepared by FDS. These summary reports will include the average 30-minute net block average PM_{10} results for each downwind E-BAM instrument and the 30-minute block average wind speed and direction data. Take Action or Stop Work Level exceedances and the dust suppression adjustment activities implemented in response will be documented in the summary reports.

Summary reports must be completed within two business days of the monitoring day being reported. The data will be validated by W & M Environmental Group, Inc. Summary reports of the validated data will be provided to the TCEQ within two business days of receipt of verifiable results, excluding the day that the results are received. If data are received that are not able to be validated, an email notification will be provided to the TCEQ with a brief description of the issue(s). The summary report with the corrected data will be resubmitted to W & M Environmental Group, Inc. followed by validation. The summary report with validated data will then be submitted to TCEQ as described above. Concurrent with submittal to the TCEQ, the summary reports will be posted to the publicly accessible website established for the Exide Frisco Facility at http://exide.com/en/sustainability/recycling-centers-sustainability/frisco.aspx.

6.0 PILOT STUDY – WASTE TREATMENT AND WASTE MILLING

Prior to commencing full scale excavation and waste treatment activities, a pilot study will be performed over a three-day initial period using the same means and methods to be utilized during full scale excavation and treatment. In addition, a second pilot study will be performed over a three day period prior to commencing full scale milling activities. The primary objective of each pilot study is to develop the relationship between particulate (dust) levels and the lead and cadmium metal fractions in the particulate. Particulate measurements can then serve as a surrogate for the lead and cadmium concentrations in the air. TCEQ will be notified at least two business days before each pilot test commences.

During the pilot studies' work activities, both the upwind and downwind particulate monitors and the air samplers for metals will be operated. When the laboratory results have been received and the relationship between the air samples for lead and cadmium in air and the downwind real time particulate air monitors for the excavation and waste treatment or milling activities has been established, this data will be submitted to the TCEQ. Within two business days after such submission, TCEQ will inform Exide if Exide cannot commence full scale waste excavation and treatment or milling due to off-site air quality concerns arising from the pilot study's results that are not sufficiently addressed by the current project design.

7.0 QUALITY ASSURANCE / QUALITY CONTROL

Quality assurance (QA) refers to the planned and systematic actions necessary to provide adequate confidence that a product or service will satisfy a given requirement for quality. QA is applied to location and equipment selection, equipment acquisition and installation, routine site operation, and data processing and reporting.

Quality control (QC) refers to the operational techniques and activities that are used to fulfill requirements for quality. QC procedures applied at each step provide checks for acceptable conditions with corrective procedures specified when necessary.

The purpose of QC procedures is to assess and document data quality and to define remedial corrective actions when operating conditions exceed pre-established limits. Routine QC procedures are designed to focus on areas most likely to have problems, based on experience and guideline documents. Table 2 shows the frequency of audits and routine QC measures for the air quality study. The following subsections describe the QC, calibration, and auditing procedures to be used during this project.

Table 2 Schedule of Audits, Calibrations, and Quality Control Checks		
Frequency	**Activity**	**Acceptable Limits**
Prior to Delivery, Prior to Start of the Project	Calibration of E-BAM Monitors	
Prior to the Start of Work Each Week	Routine Checks of E-BAM Monitors (Tape Checks, Zero Checks, Leak Check, and clean size selective inlets), Verify Clock Settings, Housekeeping) and Air Samplers	Leak Check >1.0 lpm requires nozzle and vane cleaning Leak Check > 1.5 lpm invalidates data to previous leak check
Every Three Weeks	Flow Rate Calibration (Perform Barometric Pressure Sensor Audit, Temperature Sensor Audit Prior to Flow Test), Membrane Test and Pump Test of E-BAM Monitors	Flow Rate ±0.1 lpm of Traceable Reference Standard Audit Device Barometric Pressure Audit - Calibrate E-Bam Temperature Audit– Calibrate E-Bam Membrane Test – Pass/Fail Pump test – Pass/Fail Membrane Check Pass/Fail
Every Tape Change and At Least Monthly	Cleaning Nozzle and Vane of E-BAM Monitors (A Leak Check is required anytime detector tape is removed or a new tape is installed)	Leak Check >1.0 lpm requires nozzle and vane cleaning Leak Check > 1.5 lpm invalidates data to previous leak check.
Weekly	Field Blanks Collected for Air Samplers	See 7.3 below
Monthly	Trip Blanks Collected for Air Samplers	See 7.3 below

7.1 Particulate Monitors

7.1.1 Quality Control

The E-BAM particulate monitor beta detectors are calibrated at the factory. The beta detector calibrations remain fixed for the life of the unit, and no user adjustments are required. Each unit has test membranes that are placed in the beta particle pathway to verify performance of the detector. The test membranes are thin sheets of material that absorb a fraction of beta particles equivalent to a known mass of particulate matter. Each instrument has an individually matched membrane, and the factory-provided equivalent mass reading is stored in the instrument. The reference membrane tests are manually performed prior to the start of the project and at least every three weeks (the manufacturer recommends a frequency of one or two times per year for the E-BAM). The units are also equipped with zero-check inserts that are used in the same manner as the reference membranes. The zero check insert test will be performed prior to the start of the project, and prior to the start of work each week.

QC flow checks will be performed by RSI personnel every three weeks to ensure that the correct sample flow rate is being maintained to provide proper particle size separation. The flow rate calibration is performed using a traceable reference standard flow audit device (BGI deltaCal® or equivalent). The barometric pressure and ambient temperature must be audited and calibrated, if necessary, prior to the flow check. The ambient temperature and barometric pressure indicated on the traceable reference standard flow audit device is compared to the ambient temperature and barometric pressure indicated on the e-Bam. If necessary, the ambient temperature and barometric pressure indicated on the traceable standard flow audit device is entered into the E-bam to correct the E-Bam internal ambient temperature and/or barometric pressure sensor reading. The flow rate calibration can then be performed. The E-bam internal flow rate is audited based upon the flow rate indicated by the traceable reference standard flow audit device. If necessary the E-bam flow rate indicated on the traceable standard flow audit device is entered into the E-bam to correct the E-Bam internal flow sensor reading. A pump test will be performed as well every three weeks.

The E-BAM particle size selective inlets are designed to function at a flow rate of 16.7 L/min to maintain proper particle separation. Cleaning of the size selective inlets on the particulate monitors will be conducted prior to the start of each work week. The larger particles that are removed from the air flow are captured inside the PM_{10} inlet heads. To maintain proper operation of the inlets, the particle deposits must be cleaned periodically. A leak check will be performed weekly and when the tape is removed or a new tape is installed. The nozzle and vane beneath the filter tape will be cleaned each time the tape is changed but at a minimum of once per month.

7.2 Air Samplers

7.2.1 Quality Control

Field and trip blank quality control samples will be collected. Field blank samples assess the possible contamination introduced by field sampling procedures, sampling media, sampling equipment, or shipment of the samples. Trip blanks verify the cleanliness of the sampling media.

The field blank will be shipped to the field, prepared, and handled as the other samples, and returned to the laboratory, without drawing air through the air sampler, for analysis. One field blank will be collected each week for metals analysis. The trip blank will be shipped to the field, left sealed in its packaging, and then returned to the laboratory for analysis. One trip blank will be analyzed per month.

7.2.2 Quality Assurance

Precision and accuracy checks are both elements of QA. Precision checks are a measure of agreement among individual measurements of the same parameter, usually under prescribed similar conditions. Accuracy is the degree of agreement between an accepted reference measurement and the field measurement. Accuracy may be expressed as a total difference, or as a percentage of the reference value, or as a ratio. Precision checks are performed as collocated measurements.

Accuracy of ambient air sampling equipment is measured in terms of the accuracy of the flow rate measurement. Accurate determination of the air volume drawn through the air sampler is essential to the concentration calculation. Flow rates of the air samplers will be determined pre and post sampling using calibrated equipment appropriate to the sampling device.

Preventive maintenance will be part of the air samplers' QA program. Preventive maintenance is a combination of preventive and remedial actions taken to prevent or correct failure of the monitoring systems. Preventive maintenance for the air samplers includes inspection and cleaning of the inlets.

7.3 Laboratory Validation

Data validation is used to interpret the quality of the analytical data received from the laboratory. The quality of the data is determined through evaluation of both the field and laboratory quality control samples. Data validation procedures determine whether individual project data are useable, useable with qualification, or unusable. Data will be reviewed in accordance with guidelines presented in USEPA's *National Functional Guidelines for Inorganic Superfund Data Review* (2010) and/or *National Functional Guidelines for Organic Superfund Data Review* (2008).

The Laboratory will submit the analytical data and supporting quality assurance quality control data to Exide's consultant, W & M Environmental Group, Inc., for validation. The validation review will consist of a Level II review which includes the following: blank samples (i.e., trip, method, equipment, field, etc.) are reviewed for detections which may indicate whether field or laboratory handling may have cross-contaminated samples causing false positive or high-biased data; spike recovery samples (i.e., laboratory control sample, surrogate, or matrix spike) are reviewed to evaluate accuracy in the laboratory's ability to recover known concentrations that were intentionally spiked into the quality control samples; and, duplicate samples (field and/or laboratory-prepared) are evaluated to determine precision, which is the level of agreement among individual measurements. In addition to the above quality control samples, verification of appropriate analytical methods, reporting limits, sample preservation, and holding times are also reviewed to determine data usability.

Any potential bias (high or low) or cross-contamination observed as a result of the data review is usually addressed by addition of data qualifiers. These typically include one of the following: a non-detect (U) flag for blank detections resulting in potential cross-contamination; an estimated (J) flag for results that could be high or low biased due to accuracy or precision issues; rejection of data (R) due to results grossly outside their respective control limits or questionable data.

7.4 Dust Concentration, Wind Speed and Direction Report Validation

The Daily Dust Concentration and Wind Speed and Direction summary reports will be prepared by FDS. The summary reports will be reviewed by Exide's consultant, W & M Environmental Group, Inc. for validation. The review will include review of error reports, previous instrument flow and leak check information as well as review of the data received to insure the data being reported is from the instruments being used at the site.

7.5 Sample Information Management

The sample information management system for the study will be based on a uniform sample identification system. Each sample will receive a unique ID that is based on the unique combination of project, sampling date, sampling location and the Serial Number of the E-BAM Monitor that the sample is associated with.

The sample ID will be structured as follows:

EX-YYMMDD-LOC-XXX[-QQ], where

EX-LFWT	=	Project (Exide-Landfill Waste Treatment)
YYMMDD	=	Sampling date (e.g., 11/01/2012 = 121101)
LOC	=	Sample Location (e.g. UW = Upwind, DW = Downwind)
XXX	=	E-BAM Monitor Sample Association – Last 3 digits of Serial Number,
QQ	=	Optional QA sample flag (TB = trip blank, FB = field blank, SC = duplicate)

For example, a sample collected at a downwind station on 1 November 2012 would be identified as EX LFWT 121101 DW 123.

8.0 POINTS OF CONTACT

Concerns regarding activities conducted at the Exide Technologies Frisco Recycling Center should be addressed to the following points of contact:

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