To: New York State Department of Transportation

ENGINEERING BULLETIN

EB 07-038

Title: AIR QUALITY MONITORING (AQM) DURING WORK WITHIN CLASS A CONTAINMENT

Distribution:
- Manufacturers (18)
- Local Govt. (31)
- Agencies (32)
- Surveyors (33)
- Consultants (34)
- Contractors (39)

Approved:
/s/Mary E. Ivey
Mary E. Ivey, Director
Environmental Analysis Bureau
12/14/07

ADMINISTRATIVE INFORMATION:
- This Engineering Bulletin (EB) is effective upon signature.
- This EB supersedes EI 00-008.
- The AQM protocols included with this EB will be incorporated into a future update of the Environmental Procedures Manual (EPM).

PURPOSE:
The purpose of this EB is to issue updated protocols and Department policy for AQM during bridge paint removal within Class A Containment.

POLICY:
Realtime AQM shall be performed on all bridge painting contracts that include use of Class A Containment. The number of realtime AQM days performed on each contract shall be in accordance with the realtime AQM procedure transmitted with this EB.

High Volume AQM shall also be used to ensure continued containment effectiveness and protection of public health from unacceptable levels of dust and lead. Main Office, Regional Environmental and Regional Construction staff will select bridges for High Volume AQM each year based on several factors including structure type, site characteristics, environmental setting, duration of work, etc. The number of High Volume AQM days performed on each selected bridge shall be in accordance with the High Volume AQM procedure transmitted with this EB.

AQM is performed by Department consultants working under term agreement contracts managed by the Consultant Management Bureau. The Department will fund the cost of AQM on all projects up to the basic level of monitoring as defined in the transmitted protocols. Projects that experience unacceptable AQM results will require extensions of the AQM as defined in the AQM protocols. Costs for any AQM extensions will be assessed against the contractor in the form of a contract deduction.

ENVIRONMENTAL ANALYSIS BUREAU (EAB):
EAB will identify contracts using Class A Containment, including anticipated work schedules, based on information provided by the Regional Construction Groups (RCGs). EAB will coordinate assignments for the term agreement consultant(s), based on contract scope and scheduling information provided by the Regional Construction Groups. EAB will provide overall management of the AQM activities, including technical oversight of the consultant(s) and data analysis/reporting.
REGIONAL CONSTRUCTION GROUPS:
RCGs will provide EAB with preliminary work schedules involving Class A Containment at the beginning of each Construction season. EICs will schedule a start-up/coordination meeting with EAB, Regional environmental staff, the contractor, construction inspection staff and the AQM consultant at least 2 weeks prior to initial abrasive blasting on each contract. EICs will be responsible for ensuring onsite safety compliance by the AQM consultant and for communicating daily Contractor schedules to the AQM consultant and notifying the AQM consultant of any variations in those daily schedules. Construction Inspection (CI) staff will be responsible for directing the Contractor to make either operational or engineering corrections in association with visible emissions or AQM protocol criteria exceedances reported by the AQM consultant. EICs will be responsible for directing any required work stoppages by the Contractor associated with unacceptable results reported verbally or in writing by the AQM consultant.

TRANSMITTED MATERIALS:
This EB transmits the following updated AQM protocols for use on bridge painting contracts that specify use of Class A Containment:

- High Volume AQM Procedure During Class A Containment Bridge Painting Work
- Realtime AQM Procedure During Class A Containment Bridge Painting Work

BACKGROUND:
Class A Containment is the Department standard for preventing the release of dust and lead waste into the environment during abrasive blasting and paint removal on painted steel structures. AQM is conducted annually on contracts using Class A Containment as a quality assurance measure to verify the effectiveness of Class A Containment in maintaining conformance with air quality standards and other public health criteria. Data and analysis results from AQM are provided to the Departments of Health and Environmental Conservation for their program oversight responsibilities.

High Volume AQM uses filter-based air sampling methods to determine ambient particulate concentrations, including lead fractions. While this type of AQM provides highly accurate data, general use of this method would result in several drawbacks. These would include extensive lead-time requirements for equipment setup, monitor placement issues, lengthy laboratory analysis turnaround time, and significant overall cost. Realtime AQM uses a light-scattering sensor to measure particulate levels. It does not require laboratory analysis or extensive equipment setup, and costs considerably less than High Volume AQM. Drawbacks to Realtime AQM include no measurement of the lead fraction of the particulate being measured, irrelevant elevated measurements caused by high humidity, and lack of recognition as a USEPA reference method for air sampling.

CONTACT:
Direct questions regarding this issuance to Jonathan Bass of the Environmental Analysis Bureau at 518-485-5315 or by e-mail at jbass@dot.state.ny.us.

Direct questions regarding contractor compliance to Brian DeWald of the Construction Division at 518-457-9688 or by e-mail at bdewald@dot.state.ny.us.
Introduction
Realtime Air quality monitoring performed during all Class A Containment bridge paint removal work will be conducted using a hand-held DataRAM realtime aerosol monitor, or equivalent. The hand-held DataRAM will provide realtime measurements of respirable dust adjacent to containment work and other accessory equipment including dust collectors, vacuum units, blasting pots, waste storage, etc. during daily abrasive blasting and clean-up operations.

Purpose
The purpose of the realtime air quality monitoring is to provide additional quality control during abrasive blasting activities associated with bridge painting work using Class A Containment.

Air Quality Criteria

<table>
<thead>
<tr>
<th>Measured Parameter</th>
<th>Concern Limit</th>
<th>Action Limit</th>
<th>Sample Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real-Time Particulate</td>
<td>*150 ug/m³</td>
<td>450 ug/m³</td>
<td>15 minute (TWA)</td>
</tr>
</tbody>
</table>

ug/m³ - Micrograms per cubic meter  
TWA - Time Weighted Average  
* Concern limit is 150 ug/m³ or 100 ug/m³ over background, whichever is greater

Exceedance(s) of specific criteria will require the following response actions:

Concern Limit - Single instance concern limit exceedances require operational or mechanical deficiencies to be identified and corrected. Recurring concern limit exceedances including two daily concern exceedances from the same location or four daily concern exceedances from various locations requires suspension of abrasive blasting operations. Existing deficiencies require identification and correction prior to resumption of work.

Action Limit - Action limit exceedances occurring during daily blasting and clean-up operations require suspension of abrasive blasting operations until existing deficiencies are identified and corrected prior to resumption of work.

Unacceptable realtime air quality monitoring results are defined as follows:

- Any single Action Limit exceedance
- Two Concern Limit exceedances from the same location during a single daily work shift
- Four Concern Limit exceedances from various locations during a single daily work shift
- Five Concern Limit exceedances during a five-day abrasive blasting period
Program Duration
The basic realtime air quality monitoring program shall include the first 5 days of abrasive blasting operations on each bridge for contracts having up to 3 individual structures. On contracts involving more than three individual structures this basic program shall include the first 5 days of abrasive blasting on each of the first three structures and one random day on 50% of the remaining structures. The Department may also include additional days of realtime air quality monitoring as part of this basic program on any individual structure involving more than five days of abrasive blasting.

Unacceptable results occurring during any of the basic program days shall cause an extension of the air quality monitoring. Realtime air quality monitoring extensions for painting contracts involving up to 3 individual structures shall include an additional 5 days or the remaining duration of abrasive blasting (whichever is less) on the structure where the unacceptable result(s) occurred. Realtime air quality monitoring extensions on contracts involving more than 3 individual structures shall include an additional 5 days or the remaining duration of abrasive blasting (whichever is less) on the structure where the unacceptable result(s) occurred plus 5 additional days on each of three additional individual structures not included in the basic program. Unacceptable results occurring during any monitoring extension shall cause subsequent air quality monitoring extension(s).

Equipment/Procedure/Calibration
The DataRAM aerosol monitor shall be calibrated at the beginning of each day of use following the manufacturer's recommendations. The date and time of the daily calibration checks, serial and model number, and signature of the calibrating technician will be entered into a field logbook for each project. If the instrument measurements during the calibration are incorrect, the instrument will be either recalibrated in the field and/or repaired as necessary. Any instrument that cannot be recalibrated and/or repaired in the field shall be replaced. Replacement equipment shall be available onsite.

The DataRAM shall provide readings of average aerosol measurements every 10 seconds, and shall be programmed to log the data in 15 minute intervals.

Prior to the start of daily containment work, background respirable aerosol concentrations will be measured using the hand-held DataRAM aerosol monitor equipped with an omni-directional head. Background measurements will be made in the vicinity located adjacent and upwind of the scheduled daily containment area over a period of at least 1 hour. An overall time-weighted average concentration during the entire background period will be calculated from these readings.

Throughout abrasive blasting and clean-up work, respirable aerosol concentrations will be continuously measured adjacent to containment operations and accessory equipment using the hand-held DataRAM aerosol monitor equipped with an omni-directional head. At grade surveillance of accessible exterior containment walls, seams, entrances and accessory equipment shall be continually surveyed with the DataRAM aerosol monitor at a distance of 10 to 30 feet. Based on the circumference of the containment perimeter and accessory equipment location, measurement intervals and durations shall be established to provide 2 to 4 complete containment surveillances per hour. Measurement locations shall be established at intervals from 10 to 20 feet apart and measurement durations shall be established between 1 and 5 minutes at each location. The surveillance shall consist of sequential measurements between monitoring locations moving continuously in one direction. Changes in hourly, interval or duration surveillance parameter ranges (as described above) will require prior Department approval.
If emissions from the containment or accessory equipment are observed during the regular surveillance, focus of the monitoring will be shifted to the immediate area of the emission source and maintained throughout the emission duration. Realtime monitoring during emission episodes shall continue to be conducted within the 10 to 30 foot distance from the containment and/or accessory equipment. Following cessation of the observed emission, the regular surveillance will be continued from the point of the observed emission. Emissions generated from sources other than the containment, vacuum filtration or waste containerization (i.e., onsite equipment fuel exhaust, compressor desiccator, wind blown dust, etc.) are not the focus of this monitoring.

For Class A Containment work performed on structures where at grade, adjacent access to the containment is not obtainable for perimeter surveillance (i.e., structures over water, significant height, etc.), a site specific monitoring plan shall be prepared and submitted for review and approval by EAB prior to the commencement of realtime air quality monitoring.

**Other Measurements**

Relative humidity, onsite wind direction and wind speed shall be measured continuously on a daily basis using basic meteorological instrumentation at the location of each individual structure where realtime air quality monitoring is performed.

**Data Reporting**

The daily DataRAM realtime aerosol monitoring results shall be provided as TWA concentrations at 15 minute intervals for the entire abrasive blasting and clean-up work duration. Daily reports shall consist of project related summaries including descriptions of containment location, blasting and clean-up duration, background TWA results and 15 minute TWA range of results. Daily reports shall also include general comments concerning visual emissions observed during the work, criteria exceedances, weather information, non-project sources of emissions, etc.

These reports shall be submitted to the EIC within 1 work day from each daily monitoring completion. Copies of daily reports shall also be submitted to the Regional Environmental Unit Supervisor (EUS), the Regional Construction Environmental Coordinator (CEC) and the Main Office Environmental Analysis Bureau (EAB). Observations of visible emissions and exceedances of the 15 minute TWA criteria shall immediately be verbally reported to onsite Construction Inspection staff. Final reports summarizing all daily reports for each project shall be submitted to EAB, for subsequent Regional distribution, within 30 days following the last day of AQM on the project.
High Volume Air Quality Monitoring (AQM) Procedure
During Paint Removal Work
Within Class A Containment

Introduction
High volume air quality monitoring performed during selected Class A Containment bridge paint removal work will be conducted using reference method instrumentation for collection of Total Suspended Particulate (TSP). The TSP high volume samplers will provide measurements of ambient particulate levels and the lead fraction adjacent to containment work during daily abrasive blasting, clean-up and non-blasting periods.

Purpose
The purpose of the high volume air quality monitoring is to provide additional quality control during abrasive blasting activities associated with bridge paint removal work using Class A Containment.

Air Quality Criteria

<table>
<thead>
<tr>
<th>Measured Parameter</th>
<th>Concern Limit</th>
<th>Action Limit</th>
<th>Sample Duration</th>
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<tbody>
<tr>
<td>Total Suspended Particulate (TSP)</td>
<td>250 ug/m³</td>
<td></td>
<td>24 hour (TWA)</td>
</tr>
<tr>
<td>TSP-Lead</td>
<td>1.5 ug/m³</td>
<td>4.5 ug/m³</td>
<td>TWA 24 hour ()</td>
</tr>
</tbody>
</table>

ug/m³ - Micrograms per cubic meter
TWA - Time Weighted Average

Exceedance(s) of specific criteria will require the following response actions:

Concern Limit - Single instance TSP or TSP-lead concern limit exceedances from one or more high volume monitors will require operational or mechanical deficiencies to be identified and corrected. Recurring TSP or TSP-lead concern limit exceedances from one or more high volume monitors over two or more 24 hour monitoring periods will result in suspension of abrasive blasting operations. Existing deficiencies will be identified and corrected prior to resumption of work.

Action Limit - Action limit exceedances for TSP-lead from one or more high volume monitors will result in suspension of abrasive blasting operations until existing deficiencies are identified and corrected prior to resumption of work.

Unacceptable high volume air quality monitoring results are defined as follows:

- Any single Action Limit exceedance
- Two Concern Limit exceedances occurring on separate 24 hour monitoring periods
Project Selection Criteria

Bridges are selected for high volume air quality monitoring based on use of Class A Containment. Individual bridge selection will continue to be coordinated with NYSDEC and NYSDOH for review/concurrence by EAB. Selection of individual bridge structures for high volume air quality monitoring will be based on Public Health/Environmental Risk Assessment and the following specific criteria:

- Class A Containment specification with abrasive blasting as primary method of paint removal and steel preparation;
- Amount of abrasive blasting associated with the structure involving a minimum of five (5) days.
- Routine public access within 300 feet of the structure. Examples of routine public access may include sidewalks, parks, schools, hospitals, churches, retail stores, houses, etc. Examples of locations that typically are not considered to have routine public access may include facilities over railroads, facilities over other highways (if no sidewalks are present), remote locations, etc.
- Concerns of community boards, municipal and/or locally elected officials, or the public over the abrasive blasting work.

Program Duration

The basic high volume air quality monitoring program shall include the entire abrasive blasting work schedule or 5 blasting days, whichever is less. If abrasive blasting activities are expected to last beyond 5 days, then a 5 day high volume monitoring period will be selected to capture the most intense (“dirtiest”) abrasive blasting activity to maximize the potential for discovering weak elements in the application of the containment specification which can be corrected in subsequent work.

Unacceptable results occurring during any of the basic program days will cause an extension of high volume air quality monitoring for an additional 5 work days or the remaining duration of abrasive blasting (whichever is less) on the structure where the unacceptable result(s) occurred. Unacceptable results occurring during any monitoring extension shall cause subsequent extensions.

Equipment/Procedure/Calibration

Four TSP high volume monitors shall be located in separate quadrants surrounding the containment. The high volume monitors shall be placed between 30 and 75 feet from the containment, at elevations approximately two meters above grade or bridge deck. TSP monitors shall be in the nearest feasible location generally accessible to the public to evaluate potential maximum community exposure to abrasive blasting emissions, dependent on the height of each structure and other site specific considerations.

USEPA reference method instrumentation shall be used. Calibration and other equipment maintenance procedures shall be followed. Data shall be validated and quality assurance/quality control plans developed for each project.

TSP high volume monitors shall be activated one day prior to scheduled abrasive blasting activities to capture background ambient particulate and lead levels. If available, nearby ongoing air quality monitoring (i.e., NYSDEC monitoring sites) shall be used for assistance in establishing ambient levels. If high volume monitoring continues for the entire abrasive blasting work schedule, one additional background day shall be monitored after completion of abrasive blasting to capture return to ambient levels.
TSP filters are installed prior to abrasive blasting and changed following termination of blasting activity for that day. Abrasive blasting activity is considered to include actual abrasive blasting, clean-up and tear-down of the containment structure. New filters are installed to capture the remainder of the 24 hour period. Every effort is made to minimize the time lost due to filter changes.

All sample filter analysis shall be performed by a NYSDOH accredited laboratory participating in the Environmental Laboratory Approval Program (ELAP) and currently approved under Air and Emissions for analysis of metals and suspended particulates.

Other Measurements
Paint Chip Samples shall be collected from each bridge by the AQM consultant and analyzed for total lead. A minimum of three samples shall be collected from different locations on the bridge prior to any AQM program. All paint sample analyses shall be performed by a NYSDOH accredited laboratory participating in the Environmental Laboratory Approval Program (ELAP) and currently approved under Solid and Hazardous Waste for analysis of total lead for metals.

Relative humidity, onsite wind direction and wind speed shall be measured continuously on a daily basis using basic meteorological instrumentation. Regional meteorological data is obtained from the nearest appropriate National Weather Service site.

Data Reporting
Daily reports shall consist of organized data and project related summaries including descriptions of containment locations, blasting and clean-up durations, general comments concerning visual emissions observed during the work, weather information, non-project sources of emissions, etc.

These reports shall be submitted to the EIC within 1 work day from each daily monitoring completion. Copies of daily reports shall also be submitted to the Regional Environmental Unit Supervisor (EUS), the Regional Construction Environmental Coordinator (CEC) and the Main Office Environmental Analysis Bureau (EAB). Observations of visible emissions shall immediately be verbally reported to onsite Construction Inspection staff.

The daily high volume monitoring results and any reported AQM criteria exceedances shall be provided to the Department on-site personnel within four days from collection. Results for blasting, non-blasting and 24 hour periods shall be presented in tabular and graphic formats for TSP & TSP-lead as follows:

- Average for the period of abrasive blasting within a 24 hour period
- Average for the period of non-abrasive blasting within a 24 hour period
- 24 hour TWA combining blasting and non-blasting periods
- Background day results are presented as only 24 hour TWAs

Final reports summarizing all daily reports and monitoring results shall be submitted to EAB, for subsequent Regional distribution, within 30 days following the completion of the last day of AQM.