

*Attachment H*



**EASTMOUNT ENVIRONMENTAL SERVICES, LLC**

Air Quality Specialists

## **Final Report**

Collection and Analysis of  
Particulate Fallout Samples near  
Coal-Fired Power Plant in  
Alexandria, VA

*Prepared for . . .*

Schnader, Harrison, Segal & Lewis  
LLP

*Prepared by . . .*

**Eastmount** Environmental Services, LLC  
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Project No.06-082

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## 1.0 INTRODUCTION

### 1.1 General

The City of Alexandria, Virginia has expressed concerns regarding the operation of a coal-fired power plant located within the city perimeter. One of the concerns is that particulate fallout is being deposited on the buildings located near the power plant. The City is interested in determining how much of the particulate fallout is attributed to plant operations, either from coal fly ash (stack emissions), coal ash, (stack emissions), or coal dust (coal piles, conveyors). The legal office of Schnader, Harrison, Segal & Lewis LLP (Schnader), representing the City of Alexandria, has asked Eastmount to develop a technical approach to collecting and analyzing particulate samples to establish the extent of particulate contribution by the coal-fired power plant operations.

### 1.2 Program Overview

An Eastmount Environmental representative traveled to Alexandria, Virginia to perform sample collections in the area of the coal-fired power plant. The Eastmount representative, Joseph Brady, Environmental Engineer, was accompanied by two representatives from Schnader. Twenty-seven samples were taken from different areas using the following procedure:

Analytical Procedure:

- 1) Samples were collected on opaque-type (transparent brand) scotch tape by rolling the tape into a 1 inch loop with the sticky side out, and then rolling the tape loop onto the particulate-laden surface, causing any particulate to stick to the tape. Care was taken to avoid getting fingerprints on the tape adhesive. The Eastmount engineer wore nitrile gloves during the collection procedure to eliminate the possibility of fingerprints obscuring the sample, and to generally preserve sample integrity. This procedure was repeated for each sample.
- 2) Each tape sample was placed into a clean film canister. Each canister was labeled with identifying remarks, and sealed tamper-proof evidence tape. The samples were brought back to Eastmount Environmental Services, entered into a sample log, and then shipped to Aerotech/P & K laboratories of N. Billerica, Massachusetts for analysis.

- 3) Aerotech analyzed the samples as follows: a) A portion of each sample was mounted in index oil and examined by Polarized Light Microscopy (PLM) to identify the components (percent biological, mineral, soot, fibers, etc.) making up the sample; b) Suspect particles were examined by Scanning Electron Microscopy (SEM). This technique further confirmed the identification of any coal soot, coal ash, and/or coal fly ash initially identified by PLM; c) Energy dispersive x-ray (EDX) spectra were plotted for the selected particle types. This established the main elemental constituents of the suspect particles; d) A final report summarizing the lab findings was submitted. The report includes both PLM and SEM microscope images of each sample, as well as EDX graphs.

## 2.0 RESULTS

### 2.1 Results Table

Sample	Location	Soot (%)	Fly Ash	Coal Ash	Oil Soot	Coal	Wood Char
1	Marina #1410 Bedroom Shelf	N/D	N	N	N	N	N
2	Marina #1410 Bedroom Table	Trace	Y	N	N	N	N
3	Marina #1410 Living Shelf	Trace	Y	N	N	N	N
4	Marina #1410 Balcony Doorframe	3%	Y	Y	N	N	N
5	Marina #1410 Balcony Railing	10%	Y	Y	Y	N	N
6	Marina #1402 Balcony Table Legs	10%	Y	Y	N	N	N
7	Marina #1402 Balcony Railing	3%	Y	Y	N	N	N
8	Marina #1402 Balcony Table Top	15%	Y	Y	N	Y	Y
9	1200 N. Pitt Deck Table Top	5%	Y	Y	N	N	N
10	1200 N. Pitt Deck Awning Joint	5%	Y	Y	N	Y	N
11	1202 N. Pitt Doorway	5%	Y	Y	N	N	Y
12	1206 N. Pitt Side Doorway	5%	Y	Y	N	N	N
13	529 Bashford #1 Inside Sill	5%	Y	Y	N	Y	N
14	1317 E. Abingdon Lamp	3%	Y	Y	N	Y	N
15	1317 E. Abingdon Exhaust	Trace	Y	Y	N	N	N
16	Harbor Terrace Meter Box	10%	Y	Y	N	Y	N
17	Harbor Terrace Conduit Box	10%	Y	Y	N	N	N
18	400 N. Royal Windowsill	10%	Y	Y	N	Y	N
19	400 N. Royal Door	1%	Y	Y	N	N	N
20	317 Hearthstone Window	5%	Y	Y	Y	Y	N
21	1114 N. Pitt Filter	N/D	N	N	N	N	N
22	1114 N. Pitt Alternate Dust Site	Trace	N	N	Y	N	N
23	Mirant Entrance Trash Can	10%	Y	Y	N	N	N
24	Coal Pile Trash Can	3%	Y	N	N	Y	N
25	1603B Patio Hunting Creek Door	2%	Y	N	N	N	N
26	1603B Patio Hunting Creek Wall	5%	Y	N	N	Y	N
27	1603B Hunting Creek Windowsill	2%	Y	Y	N	N	N

N/D - Not Detected

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## 2.2 Discussion

The table shows that Coal Ash and Coal Fly Ash are present in the majority of locations. The following is a description of the items found in the samples.

**Fly Ash** – is the finely divided mineral residue resulting from the combustion of powdered coal in electric generating plants. Fly ash consists of inorganic, incombustible matter present in the coal that has been fused during combustion into a glassy, amorphous structure. Coal can range in ash content from 2%-30%, and of this around 85% becomes fly ash. Fly ash particles are generally spherical in shape and range in size from 0.5  $\mu\text{m}$  to 100  $\mu\text{m}$ . They consist mostly of silicon dioxide ( $\text{SiO}_2$ ), aluminium oxide ( $\text{Al}_2\text{O}_3$ ) and iron oxide ( $\text{Fe}_2\text{O}_3$ ). Fly ash also contains some heavy metals

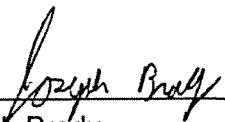
**Coal Ash** – partially burned coal. It is heavier than fly ash and under analysis it is uniquely shaped with many pits and craters.

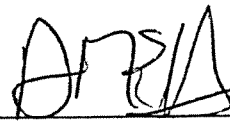
**Coal** – non-combusted coal.

## 2.3 Conclusion

Results of this program indicate that post-combustion coal particulate (flyash and/or coal ash) was present in fallout samples collected at 24 out of 27 sites. Coal particulate represented between <1% to 15% of the total particulate in these samples, with thirteen of these samples containing between 5% to 10% post-combustion coal particulate.

The information contained in this report is true and accurate to the best of my knowledge.

  
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Joseph Brady  
Environmental Engineer

  
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Anthony Stratton  
Vice President / Technical Services