Lawrence
207 Marston St.
3-18126

Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

Northeast Regional Office • 205B Lowell Street, Wilmington MA 01887 • 978-694-3200

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Secretary

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Commissioner

July 15, 2011

Mr. & Mrs. Joseph Beaulieu
33 Hofmann Avenue
Lawrence, MA 01841

Mr. & Mrs. Alfred Beaulieu, Jr.
51 Hofmann Avenue
Lawrence, MA 01841

RE: Lawrence
Soil – Coal Ash Analysis

Laboratory Results of Soil – Coal Ash Analysis

On June 3, 2011, the U.S. Environmental Protection Agency (EPA) collected a soil sample from the property line at 33 & 41 Hofmann Avenue, Lawrence, MA, during its soil excavation activities at this location. This sample was collected at the request of the Massachusetts Department of Environmental Protection (MassDEP) to confirm, through laboratory analysis, the visual observations of coal and coal ash in soil reported by EPA during its assessment activities in August/September 2010 and during its soil excavation at 33 & 41 Hofmann Ave. in May/June 2011.

The soil sample was collected at a depth of 18"-24" below the ground surface. The area of sample collection was subsequently excavated and removed by EPA as part of its remedial actions. The sample was provided to MassDEP and transported to MicroVision Laboratories, Inc. for analysis by Polarized Light Microscopy (PLM) and Scanning Electron Microscopy with Energy Dispersive X-Ray Spectroscopy (SEM/EDS).

On July 14, 2011, MassDEP received the attached analytical report from MicroVision Laboratories, Inc. The analysis confirmed the presence of coal, coal ash, and wood ash in the soil. This report has also been provided to EPA.

If you have any questions concerning the attached report, please contact Joanne Fagan at 978-694-3390.

Sincerely,

Joanne Fagan
Section Chief, Brownfields
Bureau of Waste Site Cleanup

Cc: Eric Vanderboom, EPA

7/14/2011

MICROVISION
LABORATORIES, INC.

Mass Department of Environmental Protection
BWSC Division of Technical and Financial Services
1 Winter Street
Boston, MA 02108
Attn: Joanne Fagan

No: R01-100830MB-06/07/11-0014
Job #: 4401

Dear Joanne:

This report covers the methods and findings of the Coal/Coal Ash analysis that MicroVision Laboratories, Inc. conducted on one (1) soil sample you submitted for this testing from your Project# R01-100830MB-06/07/11-0014. The purpose of this analysis was to detect and document any coal, coal ash, or wood ash that may be present in the submitted soil sample, by use of a combination of microscopy techniques including SEM/EDS, PLM, and macroscopic inspection.

Methods:

The sample was dried and examined by eye and under the stereomicroscope for any suspect dark components to the soil. Dark suspect particles were separated from the soil sample and prepared for examination by Polarized Light Microscopy (PLM) and Scanning Electron Microscopy with Energy Dispersive X-Ray Spectroscopy (SEM/EDS).

For the PLM examination, the suspect particle types detected in the sample were ground in a mortar and pestle, mounted on glass slides in immersion oil (n=1.515) and covered with glass cover slips. These samples were then examined at various magnifications and digital images were taken.

For the SEM examination the suspect particle types were mounted on an aluminum analysis stub with double sided adhesive tape, coated with evaporated graphite and examined under the SEM by EDS to obtain elemental data in the form of EDS spectra. Digital images were taken of the samples at various magnifications with the SEM.

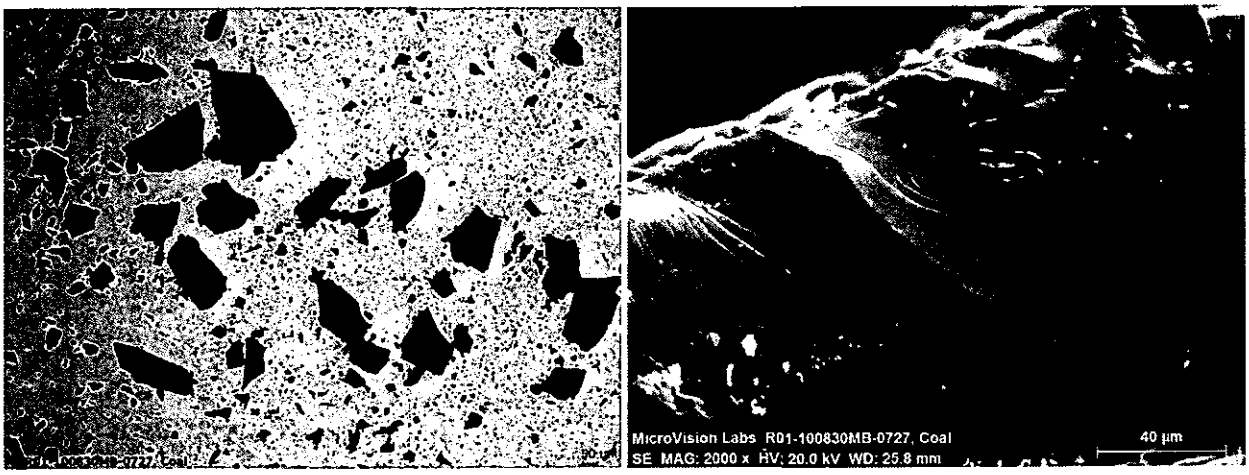
Findings:

The following pages display the data for each particle type detected in the sample for this project. Each page contains a PLM image, SEM image, and EDS spectrum for the particle types detected in this sample as well as particle type descriptions and observations.

Sample: R01-100830MB-0727

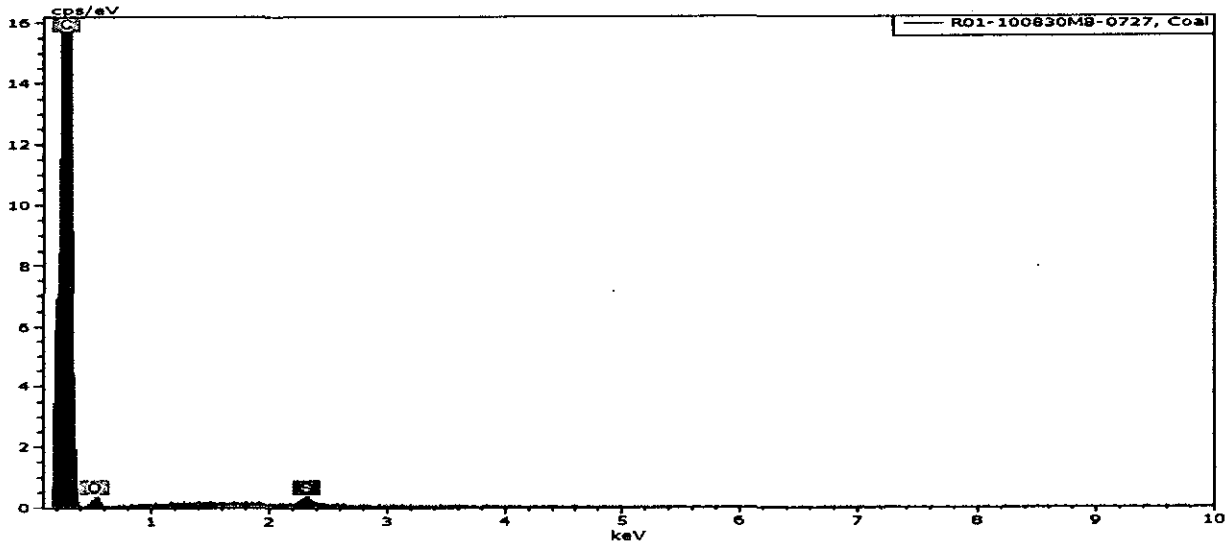
Number of Suspect Particle Types: Three (3)

Particle type 1 consisted of over twenty (20+) shiny, black grains approximately 1mm-10mm in diameter. The PLM examination indicated this particle type to be consistent with coal. The PLM and SEM images of this particle type show the angular edges and typical conchoidal fractures found in coal.



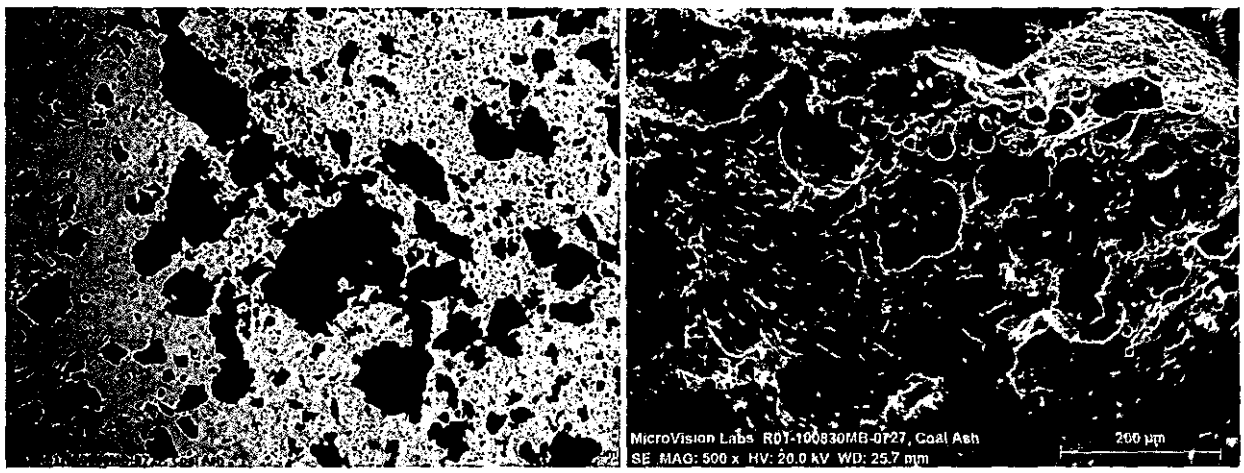
PLM Image **SEM Image**

The EDS spectrum, shown below, confirms that this particle type is coal. The analysis for this particle shows a strong peak concentration of carbon, with lower peak concentrations of oxygen, and sulfur.



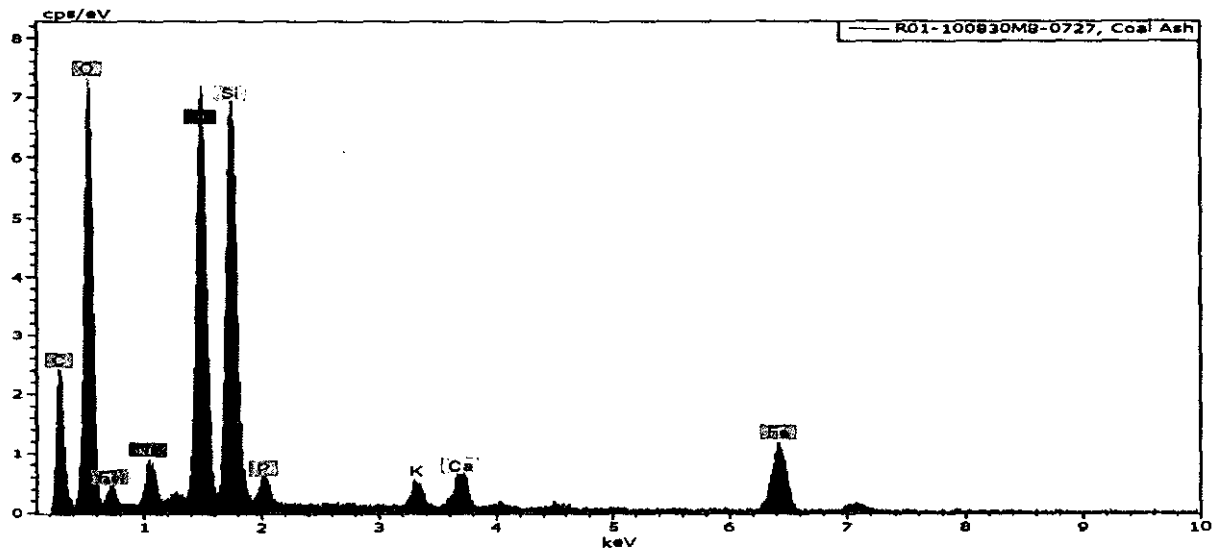
MicroVision Laboratories, Inc. 187 Billerica Road, Chelmsford, MA 01824
Phone: (978) 250-9909 Fax: (978) 250-9901 Email: Sales@MicroVisionLabs.com
www.MicroVisionLabs.com

Particle type 2 consisted of three (3) dark, porous grains approximatcly 2mm-15mm in diameter. The PLM examination indicated this particle type to be consistent with coal ash. The PLM and SEM images show the spherical gas voids that formed during combustion.



PLM Image **SEM Image**

The EDS spectrum, shown below, confirms this particle type is coal ash. The analysis for this particle type shows strong to moderate peak concentrations of carbon, oxygen, aluminum, silicon, and iron, with lower peak concentrations of sodium, phosphorus, potassium, and calcium.



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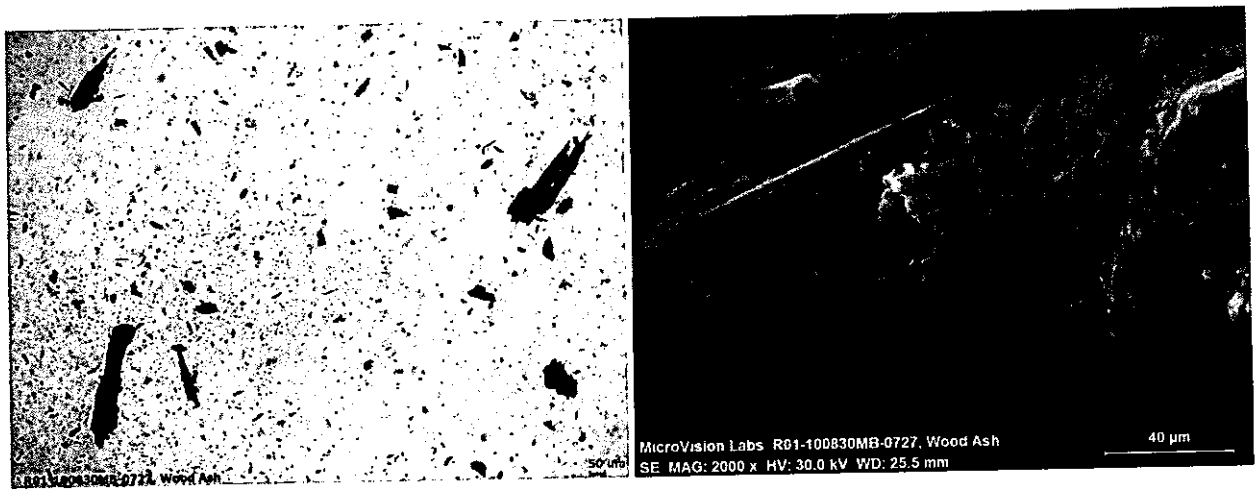
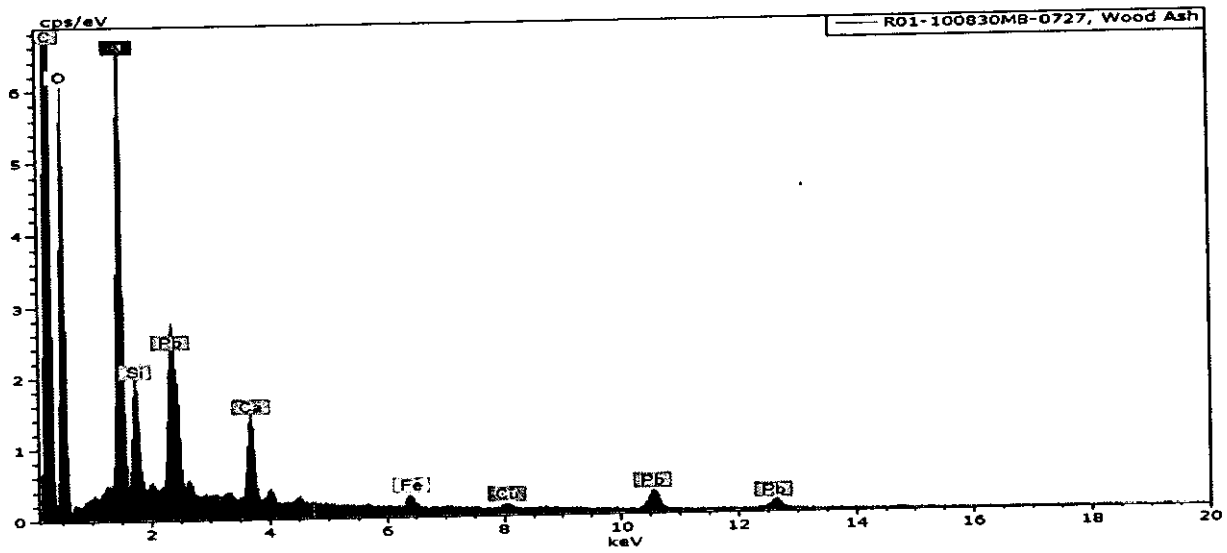
Particle type 3 consisted of three (3) friable, black grains approximately 1mm-2mm in length. The PLM examination indicated this particle type to be consistent with wood ash. The PLM and SEM photos show the cellular structure typical of wood still present in these grains.



PLM Image **SEM Image**

The EDS spectrum, shown below, confirms this particle type is wood ash. The EDS spectrum for this particle type shows strong to moderate peak concentrations of carbon, oxygen, aluminum, silicon, lead, and calcium, with lower peak concentrations of iron and copper.



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Results Summary Table:

Sample Name	Material Detected
R01-100830MB-0727	**Coal (heavy), Coal Ash (light), Wood Ash (trace)**

Lead was detected in the wood ash particles. This is not a naturally occurring element in wood ash particles and further testing may be beneficial to determine the source and amount present. The concentrations of the particle types detected in this sample are listed in parenthesis in the table above and are based on the number of particles found and the relative difficultly in finding them. The concentration information is listed for informational purposes only and has no bearing on exemption status. Please let me know if you have any questions about this analysis or if there is anything else I can do for you.

Sincerely,

Denise Weidler
Microscopist

John H. Knowles
President

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Page 1 of 1

Site #: R01-100830MB
Date Shipped: 6/9/2011
Carrier Name: Pickup

CHAIN OF CUSTODY RECORD
Tombarello Removal Site
Eric Vanderboom
857-294-0703

No: R01-100830MB-06/07/11-0014
MassDEP

Lab #	Sample #	Location	Matrix	Collected	Sample Time	Numb Cont	Container	MS/MSD
	R01-100830MB-0727	P33/P41 Ash 18"-24"	Soil	6/3/2011	16:00	4	4oz	

Special Instructions: *Composite 4 jars into one sample for analysis via PLM and SEM/EDS [coal ash analysis].

SAMPLES TRANSFERRED FROM CHAIN OF CUSTODY #

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
	[signature]	6/9/11	Joanne Fagan	6/9/11	8:30am						
	Joanne Fagan	7/7/11	[signature]	7/7/11	2:07pm						

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