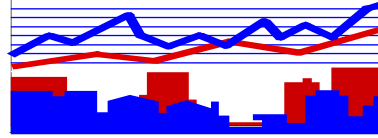


## Bayshore Environmental

1515 Wavertree Lane, Fullerton, CA 92831

P: 714-985-9659    [cih@bi-air.com](mailto:cih@bi-air.com)



### **CONDITION OF LUGGAGE: TOTAL BIOMASS and COMBUSTION PARTICULATE**

Customer:                    BMS Global, 303 Arthur St., Fort Worth, TX 76107

BMS Global Project: MR 5352: Amtrak Train Crash; Fallon, NV; June 24, 2011

BEI Report:                BC-070611

Inspection Date:        July 6 & 7, 2011

Report Date:             August 2, 2011

Field Inspector:        Joe Spurgeon, Ph.D., CIH

Location:                2020 E. 4<sup>th</sup> St., Ft. Worth, TX

Joe C. Spurgeon, Ph.D., CIH

**Conditions, terms, and limitations.** This report was provided to the client and/or customer under the conditions, terms and limitations contained in the current Bayshore Environmental [BEI] Work Order and Contract. The client and/or customer may not rely upon the contents or recommendations of this report if they do not accept the conditions, terms and limitations of the Work Order and Contract.

## INTRODUCTION

**Site Visit.** A site visit was conducted on July 6 & 7, 2011 at the BMS Global facility located in Ft. Worth, TX for Project MR 5352. Samples were collected for total biomass and combustion particulate. The site visit was performed by Joe Spurgeon as a representative of BEI.

**Purpose.** The purpose of the site visit was to perform initial sampling of luggage from an Amtrak train crash that occurred in Fallon, NV on June 24, 2011. Two parameters were measured. The first parameter was total biomass using ATP concentrations as a marker for microbial and biological contamination. The second parameter was combustion particulate using MCE filter cassettes analyzed by SEM/TEM.

**Scope.** The scope of the investigation included a visual inspection of the sampled items and the collection of representative samples from 80 items of luggage that had been received at the Ft. Worth facility. The sampling plan involved sampling two pieces of luggage from each of the three rail cars represented by the 80 items.

**Property Description.** The exterior surfaces of passenger luggage from Project MR 5352 were sampled. The pieces of luggage were from Level 2 (Coach Car) and Level 3 (Sleeper Cars, middle and last) areas of damage. The items sampled were intact, had remained dry, appeared to be in good condition, lacked a detectable odor, and had little visible evidence of smoke damage.

ATP Adenosine TriPhosphate  
MCE Mixed Cellulose Ester  
SEM Scanning Electron Microscope  
TEM Transmission Electron Microscope

## RESULTS AND CONCLUSIONS

### Total Biomass

A sterile 3M XL-100 swab stored in a refrigerator was allowed to come to room temperature, and then was used to collect surface samples. An area estimated to be about 4 square inches was wiped repeatedly with the swab. The swab was placed in its container and kept at room temperature for ATP analysis. ATP concentrations were reported as Relative Light Units (RLU). Samples were not activated until analyzed using a 3M Biotrace Luminometer in a temperature-controlled environment, which occurred within 10 minutes of collecting the sample.

### ATP Concentration: Results for Six Representative Pieces of Luggage.

Item ICN Number	Damage Level	Pre-Cleaning [RLU]	Post-Cleaning [RLU]	Reduction (%)
227.0000	2	579	719	-24
312.0000	2	3,878	162	96
811.0000	3	343	211	38
825.0000	3	758	263	65
1005.0000	3	166	452	-172
1054.0000	3	296	437	-48

<b>AVERAGE</b>	NA	1,003	374	63
----------------	----	-------	-----	----

Table, Storage	Control	213	NA	NA
Table, Sampling	Control	231	NA	NA

Cleaning the sampled items reduced the average ATP concentration by 63 %.

ATP concentrations below 1,000 RLU were considered to be typical of background, and slight increases upon cleaning were not considered to be significant due to expected variability. Only one of the sampled items, ICN # 312.0000, was classified as contaminated (3,878 RLU). After cleaning this item, the RLU value was reduced by 96 %.

*Conclusion: The representative items that were sampled, based on total biomass concentration, were in an acceptable condition and may be returned to passengers or their estates.*

### Combustion Particulate

A high-volume pump was calibrated at an airflow rate of 10 liters per minute with a 25 millimeter cassette containing a 0.8 micron mixed cellulose ester filter in-line. Calibration was accomplished using a 60 millimeter rotameter with an airflow range of 0-20 liters per minute. A closed-face sample cassette was attached to the pump, and a short piece of beveled polyvinyl-chloride tubing was attached to the inlet of the cassette. The beveled tubing was used to collect a dust sample from the front and sides of luggage. The cassette was sealed, placed in a plastic sample bag, and submitted to Forensic Analytical (Hayward, CA) for analysis of combustion particulate by SEM/TEM.

Results that were below the limit of detection (LOD) of 1 % were assigned a value of ½ the LOD, or 0.5 % when performing calculations.

#### Combustion Char: Results for Six Representative Pieces of Luggage.

Item ICN Number	Damage Level	Pre-Cleaning [%]	Post-Cleaning [%]	Reduction (%)
227.0000	2	< 1	1	NA
312.0000	2	6	< 1	92
811.0000	3	3	< 1	83
825.0000	3	4	< 1	88
1005.0000	3	< 1	< 1	NA
1054.0000	3	< 1	< 1	NA
<b>Geometric Mean</b>		1.44	0.56	61
<b>Average</b>	NA	2.42	0.58	76
Field Blank	Control	NA	< 1	NA

1. The concentration of char (black particulate resulting from the pyrolysis of organic material) was reduced by an average of 88 % for the three samples with an elevated quantity of char.
2. In addition, the quantity of char remaining on the cleaned items was similar to the quantity on the field blank.
3. The conclusion was that the cleaning procedure was effective in removing char from the luggage that was sampled.

**Opaque Particulate: Results for Six Representative Pieces of Luggage.**

<b>Item ICN Number</b>	<b>Damage Level</b>	<b>Pre-Cleaning [%]</b>	<b>Post-Cleaning [%]</b>	<b>Reduction (%)</b>
<b>Geometric Mean</b>	NA	5.51	2.67	52
<b>Average</b>	NA	8.33	2.83	66
Field Blank	Control	NA	3	NA

1. The quantity of opaque particulate (typical of soot) was reduced by an average of 66 % by the cleaning procedure.
2. In addition, the quantity of opaque particulate remaining on the cleaned items was similar to the quantity on the field blank.