



Advanced MicroAnalytical

50A Northwestern Drive – Unit #4

Salem, NH 03079

Phone (603)898-7074

www.advancedmicroanalytical.com

AMA Order:

Customer ID:

Customer PO:

Attn: **Client Contact**
Client Company
Address 1
Address 2

Phone:
Fax:

Collected: **10/01/14**

Received: **10/02/14**

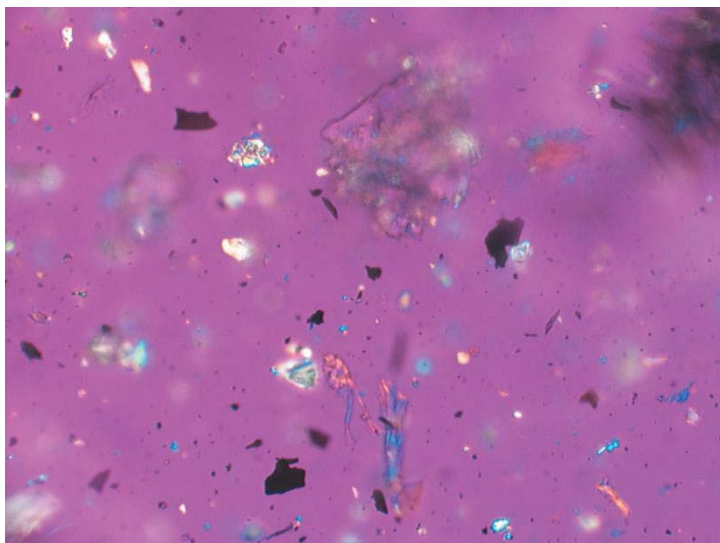
Analyzed: **10/02/14**

Project: **Particulate Micro-Analysis Demo Report**

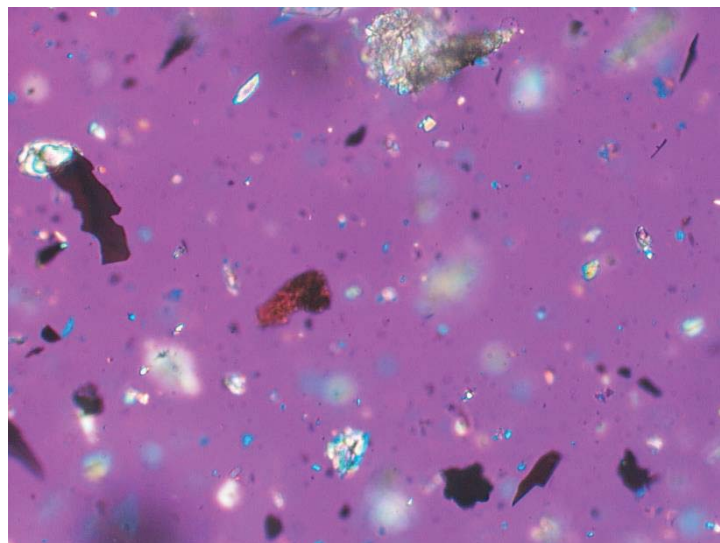
PMA – (Particulate Micro-Analysis)

Sample ID:
Client Notes:
Sample Appearance:

PLM Analysis – Determination of Sample Particle Distribution

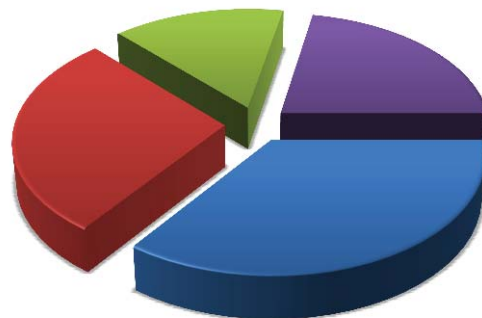


*Figure Opt1: (Fibrous Materials and Aggregates (200x)
Crossed Polars/Full Wave Plate)*



*Figure Opt2: (Opaque Char and Calcite Materials (200x)
Crossed Polars/Full Wave Plate)*

Percentage	Particle Class	Types of Particles
35%	Minerals	quartz, lime, calcite, clays
28%	Biologicals	pollen, trichomes, spores, hair (human)
15%	Opagues	ambiguous, rust/metallic flakes, char
22%	Fibers	cellulose, glass fibers, nylon
Percentages Reported by VAE Method		
Particles listed in order of relative incidence		





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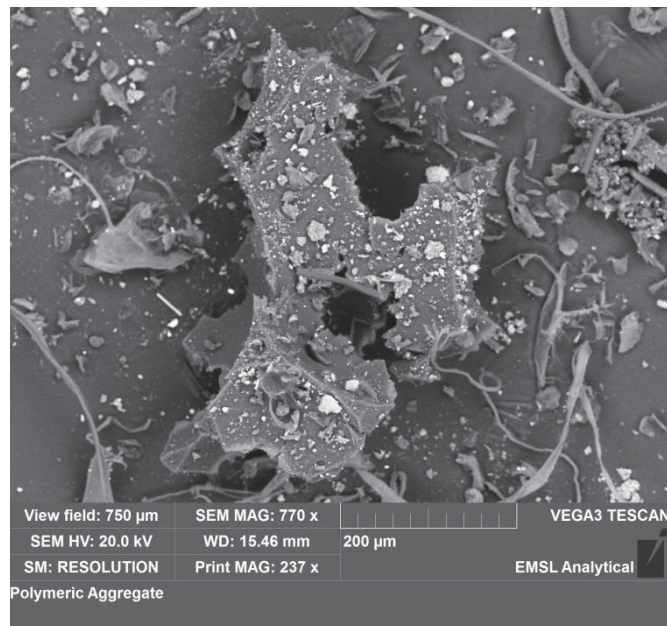
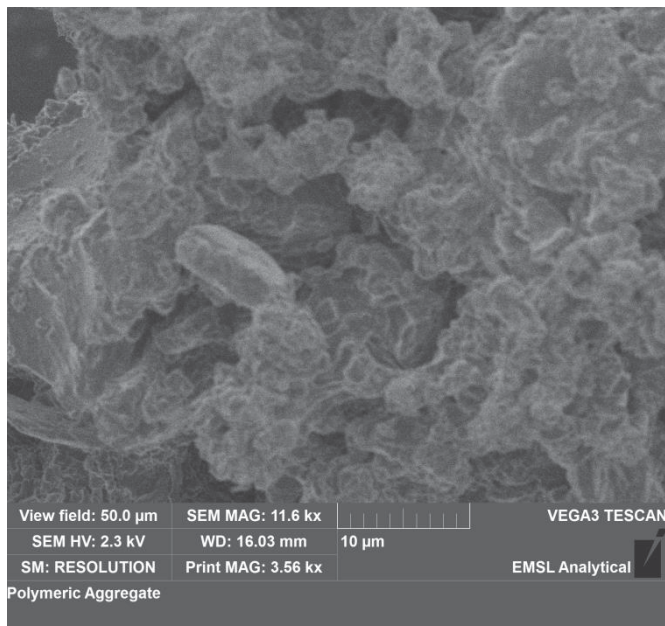
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Figures 2, 3: (Salt and insulation aggregates with mineral and organic debris adhesion)

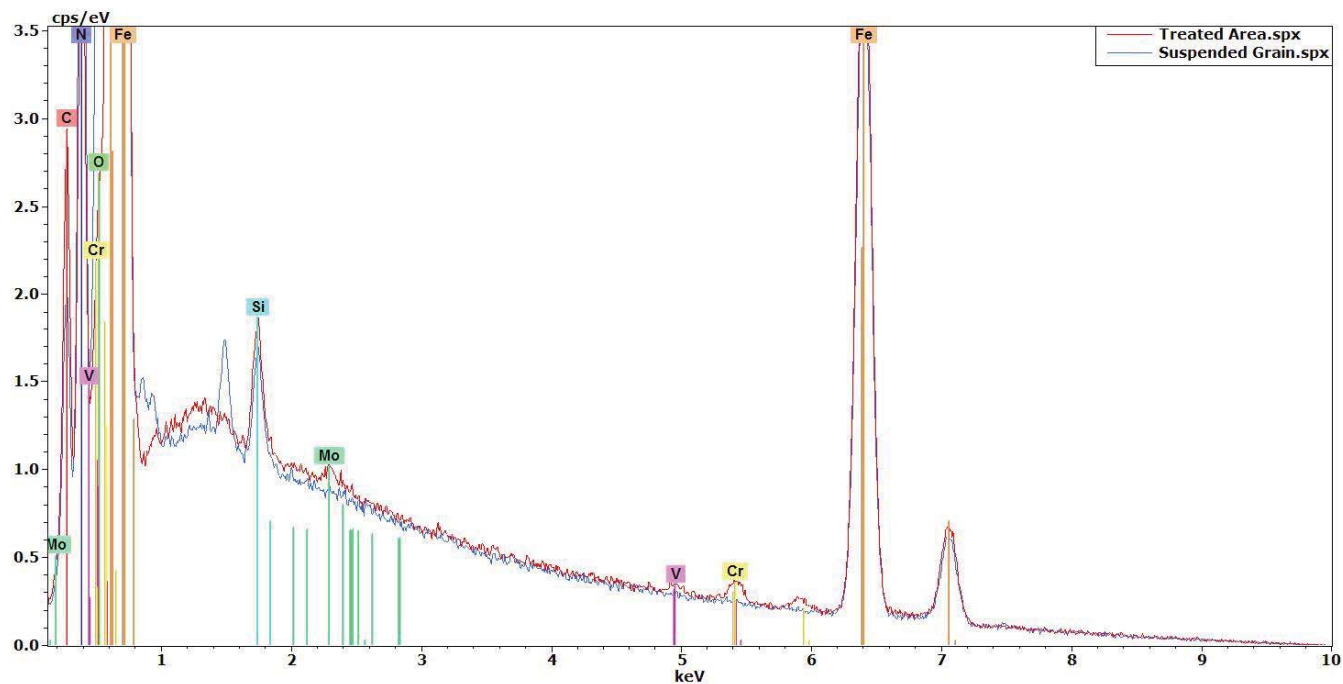


Figure 4: (EDS Spectrum of a steel flake with corrosion and mineral materials)



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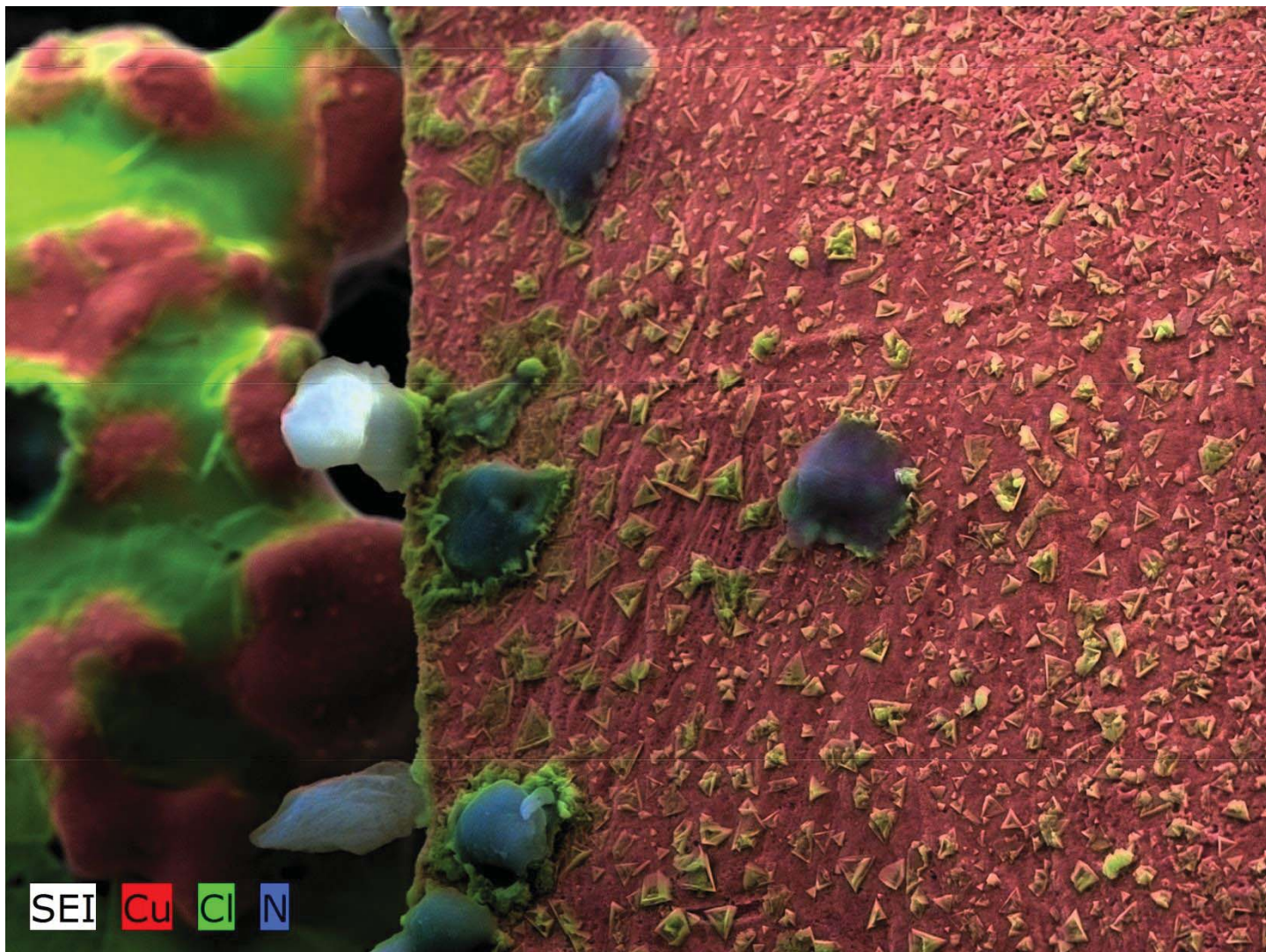


Figure 5: (EDS Mapping Image of corrosion debris from piping)



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Observations & Analysis:

- This sample was highly loaded with particles. The particles and their inter particle associations suggest that this is a combination of outside air and moisture impacting the ducting, rather than any particulate material generated by operations on site.
- Inorganic and mineral particles consisted of a number of salt species and calcium rich mineral forms. Many of these particles were observed to consist of calcium clinker debris as well as calcium oxide and hydroxide particles, often encapsulating other silicate minerals. These particles are consistent with degraded concrete debris, and were often associated with sulfur, indicating that there may be water with sulfate salts that could attack the concrete.
- Metallic particles included a number of iron oxide and iron chloride flakes and strips; these are common results of corrosion of steel ducting or piping systems with water containing chlorides.
- Pollen grains were common throughout the sample, and some of the pollen showed signs of being degraded by mold growth, with spores and small hyphae. The mold growth is potentially indicative of long term moisture. Opaque particles consisted of a mixture of metallic, as well as organics, identified to be a mixture of sap droplets (from trees or woody plants outdoors) and fine particles of rubber (likely from degrading gaskets or seals)

Conclusion/Recommendations:

The materials within the submitted sample are consistent with infiltration of outdoor moisture and particulates into the ducting of the facility. The growth of mold spores as well as corrosion products from ducting and pipe materials are typically indicative of long term moisture. Pollen, tree sap, and other vegetative particles indicate outdoor air motion. The presence of sulfur degraded concrete and secondary concrete and clinker related particles, as well as fragments of rubber may suggest standing water or insufficient drainage degrading building materials and providing a pathway into air ducts. No sign of materials generated in the manufacturing facility were noted in this sample. Examination of ducting for likely inlet points and examination of physical plant assets is recommended.

Analyst

Laboratory Manager
Or other approved signatory