

January 28, 2016

Mr. John J. Ghaznavi
2000 Corporate Drive
Suite 240
Wexford, PA 15090

Dear Mr. Ghaznavi:

The following report summarizes the results of XRD analysis of a sample received at PMET's laboratory on January 11, 2016.

Table 1
Sample Identification

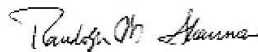
PMET I.D.	Description
6610-1	ash

The sample was split and pulverized to -325 mesh for analysis. A standard spike was added to determine the amorphous fraction. The sample was scanned using a Siemens D500 diffractometer operated at 45 KV and 30ma. The crystalline phases were identified using proprietary Bruker AXS search-match. The identified phases were quantified using Rietveld whole pattern refinement and the NIST inorganic crystal structure database. The results are tabulated on the following page. Figure 1 on Page 3 shows the diffractogram with the peak locations and phase identification. Peak intensity and resolution calibration were verified using a solid quartz standard, shown on Page 4.

The sample is eighty percent amorphous with small amounts of crystalline quartz, plagioclase, and mica.

Please contact me by email if you would like to discuss these results. Thank you for using PMET's x-ray diffraction capabilities for your project.

Sincerely,



Randolph W. Shannon
Laboratory Manager

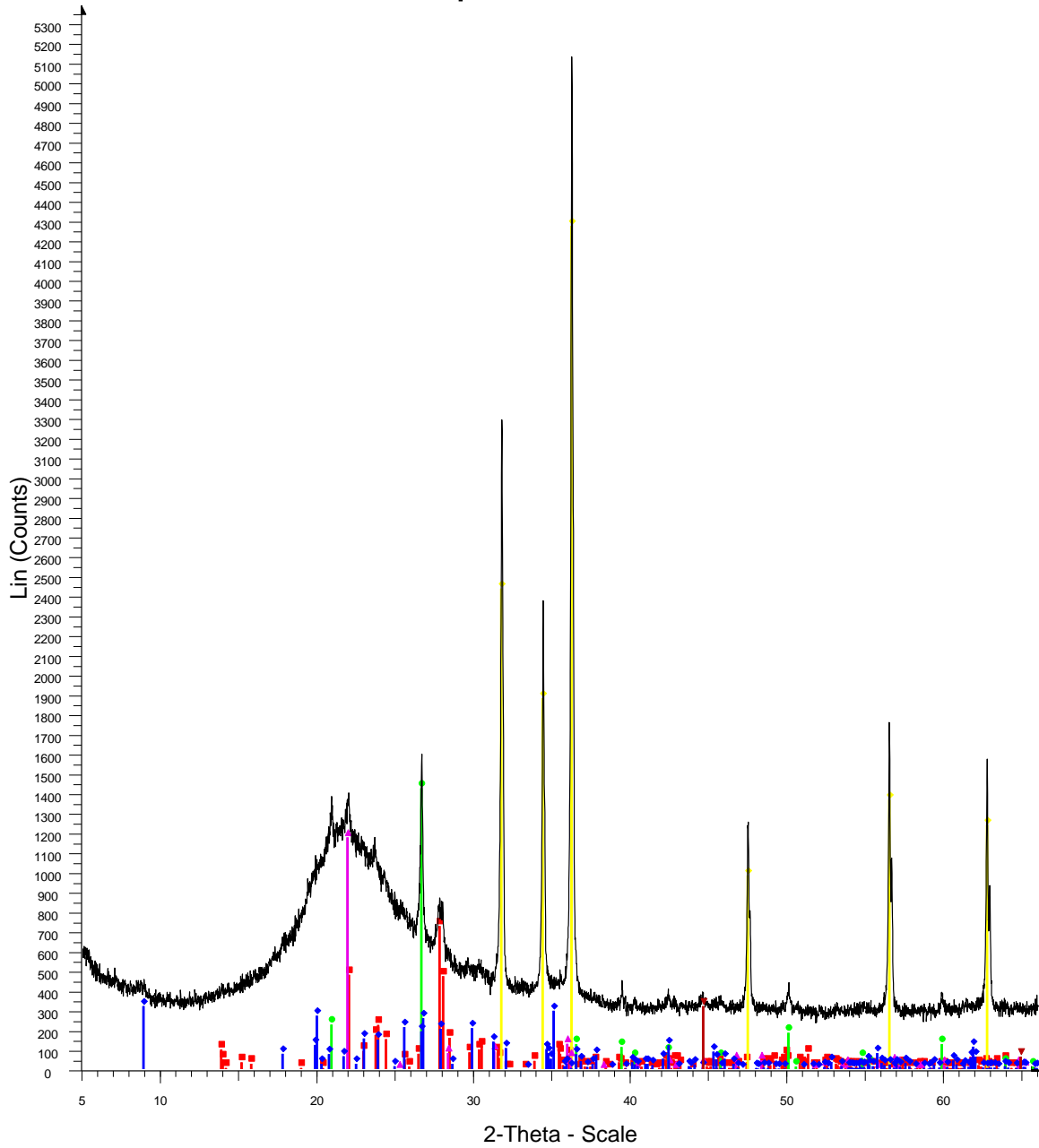
RFA 6610

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XRD Rietveld Analysis Results
Weight Percent

Phase	Atomic Formula	Ash
quartz	SiO ₂	5.2
cristobalite	SiO ₂	1.0
albite (plagioclase)	Na(AlSi ₃ O ₈)	7.8
muscovite	KAl ₂ (Si ₃ Al)O ₁₀ (OH) ₂	3.3
iron	Fe	0.2
amorphous	carbon	0.2
	glass	82.3

Apex Ash



6610-1 - File: 6610-1.raw - Type: 2Th/Th locked - Start: 4.967 ° - End: 66.156 ° - Step: 0.015 ° - Step time: 0.9 s - Temp.: 25 °C (Room) - Time Started: 21 s -
Operations: Displacement -0.127 | Import

- Albite intermediate - Na(AlSi3O8) - 78-1995 (C) - Y: 14.17 % - d x by: 1. - WL: 1.5406 - Triclinic - I/lc PDF 0.6 - S-Q 16.1 % -
- Zincite, syn - ZnO - 36-1451 (*) - Y: 83.33 % - d x by: 1. - WL: 1.5406 - Hexagonal - I/lc PDF 1. - S-Q 58.7 % -
- Quartz, syn - SiO2 - 46-1045 (*) - Y: 27.77 % - d x by: 1. - WL: 1.5406 - Hexagonal - I/lc PDF 3.4 - S-Q 5.7 % -
- Cristobalite low, syn - SiO2 - 77-1317 (C) - Y: 22.92 % - d x by: 1. - WL: 1.5406 - Tetragonal - I/lc PDF 5. - S-Q 3.2 % -
- Muscovite 2M1 - K0.94Al1.96(Al0.95Si2.85O10)((OH)1.744F0.256) - 86-1386 (C) - Y: 6.25 % - d x by: 1. - WL: 1.5406 - Monoclinic - I/lc PDF 0.4 - S-Q 11.9
- Iron, syn - Fe - 06-0696 (*) - Y: 6.25 % - d x by: 1. - WL: 1.5406 - Cubic - I/lc PDF 1. - S-Q 4.4 % -

Quartz Standard 12/05/14

