

# **Uncertainty in Residual Risk from Abrasive Blasting Emissions: Particle Size and Metal Speciation**

White Paper Proposal

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# Outline

- Lack of EF data for Metals Emitted (inhalable fraction) from a Single Research
- EPA's Proposed EFs
- Objectives
- Methodology Proposed
- Benefits of the Research

# Lack of Metal EFs for Blasting from Single Research

- UNO study, “Environmentally-friendly Abrasives” – Uncontrolled Total PM (No particle size and metal speciation)
- SP1 sponsored PM<sub>10</sub> and metals study subsequently (saved filters from UNO’s study), but EPA pointed some limitations





# Average Metal Concentration in the Total PM (ppm)

<b>Abrasive</b>	<b>Pb</b>	<b>Total Cr</b>	<b>Mn</b>	<b>Ni</b>
<b>Barshot</b>	40.38	2.26	3.87	0.00
<b>Cobalt</b>	5.49	1.66	27.17	1.07
<b>Copper Slag</b>	143.98	10.00	30.45	1.84
<b>Garnet</b>	7.64	7.79	224.54	1.12
<b>Steel Grit</b>	62.74	163.01	595.98	0.00
<b>Specialty Sand</b>	5.74	0.00	7.28	0.05

# EPA's Proposed EFs for Blasting Emissions

- EPA proposed EFs for metals as follows:
  - Total PM from UNO study
  - Particle size from KTA and others
  - Metal speciation from one shipyard “abrasive” sample (not airborne sample)

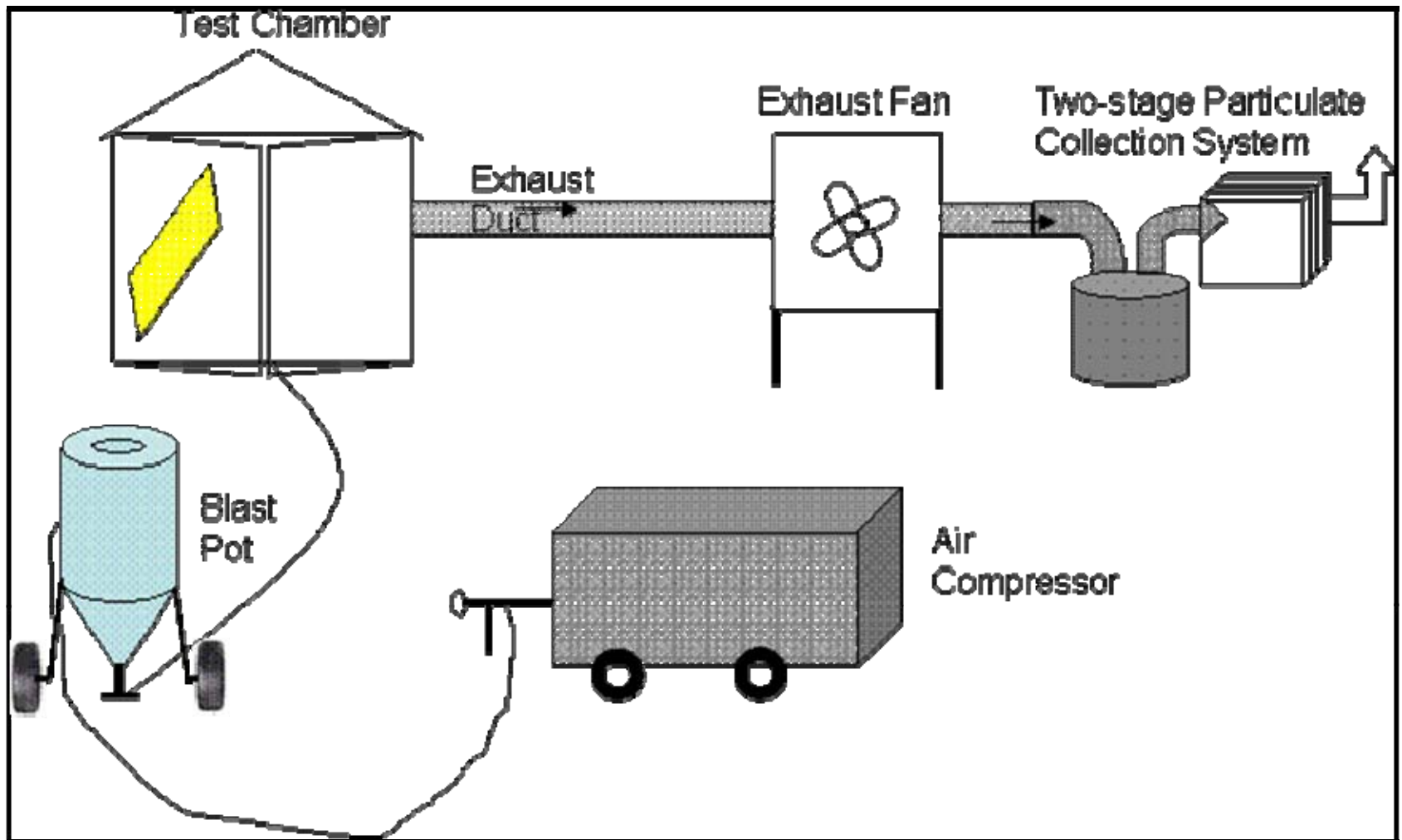
# Effect of EPA's Proposed EFs

- EPA's proposed abrasive blasting EFs will yield unrealistic metal emissions
  - e.g., 1000 tons abrasive/year → 40,000 lb of Cr(VI) ????? (Vince's calculation???)
- While EPA is reevaluating their proposed Blasting EFs, it is **IMPORTANT** to study the actual metal emissions through “EPA Recommended Methodology”

# Objective

- Recreate UNO's Emissions Test Facility to the extent possible (UNO ETF damaged by Katrina)
- Use EPA recommended approach to test one abrasive (Coal Slag) for all parameters:
  - Uncontrolled TPM
  - Inhalable fraction ( $PM_{10}$ )
  - Metals (Cr(VI), Cr(III), Cr, and others)

# UNO Emissions Test Facility (ETF) for Dry Abrasive Blasting



# Total PM Emissions Monitoring Using EPA's Stack Test Procedure



# Methodology

- Use modified EPA Method 5 to measure  $PM_{10}$  emitted from abrasive blasting (coal slag)
- Analyze the filters with  $PM_{10}$  for Cr(VI), Cr, and other potential metals

# Benefits

- Beneficial to resolve this uncertainty to prevent overestimation of the public health risk
- Undue focus for long will put the “proof of burden” on the industry sector
- Demonstration to EPA that NSRP recognizes the uncertainty and is working to develop good science-based EFs will be beneficial

# Residual Risk from Blasting: Role of Particle Size and Metals

