

August 15, 1978

H. M. Hancock

Apache-Blast abrasive would be a suitable replacement for sand from an industrial hygiene standpoint. The TLV for the mixture is calculated on the attached page. This TLV is significantly greater than the OSHA PEL for sand. Air samples of this abrasive should be collected as early as possible. G. L. Buchanan will conduct the air sampling.

JDR:gri

cc: M. T. Anderson
G. L. Buchanan/
D. O. Chrismer


J. D. RANSELL

LAM 016026

DPMC-12815

APACHE-BLAST ABRASIVE
Typical Chemical Analysis

<u>TLV</u>		
5	Iron.....	41.2% (FeO = 32.0, Fe ₃ O ₄ = 9.2%)
10	Silicon.....	38.5 (no free silica)
10	Aluminum.....	9.41 (oxide)
5	Calcium.....	6.1 (oxide)
10	Magnesium.....	1.51 (oxide)
5	Zinc	1.46
5(c)	Manganese.....	0.50
1	Copper.....	0.38
10	Titanium.....	0.18
.15	Lead.....	0.015
0.5	Barium.....	0.027
2	Tin.....	0.038
-	Gallium.....	0.011
.05	Chromium.....	0.035
1	Nickel.....	0.012
10	Molybdenum.....	0.032
.05(c)	Vanadium.....	0.006
.01	Silver.....	0.0011
0.1	Cobalt.....	0.015
-	Strontium.....	0.029
	Gold.....	0.001 (not detected, less than)
	Platinum.....	0.002 (not detected, less than)
	Palladium.....	0.002 (not detected, less than)
	Rhodium.....	0.010 (not detected, less than)
	Ruthenium.....	0.010 (not detected, less than)

all other elements nil.

Note: All the elements occur as complex silicates in the slag matrix.
Some variances will occur with copper production; the above is certified
as typical and representative.

$$\begin{aligned}
 \text{TLV for mixture} &= \frac{1}{\frac{f_{Fe}}{TLV_{Fe}} + \frac{f_{Si}}{TLV_{Si}} + \frac{f_{Al}}{TLV_{Al}} + \frac{f_{Ca}}{TLV_{Ca}} + \frac{f_{Mg}}{TLV_{Mg}} + \frac{f_{Zn}}{TLV_{Zn}} + \dots} \\
 &= \frac{1}{\frac{.412}{5} + \frac{.385}{10} + \frac{.0941}{10} + \frac{.061}{5} + \frac{.0151}{10} + \frac{.0146}{5} + \dots} \\
 &= \frac{1}{.1432} \\
 &= 6 \text{ mg/m}^3
 \end{aligned}$$

LAM 016027

APACHE-BLAST ABRASIVE
Typical Chemical Analysis

<u>TLV</u>		
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10	Silicon.....	38.5 (no free silica)
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$$TLV \text{ for mixture} = \frac{1}{\frac{f_{Fe}}{TLV_{Fe}} + \frac{f_{Si}}{TLV_{Si}} + \frac{f_{Al}}{TLV_{Al}} + \frac{f_{Ca}}{TLV_{Ca}} + \frac{f_{Mg}}{TLV_{Mg}} + \frac{f_{Zn}}{TLV_{Zn}} + \dots}$$

$$= \frac{1}{\frac{.412}{5} + \frac{.385}{10} + \frac{.0941}{10} + \frac{.061}{5} + \frac{.0151}{10} + \frac{.0146}{5} + \dots}$$

$$= \frac{1}{.1432}$$

$$= 6 \text{ mg/m}^3$$

LAM 016028