To: M. L. Nathan, Manufacturing, Aberdeen

From: R. J. Lahiere, W. C. Turk, R. R. Hammons
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Interoffice Communication

Subject: SILO AND FLUID BED AERATION DOES NOT REDUCE REACTOR CULLS RVCM SIGNIFICANTLY

VISTA

OBJECTIVE

Stricter RVCM requirements for resin and a tighter PVC market have resulted in a need for more vinyl chloride removal from reactor culls. The objective of this study was to determine if silo or fluid bed aeration can reduce the concentration of RVCM in reactor culls to acceptable levels. Equipment used in the investigation included an 8-inch diameter laboratory silo and the fluid bed dryer for the PVC pilot plant in Ponca City.

RESULTS AND CONCLUSIONS

The RVCM removal rate from reactor culls with silo and fluid bed aeration was inadequate with regard to current environmental regulations. Results from the study were:

Silo Aeration with Hot Air Reduced RVCM to 400 ppm

Silo aeration with air at 150°F and 1.90 scfm (corresponds to 500 scfm in plant silos) did not reduce the RVCM level in culls below 400 ppm. Although this represented a 75% reduction in RVCM, most of the reduction occurred during the initial stages of aeration and the RVCM level remained relatively unchanged from 6 to 48 hours. This effect is demonstrated in Figure 1.

Ambient Air Silo Aeration Removed Very Little RVCM

Bench-scale aeration with 77°F-air at 0.95 scfm reduced RVCM levels from about 2000 ppm to 1540 ppm, as shown in Figure 1. This represented only a 22% reduction over a 37-hour period.

Fluid Bed Aeration Removed Small Amounts of RVCM

Aeration in the fluid bed dryer with 180°F-air did not significantly reduce the concentration of RVCM in the culls. Less than 25% RVCM was removed during 29 hours of aeration time. The fluid bed data, exhibited in Figure 2, show that RVCM reduction did not occur after 3-4 hours of aeration.

Glassies and Low Porosity Hinder RVCM Removal From Culls

The poor removal of RVCM from reactor culls during aeration can be attributed to the high number of glassies and the low porosity of the resin particles. An examination of photographs of the culls (magnified by 40x) in Figure 3 reveals the large amount of glassies in the resin.

RECOMMENDATIONS

To obtain better RVCM removal, the reactor culls should be ground to a smaller diameter. The culls aerated in these experiments were rather course (average particle diameter of 294 microns). Finer cull particles will contain less RVCM because of two factors: (1) the additional heating required to process fine reactor culls will remove more VCM and (2) the smaller diameter of the particles will increase VCM transfer from the resin.

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attachments

cc/attachments:
Ponca City: SEM RBQ CJMc AWW MEO
Aberdeen: VEM SF

Figure 3.

Reactor Culls (40x) - 40 Mesh

Reactor Culls (40x) - 60 Mesh

Fig. 1: Silo Aeration of Reactor Culls

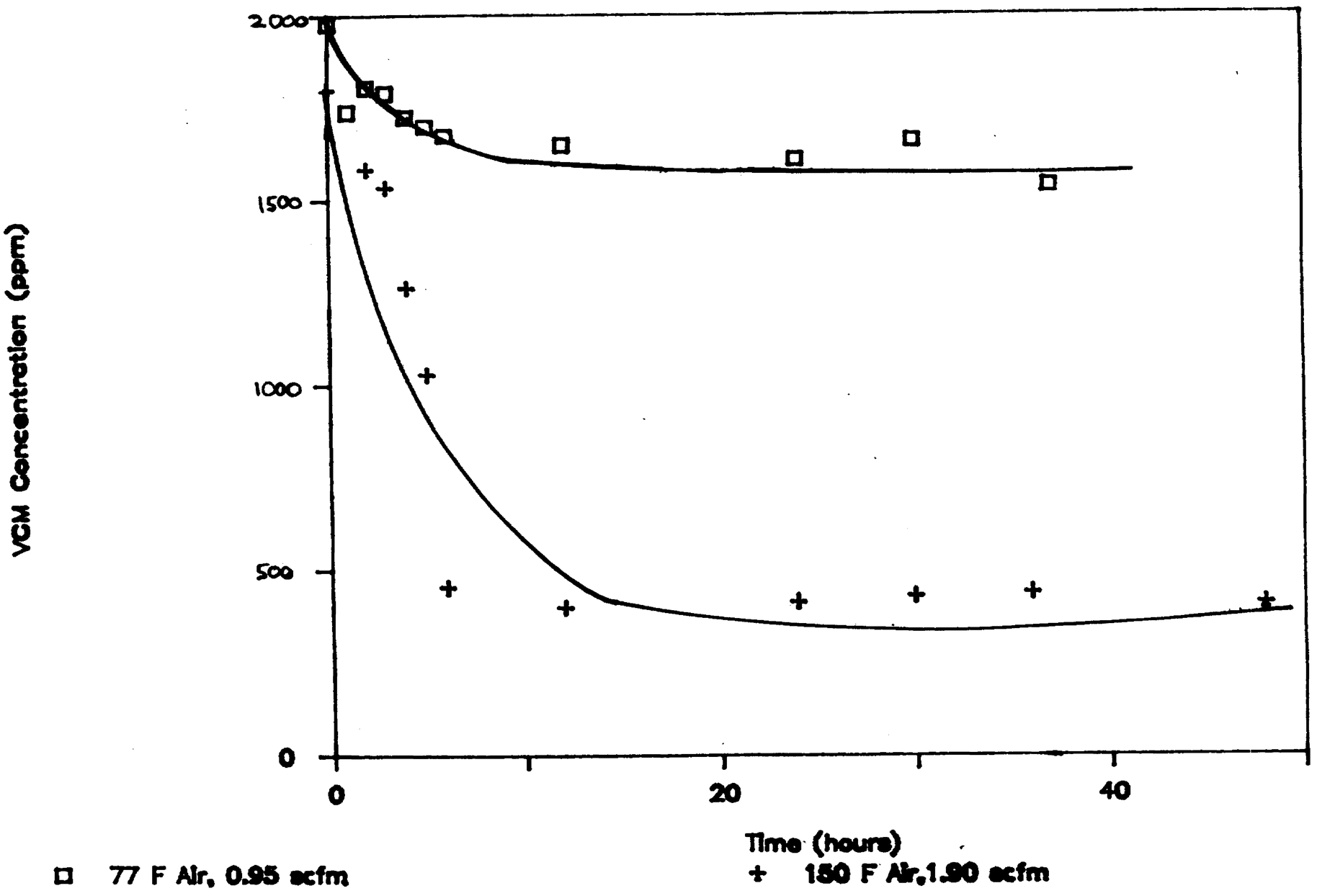

Fig.2: Reactor Culls Fluid Bed Aeration