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CHEMICAL MANUFACTURERS ASSOCIATION

POLYSTYRENE
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Section 5.13.3
Reference Number
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May 5, 1981

Mr. C. R. Newman, Jr.
Energy and Environmental Analysis, Inc.
3101E Guess Road
Durham, North Carolina 27705

Dear Buddy:

Per your request our Polymers and Resins Work Group has reviewed the emissions factors for polymers/resins manufacture which we received when we met with the EEA/EPA project team. Our comments follow:

General Comments

- 1) Prior attempts to develop emissions factors and control options based upon the model plant concept have been fraught with problems. Variations in process type and configuration for the manufacture of a specific product have been the major limitations of this approach in the past. The problem persists and is magnified when one attempts to apply the model plant approach to polymers/resins manufacture. Not only are many of the major polymers manufactured by different process technologies but different products may be manufactured in any given plant.

Polymers and resins manufacture may be somewhat unique in this regard. Most plants are capable of producing different grades of polymer by varying feedstock compositions, catalysts and/or operating conditions. Since polymer production capacity or any of the operational parameters may change significantly from one grade of polymer to another, the plant's emissions factors may also vary. This variability does not appear to have been considered in developing the emissions factors presented by EEA. Data on the variability of emissions from polymer to polymer should be considered if an attempt at developing a model plant is pursued.

- 2) Process terminology varies considerably from one manufacturer to another, and may lead to confusion in defining individual emissions factors for any given process. This may be alleviated somewhat by defining the emissions factors for sections of a

process rather than for individual vents. For example, an emissions factor for the polymerization section of a slurry phase polypropylene unit may be preferable to individual emissions factors for the reactor, scrubber and neutralizer.

Specific Comments

Low Density Polyethylene (LDPE) - For the high pressure liquid phase LDPE process, intermittent reactor emissions vary widely from one plant's instrumentation and operations, and reaction decompositions will vary greatly in frequency and volume. At some plants decomposition releases are treated as emergency releases. It is unclear whether the reactor emissions factor of 1.7 #VOC/1000# resin developed by EEA includes reactor decomposition releases. Also, if the EEA developed emergency releases emissions factor of 0.2 #VOC/1000# resin includes reactor decomps and vessel and compressor interstage relief valve emissions then this factor is much too low. A combined reactor and emergency releases emissions factor in the range of 2.0 to 2.5 #VOC/1000# resin is probably more typical.

Polypropylene - Variations in process configuration and terminology are significant for this polymer. Some plants do not have a product scrubber following the reactor. Reactor effluent may be cooled in slurry condensers or, alternatively, the effluent may be routed directly to a flash tank for separation of light ends. Downstream product neutralization may or may not be carried out in the deactivation vessel. Emissions factors were presented for the slurry filter/vacuum system while some plants utilize centrifuges instead. This is a prime example of the weakness of the model plant approach.

Polystyrene - For the continuous polystyrene process, the emissions factor for the reactor vent condenser may in some cases be too high. Some larger plants may route this stream to the monomer recovery section since it is sizable and consists primarily of unreacted styrene monomer. Recovery of these vent condenser emissions at smaller plants may not justify the expense involved in routing this stream to the vacuum tower.

If you have any questions or comments concerning these issues please call me at (202) 887-1174.

Sincerely,



Janet S. Matey
Manager
Air Programs

JSM/vac

cc: Polymers and Resins Work Group
Process Emissions Regulations Task Group