MEMORANDUM

DATE: August 26, 2009

TO: BAQ Engineering Services, BAQ Technical Management, BAQ Enforcement, Regional Air Program Lead's

FROM: Christopher Hardee, P.E., BAQ Engineering Services

SUBJECT: Concrete Admixture Storage Tanks as an Unlisted Exempt Activity

Concrete admixture storage tanks have been exempted per SC Regulation 61-62.1, Section II(B)(2)(h), which states that sources with an uncontrolled VOC emission rate of less than 1,000 lbs/month are exempt from construction permit requirements. These tanks are normally listed in a concrete batch plant's exempt equipment list in the operating permit; however, due to the mobility of small tanks and the frequency of their installation and removal from concrete batch sites, tanks with a volume of less than 1,000 gallons are not listed on the permits.

Background

A survey of concrete producers and admixture suppliers yielded 15 common admixtures used in South Carolina. MSDS's of the admixtures found 2 that had any ingredient that was a HAP, TAP, or VOC. Admixture A had 2,3,7,8-tetrachloro-dibenzo-p-dioxin (HAP, TAP, VOC) at a maximum concentration of < 0.1% by weight. Admixture B had ethylene oxide (HAP, TAP, VOC) and dioxane (HAP, TAP, VOC), both at a maximum concentration of < 0.1% by weight.

Basis

Maximum dosage of Admixture A is 10 floz/cwt\(^1\) of cementitious material and the maximum dosage of Admixture B is 15 floz/cwt of cementitious material. Per AP-42 Section 11.12 the average cubic yard of concrete uses 491 lb of cement and 73 lb of cement supplement for a total of 564 lb of cementitious material. Specific gravity of Admixture A 1.2 and Admixture B is 1.05. For calculation purposes admixture is abbreviated AM and cementitious material is CM. For a worst case scenario it was assumed that an extremely large concrete plant rated at 400 yd\(^3\)/hr and 50% of the admixture used was emitted to the atmosphere (not realistic, but extremely conservative for the purposes of emission estimates).

\(^1\) cwt is the notation for a mass measurement in “hundred weight.” It is the measurement of how many hundreds of pounds material weighs. For example, 1,200 lb is equal to 12 cwt.
Admixture A:

\[
\left( \frac{10 \text{ fl oz}}{\text{cwt}} \right) \left( \frac{\text{gallon}}{128 \text{ fl oz}} \right) \left( \frac{1.2 \text{ SG}}{\text{gallon}} \right) \left( \frac{\text{cwt}}{100 \text{ lb}} \right) = 7.82 \times 10^{-3} \left( \frac{\text{lb Admixture}}{\text{lb CM}} \right)
\]

\[
\left( \frac{400 \text{ yd}^3}{\text{hr}} \right) \left( \frac{24 \text{ hour}}{\text{day}} \right) \left( \frac{31 \text{ day}}{\text{month}} \right) \left( \frac{564 \text{ lb CM}}{\text{yd}^3} \right) = 1.68 \times 10^8 \left( \frac{\text{lb CM}}{\text{Month}} \right)
\]

\[
\left( \frac{1.68 \times 10^8 \text{ lb CM}}{\text{month}} \right) \left( \frac{7.82 \times 10^{-3} \text{ lb AM}}{\text{lb CM}} \right) \left\{ 0.001 \left( \frac{\text{lb TCDD}}{\text{lb AM}} \right) \right\} 0.5 = 657 \left( \frac{\text{lb}}{\text{month}} \right) \leq 1,000 \left( \frac{\text{lb}}{\text{month}} \right)
\]

Admixture B:

\[
\left( \frac{15 \text{ fl oz}}{\text{cwt}} \right) \left( \frac{\text{Gallon}}{128 \text{ fl oz}} \right) \left( \frac{1.05 \text{ SG}}{\text{Gallon}} \right) \left( \frac{\text{Cwt}}{100 \text{ lb}} \right) = 1.03 \times 10^{-2} \left( \frac{\text{lb Admixture}}{\text{lb CM}} \right)
\]

\[
\left( \frac{1.68 \times 10^8 \text{ lb CM}}{\text{month}} \right) \left( \frac{1.03 \times 10^{-2} \text{ lb AM}}{\text{lb CM}} \right) \left\{ 0.001 \left( \frac{\text{lb EO or Dioxane}}{\text{lb AM}} \right) \right\} 0.5 = 865 \left( \frac{\text{lb}}{\text{Month}} \right) \leq 1,000 \left( \frac{\text{lb}}{\text{Month}} \right)
\]
<table>
<thead>
<tr>
<th>DATE</th>
<th>Description of Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 26, 2009</td>
<td>Initial Document</td>
</tr>
<tr>
<td>June 8, 2011</td>
<td>Revised Document</td>
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