

## Attachment B: Sand Handling Emission Factor Development

(Excerpted from Draft Review Report 03-2631, Application number 016656, 10/29/1998)

- b. Sand handling/reclamation (silos & mixer): Silo devices D1-3 through D1-5 each has a bin vent with an airflow rate of 500 ft<sup>3</sup>/min, which is equal to 30,000 ft<sup>3</sup>/hr or 0.03 x 10<sup>6</sup> ft<sup>3</sup>/hr. Green diamond silos D1-1 and D1-2 have a combined air flow rate of 0.6 x 10<sup>6</sup> ft<sup>3</sup>/hr. The silo vendor guarantees the PM/PM<sub>10</sub> discharge rate of 0.005 gr/dscf (0.7 lbs/10<sup>6</sup> ft<sup>3</sup>). Silica sand silos (D1-3 through D1-5) and Green diamond silos (D1-1 & D1-2) operate only when sand is being delivered to the process area. The permittee estimated each silica sand silo would deliver about 144 x 10<sup>6</sup> ft<sup>3</sup>/yr (4800 hrs/yr), and green diamond sand silos would deliver about 30 x 10<sup>6</sup> ft<sup>3</sup>/yr (50 hrs/yr). Based on these numbers, the annual PM/PM<sub>10</sub> emissions from the silo transfer operations are estimated:

	Air Flow	Emission Factor	PM/PM <sub>10</sub> Emissions
D1-1/D1-2 GD Sand Silos	30 x 10 <sup>6</sup> ft <sup>3</sup> /yr	0.7 lbs/10 <sup>6</sup> ft <sup>3</sup>	0.0105 tons/yr
D1-3 Silica Sand Silo	144 x 10 <sup>6</sup> ft <sup>3</sup> /yr	0.7 lbs/10 <sup>6</sup> ft <sup>3</sup>	0.0504 tons/yr
D1-4 Silica Sand Silo	144 x 10 <sup>6</sup> ft <sup>3</sup> /yr	0.7 lbs/10 <sup>6</sup> ft <sup>3</sup>	0.0504 tons/yr
D1-5 Silica Sand Silo	144 x 10 <sup>6</sup> ft <sup>3</sup> /yr	0.7 lbs/10 <sup>6</sup> ft <sup>3</sup>	0.0504 tons/yr
Sub-total:			0.162 tons/yr
* Sand Reclamation (D1-6)	27,500 tons/yr	0.2 lbs/ton	2.750 tons/yr
Total Sand Reclamation:			2.912 tons/yr

\* The sand usage to casting production ratio is about 2 (see item 12.a.ii).

The calculated results indicate emissions from silos (0.162 tons/yr) are insignificant by themselves. Furthermore, because sands are reclaimed and reused, the exact amount of sand processed at any given period is not readily obtainable. This may pose a problem when short-term emission estimate is needed to determine compliance with the short-term PSEL. The permittee tracks casting production on a regular basis, and this is one parameter that is readily available at any given time. Therefore, in order to eliminate the need to monitor individual silo throughputs and/or flow rates, the equivalent rate of PM/PM<sub>10</sub> emissions from the total sand reclamation processes are calculated. The overall PM/PM<sub>10</sub> emission factor for the sand transfer/reclamation processes is: 2.912 x 2,000 ÷ 13,750 = **0.4 lbs/ton** of casting produced.