



# U. S. Chemical Safety and Hazard Investigation Board

## RECOMMENDATIONS STATUS CHANGE

### SUMMARY

<b>Report:</b>	Carbide Industries Fire and Explosion
<b>Recommendation Number(s):</b>	2011-5-I-KY-R3
<b>Date Issued:</b>	February 7, 2013
<b>Recipient:</b>	Carbide Industries
<b>New Status:</b>	Closed – Acceptable Action
<b>Date of Status Change:</b>	May 30, 2016

#### **Recommendation Text(s):**

*Implement a mechanical integrity program for the electric arc furnace and cover, including preventive maintenance based on periodic inspections, and timely replacement of the furnace cover. At a minimum, the program should include factors such as leak detection and repair and refractory lining wear.*

#### **Board Status Change Decision:**

##### A. Rationale for Recommendation

On March 21, 2011, the electric arc furnace exploded at Carbide Industries, LLC in Louisville, Kentucky. Two workers sustained fatal injuries after hot gases and debris blown from the furnace broke through the double-pane reinforced glass window of the control room, which was located only 12 feet from the furnace. A third worker was injured. The CSB's investigation found that furnace overpressure events, or "blows", occurred at the facility a few times a year, but found no evidence that these incidents were investigated to determine their root causes or to prevent their recurrence. The CSB also concluded that water leaks into the furnace could contribute to overpressurization events; however, Carbide did not have a robust inspection and mechanical integrity program for the furnace and its cover. As a result, the CSB issued a recommendation that Carbide Industries develop and implement a mechanical integrity program for the electric arc furnace that included inspection of leaks and refractory lining wear.

##### B. Response to the Recommendation

Carbide has stated that it will inspect the furnace cover every 6.5 years (rather than every 10 years), and will replace the cover at that time, if needed. In addition, Carbide will taken action in between that period should the cover indicate substantial wear. Carbide has indicated that refractory lining is inspected daily and monthly and more in depth during the annual shutdown. The furnace is now equipped with several water leak alarms and water temperature alarms. In addition, Carbide had changed its water treatment process for non-contact water cooling to detect any deposit build up. In response to the CSB, Carbide has added additional controls to its standard operating procedures to ensure that setpoints for water flow alarms cannot be reset more than twice without turning off the furnace and alerting a Shift Leader, Supervisor or Manager. Similarly, the water temperature alarm operating procedures indicate that certain temperature alarms also require the shutdown of the the furnace and alert to a Shift Leader, Supervisor or Manager. Carbide has implemented the CSB's recommendation, in that it has created a mechanical integrity program, including maintenance based on periodic inspections, which inform the need for replacement of the furnace cover. In addition, their mechanical integrity program includes leak detection and refractory lining wear.

##### C. Board Analysis and Decision

As Carbide has implemented a mechanical integrity program, the Board voted to move Recommendation No. **2011-5-I-KY-R3** to **"Closed – Acceptable Response."**

