



## U. S. Chemical Safety and Hazard Investigation Board

# RECOMMENDATION STATUS CHANGE SUMMARY

|                                |                                                                                                                                                                                                                                                                                           |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Report:</b>                 | Yenkin-Majestic Resin Plant Vapor Cloud Explosion and Fire                                                                                                                                                                                                                                |
| <b>Recommendation Numbers:</b> | 2021-04-I-OH-R1 (R1)<br>2021-04-I-OH-R2 (R2)<br>2021-04-I-OH-R3 (R3)<br>2021-04-I-OH-R4 (R4)<br>2021-04-I-OH-R5 (R5)                                                                                                                                                                      |
| <b>Date Issued:</b>            | November 30, 2023                                                                                                                                                                                                                                                                         |
| <b>Recipient:</b>              | Yenkin-Majestic Paint Corporation/OPC Polymers                                                                                                                                                                                                                                            |
| <b>New Statuses:</b>           | R1: Open – Unacceptable Response/No Response Received<br>R2: Open – Unacceptable Response/No Response Received<br>R3: Open – Unacceptable Response/No Response Received<br>R4: Open – Unacceptable Response/No Response Received<br>R5: Open – Unacceptable Response/No Response Received |
| <b>Date of Status Change:</b>  | September 19, 2025                                                                                                                                                                                                                                                                        |

### Recommendation Text:

#### CSB Recommendation No. 2021-04-I-OH-R1

*Update mechanical integrity procedures for all process vessels in highly hazardous chemicals service, including pressure vessels not exceeding 15 psig, to adopt alteration guidance in API 510 Pressure Vessel Inspection Code or Part 3 of the National Board Inspection Code.*

#### CSB Recommendation No. 2021-04-I-OH-R2

*Assess and document applicable design, construction, and alteration standards for all pressure vessels in highly hazardous chemicals service in new resin plant designs, including pressure vessels not exceeding 15 psig. At a minimum, adopt PIP VESLP001 Low-Pressure, Welded Vessel Specification as design and construction guidance for pressure vessels not exceeding 15 psig. Implement a program to assess the pressure vessels against updated applicable recognized and generally accepted good engineering practices, such as those published by API, ASME, PIP, and other organizations, at least once every five years, and address the gaps identified. Develop and implement written procedures to document and maintain records of (i) all inspections of, (ii) all alterations to, and (iii) all maintenance and repairs on all pressure vessels in highly hazardous chemicals service.*

#### CSB Recommendation No. 2021-04-I-OH-R3

*Demonstrate the use of prevention through design using the hierarchy of controls in future resin plant designs. Specifically, prioritize inherently safer design and engineering controls to prevent*

*process safety events. Refer to sources such as Safety Instrumented Systems: A Life-Cycle Approach by P. Gruhn and S. Lucchini, Human Error in Process Plant Design and Operations – A Practitioner’s Guide by J. Robert Taylor, Guidelines for Preventing Human Error in Process Safety by the Center for Chemical Process Safety (CCPS), Guidelines for Inherently Safer Chemical Processes – A Life Cycle Approach by the CCPS, and Guidelines for Risk Based Process Safety by the CCPS for guidance. Demonstration could include documentation of conceptual design safety reviews, hazard analysis and risk assessments of detailed project designs, and a plan to address the recommendations to control the hazards.*

#### **CSB Recommendation No. 2021-04-I-OH-R4**

*Identify and document all equipment that could release flammable materials and install LEL detectors in accordance with sources and guidance such as Guidelines for Engineering Design for Process Safety by the Center for Chemical Process Safety and Explosion Hazards in the Process Industries by Rolf K. Eckhoff. Ensure that detection of hazardous conditions automatically triggers both visual and audible alarms to alert plant personnel of the hazard. Develop and implement employee training on actions to take, such as prompt evacuation, when such alarms are activated.*

#### **CSB Recommendation No. 2021-04-I-OH-R5**

*Develop and implement requirements for personnel to wear flame-resistant uniforms in all operating areas that process flammable chemicals. Update employee training material to include the requirement for and purpose of PPE use.*

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

##### **A. Rationale for Recommendation**

On April 8, 2021, a flammable liquid mixture and its vapors became pressurized and then released through the seal of a closed manway of an operating kettle at the Yenkin-Majestic Paint Corporation (Yenkin-Majestic)/OPC Polymers resin plant in Columbus, OH. The vapor spread throughout the facility, forming a flammable cloud which found an ignition source and exploded resulting in a fire.

One Yenkin-Majestic employee was fatally injured due to burns and smoke inhalation. This employee was found partially covered by rubble inside the second floor of the resin plant. Eight other employees were transported to area hospitals for treatment of their injuries, which included third-degree burns and limb fractures. One employee required a leg amputation after being crushed under debris.

As a result of the incident the severely damaged facility was demolished. Yenkin-Majestic estimated the total property damage from the incident to be over \$90 million. In addition to the demolished facility, firefighting water runoff contaminated the nearby Alum Creek, and the Ohio Environmental Protection Agency reported observations of offsite impact through at least April 11, 2021.

The U.S. Chemical Safety and Hazard Investigation Board (CSB) investigated the incident and found several safety issues including ineffective guidance on mechanical integrity of low-pressure vessels, ineffective safeguard selection, and a lack of emergency preparedness. As a result of these findings, the CSB issued five recommendations to Yenkin-Majestic/OPC Polymers. This status change summary addresses CSB Recommendation Nos. 2021-04-I-OH-R1 through 2021-04-I-OH-R5.

B. Response to the Recommendation

To date, Yenkin-Majestic/OPC Polymers has not provided information responsive to the recommendations. CSB staff have made multiple attempts to elicit such information, all of which have been unsuccessful. The CSB hopes that further dialogue will cause Yenkin-Majestic to act on these recommendations.

C. Board Analysis and Decision

Based upon the information above, the Board voted to change the statuses of CSB Recommendation Nos. 2021-04-I-OH-R1 through 2021-04-I-OH-R5 to: “Open – Unacceptable Response/No Response Received.”