



# U. S. Chemical Safety and Hazard Investigation Board

## RECOMMENDATION STATUS CHANGE

### SUMMARY

<b>Report:</b>	Loy Lange Box Company Pressure Vessel Explosion
<b>Recommendation Number:</b>	2017-04-I-MO-R1
<b>Date Issued:</b>	July 29, 2022
<b>Recipient:</b>	Loy-Lange Box Company
<b>New Status:</b>	Closed – Acceptable Alternative Action
<b>Date of Status Change:</b>	December 20, 2023

#### Recommendation Text:

*Develop and implement a comprehensive safety management system. Include in that system process safety elements recommended in industry guidance publications, such as the Center for Chemical Process Safety (CCPS) publication Guidelines for Risk Based Process Safety.*

#### Board Status Change Decision:

##### A. Rationale for Recommendation

On April 3, 2017, an explosion occurred at the Loy-Lange Box Company (Loy-Lange) in St. Louis, Missouri when the bottom head of a pressure vessel (called a Semi-Closed Receiver (SCR)) catastrophically failed. The pressure vessel failure caused a boiling liquid expanding vapor explosion (BLEVE) which fatally injured a Loy-Lange employee working nearby. The pressure vessel then launched from the Loy-Lange building into the air and crashed through the roof of a nearby business, fatally injuring three members of the public.

The U.S. Chemical Safety and Hazard Investigation Board (CSB) investigated the incident and found that the failed pressure vessel resulted from oxygen pitting corrosion and generalized corrosion which thinned the pressure vessel bottom head until it could no longer contain the pressure inside the vessel. The CSB determined that the cause of the incident was deficiencies in Loy-Lange's operations, policies, and process safety practices that failed to prevent or mitigate chronic corrosion in the pressure vessel as well as Kickham Boiler and Engineering, Inc.'s performance of an inadequate repair to the SCR in 2012 that left damaged material in place. The CSB identified additional issues in their overall regulatory compliance as well as with their records and data management. As a result of these findings, the CSB issued three recommendations to Loy-Lange. This status change summary addresses CSB Recommendation No. 2017-04-I-MO-R1.

##### B. Response to the Recommendation

In August of 2023 Loy-Lange notified the CSB that they had implemented a safety program. In support of their statement, Loy-Lange provided a copy of their safety manual. Loy-Lange's safety program does not address process safety elements, as required by the recommendation, but their facility also no longer contains equipment or operations typically associated with process safety management. Based upon a comprehensive review, Loy-Lange's safety manual appears

sufficient given the current nature of the operations of their facility and the hazards associated with their industry.

C. Board Analysis and Decision

Based upon the information above, the Board voted to change CSB Recommendation No. 2017-04-I-MO-R1 to: “Closed – Acceptable Alternative Action.”