# U. S. Chemical Safety and Hazard Investigation Board
# RECOMMENDATION STATUS CHANGE SUMMARY

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| **Report:** | TPC Port Neches Explosions and Fire |
| **Recommendation Number:** | 2020-02-I-TX-R4 |
| **Date Issued:** | December 19, 2022 |
| **Recipient:** | American Chemistry Council (ACC) |
| **New Status:** | Closed – Acceptable Alternative Action |
| **Date of Status Change:** | August 15, 2024 |

**Recommendation Text:**

*Revise the Butadiene Product Stewardship Guidance Manual to include guidance on identifying and controlling or eliminating dead legs in high-purity butadiene service. Specifically, provide guidance on the potential for dead legs to be formed when equipment, such as primary or spare pumps, is out of service. In the Manual, also provide guidance on method(s) to identify dead legs that could be formed when equipment, such as primary or spare pumps, is temporarily or permanently out of service. Recommend actions to mitigate, control, and prevent hazardous popcorn polymer buildup in these in-process or temporary dead legs, such as through monitoring, use of inhibitor(s), or conducting maintenance activities to minimize the presence of dead legs.*

**Board Status Change Decision:**

A. Rationale for Recommendation

On the morning of November 27, 2019, a dead leg between the Final Fractionator A and the manual isolation valve upstream of an offline pump in the TPC Group Port Neches Operations facility's butadiene unit ruptured. As a result of the rupture, approximately 6,000 gallons of liquid, primarily butadiene, was released. The liquid butadiene vaporized upon release forming a flammable vapor cloud that ignited moments later causing multiple fires and explosions. After the initial fires were contained, smaller fires burned for more than one month while isolation efforts were underway.

During the initial explosion two TPC Group employees and a security contractor suffered non-life-threatening injuries. Jefferson County officials reported that five additional minor injuries were suffered by residents of the community. Additionally, the blast damaged nearby homes and buildings and was reportedly felt as far away as 30 miles from the facility. County officials declared a state of disaster and multiple shelter-in-place and evacuation orders were issued.

As a result of the incident, the butadiene unit was completely destroyed and butadiene production operations ceased indefinitely. The incident caused $450 million in on-site property damage, and an additional $153 million in off-site property damage. The facility has since been transitioned to a "terminal and services" operation and on June 1, 2022, TPC Group filed for Chapter 11 bankruptcy.

The U.S. Chemical Safety and Hazard Investigation Board (CSB) investigated the incident and found several safety issues including failures in dead leg identification and control, process hazard analysis action item implementation, control and prevention of popcorn polymer, and providing remotely operated emergency isolation valves. As a result of these findings, the CSB issued two recommendations to the American Chemistry Council (ACC). This status change summary addresses CSB Recommendation No. 2020-02-I-TX-R4.

B. Response to the Recommendation

In June of 2024 the ACC published an updated version of the Butadiene Product Stewardship Guidance Manual. The updated version of the manual contains information acknowledging the complexity of managing popcorn polymer and directing facilities to reference their specific process safety documents where they exist. The new information also calls on facilities to develop and implement process safety documents to prevent and control popcorn polymer formation if they don't already have them.

C. Board Analysis and Decision

The updates to the manual do not specifically address dead legs as described by the recommendation. Previous editions of the manual already advised against having dead legs and infrequently used lines though. Previous editions of the manual also already had guidance on mitigating, controlling, and preventing popcorn polymer. This guidance included monitoring and the use of inhibitor(s). The extent to which dead legs exist in these processes, and the effect they have on popcorn polymer formation, varies based on the conditions of the facility. As such, the ACC's guidance for facilities to follow or develop and implement, where necessary, facility specific procedures to prevent and control popcorn polymer is appropriate.

Although the updated manual does not address all of the specifics of the recommendation, the revised *Butadiene Product Stewardship Guidance Manual* meets the intent of the recommendation and will improve safety at facilities handling butadiene. Based upon the information above, the Board voted to change CSB Recommendation No. 2020-02-I-TX-R4 to: "Closed – Acceptable Alternative Action."