Investigation Update

September 17, 2025

This document provides an update on the CSB's investigation of the July 29, 2025, incident at the Horizon Biofuels, Inc. facility in Fremont, Nebraska.

Incident Summary

- On July 29, 2025, at approximately 11:56 a.m., a large explosion occurred at the Horizon Biofuels, Inc. ("Horizon Biofuels") facility in Fremont, Nebraska. Preliminary evidence indicates that the explosion occurred when a large release of combustible wood product, most likely wood dust from the process, ignited. The explosion fatally injured three people—an operator and his two young daughters, aged 8 and 12. The operator's daughters had accompanied him to work that day and were in the facility's break room at the time of the explosion. The blast caused extensive damage to the facility, affecting the production tower, offices, and warehouse (**Figure 1**). Several fires also occurred at the facility and combustible material at the facility has continued to smolder for more than a month.

Figure 1. Post-incident image of the Horizon Biofuels facility on July 31, 2025. (Credit: Chris Machian Photos, Omaha World-Herald [1]

Background Information

- Located in Fremont, Nebraska, Horizon Biofuels produced wood pellets for use as home heating fuel and wood mulch for animal bedding.[a] The company produced these materials from scrap wood such as spruce, pine, and fir. Horizon Biofuels started production of wood pellets and animal bedding in 2009 after acquiring and adapting a grain mill facility built in the early 1970s that had produced animal feed pellets [2].[b]

- Horizon Biofuels' wood pelleting and animal bedding production processes started by grinding scrap wood deliveries into mulch, then a fine wood meal. Conveying equipment transported the material to process equipment and storage bins inside the tower. The company packaged some of the mulch as animal bedding. Additional equipment processed the rest of the wood to ensure that the ground wood's size and moisture levels were within production ranges. The resulting mixture was then fed through a pellet mill, where it was compressed into small pellets that typically exited the mill at over 200 degrees Fahrenheit [3]. After the wood pellets were cooled and bagged, the product was ready for delivery.

- Horizon Biofuels had a dust collection system connected to process equipment to help control wood dust generated from the process. Air blowers carried the wood dust and routed it through an enclosed system into the dust control equipment. The dust control equipment, located on the top floor of the tower, separated the wood dust from the carrier air and discharged the clean air outside the building.[c]

- At the time of the incident, Horizon Biofuels employed five people: two operators (one day shift operator and one night shift operator), two part-time maintenance employees, and the general manager. During each eight-to-ten-hour shift, an operator started the equipment, operated it, and shut it down at the end of the shift.[d] At the time of the incident, the day shift operator was the only employee at the facility.[e]

[a] Horizon Biofuels was originally formed to produce biodiesel. Due to a decreasing market for biodiesel, the company acquired a grain mill facility in 2007 and pivoted to manufacturing wood fuel pellets and animal bedding.

[b] The building was originally constructed in 1973 to operate as a feed mill by Golden Sun Feeds Inc., an animal feed production company headquartered in Estherville, Iowa [12]. Typical ingredients processed in feed mills include corn, soybean, and other grains [13].

[c] In February 2025, the Nebraska Department of Environment and Energy conducted an air quality investigation at the Horizon Biofuels facility in response to a complaint regarding wood dust blowing into adjacent properties. A Horizon Biofuels representative told the CSB that in response to the complaint, the company temporarily shut down the facility, resolved an issue with one of the cyclones (a device that controls wood dust generated from the process), and restarted operations as normal.

[d] The day shift was approximately 8 a.m. to 4:30 p.m. and the night shift was approximately from 9 p.m. to 7 a.m.

[e] As noted, the day shift operator's two daughters also were in the facility at the time of the incident.

Incident Description

- Horizon Biofuels employees told the CSB that the facility operated normally the day before the incident. No operational issues were reported during the night shift prior to the incident.
- On the morning of the incident, the day shift operator brought his two daughters to work, as one of the girls had medical appointments in the afternoon. The two girls waited for their father in the break room while he worked.
- At approximately 11:56 a.m., a large puff of dust or smoke started billowing from windows near the top of the tower (**Figure 2**, *panel 1*) and openings from the ground floor of the tower. Within seconds, flames started jetting out of the windows (**Figure 2**, *panel 2*), followed by a large explosion at the top of the tower (**Figure 2**, *panel 3*). The explosion and fire propagated through the facility, which severely damaged the structures (**Figure 2**, *panel 4*). During the explosion, portions of the tower and its adjacent structures collapsed, including the break room immediately north of the tower where the two girls were located.

Figure 2. Video screen captures of the explosion on July 29, 2025 (Credit: Americold)

- The general manager was working from home on the day of the incident. Upon learning of the explosion, at 12:06 p.m., the general manager called the day shift operator on his cell phone, who reported that he was trapped. Soon after, the day shift operator called his wife and told her he was pinned down. Witnesses working in neighboring businesses reported that they approached the building and heard the operator call for help. Some of the witnesses entered the collapsed warehouse area and attempted to rescue him without success. When emergency responders arrived, they evacuated everyone

from the building and prevented people from approaching it due to the risks of explosion, the continuing fire, and the potential for building collapse.

- Combustible materials inside the partially collapsed, structurally unstable building continued to burn well after the explosions, which made search, rescue, and recovery dangerous.[a] Responders were not able to access the building until the following day, on July 30, 2025, when they recovered the bodies of the three fatally injured people (**Figure 3**). Responders coordinated fire suppression efforts and continual monitoring of the structural integrity of the building through the recovery operation.

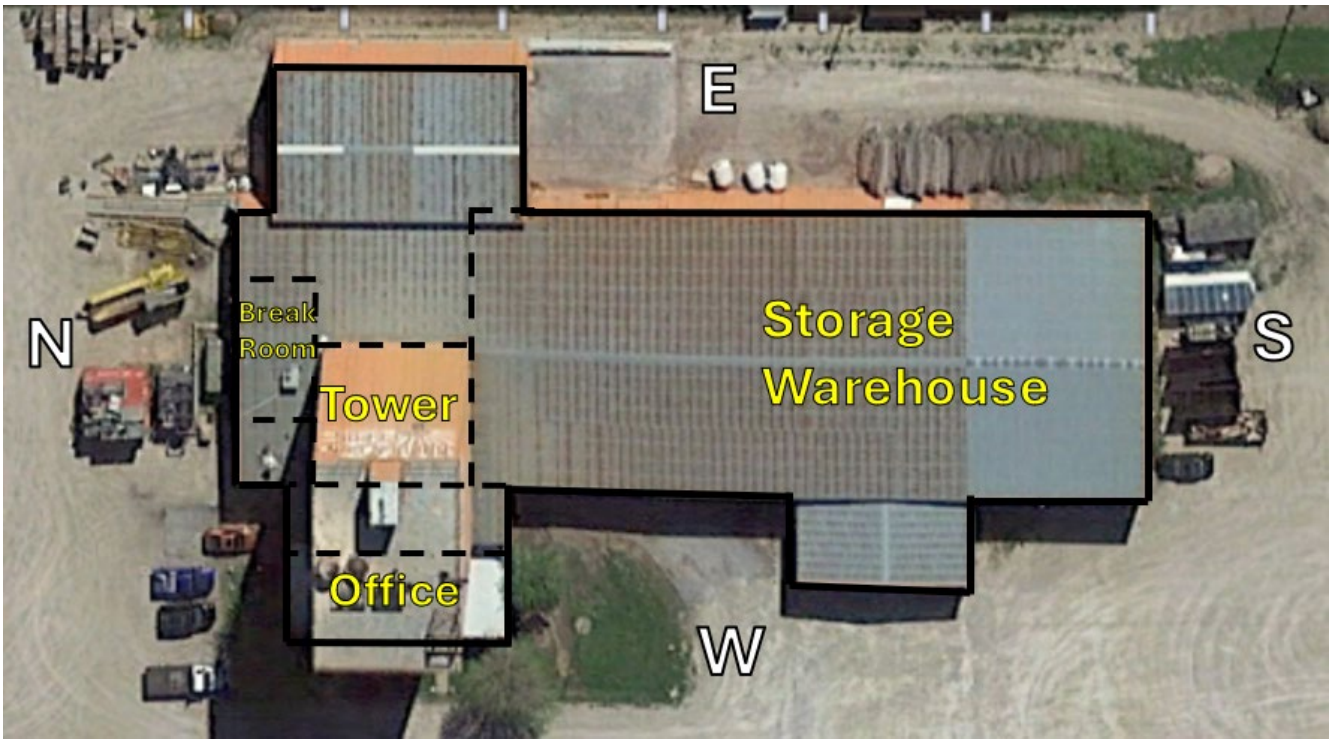

Figure 3. Overhead view of the facility. (Credit: Google Earth, with annotations by CSB)

- There was significant building and vehicle damage within the Horizon Biofuels property as a result of the explosion. There was no apparent physical damage reported to nearby businesses, but explosion debris struck some vehicles in neighboring parking lots [4]. Portions of roads around Horizon Biofuels were closed for traffic after the explosions and fires, affecting neighboring businesses [5] until the emergency responders reduced their presence two days after the explosion, on Thursday, July 31, 2025 [6].

[a] Other fuel sources exacerbated the fire. At 12:05 p.m., approximately 10 minutes after the initial explosion, a hydrocarbon flame erupted near the northern side of the building. Emergency responders noted "an intense fire that was likely being fed from a natural gas line," and summoned utility workers who shut off the gas supply to the facility. The warehouse area also housed some propane cylinders, which also likely exploded during the fire.

Combustible Dust Explosions

- The National Fire Protection Association (NFPA) defines a combustible dust as "a finely divided combustible particulate solid […] that presents a flash fire hazard or explosion hazard when suspended in air […] over a range of concentrations" [7, pp. 660-20]. Dust generated in wood processing facilities can be combustible.[a]

- Combustible dust can explode when it meets the five conditions as illustrated in the combustible dust explosion pentagon (**Figure 4**). Dust may accumulate on surfaces and lie undisturbed for years. An initial fire or explosion, known as a primary event, may shake this dust loose and cause it to *disperse* throughout a building. When the dispersed material reaches an explosive concentration in the *confinement* of an enclosed space, it can ignite and generate secondary dust explosions powerful enough to destroy buildings [8, 9, p. 12].

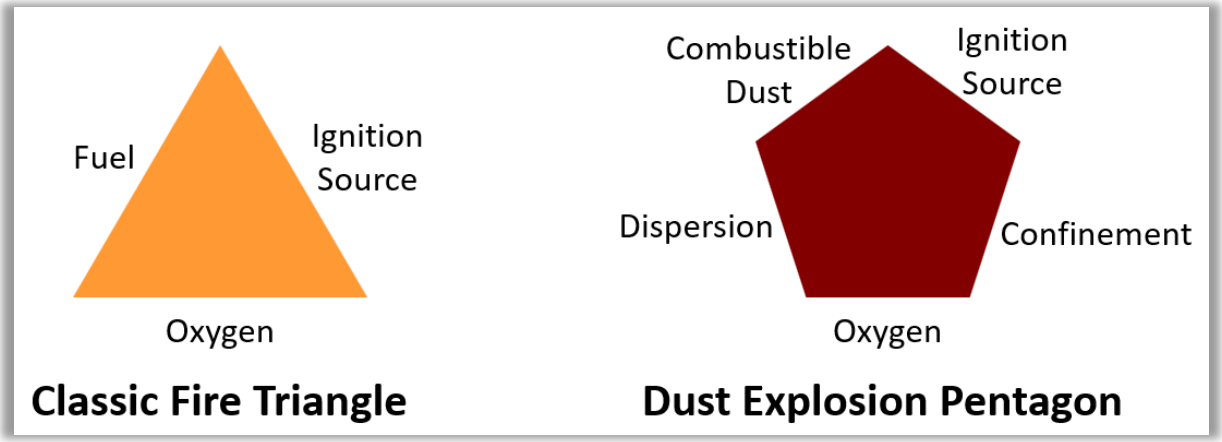

Figure 4. Classic fire triangle (left) and combustible dust explosion pentagon (right). (Credit: CSB)

- The CSB previously investigated eight combustible dust explosion incidents that spanned multiple industries and commodities [8, 10]. In 2006, the CSB also published a Combustible Dust Hazard Study that analyzed 281 combustible dust incidents between 1980 and 2005 that killed 119 workers, injured 718, and extensively damaged industrial facilities [9]. Since 2006, the CSB has made several recommendations to the U.S. Occupational Safety and Health Administration (OSHA) to promulgate a combustible dust standard, which the CSB reiterated in 2023 and which still remains open today [11].[b]

[a] In December 2024, NFPA published NFPA 660, *Standard for Combustible Dusts and Particulate Solids* [7], which consolidated multiple existing NFPA dust standards across a wide range of industries and commodities, including wood processing.

[b] In 2023, the CSB published its investigation report on the 2017 Didion Milling Company combustible dust explosion and fire in Cambria, Wisconsin, that killed five employees and injured 14 others [11].

Path Forward

- At the time of writing this update, the Horizon Biofuels facility is still not safe for access. Combustible materials at the facility have continued to smolder weeks after the incident, and the City of Fremont has advised people to maintain a safe distance from the facility due to the potential for the structurally compromised building to collapse, which has prevented the CSB from approaching the building so far.
- The CSB is continuing to gather facts and analyze several key areas, including:
    - Cause or probable cause of the initiating dispersion of dust
    - Events and conditions at the facility prior to the incident
    - Post-incident equipment condition and failure analysis
    - Properties of combustible wood dust
    - Industry guidance for facilities that generate wood dust
    - Regulatory analysis
- The investigation is ongoing. Complete findings, analyses, and recommendations, if appropriate, will be detailed in the CSB's final investigation report.

References

[1] Omaha World-Herald, "Fremont Wood Pellet Plant Investigated for Releasing Excessive Dust 5 Months Before Fatal Blast," Omaha World-Herald, 11 August 2025. [Online]. Available: https://omaha.com/news/local/article_10f919e4-8d35-4b71-8b67-d9ed748ab0b8.html. [Accessed 11 August 2025].

[2] Fremont Tribune, "International Fulbright Scholars tour Fremont," 13 August 2009. [Online]. Available: https://fremonttribune.com/news/local/article_e976cc99-a576-5b7d-98b5-b0a33cca0ffc.html. [Accessed 15 September 2025].

[3] D. Ciolkosz, "Manufacturing Fuel Pellets from Biomass," PennState Extension, 27 January 2023. [Online]. Available: https://extension.psu.edu/manufacturing-fuel-pellets-from-biomass. [Accessed 8 September 2025].

[4] KETV Chanel 7 News, "They aren't covering anything': Fremont woman says Horizon Biofuel's insurance denied her claim after explosion," KETV Chanel 7 News, 2 September 2025. [Online]. Available: https://www.ketv.com/article/they-arent-covering-anything-fremont-woman-says-horizon-biofuels-insurance-denied-her-claim-after-explosion/65951789. [Accessed 4 September 2025].

[5] MSN, "What we know: New details released after plant explodes in Fremont," MSN, 30 July 2025. [Online]. Available: https://www.msn.com/en-us/news/us/what-we-know-three-people-are-missing-after-plant-in-fremont-explodes/ar-AA1JxIh1. [Accessed 5 September 2025].

[6] News Channel Nebraska, "Horizon BioFuels scene now ‘stabilized’, fire marshal describes ‘accidental dust explosion’," 31 July 2025. [Online]. Available: https://www.newschannelnebraska.com/story/52968969/scene-of-fremont-explosion-now-stabilized-authorities-say. [Accessed 5 September 2025].

[7] National Fire Protection Association (NFPA), NFPA 660: Standard for Combustible Dusts and Particulate Solids, Quincy, MA: National Fire Protection Association (NFPA), 2025.

[8] U.S. Chemical Safety Board (CSB), "Combustible Dust Safety Fact Sheet," 2018. [Online]. Available: https://www.csb.gov/assets/1/6/csb_2018_factsheet_combustibledust_05.pdf?16219. [Accessed 4 September 2025].

[9] U.S. Chemical Safety Board (CSB), "Combustible Dust Hazard Investigation," 1 October 2006. [Online]. Available: https://www.csb.gov/combustible-dust-hazard-investigation/. [Accessed 4 September 2025].

[10] U.S. Chemical Safety Board (CSB), "Completed Investigations - Incident Type: Combustible Dust Explosion and Fire," [Online]. Available: https://www.csb.gov/investigations/completed-investigations/?F_AccidentTypeId=1267. [Accessed 4 September 2025].

[11] U.S. Chemical Safety Board, "Didion Milling Company Explosion and Fire," 6 December 2023. [Online]. Available: https://www.csb.gov/didion-milling-company-explosion-and-fire-/. [Accessed 4 September 2025].

[12] Company Histories, "Purina Mills, Inc.," [Online]. Available: https://www.company-histories.com/Purina-Mills-Inc-Company-History.html. [Accessed 4 September 2025].

[13] American Feed Industry Association (AFIA), "Feed Industry Statistics," [Online]. Available: https://www.afia.org/feedfacts/feed-industry-stats/. [Accessed 4 September 2025].