

Investigation Update

November 2024

This document provides an update on the CSB's investigation of the September 29, 2024, incident at Bio-Lab, Inc. in Conyers, Georgia.

Incident Summary

- On September 29, 2024, the Bio-Lab, Inc. facility located in Conyers, Georgia, experienced a chemical reaction involving material stored in a warehouse, which resulted in multiple fires, extensive off-gassing, and a massive plume of potentially toxic smoke.^a The reaction generated heat that led to the decomposition of products and subsequently caused the fires within the building. The resulting decomposition and fires produced large plumes of smoke and released toxic vapors, prompting shelter-in-place orders, evacuations, and road closures. Ultimately, the warehouse was completely destroyed. No injuries were reported at the site during the incident or in the subsequent emergency response that followed.

Background Information

- Bio-Lab, Inc. manufactures chlorinating agents designed to kill algae and bacteria in large volumes of water, predominantly in swimming pools and hot tubs. These agents are available in tablet, stick, and granular forms. The Conyers facility has been in operation since 1973 and has changed ownership several times.^b
- Bio-Lab's Conyers facility (Bio-Lab) converts raw materials and packages finished recreational water care consumer products for retail sale. As of September 2024, the facility had approximately 241 full-time employees.
- The Bio-Lab Conyer's site operates several production/manufacturing facilities and storage warehouses on-site, including one designated as Plant 12. This single-story building, classified as Type 2 (non-combustible construction), stood 24 feet tall and covered an area of 275,125 square feet, which is larger than five football fields combined. Plant 12 was equipped with rack storage, floor storage, and seven sprinkler fire protection systems.
- The Plant 12 storage warehouse consisted of a bulk chemical storage area separated from the main warehouse area by a firewall and fire shutters.^c These materials were then distributed from this location to the facility's production buildings. Additionally, raw and packaging materials were received and stored in racks at Plant 12.

^a "Off-gassing" is defined as the "emanation of volatile matter of any kind from materials into habitable areas" [2, p. 282], with "volatile matter" defined as "[p]roducts given off by a material as gas or vapor" [2, p. 428].

^b Since 2013, Bio-Lab has been a subsidiary of KIK Custom Products, Inc. and operates as a separate corporate entity.

^c The definition of firewall is "[a] wall... subdividing a building to prevent the spread of fire and having a fire resistance rating and structural stability" [4, p. 3.3.15.6].

- The primary bulk chemicals at Plant 12 were 99 percent trichloroisocyanuric acid (TCCA) and 99 percent sodium dichloroisocyanurate (DCCA). These chemicals were stored in super sacks prior to their distribution to other parts of the Bio-Lab complex.^a Both chemicals are solid oxidizers in granular form and have a chlorine odor. They can release toxic and corrosive products such as chlorine gas and hydrogen chloride upon decomposition. Oxidizers are materials that “readily yield oxygen or other oxidizing gas or that readily react to promote or initiate combustion of combustible materials and that can, under some circumstances, undergo a vigorous self-sustained decomposition due to contamination or heat exposure” [1, pp. 400-18].
- Plant 12 also stored super sacks of bromochloro-5,5-dimethylimidazolidine-2,4-dione (BCDMH), which is a granular solid oxidizer with a halogen odor that, in addition to chlorine gas and hydrogen chloride, can also release bromine gas and hydrogen bromide upon decomposition.
- TCCA, DCCA, and BCDMH are chlorinating and brominating agents^b used in the manufacture of sanitizers designed to kill algae and bacteria in large volumes of water.
- Bio-Lab leadership informed the CSB that the facility had established a permanent fire watch^c two or three months prior to the incident after detecting strong odors from oxidizers in two storage buildings, one of which was Plant 12. This precaution was taken to mitigate any potential product decomposition events. At the time of the initial incident, two Bio-Lab employees were present on-site to carry out fire watch duties. Their responsibilities included identifying and managing hazards, detecting early signs of product decomposition or fire hazards, notifying site leadership of any observed leaks or other water intrusions, and contacting the third-party sprinkler company if a sprinkler head was leaking.

^a Each full super sack contained about 2,750 pounds of material.

^b While TCCA and DCCA only function as chlorinating agents, BCDMH is both a chlorinating and brominating agent.

^c The National Fire Protection Association Life Safety Code (NFPA 101) 2012 Edition defines fire watch as “The assignment of a person or persons to an area for the express purpose of notifying the fire department, the building occupants, or both of an emergency; preventing a fire from occurring; extinguishing small fires; or protecting the public from fire or life safety dangers” [3, p. 3.3.103].

Incident Description

- One of the Bio-Lab employees assigned to fire watch in the Plant 12 storage warehouse reported hearing a popping sound as they stepped out of the breakroom to begin their 5:00 a.m. round on September 29, 2024. The employee immediately recognized that the product was wet and called the only other Bio-Lab employee who was on site. At that time, no flames were observed.
- After an unsuccessful attempt to isolate the reacting product, the Bio-Lab employee on fire watch in Plant 12 called 9-1-1 at approximately 5:10 a.m. due to the large toxic vapor plumes inside the building.^a
- By 6:30 a.m., flames were visible through the roof above the area where the employees had first observed the chemical reaction and off-gassing. The first shelter-in-place order was issued at approximately 7:40 a.m. The fire was extinguished at approximately 8:10 a.m. by the Rockdale County Fire Rescue (**Figure 1**).



Figure 1. Plant 12 warehouse roof damage at approximately 8:10 a.m. after flames were extinguished (Credit: Rockdale County Fire Rescue)

- Around noon, a second fire erupted, producing thick black smoke, followed by multicolor plumes of smoke (**Figure 2**). An emergency responder described his observations of the scene as “major chemical reactions.”

^a No fire was reported when 9-1-1 was called at approximately 5:10 a.m.



Figure 2. Multicolor plumes of smoke observed after the second fire at Bio-Lab on September 29, 2024 (Credit: Ross/11Alive)

- Emergency responders began evacuations shortly before 12:30 p.m. The Rockdale County Fire Chief reported the fire was extinguished at approximately 4:00 p.m.
- Portions of the Plant 12 building collapsed during the fire and had to be removed during the emergency response efforts. Ultimately, the building was completely destroyed. The Plant 12 area remained an active emergency response scene for nearly four weeks under Unified Incident Command.
- Interstate I-20, which runs parallel to the facility, was shut down at 12:57 p.m. on September 29, 2024, shortly after the building collapsed. It reopened to the public at approximately 7:00 a.m. on September 30, 2024. While this major interstate was reopened, smaller roads near the facility remained closed, and the Rockdale County Emergency Management Agency continued to issue nightly shelter-in-place warnings to the surrounding community within a 2-mile radius for several weeks after the incident.
- The final shelter-in-place warning issued to the surrounding community was communicated on October 16, 2024, effective at 7:00 p.m. that evening and expiring the morning of October 17, 2024.

Post-Fire Activities and Consequences

- The extended period of off-gassing from the site occurred because residual TCCA product remained onsite, including beneath the collapsed walls and structure debris, requiring the use of heavy equipment to access and remove the material for treatment. **Figure 3** shows the ongoing off-gassing from the building site during cleanup activities in the days after the incident.



Figure 3. Ongoing off-gassing observed from the site during cleanup operations on October 2, 2024, several days after the incident. (Credit: CSB)

- The toxic vapor plume released during the incident impacted the surrounding community, resulting in evacuations, multiple road closures, including Interstate I-20, and extended nightly shelter-in-place periods. Although the affected building was destroyed the day of the incident, shelter-in-place notifications were issued nightly through October 16, 2024, throughout the duration of the active emergency response phase at the incident site.
- Smoke from the fires also drifted toward Atlanta, resulting in a smog or haze with a chlorine smell in parts of the metropolitan area.
- Chlorine and hydrogen chloride were detected at concentrations above their respective Level 1 Acute Exposure Guideline Level (AEGL-1) action levels intermittently during overnight, 5:00 p.m. to 5:00 a.m., periods on September 30 to October 1, 2024, and October 1 to October 2, 2024, based on the U.S. Environmental Protection Agency (EPA) 12-hour air monitoring results from the duration of the emergency

response.^a The AEGL-1 is a screening value developed by the EPA for use by emergency responders during active release events to help ensure the protection of the public, including sensitive and vulnerable populations.

- The highest chlorine detections were recorded the night of September 30 to October 1, 2024, between 12:00 and 3:00 a.m. at a monitoring station located immediately southeast and downwind of the site (**Figure 4**), with a maximum detection of 31.20 parts per million (ppm) and an hourly average concentration of 10.7 ppm during this period versus the 0.5 ppm AEGL-1 hourly average action level.^b The maximum hydrogen chloride detection for this same air monitoring station was 15.5 ppm measured at 12:45 a.m. and an hourly average of 2.15 ppm (measured between 1:00 and 2:00 a.m.) versus an hourly average AEGL-1 action level of 1.8 ppm.

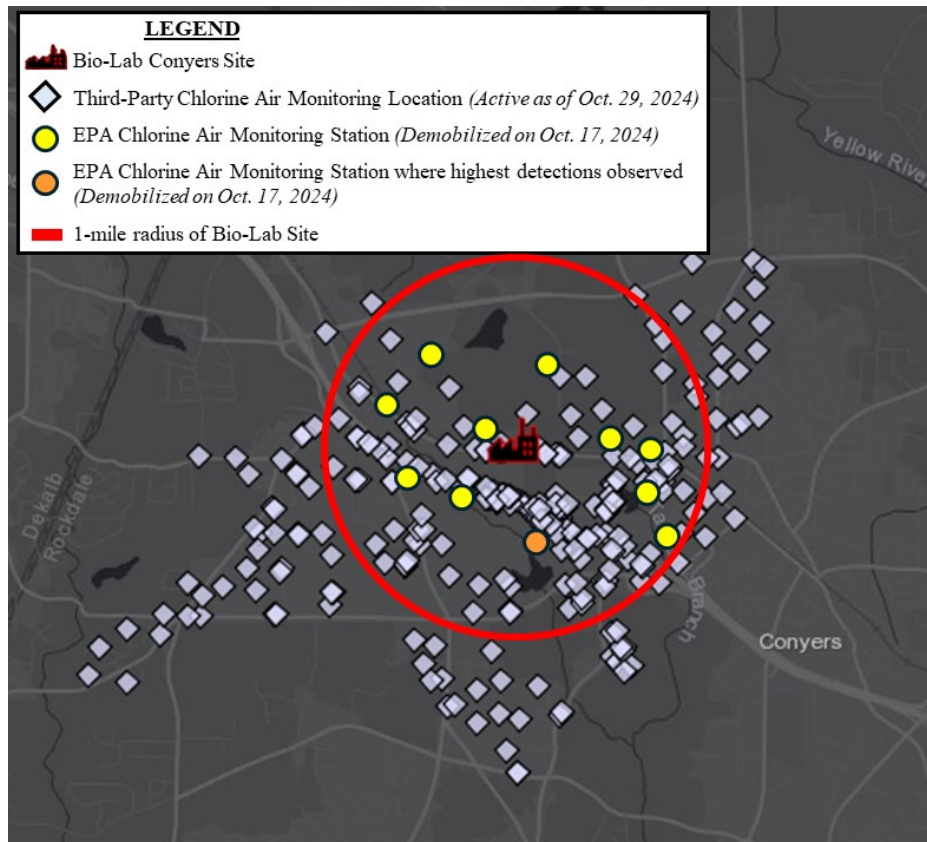


Figure 4. EPA and Third-Party Chlorine Air Monitoring Sampling Locations Surrounding Bio-Lab. (Credit: EPA Region 4, modified and annotated by CSB).^c

^a The EPA defines three levels of Acute Exposure Guideline Level (AEGL). Level 1 is the concentration resulting in “[n]otable discomfort, irritation, or certain asymptomatic non-sensory effects. The effects are not disabling and are transient and reversible upon cessation of exposure.” Additional information is available at: <https://www.epa.gov/aegl/about-acute-exposure-guideline-levels-aegls>.

^b Chlorine is recognized as a “potent irritant in humans to the eyes, the upper respiratory tract, and the lungs” with “itching of the nose and cough, stinging, or dryness of the nose and throat [occurring] at 0.06 to 0.3 ppm” [5, p. 1].

^c Location dates shown in **Figure 4** are defined in the Legend for each station type, as individual stations may have moved due to evolving conditions during the active emergency response phase of the incident.

- During the final day of air monitoring conducted by EPA on October 17, 2024, low-level chlorine detections were observed at all eleven monitoring stations in the site vicinity. The one-hour average chlorine concentrations remained well below the AEGL of 0.5 ppm as one-hour average. When the EPA officially discontinued its air monitoring on October 17, 2024, the Georgia Environmental Protection Division assumed oversight of Bio-Lab's remaining remediation and cleanup operations. At the time the EPA demobilized its own air monitoring stations, the agency continued publicly sharing data collected by Bio-Lab's contractor in its online real-time viewer on the EPA website.^a **Figure 4** shows the locations of chlorine air monitoring stations actively collecting data for public viewing on the EPA's dedicated Bio-Lab website as well as the locations of the EPA stations that were demobilized on October 17, 2024.^b
- The EPA continued providing live chlorine air monitoring data collected by Bio-Lab's contractor for an extended period after the incident, as post-incident site clean-up activities remained ongoing after the active emergency response phase, which ended on October 17, 2024.

Path Forward

- The CSB is continuing to gather facts and analyze several key areas, including:
 - The cause of the material decomposition, off-gassing, and fire
 - Storage and handling of oxidizers and their compatibility
 - Best practices for responding to emergencies involving bulk solid oxidizer chemical reactions and decompositions
 - Regulatory and Industry guidance on fire protection systems for bulk solid oxidizers
- The investigation is ongoing. Complete findings, analyses, and recommendations, if appropriate, will be detailed in the CSB's final investigation report.

^a The EPA's Region 4 website established for the Conyers, GA BioLab Fire is available at: <https://www.epa.gov/ga/conyers-ga-biolab-fire>.

^b All EPA data collected between September 29 and October 17, 2024, are publicly available at the agency's dedicated Bio-Lab incident website and the live viewer of third-party chlorine air monitoring data, which remained active as of November 7, 2024. The final review of live data prior to the finalization of this report occurred on October 31, 2024.

References

- [1] National Fire Protection Association, "NFPA 400: Hazardous Materials Code (2025 Edition)," 2024.
- [2] J. Tomac, Dictionary of Materials and Testing, 2nd Edition, SAE International, 2000.
- [3] National Fire Protection Association, "NFPA 101: Life Safety Code, 2012 Edition," 2012.
- [4] National Fire Protection Association, "NFPA 221: Standard for High Challenge Fire Walls, Fire Walls, and Fire Barrier Walls," 2024.
- [5] U.S. Environmental Protection Agency (EPA), "Chlorine - U.S. Environmental Protection Agency," 2016. [Online]. Available: <https://www.epa.gov/sites/default/files/2016-09/documents/chlorine.pdf>. [Accessed 14 November 2024].