



In-Station Training

TM 26-27 Nitric Acid Release



Author

Chief Ed Hartin

Purpose

Nitric acid incidents occur less frequently than releases of other corrosives such as sulfuric or hydrochloric acid. However, nitric acid is highly reactive with a range of other substances and is both a corrosive and a powerful oxidizer.

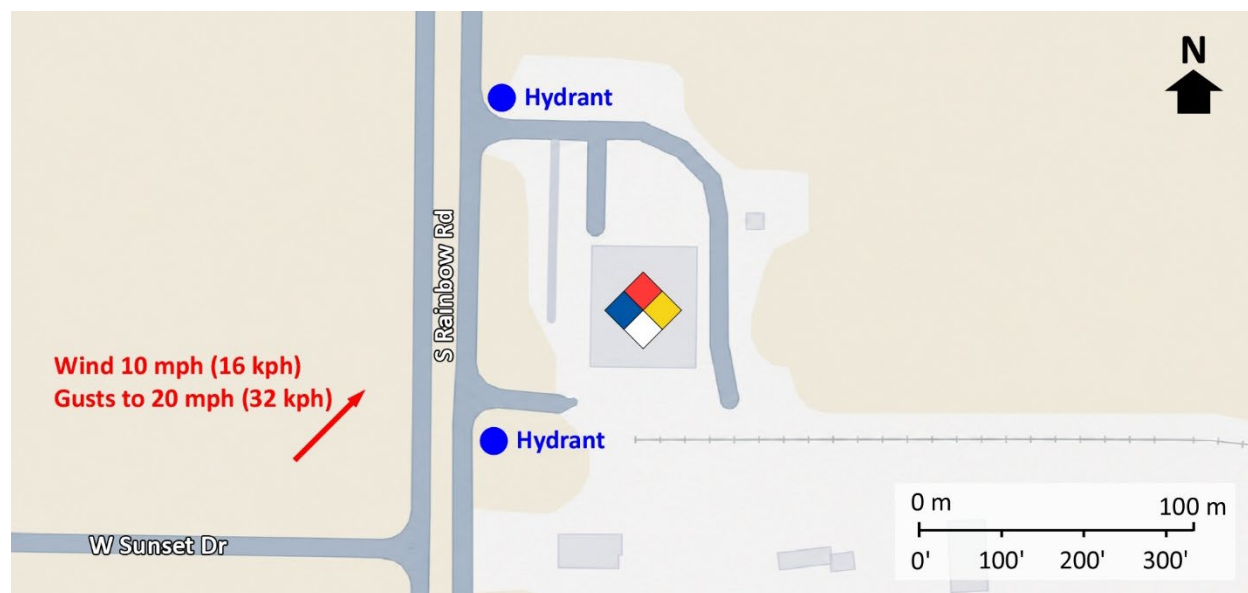
Learning Outcomes

Initial incident commanders perform an effective size-up, select an appropriate strategy, and implement tactics based on the strategic decision-making model.

Conducting the Drill

This incident involved a nitric acid release at the Thatcher Company of Arizona located at 6321 S Rainbow Road, Buckeye, Arizona on Saturday, June 21, 2024, at 16:30 (12 News, 2024 & Arizona's Family, 2024a, 2024b, 2024c, & 2024d). Review the map and photos (Figures 1-8) to gain an understanding of the building and area involved.

Figure 1. Map of the Incident Area



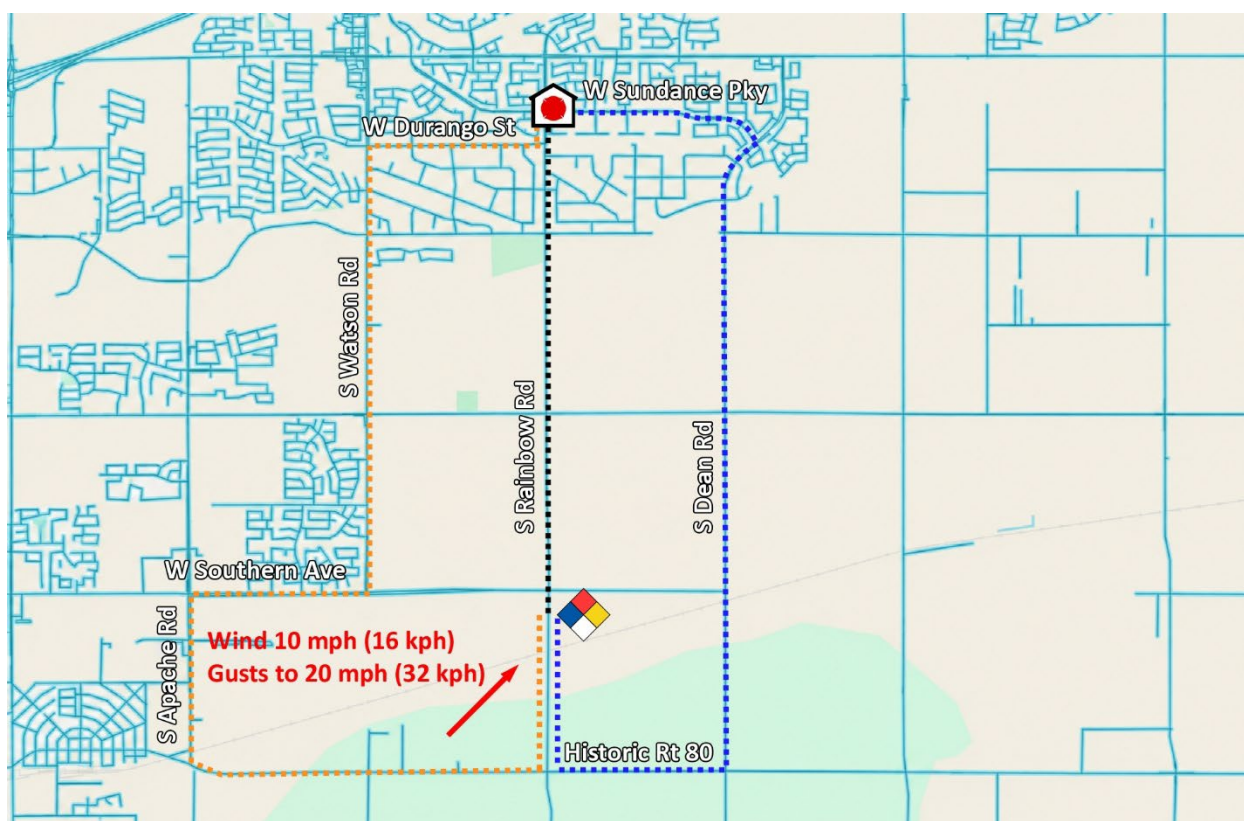
Note: Adapted from Google. (2026a). [Map, 6321 S Rainbow Road, Buckeye, AZ]. Map data ©2026 Google. <https://bit.ly/4aVkuEm>.

The closest hydrants are adjacent to the north and south entrances to the facility illustrated in Figure 1.

Use the following reference resources as needed: Safety Data Sheets (SDS) for [Ethylenediamine](#) (ThermoFisher Scientific, 2015) and [Safety Data Sheet – Nitric Acid ≤ 70%](#). (ThermoFisher Scientific, 2009), [Emergency Response Guidebook](#) (US DOT, 2024), [Pocket Guide to Hazardous Chemical Hazards](#), and [CAMEO Chemicals](#) (NOAA, 2024) to as needed to inform your decision making.

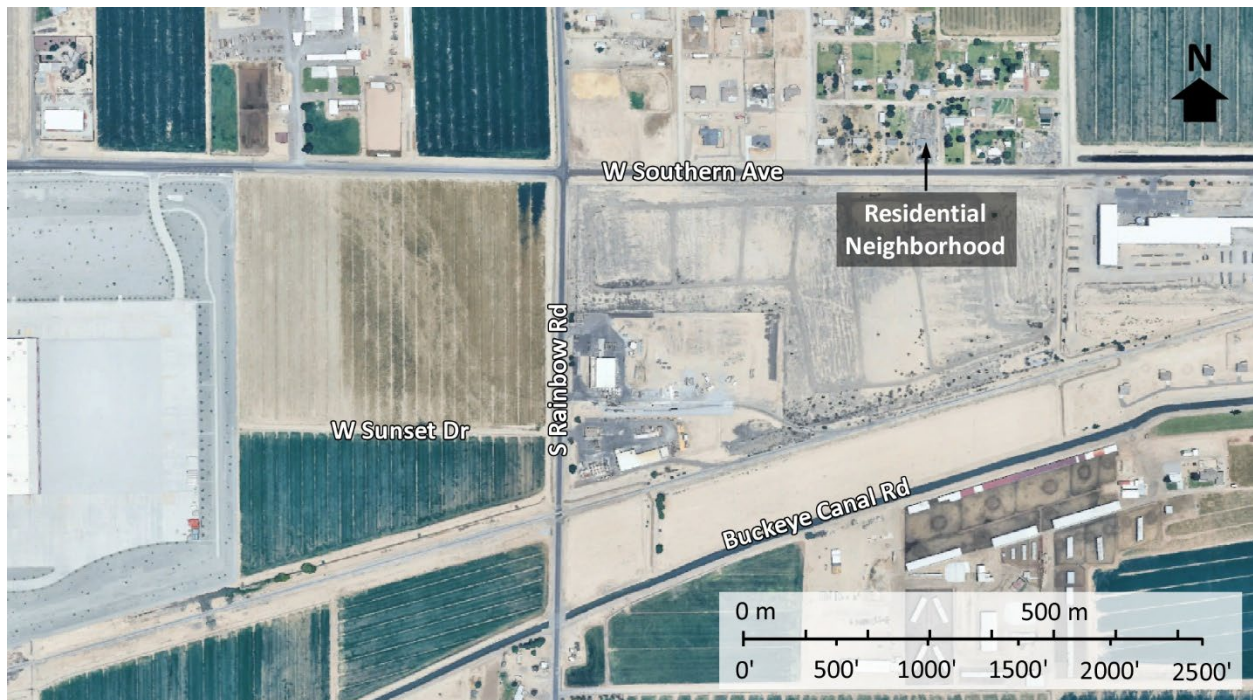
The first arriving engine has three response route options. The shortest is directly down South Rainbow Road from the fire station and approaching the incident from the north. Other options included response via South Dean Road or South Watson Road. These response routes are longer but allow approach to the incident from the south.

Figure 2. Response Route Map



Note: Adapted from Google. (2026b). [Map, 6321 S Rainbow Road, Buckeye, AZ]. Map data ©2026 Google. <https://bit.ly/4aKzQM7>.

Figure 3. Aerial View



Note: Adapted from Google. (2026c). [Aerial view Map, 6321 S Rainbow Road, Buckeye, AZ]. Imagery © Google, Imagery © Airbus Maxar Technologies, Map Data © 2026. <https://bit.ly/4xU21C6>.

Figure 4. Facility Aerial View



Note: Adapted from Google. (2026d). [Aerial view Map, 6321 S Rainbow Road, Buckeye, AZ]. Imagery © Google, Imagery © Airbus Maxar Technologies, Map Data © 2026. <https://bit.ly/4atuBAe>.

Figure 5. Alpha/Bravo Corner



Note: Adapted from Google. (2024a). [Street view Map, 6321 S Rainbow Road, Buckeye, AZ]. ©2026 Google. <https://bit.ly/4v1BrnU>.

Figure 6. Side Alpha



Note: Adapted from Google. (2024b). [Street view Map, 6321 S Rainbow Road, Buckeye, AZ]. ©2026 Google. <https://bit.ly/4uXKjL5>.

Figure 7. Alpha/Delta Corner



Note: Adapted from Google. (2024c). [Street view Map, 6321 S Rainbow Road, Buckeye, AZ]. ©2026 Google. <https://bit.ly/4y0C97J>.

Figure 8. Side Charlie



Note: Adapted from Google. (2026e). [3d aerial view, 6321 S Rainbow Road, Buckeye, AZ]. <https://bit.ly/4wdepeL>. Image edited with ChatGPT (OpenAI, 2026) to provide a ground level 2D view.

The incident is in a low-density desert fringe area outside the city. The surrounding area includes large parcels, open land, light-industrial or commercial uses, and scattered rural or estate-style residences. There is a suburban residential neighborhood located approximately 2500' to the northeast of the incident location. English is the predominant language in the broader community, with a significant

number of Spanish-speaking or bilingual (Spanish/English) residents. (Open AI, 2026). Fire and emergency medical call volume in this area is generally moderate, typical of a low density industrial area.

The temperature is currently 109 F (43° C) with wind from the southwest at 10 mph (16 kph) with gusts to 20 mph (32 kph) (Weather Underground, 2024). It is Saturday, June 21st and you have been dispatched to a nitric acid release at Thatcher Company of Arizona, 6321 S Rainbow Road. You are responding along with four other engines, two ladder companies, a medic unit, hazardous materials team, and two command officers. **You are the officer of the first due company.** Engines, ladders, and the hazmat unit have four-person staffing¹. The hazmat unit and an engine respond together and are both staffed with hazmat technicians. Regardless of the response route you select, you will arrive first, followed by a ladder company, a second engine, and the command officer. All other resources will arrive after the first command officer.

This [simulation video](#) (Hartin, 2026) provides prompts to pause the simulation and answer related questions. Each question has a brief prompt that appears in the simulation (e.g., the text “Critical Factors” is a prompt for question one. Click the link above or scan the QR code to access the incident simulation video.



This simulation video also contains a decision point. Clicking on the YouTube information card corresponding to your choice of action will play an additional video segment, continuing the simulation.



Time starts now! Answer the first ten questions within the next 10 minutes. Save discussion until after you have answered these questions.

1. What critical factors would you consider when dispatched and during response? What conversations would you have with your crew during response?
2. Based on the dispatch information and what you know about this occupancy and response area, what do anticipate finding on arrival?

¹ If your first alarm deployment is different, use your own resource assignment and staffing.



Important! Answer questions three through ten in the form of communication you would have with your crew, dispatch, other companies, and the first arriving command officer. State the communications exactly as you would say them face-to-face or over the radio. Save explanation or discussion until after you have completed these questions.

3. What response route will you select? State your answer in the form of face to face communication with your apparatus operator?

4. State your initial radio report (IRR) exactly as you would transmit it to dispatch.

5. What specific actions would you take (as the company officer) immediately upon arrival and exiting the apparatus and what task orders would you give your crew?

6. Would you change the action you are taking or modify the assignments given to your crew? If so, what task orders would you provide?

7. State your follow up report exactly as you would transmit it to dispatch.

8. Ladder 1 arrives and reports that they are Level 1 on Historic Route 80 and South Rainbow Road. State the tactical assignment you would give them exactly as you would transmit it.

9. Engine 2 arrives and reports that they are Level 1 on Historic Route 80 and South Rainbow Road. State the tactical assignment you would give them exactly as you would transmit it.

10. Based on anticipated effectiveness of your tactical operations, state your conditions, actions, and needs (CAN) report that you would provide to the first arriving command officer as part of command transfer to IC #2.



Reflect on your strategic decision-making and responses to questions one through nine before answering the next eight questions. Think about what cues, patterns, or anomalies (differences from conditions that you would anticipate) informed your answers.

11. What information most influenced your expectations?
12. Did anything in the incident post-arrival challenge your initial expectations?
13. What was the actual problem once you arrived?
14. What were your tactical priorities and what was getting in the way of achieving them?
15. During initial operations, was there an immediate threat of serious injury or death to you, your crew, or other companies?
16. Was it reasonable to believe that the building was occupied?
17. Was there searchable space?
18. If you believed there was searchable space and that it was reasonable that the building was occupied, what could you do about it?

Watch [Chemical Leak Forces Shelter-in-Place in Buckeye](#) (Arizona Family, 2024a).



Watch [Company in Buckeye chemical leak has history of EPA violations](#) (Arizona Family, 2024b).



Watch [Shelter-in-Place Lifted After Toxic Chemical Leak in Buckeye](#) (Arizona Family, 2024c).



19. How did you determine the initial isolation distance (hot zone boundary) for this incident. Did you address downwind protective action as part off your initial incident action plan or in your command transfer conditions, actions, and needs (CAN) report? If so, were your thoughts on downwind protective action distances consistent with those used by responders in this incident?

20. Companies responding to this incident positioned on South Rainbow Road in front of the incident occupancy. Was this consistent with where you positioned your apparatus? What critical factors influenced your initial apparatus positioning (Engine 1 (your apparatus), Ladder 1 and Engine 2)?

21. A facility manager reported that 10 employees were inside the facility at the time of the release and that they were out, accounted for, and uninjured. What influences the credibility of this report? How would your incident action plan have changed if one or more of the employees were unaccounted for?

Additional Learning

Reference materials are critical to effective decision making in hazardous materials incidents.

Review Your References

Take the opportunity to review the hazardous material references available on your apparatus and how they can inform your decision making during the initial stages of a hazmat incident.

Emergency Response Guidebook

It is easy to become overwhelmed with information obtained from hazardous materials references. The Emergency Response Guidebook (US DOT, 2024) is the simplest, and quickest reference. However, the ERG is indexed by proper shipping name and UN ID Number (so it is not useful for trade name materials). The ERG is intended for use in transportation incidents and may or may not be as useful for incidents occurring at fixed facilities. Watch [How to Use the ERG: A Complete Guide \(2024\)](#) for a solid review of this hazmat reference.

The green pages of the Emergency Response Guidebook (US DOT, 2024) identify specific initial isolation distances and downwind protective action distances for hazardous materials classified as toxic inhalation hazard (TIH) materials. For all other hazardous materials, initial isolation distances are identified in the orange guide pages. The guide pages identify initial isolation distances based on the hazardous material's state of matter: Solids-75', liquids-150', and gases 300'.

Critical Thinking

Guide 157 is used for nitric acid. Red fuming nitric acid is identified as a toxic inhalation hazard (TIH) material and guidance on isolation and protective action distances are identified on page 304 in the green pages while other types and concentrations of nitric acid are not. The product involved in the Buckeye incident was most likely 67% nitric acid. As a liquid, the initial isolation distance specified in Guide 157, is 150'.

Did you define the hot zone boundary using an equal 150' radius? If not, what cues prompted you to modify the size and shape of the hot zone?

Think about how state of matter impacts dispersion of hazardous materials and discuss how these basic initial isolation distances may need to be modified based on incident conditions.

References

- 12 News. (2024). Chemical spill leads to HAZMAT situation, shelter-in-place order in Arizona. Retrieved June 28, 2026, from <https://bit.ly/4v62z4Z>.
- Arizona's Family. (2024a). Chemical leak forces shelter-in-place in Buckeye. Retrieved June 28, 2026, from <https://bit.ly/4gIOjf0>.
- Arizona's Family. (2024b). Company in Buckeye chemical leak has history of EPA violations. Retrieved June 28, 2026, from <https://bit.ly/4vAF1X1>.
- Arizona's Family. (2024c). Shelter-in-place lifted after toxic chemical leak in Buckeye. Retrieved June 28, 2026, from <https://bit.ly/4uZA0q4>.
- Arizona's Family. (2024d). ADEQ issues notice of violation against Buckeye facility following nitric acid spill. Retrieved June 28, 2026, from <https://bit.ly/4f82qJB>.

- Google. (2024a). [Street view Map, 6321 S Rainbow Road, Buckeye, AZ]. ©2026 Google. Retrieved June 28, 2026, from <https://bit.ly/4v1BrnU>.
- Google. (2024b). [Street view Map, 6321 S Rainbow Road, Buckeye, AZ]. ©2026 Google. Retrieved June 28, 2026, from <https://bit.ly/4uXKjL5>.
- Google. (2024c). [Street view Map, 6321 S Rainbow Road, Buckeye, AZ]. ©2026 Google. Retrieved June 28, 2026, from <https://bit.ly/4y0C97J>.
- Google. (2026a). [Map, 6321 S Rainbow Road, Buckeye, AZ]. Map data ©2026 Google. Retrieved June 28, 2026, from <https://bit.ly/4aVkuEm>.
- Google. (2026b). [Map, 6321 S Rainbow Road, Buckeye, AZ]. Map data ©2026 Google. Retrieved June 28, 2026, from <https://bit.ly/4aKzQM7>,
- Google. (2026c). [Aerial view Map, 6321 S Rainbow Road, Buckeye, AZ]. Imagery © Google, Imagery © Airbus Maxar Technologies, Map Data © 2026. Retrieved June 28, 2026, from <https://bit.ly/4xU21C6>.
- Google. (2026d). [Aerial view Map, 6321 S Rainbow Road, Buckeye, AZ]. Imagery © Google, Imagery © Airbus Maxar Technologies, Map Data © 2026. Retrieved June 28, 2026, from <https://bit.ly/4atuBAe>.
- Google. (2026e). [3d aerial view, 6321 S Rainbow Road, Buckeye, AZ]. Retrieved June 28, 2026, from <https://bit.ly/4wdepeL>. Image edited with ChatGPT (OpenAI, 2026) to provide a ground level 2D view.
- Hartin, E. (2026). *10-minute training 26-27 nitric acid incident simulation* [Fire Studio 7 video]. Retrieved June 28, 2026, from <https://bit.ly/444soaQ>.
- Hazmat Ops Training. (2024). *How to use the ERG: a complete guide*. Retrieved October 27, 2025, from <https://bit.ly/48Q4VOg>.
- National Institute for Occupational Safety and Health (NIOSH). (2020). *Pocket guide to chemical hazards*. Retrieved August 3, 2025, from <https://bit.ly/4mobBGF>.
- National Oceanic and Atmospheric Administration (NOAA). Computer Aided Management of Emergency Operations (CAMEO) Chemicals. Retrieved October 19, 2025, from <https://bit.ly/3Xm9byB>.
- OpenAI. (2026). *ChatGPT 5.2* [Large language model]. Retrieved June 28, 2026, from <https://chat.openai.com/chat>.
- ThermoFisher Scientific. (2009). *Safety data sheet – nitric acid ≤ 70%*. Retrieved June 28, 2026, from <https://bit.ly/4xPg5Nj>.
- Weather Underground (2024). *Buckeye, AZ weather history* [historical weather June 21, 2024]. Retrieved June 28, 2026, from <https://bit.ly/4xP9McB>.

Build command competence through weekly practice.

Receive a link to each new 10-Minute Training tactical decision game by email.

[Click here](#) or scan the QR code to subscribe.

