



# EMERGENCY RESPONSE REVIEW

## BOC Gases Ammonia Release, Baytown, Texas

**FINAL REPORT :: JANUARY 23, 2002**

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**EPA Region 6 is issuing this Emergency Response Review as part of its ongoing effort to protect human health and the environment by responding effectively to chemical accidents.**

**It is important that facilities, LEPCs, and emergency responders review this information and take appropriate steps to minimize potential risks during an emergency response.**

**This document does not substitute for EPA's regulations, nor is it a regulation itself. It cannot impose legally binding requirements on EPA, states, or the regulated community, and may not apply to a particular situation based upon circumstances. This guidance does not represent final agency action, and may change in the future, as appropriate.**

## **Ammonia Release, Baytown, Texas**

### **SUMMARY OF INCIDENT**

On May 27, 2001, an anhydrous ammonia release (approximately 600 pounds) occurred at BOC Gases in Baytown, Texas. The Baytown Fire Department responded to the call from the BOC Gases Plant Manager, Charlie Crutcher. Upon arriving on the scene, the three firefighters viewed a visible cloud coming from the suspected point of release. The cloud was drifting over the fence line boundary, and over the roadway.

At the time of the department arrival, the firefighters believed the chemical to be only "ammonia vapors," and referred to the hazards for "ammonia vapors" in the DOT Emergency Response Guidebook. The responding firefighters were not aware that the release was primarily "liquid anhydrous ammonia, and thus potentially much more dangerous than just "vapors."

The BOC Gases Plant Manager asked the responders to attempt to stop the release by closing the valve, which was next to the release point. The primary responder for the Baytown Fire Department, Lieutenant Carr, made a total of three (3) entries into the vapor / liquid cloud to attempt to shut the valve.

Upon arrival, the Shift Battalion Chief, Cecil Clemmer, assumed the role of Incident Commander during the release incident.

The first and second attempts by Lt. Carr to stop the ammonia release were not successful, as the valve was frozen in place from direct contact to the liquid ammonia.

After the second failed attempt, the lieutenant returned to the fire engine, where it was noted by the other responders that the lieutenant appeared as if he was "covered in a block of ice," and apparent vapor odors were emitting from his bunker gear. Lt. Carr was decontaminated (by water spray from the engine's hoses) and redness on his arms was apparent. The lieutenant changed into the driver's bunker gear to prepare for a third entry.

At This point, the BOC Gases Plant Manager defrosted the valve by hosing it down with water, making it easier to shut off. Engine 2 was moved closer to the release, in order to create a water shield. The lieutenant entered the cloud a third time with another firefighter (August Naumann) using the hose from Engine 2 to create water shield.

The third attempt proved successful, and the valve was eventually shut off. Upon deconning and disrobing, Lieutenant Carr showed signs of burn/blistering on his arms and torso. Lieutenant Carr went to the hospital emergency room, and was seen by a physician. The physician released him to work that evening. Upon starting his regularly scheduled shift on Monday morning, he was sent home by his Battalion Chief and encouraged to seek further medical care.

EPA Region 6, Response and Prevention Branch, was asked to review the response by the Baytown Fire Department, and make recommendations that will assist the Baytown Fire Department during future responses.

On July 26, 2001, an EPA team visited the Baytown Fire Department, and interviewed several members of the Department. Lieutenant Carr was not available for the interview during the visit; it was determined the report could be satisfactorily completed without followup interviews.

The EPA team consisted of:

Steve Mason, EPA On-Scene Coordinator  
Lon Biasco, EPA On-Scene Coordinator  
Steve Hamm, TNRCC Emergency Coordinator  
Christy Tullis, EPA START Contractor  
Mike Callan, EPA Headquarters, CEPPO

The following is a summary of key findings, based on the interviews conducted on July 21, 2001, and recommendations from team members.

## KEY FINDINGS

- ❑ The tactics used in the ammonia response were too aggressive, given the circumstances of the incident. Based on interviews, the responding firefighters were trained to the Operations Level, under the Hazardous Waste Operations and Emergency Response (HAZWOPER) Standards, developed by the Occupational Safety and Health Administration (OSHA), and adopted by EPA for State and local government agencies.

Under the OSHA HAZWOPER Guidance, those responders trained to the Operations Level, as determined by the responder's employer, "...are trained to take defensive actions rather than try to stop the release. Their function is to contain the release from a safe distance, keep it from spreading, and prevent exposure..."

Responders trained to the Technician Level, as identified under the OSHA HAZWOPER Standard, are "...those who respond to releases or potential releases for the purpose of stopping the release..."

Therefore, the responders were attempting work that exceeded their admitted training level, under the OSHA/EPA HAZWOPER Standards.

- ❑ The act of dispatching a single engine to a major ammonia release is putting the initial responders at a dangerous manpower level. Most fire departments dispatch a structure fire response or equivalent manpower.
- ❑ The dispatcher has some discretion for "odors" calls. A known or declared release by the caller should warrant a full response, with appropriate manpower, Personal Protective Equipment (PPE), and other resources.
- ❑ During a response where an entry is attempted to stop a full liquid ammonia release or other hazardous material, the accepted protocol is "2 in / 2 out" response. This protocol indicates that two people would enter the scene, while two others were on "standby" out of the "hot zone." Even though six men were dispatched (3 on engine, Battalion Chief, and 2 medics) from separate response routes, position of the ammonia cloud and apparatus placement put only engine 2 in a position to operate. During this response, 2 men entering a pump operator violated the "2 in / 2 out" rule.
- ❑ The members of the department do not lack for training. Interviews indicated that additional specific hazardous materials training was desired. Refresher training that met hourly requirements was conducted.
- ❑ Based on interviews, standard basic procedures for a hazardous materials response were not followed, e.g., did not approach the scene from an upwind direction, improper decontamination procedures followed.
- ❑ Mr. Naumann, who was a new recruit, received the 40 hour hazardous materials training during basic fire training, but had not started his annual refresher training scheduled before the incident occurred.
- ❑ The absence of a department training officer for a period of time, due to a retirement, contributed to the lack of overall training. Refresher training is needed, not only for a review, but sets guidelines for what a first responder can or can't do.

Again, this incident was a technician operation from the start, while the department firefighters were trained at operations level only. An operations level first responder should never attempt to address the aggressive operations, as did the Baytown firefighter entry team.

- ❑ On the day of the incident, one of the members of the entry team regularly worked on a different shift. With the lack of standard operating procedures for hazardous chemical releases, as well as other operations procedures within the department, there was not one standard for proper procedures during the response.
- ❑ Based on interviews, the emergency room physician should not have allowed Lieutenant Carr to return to active duty after being injured during the incident. The fire department acted appropriately in providing further medical treatment, and removing him from active duty until fully recovered.
- ❑ All persons interviewed indicated that hindsight showed that the persons responding were not trained to the appropriate level to attempt a shut-off of the release, and all also agreed that the proper equipment and protective apparel was not used.
- ❑ A review of the dispatching procedures should be conducted in order to enhance and strengthen their knowledge in responding to hazardous materials incidents.
- ❑ Any time a department responds to an incident of this nature, a critique, or “hot wash” should be conducted to ensure that any concerns are brought out and addressed.
- ❑ As part of ongoing training, fire officers need to become aware of what is in the Local Emergency Response Plan, so that they are aware of what the local community as available as resources when responding to incidents, and when it is appropriate to bring in other local resources.
- ❑ The fire department needs to expand ongoing discussions with the facilities in the area (e.g., Exxon) on what resources they may have to offer during a release off the facility site, as well as specialized training offered at the facility that fire department personnel may be able to attend.

## RECOMMENDATIONS

- ❑ Develop appropriate specific guidelines for medical surveillance pursuant to acute exposures to specific substances. These guidelines can be added to the standard NFPA guidelines already followed by the department.
- ❑ Standard Operating Procedures (SOPs) for hazardous materials responses are critical. The SOPs should not be contingent on one person, but based on a system that can provide employees the skills needed at any time on any shift. These procedures should also cover the aspects of properly approaching a scene, site security, decontamination, PPE, etc.
- ❑ Training protocols should be reviewed, and records should be kept, with a plan to keep certifications and refresher trainings regulated and up to date. The training officer should review the operations level training received by department personnel to determine if the training was sufficient for the situations likely to be encountered in Baytown.
- ❑ Fire department personnel should be familiarized with procedures on how to handle PPE after it has been in a contaminated environment. Protocols need to be strengthened on what to do with contaminated equipment and PPE.
- ❑ All officers must know their limitations. Officers should be fully aware of the capabilities for each responder, based on the level of training received, plus PPE, manpower, and resources available during the response.
- ❑ All supervisors need to understand their responsibilities to firefighters under their purview. If a supervisor feels uncomfortable with the response choices being made, they should always lean toward the cautious.
- ❑ The Hazardous Materials Standard Operating Procedures, drafted by the fire department, should be finalized. The draft guidelines have been reviewed by the EPA team, and have been found to be satisfactory.