Montgomery County Fire and Rescue Service

POST INCIDENT ANALYSIS

Confined Space Rescue
1220 East-West Highway
Silver Spring, MD

Incident Date: January 17, 2012

Submitted by
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On February 25, 2012

Incident Overview

Note: This post incident analysis is based upon the review of the incident audio tape, interviews with crews who operated at the emergency scene and the completion and review of PIA Unit Fact Sheets.

On January 17, 2012, at 1610 hours, MCFRS units responded to 1401 Blair Mill Road, Silver Spring, Maryland for a report of confined space rescue in an underground oil tank. Weather conditions at the time of incident were mild with a temperature of 58^0F, scattered clouds, and light winds from southwest. Rush hour activities were underway with motor vehicle and pedestrian traffic on the increase.

Battalion Chief 701 (BC701) was the first unit to arrive on the scene: he was flagged down by a worker in front of 1220 East West Highway where the worker advised the battalion chief of a man trapped in an underground oil tank. Battalion Chief 701 advised ECC of the corrected address and then went with the worker to investigate the situation.

Battalion Chief 701 found an open manway on Side A of property. The reporting worker advised that his coworker was down in the tank and was too tired to climb out under his own power. The worker advised that the tank was a 10,000-gallon heating oil tank that was in the process of being cleaned and taken out of service. The worker reported that both he and the trapped coworker had been working in the tank and that his coworker had too many jackets on to climb up through the tank opening.

Upon further investigation, BC701 found a 58 year old male worker sitting on the bottom of the tank. There was an odor of heating oil present, but there appeared to be no other atmospheric hazard. Positioned at the tank opening, BC701 was able to communicate verbally with the trapped worker and learned that the man had made several attempts to climb up through the narrow tank opening, but each time he had gotten stuck and had to retreat. The trapped worker advised that he simply was too tired to climb out of the tank under his own power.

Additional resources began to arrive and BC701 transitioned to a stationary, Incident Command Post (ICP) after briefing the arriving company officers of his investigative findings.

Paramedic Engine 701, Medic 701, and Ambulance 701 all arrived at about the same point and Paramedic Engine 701 was assigned to start atmospheric monitoring of the tank while the EMS units were instructed to prepare to receive a patient. Tower 719 was soon to arrive thereafter and was assigned to start ventilation operations of the tank pending the arrival of the Technical Rescue Team (TRT).

Rescue Squad 741B was the next unit to arrive on the scene and was assigned by the Incident Commander (IC) to begin developing a rigging system to assist with patient removal. The initial plan was to have the trapped worker don a Class III harness and be assisted out of the tank without rescue personnel having to enter the tank. (There was an existing work ladder that was in place from the work crew.)

Units from the TRT and the hazmat team began to arrive on the scene as did the Special Operations Chief (SP700). At this point, rescue operations were transitioned to SP700 and the hazmat team assumed responsibility for atmospheric monitoring and decontamination operations if needed.

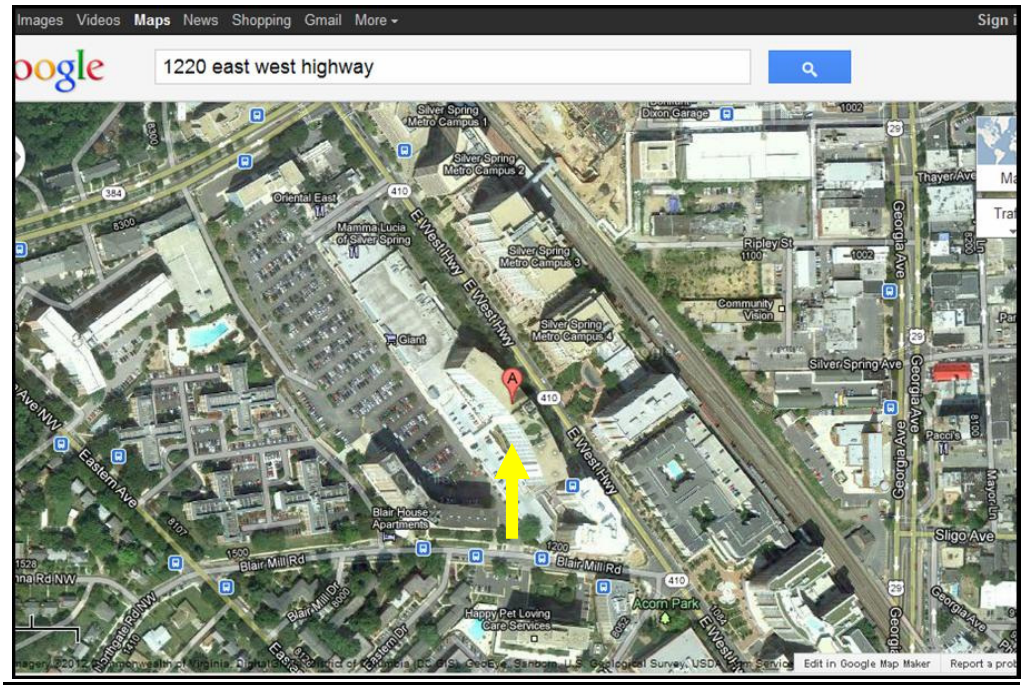
One concern that arose was the possible need for decontamination of the worker. While the tank had been steamed cleaned several days prior to the incident, there still remained an odor of heating oil and there was some concern over possible residue in the tank and possible residue on the worker. Therefore, a decontamination plan was created and put into effect pending the removal of the worker from the tank.

At 1711 hrs, the worker was removed from the tank without incident using a two-person confined space entry team and a rope rigging/retrieval system. Once out of the tank, the worker was decontaminated and loaded into Medic 701 where it was learned from the worker that he had actually fallen from the ladder during his last exit attempt before the arrival of fire department units. Based upon that information, the worker was then treated and transported to Suburban Trauma Unit by Medic 701 as a Priority 2 Category C trauma.

Structure/Site Layout

- The structure at 1220 East West Highway is a high rise, residential apartment building located amongst a cluster of other similar type buildings.
- The underground fuel tank was located about 25-feet from Side A of the building – between the building and the sidewalk. There was a masonry privacy wall located between the tank's manway opening and the sidewalk.
- The fuel tank was a 10,000-gallon cylindrical vessel that was completely buried about 4-feet below grade. The vessel measured approximately 10-feet in diameter and 28-feet in length and had a 20-inch man-way.
- The tank was in the process of being decommissioned and was slated to be filled in with dirt pending a final cleaning inspection.
- The two workers involved in the incident were part of the final cleaning and inspection program.

- The small amount of liquid that remained in the tank was a result of storm water leakage.



Aerial view of complex.

Tank Entry - Side Alpha of 1220 East West Highway

Fire Code History

- A review of the past and current fire code requirements for the structure revealed no code compliance issues.
- The fuel tank was being decommissioned because of age and leakage issues.

Communications

- The incident was dispatched on 7-Alpha and assigned to the 71-Charlie talk group. All companies were able to switch and operate on 71-Charlie without incident.
- For the most part, radio communications were effective above ground. However, the portable radio that was taken into the tank by the Entry Crew was not able to transmit on the trunked talk group or on 7-Oscar.
- The IC did not know that the Entry Crew was having radio difficulties and therefore VRS was not engaged.

Pre-Emergency Planning

- There were no pre-fire plans for the structure other than a "complex" map drawn by Station 1 personnel.
- The operations at this incident did not require any special pre-fire plans.

Command Structure

- IC = BC701
- LOFR = C701
- SOFR = SA700
- IOFR = DC700
- Rescue Group* = SP700 w/RS741B, E701, and TRT
- Vent Group = AT719
- EMS Group = EMS700 w/M701, A701, A702, and M844
- Hazmat Group = HM707

*The Rescue Group was further divided into Technical Rigging, Entry, and Tech Safety,

On Scene Operations – Key Points

- The location of the incident was not the dispatched address. The calling party had provided the wrong address to the 911 call-taker. Fortunately, the two addresses were in close proximity to each other,
- Battalion Chief 701 was first to arrive at the corrected location and was able to complete a brief recon of the incident before formally assuming command of the incident.
- Based upon Battalion Chief 701's initial assessment of the tank and the trapped worker, a rescue plan was devised to provide the worker a Class III harness and then assist the worker out of the tank using a hauling system as needed. The initial plan did not include sending

rescuers into the tank – it was the belief that the worker could self-exit with some assistance.

- The victim was unable to don the Class 3 harness due to confusion over how to don it and also due to some mobility issues related to the fall injury (which was not disclosed until the victim was out of the tank.)
- The rescue plan was revised to include a confined space entry team made up of two rescuers outfitted with Class III harnesses and SCBA for respiratory protection. The entry team was to enter the tank, assist the victim in donning a Class II harness, and then assist the victim out of the tank using a hauling system from above.
- The confined space back-up team was outfitted with Class III harnesses and SABA – however, the back-up team was never used.
- Atmospheric monitoring and ventilation continued throughout the duration of the incident.
- Once removed from the tank, the victim was decontaminated using gross decon procedures set-up by Paramedic Engine 701 and Hazmat 707 crews using a make-shift tent and a garden hose.
- The victim was then transferred to Medic 701 where it was learned that he had fallen from the ladder in the tank prior to the initial 911 call being placed. The victim was then treated and transported as a trauma patient.
- The Incident Command Post (ICP) was BC701's vehicle which was parked on Side Alpha of 1220 East West Highway. The ICP was identified using a roof-mounted, green strobe light.
- A command team was built using BC701, C701, and DC700. The team operated without incident. Units arriving on the emergency scene reported to the ICP for instructions or were directed to an assignment via radio.
- Apparatus access was not an issue.

Incident Timeline

- 1613 hrs – BC701 first unit to arrive on scene.
- 1625 hrs – atmospheric monitoring and ventilation started by E701 and AT719 – meter readings reported 0% LEL, 20.9% oxygen, and 0 ppm carbon monoxide.
- 1642 hrs – HM707 reports meter readings of 60 ppm on PID.
- 1648 hrs – TRT Entry Team ready for entry.
- 1652 hrs – first member of Entry Team is at victim's side.
- 1702 hrs – second Entry Team member is with the victim.
- 1703 hrs – SOFR reports meter readings of 0% LEL, 21% oxygen, 0 ppm carbon monoxide, and 14 ppm on PID.
- 1708 hrs – victim is in harness and begins ascent out of tank.
- 1711 hrs – victim is out of tank and decon process started.
- 1716 hrs – both members of Entry Team are out of the tank.

Making contact with the victim.

Metering and ventilating the space.

The retrieval system.

Making entry.

Victim removal.

Staging

- No specific staging activities occurred – all responding specialty team units took a position on East West Highway – which was a large enough thoroughfare to accommodate the apparatus.

Support Functions

- No Public Information Officer arrived at the incident therefore Duty Chief 700 assumed the role and provided information to the news media.
- EMS700 played an important role in contacting the hospitals to advise them about the incident and that the victim would be decontaminated prior to arrival at the emergency room.
- There were no equipment or apparatus failures.

- Traffic management was adequately handled by Montgomery County Police. East West Highway was closed in both directions for the duration of the incident.

Safety Group

- SA700 was assigned as the Incident Scene Safety Officer and was responsible for the general, overall safety of the incident. He observed the work area for any safety issues and was also given the responsibility of recording meter readings as they were provided by the personnel handling the atmospheric monitoring.
- The TRT provided their own Technical Safety position who oversaw the specifics of the rescue operation.
- There were no injuries to emergency responders.

Accountability

- There were no issues with accountability.

Patient Follow-up

- After evaluation at the trauma center, it was found that the 58 year old male had no traumatic injuries other than multiple contusions and abrasions and a laceration to the right arm which was debrided and stapled. The patient was also evaluated for possible toxic gas inhalation and hypoxia – nothing was found and the patient was discharged the same day.

Lessons Learned

- The transition of the rescue operations from the first-arriving units to the TRT was smooth.
- Confined space rescue incidents are a rare occurrence in Montgomery County and one would not expect to find a trapped worker in an underground fuel tank at a high rise in downtown Silver Spring. The importance of training and first-responder preparedness is once again reinforced.
- Prior to the arrival of the TRT, the Vent Group attempted to put a Pelsue ventilation fan into operation. The problem was that there was no tubing/ductwork for the fan. The Hazmat Unit carries a Pelsue fan but the tubing/ductwork is/was apparently carried on a different vehicle – which of course was not on the incident. Fortunately, a local contractor was able to provide some flexible ductwork so that initial ventilation operations could be started pending the arrival of the TRT. Obviously, this emphasizes the

importance of carrying the fan and its tubing on the same response vehicle.

- Personnel assigned to ride heavy rescue squads need to be well-versed in rope rescue and rigging operations. Rescue Squad 741B was the first rescue squad to arrive on the scene and did a nice job of starting the rigging process and assisting with the set-up of the tripod entry and retrieval system.
- Crews worked to identify any lock-out/tag-out issues – none were found. Lock-out/tag-out considerations are important on every rescue call and cannot be overlooked – even in what appears to be a "simple" rescue operation.
- The Hazmat team was not part of the original dispatch, but given the nature of the report – an underground fuel tank – SP700 requested the hazmat response for entry PPE if needed. While the PPE was never needed at this incident, the presence of the hazmat personnel did allow for more advanced, atmospheric monitoring (photo ionization detector or PID).
- There was some confusion over what a PID reading meant. When an inquiry was made by the Technical Rigging supervisor, he was told by a hazmat team member that the meter "reads the PID." Another hazmat team member replied that "it reads the amount of product in the space being sampled," and a third member did not have an answer. When asked if the atmosphere was an IDLH, the hazmat folks replied that "they would have to look it up." While the tank's atmosphere had been declared "safe" based upon the presence of sufficient oxygen and the absence of an LEL and CO reading, the importance of understanding and communicating all meter readings is critical to everyone operating at the incident. Specialty team personnel need to know the capabilities of their equipment and the equipment operated by other specialty teams.
- The Entry Team used 60-min SCBA from HM707. While this choice of SCBA certainly provided a longer duration air supply, the 60-min SCBA had a larger profile than a 45-min SCBA. However, at this incident, the narrowness of the tank manway required any entry team member to remove his SCBA in order to pass through the opening.
- The standard issue portable radio did not work (transmit or receive) inside the tank.
- It was reported that a "drop box" two-way PA-style communications device was available from the TRT's conspace communications cache – however, the device was not used. This item could have provided communications in lieu of the portable radio.
- Had the incident involved an LEL environment, then intrinsically safe communication devices would have been needed. One recommendation is to consider the use of SABA which has an integrated communications system built in.

Units on Incident

Initial Dispatch

PE701,
AT719
RS741B
M701, M844, A701, A702
BC701
TRT-Confined Space

Additional Units

E731, PE724, PE725
T725, T731
RS729
M729
HM707
PT731, RCN731, XPT731
EMS700
DC700
SA700
C701

Conclusion

As confined space rescue incidents go, this was a relatively straight forward event. The victim had non-life threatening injuries and there were no atmospheric hazards present in dangerous or significant quantity. All personnel worked together quite effectively to develop a rescue plan and execute that plan in as short a time frame as possible. The victim was removed without incident and within 30-minutes of TRT arrival.