BULLETIN

NO.: 21-143

DATE: August 31, 2021

TO: All Personnel

FROM: Steven Lozano, Deputy Fire Chief, Employee Services

SUBJECT: Green Sheet – Cal Fire Rancho incident - CNG Cylinder Failure

On August 16, 2021, at approximately 10:53 AM, two Riverside County Type 1 Advanced Life Support (ALS) engines and one CAL FIRE / Riverside Unit Type 3 engine were engaged in fire suppression activities involving a compressed natural gas-powered (CNG) waste disposal truck when one of the roof-mounted CNG cylinders failed and became airborne, damaging two fire apparatus and one civilian vehicle. Twelve fire department employees were transported to the local hospital for evaluation and released back to full duty. One civilian received minor injuries.

This is could happen to us and is a good reminder of some of the hazards on routine calls. The report is informative with the video capturing some very rare footage of a cylinder flying hundreds of feet.

Please find attached the information summery report - Green Sheet.

- **Refer to SDFD Operations Manual**
  - **SI 10 Section 04 Safety Communications**
    - **Serious Accident Review Team (SART)**

Any questions should be directed through the chain of command.

Please contact the Health and Safety Office at SDFDHealth&Safety@sandiego.gov with comments or areas of improvement. For all other questions contact HSO/Battalion Chief David Picone at 619.533.4466 or dpicone@sandiego.gov

Wellness Resources QR code:
login: sdfd password: wellness
or call toll free **833-SDFD-HSO (733-3476)**

Informational Summary Report of Serious or Near Serious CAL FIRE Injuries, Illnesses and Accidents

GREEN SHEET

Commercial Vehicle Fire

August 16, 2021

Rancho

21-CA-RRU-111566

21-CA-RRU-111746

California Southern Region

SUMMARY

On August 16, 2021, at approximately 10:53 AM, two Riverside County Type 1 Advanced Life Support (ALS) engines and one CAL FIRE / Riverside Unit Type 3 engine were engaged in fire suppression activities involving a compressed natural gas-powered (CNG) waste disposal truck when one of the roof-mounted CNG cylinders failed and became airborne, damaging two fire apparatus and one civilian vehicle. Twelve fire department employees were transported to the local hospital for evaluation and released back to full duty. One civilian received minor injuries.

CONDITIONS

Weather:
Temperature: 87.7° Fahrenheit
Relative Humidity: 38%
Winds: 4.5 MPH, S
Visibility: Clear

Fuel Type: N/A
Road Conditions: Dry, multi-lane asphalt surfaced road, with a marked center divider.
Topography: Flat
Fire Behavior: N/A

Make/Model of Equipment:

Vehicle #1 (V1): 2007 Peterbilt CNG Waste Disposal Truck
Vehicle #2 (V2): Ford Transit Connect
Fire Engine #1 (E1): 2016 Spartan Type 1 ALS Fire Engine
Fire Engine #2 (E2): 2009 HME / International Type 3 Fire Engine
Fire Engine #3 (E3): 2015 Spartan Type 1 ALS Fire Engine
Battalion Chief (BC): 2015 Chevy Silverado 2500 Pickup

Structural Features: N/A

SEQUENCE OF EVENTS

On August 16, 2021, at 10:38 AM, the Perris Emergency Command Center (ECC) dispatched a commercial vehicle fire response to an unincorporated area of Temecula, CA. The response consisted of one Battalion Chief (BC), two Riverside County ALS engines (E1, E3) and one CAL FIRE Type 3 engine (E2).

E1, staffed with one Fire Captain (FC1), one Fire Apparatus Engineer (FAE1) and two Firefighter IIs (FF1, FF2), arrived at scene and reported a fully involved waste disposal truck (V1) with no vegetation or other threat. FC1 requested CHP for traffic control, and established the Rancho IC. FAE1 parked E1 in a blocking position, approximately 105 feet behind V1. E2, staffed with one Fire Captain (FC2), two Firefighter Is (FF3, FF4) was parked in a blocking position, approximately 20 feet behind E1. E3, staffed with one Fire Captain (FC3), one Fire Apparatus Engineer (FAE3) and two Firefighter IIs (FF5, FF6), drove past V1 to the nearest fire hydrant and brought a 4 inch supply line back to E1. FF2 deployed a 200-foot 1¾" hose transverse line with a TFT combination nozzle from E1 and FC2 assisted with GPM selection. The BC arrived at scene and parked in a blocking position approximately 25 feet behind E2. The BC obtained a

briefing from FC1 and conducted a 360° size-up of the incident, while FF2 began applying water from the front of E1 to the hopper area of V1.

Within 60 seconds of water application, one of the four roof-mounted compressed natural gas cylinders failed. The resulting blast blew the cylinder cover off V1 and into an adjacent field. The cylinder then flew from its mounting location on top of V1 (estimated speed of travel 450 MPH), approximately 105 feet, striking a glancing blow across the right-side roof of E1, and destroying the VHF radio antenna. FC1 was in the right front seat at the time of impact. The cylinder continued in the air approximately 27 feet, striking the passenger side hose bed of E2, ripping the hose bed wall and cover from the fire body. The cylinder then tumbled mid-air, approximately 538 feet from V1, where it bounced twice in the intersection, before striking a light-duty commercial vehicle (V2) and came to rest in bushes on the south side of Rancho California Road. FC1 attempted to contact the Perris ECC on RVC CMD1 via E1's mobile radio but was unable to get out due to the detached antenna that he was unaware of. FC1 switched to their handheld radio and notified the ECC of Emergency Traffic.

At 10:53 AM, FC1 reported a natural gas explosion with possible injuries, requesting a Division Chief and an ambulance code 3. FC1 further advised significant damage to E2. The BC assumed command from FC1 and performed an accountability check for all personnel assigned to the incident. Fire suppression efforts changed to a defensive operation. All initial response personnel were assessed at the scene, due to the nature of the incident, twelve were transported to local area hospitals for evaluation and released to full duty.

INJURIES/DAMAGES

One civilian was transported to a local hospital with minor injuries.

E1 sustained moderate damage to the cab roof.

E2 sustained major damage to the fire body.

V2 sustained major damage to the roof and body.

SAFETY ISSUES FOR REVIEW

- Locating the driver of the vehicle early in the incident should be a priority. The driver is the best source of information regarding the vehicle's fuel type, emergency procedures and load identification.

- Ensure recognized hazards are communicated effectively on the fire ground.

- Use full Personal Protective Ensemble during active firefighting operations.

- Maintain situational awareness for the duration of the incident.

INCIDENTAL ISSUES/LESSONS LEARNED

- Due to changes in regulations, certain industries are no longer required to display the blue and white CNG decal.

- The markings are now more subtle with terminology such as "This is a clean air vehicle powered by Natural Gas".

- CNG cylinders do not pose a BLEVE threat.

- DO NOT apply water to CNG cylinders as this may prevent the Thermal Pressure Relief Device (TPRD) from activating and releasing pressure within the cylinders.

- Factors such as maintenance/cleaning, design flaw, mechanical failure, and thermal cooling (result of suppression efforts cooling the TPRD) were evaluated and only thermal cooling could be ruled out as causal factor.

- V1 had been in service since 2007 and due to the life expectancy, the CNG tanks were to be replaced in December of 2021.

- Cylinder and tank orientation can vary by vehicle. Identifying the fuel type, location and orientation of the cells, tanks or cylinders and making it known to on scene personnel should be a priority in order to provide situational awareness and assist in development of proper strategies and tactics.

- Proper placement of E1 and E2 minimized the impact to oncoming traffic, deflecting the cylinder's route of travel.

PHOTOS/SITE DIAGRAMS/MAPS

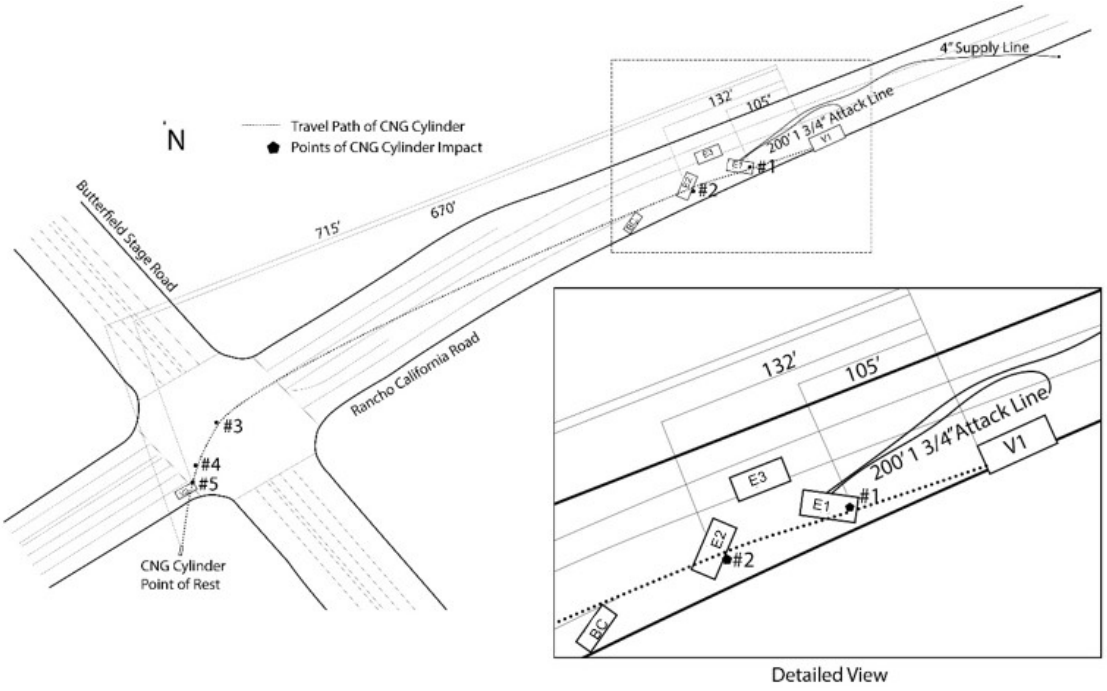

Diagram of incident location

[Click here for the video of the cylinder failure]

View of a similar truck without damage. Holes on the cylinder cover can indicate orientation of cylinders

View of typical roof-mounted cylinder configuration and cylinder cover from similar Trash Truck. Cylinder cover size is 78”L x 85”W and approximately 200lbs. Single cylinder size is 77”L x 16” diameter and 153lbs.

View from cab roof of E1

View of damage to E2 from ground level

View of damage to E2 from above

View of damage to V2

View of cylinder at point of rest

View of cylinder held upright