**FINAL**

**CALIFORNIA DEPT. OF HEALTH SERVICES**
**FACE REPORT: 93CA00901**
**APRIL 5, 1994**

**TO:** Director, National Institute for Occupational Safety and Health

**FROM:** California Fatality Assessment and Control Evaluation (CA/FACE) Program

**SUBJECT:** Welder Dies in Explosion While Working Inside a Tanker Trailer in California

**SUMMARY**

A 37-year-old, white, non-Hispanic, male welder (the victim) died when an explosion occurred in the tanker trailer where he was working. The victim was a self-employed welding contractor who was working for a bulk carrier trucking company. The victim had been asked to repair a bulkhead of a petroleum tanker trailer. According to co-workers, the tanker trailer had been "blown out" (a process used to rid tankers of excess petroleum vapors) several days prior to the incident. It is not known whether the victim had performed any air sampling before beginning work on the day of the incident. An explosion occurred shortly after the victim began welding. The victim's employee, who was outside and on top of the tanker at the time of the incident, left the scene shortly after the incident occurred. Police were the first to arrive and one officer went inside the tanker trailer to check on the victim. He reported that the victim had been killed during the explosion. He was pronounce dead at 2:28 pm. The victim was not brought out of the tanker trailer until approximately 7 hours after the incident

occurred due to the fire department's concern regarding another potential explosion. The CA/FACE investigator concluded that, in order to prevent similar future occurrences, employers should:

- maintain a written Injury and Illness Prevention Program (IIPP).
- initiate a comprehensive enforcement and safety review program for confined space entry procedures.
- expand confined space policies to address hazards due to oxygen deficient, flammable/explosive, or toxic environments.

**INTRODUCTION**

On September 27, 1993, a 37-year-old, white, non-Hispanic, male welder (victim) died after an explosion occurred in the tanker trailer where he was working. The victim was a self-employed welder hired to perform contract work for a bulk carrier trucking company. At the time of the incident the victim was welding a bulkhead inside a petroleum tanker trailer. The CA/FACE investigator was informed of the incident by a California Occupational Safety and Health Administration (Cal/OSHA) safety engineer on September 29, 1993. The CA/FACE Investigator and a National Institute for Occupational Safety and Health (NIOSH) Trauma Investigator went to the scene on November 3, 1993 and conducted an investigation with several members of the management team of the trucking company. Photographs were taken of the

incident site and a copy of the Cal/OSHA Report and the Coroner's Autopsy Report were obtained by the CA/FACE investigator.

The victim worked as a contractor for the trucking company for approximately four years. The trucking company hauled petroleum for all of the major oil companies. According to management officials, the victim was a licensed welder and had American Society of Mechanical Engineers (ASME) certification. Prior to going into business for himself, he had worked as a welder for 13-14 years. He (victim) normally worked alone according to co-workers who worked for the trucking company. However, on the day of the incident, the victim was working with another employee he had brought along to help with this job. No personal protection equipment (PPE) was found on or near the victim after the incident.

**INVESTIGATION**

The employer in this incident was a self-employed welder who had been hired by the trucking company to do welding repair work. The tanker trailer was a multi-compartment type with four compartments of different sizes (see figure 1). There was a leak in an interior wall (bulkhead) which required welding. The tanker trailer was 42.5 feet long and 8 feet wide and had a maximum holding capacity of 9500 gallons. The tanker trailer also had four holes on the top (see exhibit 2A) which were 16 inches in diameter. The tanker

trailer was approximately 4 years and 2 months old. The tanks were all single lined and had voids (see exhibit 1A) between each of the compartments in order to protect the integrity of the materials being transported. If a leak occurred in one of these compartments the material would go into the voids.

On the day of the incident, the victim began work at approximately 12:00 pm. Workers from the trucking company saw the victim and his hired employee go out to the tanker trailer. It is not known if the victim had performed any air sampling tests or if he had "blown out" the tank prior to beginning work. The victim did, however, uncap the top and bottom vents of the void. Management officials from the trucking company stated that the tanker trailer had been "blown out" several days earlier. This procedure involved blowing air into the tanker trailer for a certain period of time in order to remove residue.

Co-workers stated that they heard an explosion come from the tanker trailer at approximately 12:40 pm. The victim's hired employee left the scene shortly after the incident occurred and never returned to the scene. Co-workers did not know this employee so police and other investigators were unable to question him with regard to the incident. Police arrived first on the scene and one officer went inside the tanker trailer to check on the victim. Co-workers stated that the officer did not wear any PPE when entering

the confined space. When the officer returned he informed management that the victim had been thrown head first into the bulkhead by the force of the explosion and was killed. The victim was pronounced dead at 2:28 pm. Fire department paramedics arrived next on the scene followed by a hazardous materials team. The victim was not brought out of the tanker trailer until approximately 7:00 pm.

**CAUSE OF DEATH**

The Coroner's Autopsy Report stated the cause of death as blunt force head trauma.

**RECOMMENDATIONS/DISCUSSION**

**Recommendation #1: Employers and contractors should maintain a written Injury and Illness Prevention Program (IIPP).**

Discussion: The trucking company in this case had a written draft of the IIPP but not did not enforce any of the 7 points at the time of the incident. Under Title 8 of the California Code of Regulations (CCRs) section 3203 it is required that employers maintain a written IIPP which contains the following information:

1. identified persons with responsibility for implementing the program 3203 (a) (1);

2. a system for ensuring that employees comply with safe and healthy work practices 3203 (a) (2);
3. a system for communicating with employees matters relating to occupational safety and health 3203 (a) (3);
4. procedures for identifying and evaluating workplace hazards 3203 (a) (4);
5. procedures for investigating occupational injuries and illnesses 3203 (a) (5);
6. procedures to develop and implement correction of unsafe working conditions based on the severity of the hazard 3203 (a) (6); and
7. a plan for providing training and instruction to employees 3203 (a) (7).

**Recommendation #2: Employers should initiate a comprehensive enforcement and safety review program for confined space entry procedures.**

Discussion: All employees who repair tankers should be aware of the importance of stated company safety procedures, including confined space entry policies. The employer should reinforce employee awareness of the potential hazards associated with confined spaces. The employer did have a written policy that was sufficient to prevent the incident if it had been followed, however, this policy needs to be communicated and enforced. Such a policy should include the

following:

1. Posting of confined space procedures;
2. Regularly scheduled safety policy meetings (bi-weekly or monthly) to reinforce company safety codes;
3. Review process for allowing employees to make recommendations or improving written company safety codes;
4. Employer monitoring of tasks assigned to employees to assure the implementation of safety policies;
5. Emergency rescue procedures;
6. Availability, storage and maintenance of emergency rescue equipment.

**Recommendation #3: Employers should expand confined space policies to address hazards due to oxygen deficient, flammable/explosive, or toxic environments.**

Discussion: This incident emphasizes the need to address all potential hazards in confined spaces. Welding inside tanker trailers should be preceded by a thorough safety inspection to make sure all potential toxic and explosive gases have been removed. There are several options for cleaning tanks available. One example involves filling the tanker trailer with water and then draining it to remove residual matter. The need to inform employees about the hazards of confined spaces in all respects should be a priority of the employer.

Information concerning confined space entry procedures is available from various NIOSH documents including:

1) "Criteria for a Recommended Standard ... Working in Confined Spaces" - DHEW (NIOSH) Publication No. 80-106, and
2) "A Guide to Safety in Confined Spaces" - DHHS (NIOSH) Publication No. 87-113.

These publications are available from: Publications Dissemination DSDTT, NIOSH, 4676 Columbia Parkway, Cincinnati, Ohio 45226. Phone: (513) 841-4287