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TO: Director, National Institute for Occupational Safety and Health

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

SUBJECT: Insulation plant operator electrocuted while changing an electrode in California.

SUMMARY

California FACE Report #92CA005
April 15, 1993

A 26-year-old Hispanic male plant operator (victim) was electrocuted while changing an electrode on a smelter as a routine part of his job, overseeing the operations in the process of making insulation fibers for high temperature industrial furnaces. The procedure used for changing electrodes requires at least two employees, the first employee operated the power switch, while the second employee changed the electrode. The California FACE investigator concluded that, in order to prevent future similar occurrences, employers should:

- install lockout/tagout procedures for all electrical equipment which employees work with or around.
- have personnel trained in First Aid and Cardiopulmonary Resuscitation (CPR).
- have well maintained personal protective equipment (PPE) for all employees to use when needed.

INTRODUCTION

On May 6, 1992, a 26-year-old Hispanic male operator was electrocuted while changing an electrode on a smelter used in the process of making insulation for industrial furnaces. On May 7, 1992, the California FACE investigator was informed of the incident by the California Occupational Safety & Health Administration's (Cal/OSHA) office. The California FACE investigator went to the location and conducted an investigation with the company president, the safety officer, several co-workers, the Cal/OSHA investigator, and the company insurance representative. The California FACE investigator took pictures of the incident site.

The employer was an insulation manufacturer who had been in operation at this location for 9 months. There were 48 employees working with the company. The company operated 24 hours a day, 7 days a week. The victim was working the night shift when the incident occurred (sometime between 6:30 pm - 7:00 pm). The victim had worked for the company for eight months. He had received on the job safety training. There was no written safety plan at the worksite, however, the job the victim was doing at the time of the incident was routine and one in which he had received on the job safety training.

INVESTIGATION

On the day of the incident, the victim and three of his co-workers were in the process of changing a malfunctioning electrode. They were all working on the third level of a large platform. The smelter located on the third level consisted of a large vat ,two electrodes, a volt meter with power switch, and a power box (220 volts 3 phase Alternating Current). The electrodes were located opposite each other, inside the vat. During operation a current is generated between them. The smelter is cooled by water which circulates between the two pieces of metal. The power switch, located next to the voltage meter, was used to energize the power control box which supplied the electrical current to the electrodes. Operation of the smelter required that the volt meter be monitored carefully to ensure that proper voltage was supplied to the electrodes. The power box was the source of electricity for all of the electrical equipment.

The victim was wearing leather gloves and steel toed work boots at the time of the incident. The gloves were wet at the time of the incident, and were later described as often being wet when used by co-workers. The victim's shoes had worn through and had exposed metal near the toes.

It was observed by the California FACE investigator to be very noisy and warm on the third level of the platform because of the production processes taking place. The employees had to yell in order to hear one another. They also stated that it was necessary to take breaks often because of the warm temperatures. The production of the insulation fibers required that temperatures up to 3,800 F be used. The distance between where the victim was standing, while changing the electrode, and the power switch was approximately 10 feet. Two co-workers located next to the smelter, approximately 2 feet and 4 feet from the victim stated that they were facing away from the victim when the incident occurred. They heard the victim scream and turned to see him lying on his back and shaking. The co-worker who was stationed at the power panel stated that the victim had told him to energize the power just before the incident occurred.

The supervisor (safety officer) was immediately informed after the incident occurred, and the victim was carried from the third floor to the ground level and CPR was administered by his supervisor. The supervisor had not been trained in first aid by a nationally recognized organization. One of the victim's coworkers also called 911 while the supervisor was administering CPR. The victim was taken to the ground level after the incident as one of his co-workers' thought the victim had suffered a heat stroke or a convulsion. The victim was transported to the hospital after paramedics arrived and was pronounced dead at 7:36 pm that evening.

CAUSE OF DEATH

The Coroner's Autopsy Report stated the cause of death as electrocution with heart asystole and contusions on the right arm and legs.

RECOMMENDATION/DISCUSSION

Recommendation #1: Employers should install lockout/tagout procedures for all electrical equipment which employees work with or around.

Discussion: Lockout/tagout procedures could have made the difference between life and death in this incident. One fundamental reason for having a lockout/tagout procedure is that there would only be one person, one lock, and one key involved in any electrical systems operation. Under Title 8 of the California Code of Regulations (CCRs) section 3314 (F) (2) employers must develop energy control procedures for shutting down, isolating, blocking and securing machines or equipment to control hazardous energy. Development of procedural steps for the

placement, removal and transfer of lockout devices or tagout devices and the other energy control devices should be implemented by employers.

Recommendation #2: Employers should have personnel trained in first aid and CPR.

Discussion: The victim in this incident should have had CPR administered immediately after the incident occurred, and he should not first have been taken down three flights of stairs. The employer should have someone at the worksite trained in CPR and First Aid. Under Title 8 of the CCRs section 3400 (b) employers must have personnel trained in First Aid and CPR by an organization such as the American Red Cross.

Recommendation #3: Employers should have well maintained personal protective equipment for all employees to use when needed.

Discussion: The victim in this incident was wearing wet gloves at the time of the incident, and also wore steel toed work shoes with the steel exposed on the tips. Both of these pieces of damaged PPE could have acted as conduits for the electricity in this incident. Title 8 section 340 (a) (4) of the CCRs requires employers to provide adequate (undamaged) PPE for employees to use.

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