Drill Operator Electrocuted After Contacting A 7,200 Volt Overhead Power Line While Raising A Drill Rig Boom.

April 19, 1994

SUMMARY

On October 6, 1993, a 27 year-old male drill rig operator was electrocuted when a radio antenna on top of his drill rig boom contacted a 7,200 volt overhead power line. The incident occurred when the victim and two helpers were preparing to drill a water well in the front yard of a private home. As the victim stood at the controls and raised the boom, the antenna contacted the powerline, energizing the drill rig and electrocuting the victim. NJDOH FACE investigators concluded that, in order to prevent similar incidents in the future, the following safety guidelines should be followed:

- ***A minimum clearance of 10 feet must be maintained between equipment and energized power lines.***
- ***Employers should contact the utility company for assistance and advice when circumstances require operating less than 10 feet from power lines.***
- ***Drilling equipment should be posted with signs warning of contact with overhead power lines.***
- ***Employers should develop a clear system of communication between spotters and drill rig operators.***
- ***Antennas or other unnecessary extensions should not be placed on drill towers.***

INTRODUCTION

On October 6, 1993, the county medical examiner's office notified NJDOH FACE personnel of a work-related electrocution. Due to the sensitive nature of the incident (the victim was the son of the company owner), the FACE data collection forms were mailed to the company for completion. The site visit was also deferred until March 2, 1994. Most of the information for this incident was taken from the OSHA investigation file, written witness statements, and the police and medical examiner's reports.

The employer is a water well drilling contractor who has been in business for 30 years. The company employed 13 workers at the time of the incident. The owner states that the company has a safety officer who oversees all operations and that the driller is the designated drill site safety officer. The victim was a 27 year-old male well driller. The company owner said he had attended many seminars and courses and was very knowledgeable in well drilling.

INVESTIGATION

The incident occurred alongside a two-lane roadway leading into a rural residential area. A homeowner in the area had contracted with the company to drill a water well for the house. The site was a small single-story private residence with a front lawn that faced the street. Paralleling the street was a series of overhead service and power lines with a three phase, 7,200 volt primary system mounted side by side at the top of the poles. The area around the house was heavily wooded, with a large tree near the corner of the front yard. The well was to be drilled with a drill rig mounted on a truck. Mounted on top of the drill rig tower was a citizen's band (CB) radio antenna used for communicating with the company's main office.

The day of the incident was a clear Tuesday afternoon. The drilling crew consisted of three men, a driller and two helpers. The crew arrived at the worksite at about 3 p.m. and planned to position the rig on the front lawn of the house for use the following day. The victim (who was supervising the operation) directed the driver of the truck to back over a curb onto the front lawn. The victim then started to raise the rig tower but decided that it was too close to the overhead wires and had the driver back the rig an additional 8 feet. Because of the relatively small size of the front lawn and the large nearby tree, the rig was set up on the lawn diagonally to the house and the power lines. At about 3:20 p.m., the victim stood operating the hydraulic controls at the back of the truck while one helper stood at the front to spot the tower as it was raised. The second helper stood at the rear of the truck. As the tower rose, the spotter saw the danger and started to yell a warning but was apparently not heard over the noise of the drill rig. The antenna at the end of the tower contacted the 7,200 volt primary wire and energized the drill rig controls. The electrical energy entered the victim through his left hand and exited through his left foot. The victim yelled and was stuck to the controls for a few seconds before falling unconscious to the ground.

The contact with the wire was apparently broken when the radio antenna fell away due to the high voltage. The police and rescue squad were dispatched and arrived on scene to find the victim unresponsive. Cardio-pulmonary resuscitation (CPR) was in progress as paramedics arrived on site to give advanced life support. The victim was transported to the area hospital emergency room where he was pronounced dead at 4:20 p.m.

CAUSE OF DEATH

The county medical examiner determined the cause of death to be due to electrocution. Electrical burns were noted on the victim's left hand and left foot.

RECOMMENDATIONS AND DISCUSSION

Recommendation #1: A minimum clearance of 10 feet must be maintained between equipment and energized power lines.

Discussion: Apparently the three crewmen were aware of the overhead wires but thought that the rig was clear of them. However, the two helpers were not aware of the requirement to keep a 10 foot minimum distance from powerlines. This is addressed in the federal OSHA standard 29 CFR 1926.550(a)(15) which requires a minimum clearance of 10 feet from power lines up to 50 kilovolts and greater distances

for lines with greater voltages. In addition, the NJ High-Voltage Proximity Act (N.J.S.A. 34:6-47.1) requires a minimum clearance of 6 feet from power lines exceeding 750 volts. In cases where safe clearance may be difficult to maintain, we recommend changing the work practices or equipment to keep the proper clearance. Possible examples would be to drill the well in another area or use a drill with a shorter boom.

Recommendation #2: Employers should contact the utility company for assistance and advice when circumstances require operating less than 10 feet from power lines.

Discussion: In situations where it may be difficult or impossible to maintain the minimum 10 foot clearance, it is recommended that the employer contact the local utility company for advice and assistance. The utility company may be able to de-energize the lines or isolate them using electrically insulating hoses and blankets. In all situations where heavy equipment may be in close proximity with power lines, the utility company should be contacted for their policy on construction work near their lines.

Recommendation #3: Drilling equipment should be posted with signs warning of contact with overhead power lines.

Discussion: The drill rig did not have signs warning against contact with overhead power lines. As a reminder to employees, drilling equipment should be posted with electrical hazard warning signs. This is also a requirement of the NJ High-Voltage Proximity Act which requires warning signs on equipment that is capable of coming into contact with high-voltage power lines. It is recommended that the boom height should also be indicated on the sign.

Recommendation #4: Employers should develop a clear system of communication between spotters and drill rig operators.

Discussion: In this incident the employer used a spotter who saw the danger and tried to give a warning but was apparently not heard or seen by the drill rig operator. To prevent similar incidents, we recommend that employers develop a clear system of communication between spotters and drill rig operators. This system should include clear visual and verbal signals to notify the rig operator when he is approaching within 10 feet of power lines. Providing the spotter with an emergency warning system (such as a air horn) may also be useful in noisy environments.

Recommendation #5: Antennas or other unnecessary extensions should not be placed on drill towers.

Discussion: Mounted on the drill rig was a thin silver wire antenna that was difficult to see from the ground. The FACE Project recommends against mounting any unnecessary extensions on drill rig

towers. Necessary extensions should be brightly painted and large enough to be easily seen from the ground.

ATTACHMENTS

NIOSH ALERT: Request for Assistance in Preventing Electrocutions From Contact Between Cranes and Power Lines. Department of Health and Human Services (DHHS-NIOSH) Publication # 85-111, July 1985. NIOSH Publications Dissemination, Cincinnati OH (513) 533-8287.

REFERENCES

1. Code of Federal Regulations 29 CFR 1926, 1991 edition. U.S. Government Printing Office, Office of the Federal Register, Washington DC.
2. New Jersey Statutes Annotated 34:6-47.1 et seq., amended May 20, 1987. Reprinted by the NJ Department of Labor, Division of Workplace Standards, Trenton NJ. pp 1-4

It is important that employers obtain correct information about OSHA regulations and methods of ensuring safe working conditions. Because it is often difficult for a small business to obtain this type of information, the following sources may be helpful:

U.S. Department of Labor, OSHA

On request, OSHA will provide information on safety standards and requirements for fall protection. OSHA has several offices in New Jersey which cover the following areas:

Hunterdon, Union, Middlesex, Warren and Somerset Counties.....(908) 750-3270
Essex, Sussex, Hudson and Morris Counties.....(201) 263-1003
Bergen and Passaic Counties.....(201) 288-1700
Atlantic, Gloucester, Burlington, Mercer, Camden, Monmouth,
Cape May, Ocean, Cumberland and Salem Counties.....(609) 757-5181

NJDOL OSHA Consultative Services

The New Jersey Department of Labor OSHA Consultative Service will provide free advice for business owners on methods of improving health and safety in the workplace and complying to OSHA standards. Their telephone number is (609) 292-3922.

New Jersey State Safety Council

The NJ Safety Council provides a variety of courses on work-related safety. There is a charge for the seminars. Their address and telephone number is:

NJ State Safety Council
6 Commerce Drive
Cranford, New Jersey 07016
Telephone (908) 272-7712

Other Sources

Building trade organizations and labor unions are a good source of information on suppliers of safety equipment and training. Suppliers of roofing and building materials may be able to refer roofing contractors to suppliers of fall protection equipment.

To contact New Jersey State FACE program personnel regarding State-based FACE reports, please use information listed on the Contact Sheet on the NIOSH FACE web site. Please contact In-house FACE program personnel regarding In-house FACE reports and to gain assistance when State-FACE program personnel cannot be reached.