NIOSH Comments to DOL

COMMENTS OF THE
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
ON THE
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION PROPOSED RULE:
ELECTRICAL SAFETY-RELATED WORK PRACTICES

29 CFR PART 1910

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Centers for Disease Control
National Institute for Occupational Safety and Health

February 29, 1988

The National Institute for Occupational Safety and Health (NIOSH) has reviewed the proposed rule on Electrical Safety-Related Work Practices, Federal Register, Vol. 52, No. 229, Page 45530, Docket S-106. NIOSH believes that the proposed rule accomplishes the Occupational Safety and Health Administration's (OSHA's) goal of promoting uniformity and reducing redundancy among the general industry standards. NIOSH also believes that the proposed rule provides additional needed protection for the Nation's workers by including standards for safe work practices on or near electrical equipment, in addition to standards for the electrical equipment itself. NIOSH would favor the promulgation of a rule protecting the construction industry also, but concedes that OSHA has stated sound reasons for limiting the scope of this standard.

In response to OSHA's request for current data describing electrical fatalities, we have attached 120 reports (Attachments I-CXX) of fatal electrical accidents from the Fatal Accident Circumstances and Epidemiology (FACE) project for the years 1982-1987. These reports describe the circumstances of electrocution fatalities on investigated cases. These reports have been divided into three groups: construction industry, 14 reports; qualified electrical personnel, 38 reports; and, all others, 68 reports. The attached FACE reports can also be arranged by job title as shown in Table 1. This presentation of these (132 in Table 1) fatalities is not meant to be taken as representative of the national frequency of fatalities in these job titles. This information is provided so that OSHA and others can examine the circumstances leading to those fatalities.

NIOSH has also examined data from the National Traumatic Occupational Fatality (NTOF) data base. This data base provides data on electrocution fatalities by major industry for the years 1980 through 1984. For this time period, the NTOF data base contains information on a total of 2,823 electrical fatalities. These data are based on a search of a data field. They should be considered only as an estimate of fatal electrocutions since coding of that field may have varied depending on the person entering the information. The results of this search are contained in Attachment CXXI. Subject to the search and sampling limitations, the NTOF data is suitable to characterize the frequency and occupational distribution of electrical fatalities. By searching the NTOF data base (Table 2), NIOSH was able to identify 553 electrocution fatalities that occurred in 1984. In order to be counted among the 553 deaths, the death certificates for each case had to meet the following criteria:

1. International classification of disease code 800-999.
2. The box labeled "Injury at Work" had to be marked "yes."
3. The decedent had to be more than 15 years old.

The NTOF data indicate an annual fatality rate of over 500 due to electrocutions, approximately twice the estimate (243) that OSHA used for 1987. Table 2 provides the frequency of electrical fatalities for the years 1980-1984.

It must be remembered that neither the data from the NIOSH FACE program nor the NTOF data base provide exact information on the frequency of disabling and other nonfatal injuries.

NIOSH suggests that the title for Table S-5, "Alternating Current-Approach Distances," be changed to reflect the fact that this table is meant to apply only to qualified persons with appropriate equipment. We would suggest that the table be titled "Alternating Current; Approach Distances; Qualified Persons Only" with a footnote reflecting the distance for unqualified persons. It is an unfortunate fact of life that even when rules are consolidated and simplified, some users do not read the entire text. For this reason we would suggest that this clarifying limitation appear on the title to Table S-5.

Enclosures and/or attachments that are not included are available free of charge from the NIOSH Docket Office (513/533-8450).

Table 1
Number of Electrical-Related Deaths Subject to OSHA Regulation by Job Title, Investigated in the Fatal Accident Circumstances Epidemiology (FACE) Program from 1982-1987

Job Title of the Victim*	Number of Fatalities
Laborer	28
Lineman	20
Electrician	16
Painter	13
Truck Driver	7
Machine Operator	6
Groundman	6
Maintenance Man	5
Technician	5
Crew Leader/Foreman	4
Construction Worker	4
Iron Worker	3
Carpenter	3
Bill Poster	3
Brick Layer	3
Restaurant Worker	2
Welders	2
Firemen	2
TOTAL	132

*Government employees, municipal workers and farm workers are not covered by OSHA regulation and, therefore, are not included in this table. However, NIOSH has investigated 15 electrical fatalities that have occurred among workers in these occupational groups, including 4 painters who were government employees. These reports are also attached.

Table 2
Estimate of Electrocution Fatalities from the National Traumatic Occupational Fatality (NTOF) Data Base for 1980-1984 by Major Industry

INDCODE2	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
AGRICULTURE, FOREST, FISH	310	11.0	310	11.0
MINING	139	4.9	449	15.9
CONSTRUCTION	405	14.3	854	30.3
MANUFACTURING	230	8.1	1084	38.4
TRANSPORTATION, COMMUNICATION, ELECTRIC, GAS AND SANITARY SERVICES	468	16.6	1552	55.0
WHOLESALE TRADE	8	0.3	1560	55.3
RETAIL TRADE	48	1.7	1608	57.0
FINANCE, INSURANCE	16	0.6	1624	57.5
SERVICES	202	7.2	1826	64.7
PUBLIC ADMINISTRATION	77	2.7	1903	67.4
NOT CLASSIFIED	920	32.6	2823	100.0

Attachments I-CXX (FACE Reports)

I. Summary report 82-003--Electrocution of a Truck Driver
II. Summary report 83-009--Electrocution of a Painter
III. Summary report 84-017--Electrocution in a Fast Food Restaurant
IV. Summary report 84-019--Mechanic Dies in Elevator Machine Room
V. 87-16-II--31-year-old Fire Chief Electrocuted in North Carolina
VI. 87-15-II--19-year-old Laborer Electrocuted in Kentucky
VII. 87-14-II--Stagehand Electrocuted in Tennessee
VIII. 87-12-II--Four Members of a Maintenance Crew Electrocuted in California at a Major Naval Installation
IX. 87-11-II--Laborer Electrocuted in Ohio
X: 87-10-II--Pump Operator/Truck Driver Electrocuted in Maryland
XI. 87-8-II--Laborer Electrocuted in North Carolina
XII. 87-7-II--34-year-old Machine Operator Electrocuted in Ohio
XIII. 87-3-II--Mechanic Electrocuted in Tennessee
XIV. 87-2-II--36-year-old Laborer Electrocuted in North Carolina
XV. 85-21-I--Billboard Worker Dies when Metal Ladder Contacts 7200 Volt Power Line in Kentucky
XVI. 85-19-I--Truck Driver Electrocuted While Unloading Concrete Blocks in North Carolina
XVII. 85-18-I--Worker Electrocuted During Installation of 7200 Volt Power Line in North Carolina
XVIII. 85-17-I--City Foreman Electrocuted and 3 Crew Workers Critically Injured While Erecting a Traffic Control Pole
XIX. 85-16-I--General Foreman Electrocuted While Testing Circuits in North Carolina
XX. 85-11-I--One Electrocuted, One Burned, One Stunned in Cannery Incident
XXI. 85-7-I--Two Workers Electrocuted by 23,000 Volt Power Line Erecting a Steel Support Structure
XXII. 85-6-I--19-year-old Electrocuted by a 440 Volt Trolley Wire
XXIII. 85-1-I--Worker Electrocuted at Power Substation in Howesville, West Virginia
XXIV. 85-3-I--Transportation Employee Electrocuted by Overhead Powerline
XXV. 86-25-I--34-year-old Superintendent of Manufacturing Electrocuted in North Carolina
XXVI. 86-24-I--37-year-old Scale Technician Electrocuted in Indiana
XXVII. 86-22-I--21-year-old Electrocuted while Moving Grain Auger in Indiana
XXVIII. 86-17-I--Truck Driver Electrocuted in Georgia
XXIX. 86-14-I--21-year-old Technician Electrocuted in Indiana
XXX. 86-7-I--Two Electrocuted on Farm in Georgia
XXXI. 86-6-I--Three Electrocuted on Farm in Georgia
XXXII. 86-5-I--School Maintenance Worker Electrocuted in Ohio
XXXIII. 85-46-I--Soldier Electrocuted while Installing Communication Wire in Georgia

XXXIV. 85-43-I--County Worker Dies in Tennessee
XXXV. 85-41-I--Mobile Home Assembly Line Worker is Electrocuted in Ohio
XXXVI. 85-39-I--Rubber Worker Electrocuted After Striking Bank of Electrical Transformers with a Piece of Steel He was Carrying
XXXVII. 85-38-I--Production Welder Electrocuted in Ohio
XXXVIII. 85-37-I--Brick Worker Electrocuted in Georgia
XXXIX. 85-35-I--24-year-old Textile Worker Electrocuted in North Carolina
XL. 85-34-I--Billboard Worker Dies when Scaffold Makes Contact With Power Line in Tennessee
XLI. 85-30-I--Sign Painter, Working Off of a Truck Mounted Platform Ladder, Electrocuted in Ohio
XLII. 85-28-I--29-year-old Welder Electrocuted
XLIII. 85-24-I--Video Store Owner Electrocuted
XLIV. 85-22-I--Firefighter Electrocuted While Rappelling Down Building in West Virginia
XLV. 86-51-I--41-year-old Truck Driver Electrocuted While Unloading Concrete Blocks in Kentucky
XLVI. 86-49-II--National Guardsman Electrocuted in West Virginia
XLVII. 86-45-I--29-year-old Electrocuted at Ice Cream Plant in Tennessee
XLVIII. 86-43-I--25-year-old Restaurant Manager Electrocuted in North Carolina
XLIX. 86-39-I--Two Laborers Electrocuted in Tennessee
L. 86-35-I--34-year-old Maintenance Worker Electrocuted in Ohio
LI. 86-32-I--General Laborer Electrocuted in North Carolina
LII. 86-30-I--County Maintenance Worker Electrocuted in Ohio
LIII. 86-29-I--29-year-old Mechanic Electrocuted in Indiana
LIV. 86-27-I--Part-time Laborer Electrocuted in Ohio
LV. 87-54-II--Truck Driver Electrocuted in North Carolina
LVI. 87-52-II--Driller Electrocuted in Virginia
LVII. 87-48-II--Two Workers (a Carpenter and a Laborer) Electrocuted in South Carolina
LVIII. 87-40-II--Painter Electrocuted in Virginia
LIX. 87-37-II--Truck Driver Electrocuted in North Carolina
LX. 87-36-II--41-year-old Truck Driver Electrocuted After Unloading Bricks in Maryland
LXI. 87-32-II--27-year-old Painter Electrocuted in Georgia
LXII. 87-28-II--Two Painters Electrocuted in Ohio
LXIII. 87-22-II--Laborer Electrocuted in Ohio
LXIV. 87-18-II--Worker Electrocuted in South Carolina
LXV. 87-65-II--Tree Trimmer Electrocuted in Indiana
LXVI. 87-62-II--Laborer Electrocuted in Indiana
LXVII. 87-61-II--Laborer Electrocuted in Virginia
LXVIII. 87-60-II--Maintenance Manager Dies in North Carolina
LXIX. Summary Report 83-008--Electrocution of an Electrician
LXX. 85-8-I--Workman Electrocuted When Crane Load Line Contacts 7200 Volt Power Line
LXXI. 85-14-I--Construction Worker Electrocuted When Crane Boom Contacts 13,800 Volt Power Line in Arizona

LXXII. 85-15-I--Worker Electrocuted While Guiding a Load Suspended from a Crane in Pennsylvania
LXXIII. 85-29-I--Two Construction Workers Electrocuted When Crane Contacts One Phase of a 13.4 KV System in Tennessee
LXXIV. 85-32-I--20-year-old Electrocuted when Backhoe Breaks 7800 Volt Power Line at Construction Site in Kentucky
LXXV. 86-11-I--Two Electrical Contractor Employees Electrocuted in Kentucky
LXXVI. 86-28-I--24-year-old Mobile Home Installer Electrocuted in Indiana
LXXVII. 86-36-I--22-year-old Construction Worker Electrocuted in Kentucky
LXXVIII. 87-4-II--Apprentice Sheetmetal Worker Electrocuted in Tennessee
LXXIX. 87-9-II--Laborer Electrocuted in Maryland
LXXX. 87-13-II--Laborer Electrocuted in Tennessee
LXXXI. 87-19-II--20-year-old Bricklayer Electrocuted in Maryland
LXXXII. 87-41-II--56-year-old Pipe Layer Electrocuted in North Carolina
LXXXIII. 87-44-II--Construction Worker Electrocuted in Maryland
LXXXIV. 85-4-I--Crew Foreman Dies Due to Electric Arc from Powerline
LXXXV. 85-25-I--Contract Worker Electrocuted While Repairing 13.2KV Power Line in North Carolina
LXXXVI. 85-36-I--22-year-old Electrical Worker Killed at a North Carolina Construction Site
LXXXVII. 85-42-I--Utility Company Employee Electrocuted in California While Drilling Under a Road
LXXXVIII. 85-48-I--Electrician Dies in North Carolina
LXXXIX. 86-1-I--Electronics Plant Employee Electrocuted in North Carolina
XC. 86-2-I--A Journeyman Electrician Electrocuted in North Carolina
XCI. 86-3-I--Electric Company Serviceman Electrocuted in Indiana
XCII. 86-4-I--Electric Company Employee Electrocuted in Ohio
XCIII. 86-8-I--18-year-old Electrician's Apprentice Electrocuted in North Carolina
XCIV. 86-9-I--Lineman Electrocuted in North Carolina
XCV. 86-18-I--A Telephone Contracting Company Groundman Electrocuted in North Carolina
XCVI. 86-20-I--23-year-old Lineman Electrocuted in North Carolina
XCVII. 86-21-I--Lineman Electrocuted in North Carolina
XCVIII. 86-26-I--50-year-old Utility Worker Electrocuted in Ohio
IC. 86-31-I--23-year-old Groundman Electrocuted in North Carolina
C. 86-33-I--Electrician Electrocuted in South Carolina
CI. 86-40-I--37-year-old lineman Electrocuted in Georgia
CII. 86-42-I--31-year-old Lineman Electrocuted in North Carolina
CIII. 86-41-I--52-year-old Electrical Technician Electrocuted in Indiana
CIV. 86-44-II--Electrician Dies in North Carolina
CV. 86-46-I--22-year-old Groundman Electrocuted in Tennessee
CVI. 86-47-I--Electrician Electrocuted in North Carolina
CVII. 86-50-I--40-year-old Lineman Technician Electrocuted in North Carolina

CVIII. 86-52-I--Electrician Dies in Ohio
CVIX. 86-53-II--52-year-old First Class Electrician Electrocuted in Indiana
CX. 86-55-I--Lineman Electrocuted in Maryland
CXI. 87-34-II--19-year-old Electrician's Apprentice Electrocuted in Georgia
CXII. 87-35-II--Lineman Electrocuted in Maryland
CXIII. 87-38-II--Lineman Electrocuted in North Carolina
CXIV. 87-42-II--Apprentice Lineman Electrocuted in Virginia
CXV. 87-43-II--32-year-old Electrician Electrocuted in Georgia
CXVI. 87-53-II--An 18-year-old Groundman Electrocuted in North Carolina
CXVII. 87-55-II--Electrician Electrocuted in North Carolina
CXVIII. 87-58-II--19-year old Electrician's Apprentice Electrocuted in Maryland
CXVIX. 87-63-II--30-year-old Electrician Electrocuted in Maryland
CXX. 87-68-II--Electrician Electrocuted in Indiana

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15. Supplementary Notes

16. Abstract (Limit: 200 words) This testimony presented the background for the position of NIOSH regarding electrical safety related work practices. NIOSH has reviewed 120 reports of fatal electrical accidents from the Fatal Accident Circumstances and Epidemiology (FACE) project for the years 1982 through 1987. The reports can be divided into three groups: construction industry (14), qualified electrical personnel (38), and all others (68 reports). NIOSH has also examined data from the National Traumatic Occupational Fatality (NTOF) data base which provides data on electrocution fatalities by major industry for the years 1980 through 1984. By searching the NTOF data base, NIOSH identified 553 electrocution fatalities that occurred in 1984. The NTOF data indicate an annual fatality rate of over 500 due to electrocutions, which was about twice the estimate (243) that OSHA used for 1987. NIOSH suggests that the title for Table S-5 should include the phrase "Qualified Persons Only" and that a footnote should indicate the approach distance for unqualified persons. A list of the 120 FACE reports was appended.

17. Document Analysis a. Descriptors

b. Identifiers/Open-Ended Terms NIOSH-Publication, NIOSH-Author, NIOSH-Testimony, Lemen-R, Electrical-shock, Electrical-workers, Electrical-hazards, Safety-practices, Work-practices

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