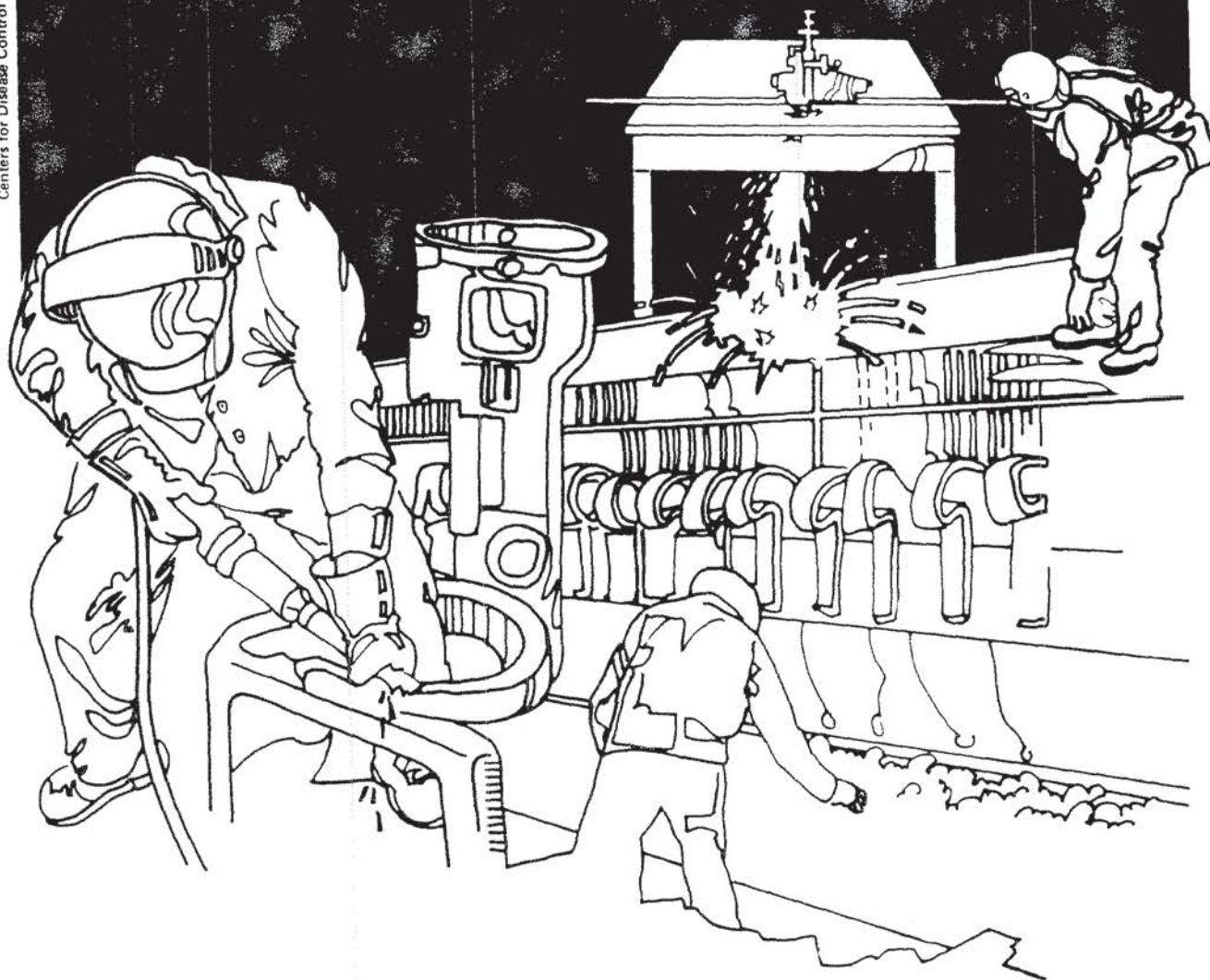


# NIOSH



## Health Hazard Evaluation Report

HETA 31-021-850  
PACIFIC POWER AND LIGHT COMPANY  
RAWLINS, WYOMING

## PREFACE

The Hazard Evaluations and Technical Assistance Branch of NIOSH conducts field investigations of possible health hazards in the workplace. These investigations are conducted under the authority of Section 20(a)(6) of the Occupational Safety and Health Act of 1970, 29 U.S.C. 669(a)(6) which authorizes the Secretary of Health and Human Services, following a written request from any employer or authorized representative of employees, to determine whether any substance normally found in the place of employment has potentially toxic effects in such concentrations as used or found.

The Hazard Evaluations and Technical Assistance Branch also provides, upon request, medical, nursing, and industrial hygiene technical and consultative assistance (TA) to Federal, state, and local agencies; labor; industry and other groups or individuals to control occupational health hazards and to prevent related trauma and disease.

Mention of company names or products does not constitute endorsement by the National Institute for Occupational Safety and Health.

HETA 81-021-850  
April 1981  
Pacific Power and Light Company  
Rawlins, Wyoming

NIOSH INVESTIGATOR:  
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## I. SUMMARY

On October 6, 1980, the National Institute for Occupational Safety and Health (NIOSH), received a request from Local 127, Utility Workers Union of America, AFL-CIO, for a health hazard evaluation at Pacific Power and Light Company, Rawlins Service Center, Rawlins, Wyoming. The request stated that employees were exposed to 1,1,1-trichloroethane while cleaning spliced cables in confined spaces. On January 27, 1981, environmental measurements were made to determine exposures to 1,1,1-trichloroethane. Ten employees were interviewed by NIOSH industrial hygienists to evaluate symptoms possibly related to their work.

Results of linemen's personal breathing zone and area environmental samples for 1,1,1-trichloroethane ranged from 4 to 610 mg/M<sup>3</sup> (milligrams of substance per cubic meter of air). NIOSH Criteria recommends 1910 mg/M<sup>3</sup> ceiling limit, 15 minute exposure. The OSHA standard is 1900 mg/M<sup>3</sup> for an 8-hour time-weighted average exposure (TWA).

The ten workers interviewed reported no health problems at that time. However, 60% of the workers detailed symptoms of headache, eye irritation, nausea and dizziness associated with 1,1,1-trichloroethane exposure during the summer when larger quantities of the solvent are used.

Based on the results of this survey, NIOSH concludes that a health hazard of 1,1,1-trichloroethane exposure did not exist at the time of this study. However a hazard may exist periodically when large quantities of solvent are used. Recommendations to aid in providing a safe and healthful working environment are presented in Section VII of this report.

KEYWORDS: SIC 4911. 1,1,1-trichloroethane (Little Wonder)

## II. INTRODUCTION

On October 6, 1980, NIOSH received a request from Local 127, Utility Workers Union of America, AFL-CIO, Casper, Wyoming to determine if there was a health hazard at Pacific Power and Light Company, Rawlins Service Center, Rawlins, Wyoming from exposure to 1,1,1-trichloroethane while cleaning spliced cables in confined spaces. An environmental survey was conducted on January 27, 1981 to evaluate exposure to 1,1,1-trichloroethane.

Interim Report #1 was distributed on February 27, 1981, reporting the findings to date and the future actions to be taken.

## III. BACKGROUND

Underground electric cable is spliced in a semi-confined space, out of doors, in trenches about 2-1/2' deep. After the cable is spliced, workers clean the cable by spraying 1,1,1-trichloroethane from an aerosol can. A plastic sleeve to prevent moisture from decomposing the cable, is then placed over the splice and heated with acetylene torch.

## IV. ENVIRONMENTAL DESIGN AND METHODS

Personal breathing zone and general area samples to measure 1,1,1-trichloroethane were collected on linemen performing routine functions via organic vapor charcoal tubes using vacuum pumps operated at 100 and 200cc per minute and were analyzed by NIOSH method P&CAM No. 127.

Ten employees were interviewed by NIOSH industrial hygienists to elicit symptomatology possible related to health problems arising from their work environments.

## V. EVALUATION CRITERIA

### A. Environmental

Criteria used to assess work room concentrations of air contaminants: (1) NIOSH criteria document which recommends 1910 mg/M<sup>3</sup> - ceiling limit, 15 minute exposure and (2) Occupational Safety and Health Administration (OSHA) standards (29 CFR 1910), January 1978.

Permissible Exposure Limits  
8-Hour Time-Weighted (OSHA)  
Exposure Basis (mg/M<sup>3</sup>)

1,1,1-trichloroethane (methyl chloroform) 1900

mg/M<sup>3</sup> = milligrams of substance per cubic meter of air

Occupational health standards are established at levels designed to protect individuals occupationally exposed to toxic substances on an 8-hour per day, 40-hour per week basis over a normal working lifetime.

## B. Toxicological

1,1,1-trichloroethane - is a colorless, nonflammable, aromatic liquid with an odor similar to chloroform. It closely resembles carbon tetrachloride in its solvent action and evaporation rate; however, it is much less toxic. The primary routes of absorption are from inhalation of the vapor and direct skin contact. Exposure to 1,1,1-trichloroethane liquid and vapor is irritating to the eyes and repeated skin contact may produce a dry, scaly, and fissured dermatitis, due to the solvent's defatting properties. In high concentrations, the solvent acts as a narcotic and depresses the central nervous system (CNS). Acute exposure symptoms include dizziness, incoordination, drowsiness, increased reaction time, unconsciousness, and in some instances death.  
1,2

## VI. RESULTS AND DISCUSSION

Results of the environmental samples collected for 1,1,1-trichloroethane are shown in Table I. The levels ranged from 4 to 610 mg/M<sup>3</sup>. All air levels were well below the recommended environmental criteria, and as such, they are not considered to present a health hazard.

The ten workers interviewed voiced no health problems on the day of the survey. However, 60% of the workers detailed symptoms of headache, eye irritation, nausea and dizziness from 1,1,1-trichloroethane (Little Wonder) during the summer when larger quantities of the solvent are used.

Based on the environmental sampling results, employee interviews and available toxicological information, NIOSH concludes that a health hazard did not exist at the time of this survey on January 27, 1981. However, a hazard may exist periodically when large quantities of solvent are used in the summer time.

## VII. RECOMMENDATIONS

1. An environmental survey should be conducted in the summer when larger quantities of 1,1,1-trichloroethane are used.
2. An educational program should be instituted so that employees are made aware of the hazards associated with the materials used at Rawlins Service Center.
3. Good personal hygiene and good work practices should be observed by all employees. Washing of hands before smoking, eating and drinking will help reduce the risk of the contamination.

## VIII. REFERENCES

1. Criteria for a Recommended Standard...Occupational Exposure to 1,1,1-trichloroethane, U.S. Department of Health, Education, and Welfare, PHS, CDC, NIOSH, July 1976, DHEW (NIOSH) Publication No. 76-184.
2. Occupational Diseases - A Guide to Their Recognition, U.S. Department of Health, Education, and Welfare, PHS, CDC, NIOSH, June 1977, DHEW (NIOSH) Publication No. 77-181.



IX. AUTHORSHIP AND ACKNOWLEDGEMENTS

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X. DISTRIBUTION AND AVAILABILITY OF REPORT

Copies of this report are currently available upon request from NIOSH, Division of Technical Services, Information Resources and Dissemination Section, 4676 Columbia Parkway, Cincinnati, Ohio 45226. After 90 days, the report will be available through the National Technical Information Service (NTIS), Springfield, Virginia 22161.

Copies of this report have been sent to:

1. Pacific Power and Light Company, Rawlins, Wyoming
2. Local 127, Utility Workers Union of America, AFL-CIO
3. NIOSH, Region VIII
4. OSHA, Region VIII

For the purposes of informing the affected employees, copies of this report shall be posted by the employer in a prominent place accessible to the employees, for a period of 30 calendar days.

Table I

Results of Personal Breathing Zone and General Area Concentrations of  
 1,1,1-Trichloroethane (Methyl Chloroform)  
 Pacific Power and Light Company  
 Rawlins, Wyoming

January 27, 1981

| <u>Job and/or Location</u>                       | <u>Sampling<br/>Period</u> | <u>Sample<br/>Volume<br/>(liters)</u> | <u>1,1,1-Trichloroethane* mg/M<sup>3</sup></u> |
|--|----------------------------|---------------------------------------|--|
| Lineman A  | 0930-1001                  | 5.9                                   | 4  |
| Lineman B  | 0934-1001                  | 3.1                                   | 32   |
| General area (trench)                            | 0936-1001                  | 5.3                                   | 68   |
| Lineman A  | 1013-1025                  | 2.0                                   | 15   |
| Lineman B  | 1013-1025                  | 1.5                                   | 80   |
| General area (trench)                            | 1015-1025                  | 1.8                                   | 611  |
| <u>Environmental criteria (mg/M<sup>3</sup>)</u> |                            |                                       | <u>1910 ceiling</u>                            |
| Limit of detection (mg)                          |                            |                                       | 0.01   |

\*mg/M<sup>3</sup> = milligrams of substance per cubic meter of air