U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
CENTER FOR DISEASE CONTROL
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
CINCINNATI, OHIO 45226

HEALTH HAZARD EVALUATION DETERMINATION
REPORT NO. 77-113-461

Southern Bell Telephone Company
Fort Lauderdale, Florida
February 1978

I. TOXICITY DETERMINATION

A survey team for the National Institute for Occupational Safety and Health (NIOSH) performed a Health Hazard Evaluation at Southern Bell Telephone Company, Fort Lauderdale, Florida on November 16-17, 1977. It has been determined that employees' exposures to "Quick Fix" were not found to be hazardous under the conditions of use. This determination is based on environmental measurements of airborne contaminants, a review of pertinent literature, observations of employees work practices, and results of a non-directed medical questionnaire.

Several solvents (methyl chloroform and trichloroethylene) were monitored for two days during the application of "Quick Fix". The airborne concentrations were within accepted limits of exposure. Furthermore, an analysis of the bulk sample revealed that trichloroethylene was not present in "Quick Fix". Airborne concentrations of free isocyanates (methylene bisphenyl isocyanate and toluene diisocyanate) indicated that these airborne concentrations were not detected using the prescribed sampling and analytical methods and thus were within the acceptable evaluation criteria.

II. DISTRIBUTION AND AVAILABILITY OF DETERMINATION REPORT

Copies of this Determination Report are currently available upon request from NIOSH, Division of Technical Services, Information 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. Information regarding its availability through NTIS can be obtained from NIOSH, Publications Office at the Cincinnati address.

Copies of this report have been sent to:

a) Southern Bell Telephone Company, Fort Lauderdale, Florida
b) Authorized Representatives of Locals 3111, 3112, 3120 Communication Workers of America.
c) International Union of Communication Workers of America, Washington, D.C.
d) U.S. Department of Labor - Region IV
e) NIOSH - Region IV

For the purpose of informing the approximately 35 "affected employees", the employer shall promptly "post", for a period of thirty calendar days, this Determination Report in a prominent place(s) near where exposed employees work.

III. INTRODUCTION

Section 20 (a)(6) of the Occupational Safety and Health Act of 1970, 29 U.S. Code 669 (a)(6) authorizes the Secretary of Health, Education, and Welfare, following a written request by 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 National Institute for Occupational Safety and Health received such a request from an authorized representatives of employees regarding workers alleged exposures to "Quick Fix".

IV. HEALTH HAZARD EVALUATION

A. Process Description and Evaluation Design

Southern Bell Telephone Company, South East Florida, is field testing a chemical called "Quick Fix" which will be used in an interim maintenance program. The maintenance program consists of workers, usually cable repairmen, spraying "Quick Fix" on outside plant buried closures and splice points which are exposed to moisture and excessive vermin infestation. The objectives of the program are basically two-fold. First, the program would allow up to a year's delay for permanent repairs of outside closures. Second, the maintenance program would improve plant productivity by reducing trouble reports.

"Quick Fix" is a compound composed of the following components: isopropyl alcohol, methyl chloroform, urethane laquer, and a fungicide called methasol TK-100. The application of "Quick Fix" is outlined in a procedures manual which was prepared and disseminated to the appropriate personnel on or about June 15, 1977.

The employees spraying "Quick Fix" usually work this job for about four to six weeks; afterwhich, a new worker is assigned this task. Each employee services about 30 to 50 enclosures per day depending upon the accessibility of the enclosure.

The cable repairman obtains the material he may need at the central office (e.g. "Quick Fix", small pebbles, safety equipment, etc.), and he drives to a pre-designated area where the closures are to be serviced.

The employee carefully removes the dome or cover from the closures. Caution is exercised since many insects and reptiles utilize these terminals for harborage. Upon removal of the cover, the employee inspects the wire loop for its condition. If the employee discovers that the wire loop is in need of repair, a red dot is affixed to the outer cover. After inspecting the wire loop, the cable repairman puts on rubber gloves and safety goggles, and applies the "Quick Fix" solution to the wire loop with a compressed air liquid applicator (Root-Lowell applicator Model #1933)*. The solution is liberally applied to the point of run-off to insure adequate coverage of the exposed wires. Total application time of the solution is about one minute. After the application, the cover is replaced and a white dot is placed on the cover to indicate the terminal has been serviced.

Closures may have aerial or overhead lines, or they may have underground cable lines. Closures with underground cable have a hollow-core at the base of closures. Therefore, a polished non-porous pebble is used to fill the base of the closure. The pebble serves as a heat barrier between the ground and air hence condensation is eliminated.

B. Evaluation Methods

Airborne exposure to methyl chloroform, trichloroethylene, methylene bisphenyl isocyanate (MDI) and toluene-2,4-diisocyanate (TDI) were measured using personal sampling techniques. The collection and analytical techniques are described below.

1. Solvents[1] (Methyl Chloroform and Trichloroethylene)

The recommended sampling procedure consisted of using a low volume pump and drawing a recommended volume of six liters through a two section 150 milligram (mg) activated charcoal tube. The contents of the charcoal tube were desorbed with one milliliter of carbon disulfide; the sample was separtated with a gas chromatograph and analyzed with a flame ionization detector according to NIOSH physical and chemical analytical method (P&CAM) number 127.

*Mention of company name or product does not constitute endorsement by NIOSH.

2. Isocyanates (Methylene bisphenyl isocyanate {MDI}[2] and Toluene diisocyanate{TDI}[3])

The recommended sampling procedure consists of using a MSA flow pump to which a midget impinger containing 15 milliliter (ml) of absorbing solution is connected. The absorbing solution is prepared according to the Marcali method[4]. Sampling is accomplished at a flowrate of one liter per minute for 20 to 30 minutes.

C. Evaluation Criteria

1. Environmental Assessment

There are several criteria used to evaluate the toxic air contaminants of an employees work environment: (1) NIOSH Criteria Documents for a Recommended Occupational Health Standard, (2) Proposed and Recommended Threshold Limit Values (TLV's), as suggested by the American Conference of Governmental Industrial Hygienists (ACGIH), 1976, (3) the OSHA standards.

The concentration for each contaminant is based upon the current state of knowledge concerning toxicity of these substances. The concentration is designed to allow an occupational exposure for up to a 10-hour work day, 40-hour work week as a time-weighted average (TWA) over a normal lifetime without the worker experiencing adverse effects. In some instances, a few employees may experience discomfort at or below the TWA.

There are some airborne contaminants for which this TWA is inappropriate; consequently, the substance may be preceded by the letter "C". This letter indicates a ceiling value for an interval of 30 minutes or less. The ceiling value is used to identify hazardous substances which are fast acting.

The criteria mentioned above have been tabulated, footnoted, and compared to the OSHA standard listed in the Code of Federal Regulations (CFR), (1976) Title 29, Part 1910, subpart Z, Section 1000. The OSHA standard has been cited so that the reader may see which of the standards, if any at all, have been exceeded.

Table A

Evaluation Criteria

Time Weighted Average (TWA)

Substance	8-hour	10-hour	Ceiling Value	Minutes
Methyl Chloroform[1]		200 ppm*	350 ppm	15
Trichloroethylene[2]	100 ppm		150 ppm	
(MDI)[3]	0.02 ppm			
(TDI)[4]	0.005 ppm		0.02 ppm	20

*ppm - parts of a contaminant per million parts of air by volume

1) NIOSH Criteria Document (1976). OSHA standard (1976) is 350 ppm for an 8-hour TWA.

2) NIOSH Criteria Document (1973). OSHA standard (1976) is 100 ppm for 8-hour TWA.

3) OSHA Standard (1976).

4) NIOSH Criteria Document (1973). OSHA standard (1976) is 0.02 ppm for an 8-hour TWA.

2. Toxicological Effects

a) Methyl Chloroform(1,1.1-Trichloroethane)[5,7]

Methyl chloroform is a colorless, non flammable liquid with an odor similiar to chloroform. This chlorinated hydrocarbon has found wide use, and few reports of serious ill effects have been reported. Methyl chloroform exposure occurs by inhalation of vapors and skin absorption. This solvent, like most chlorohydrocarbons causes central nervous system depression and defatting of the skin. Acute exposure symptoms include dizziness, incoordination, drowsiness, increased reaction time, unconsciousness and death.

b) Isocyanates (MDI and TDI)[5,6,7,8]

Both of these chemicals are liquids and may exist as different isomers (two species of the same composition differing in structure and hence in properties).

Isocyanates are generally irritating to the skin, eyes, and respiratory tract; however, the irritation may be severe enough to produce bronchitis and pulmonary edema.

Allergenic sensitization to MDI or TDI may occur, which produces an asthmatic reaction with wheezing, dyspnea, and cough. These symptoms may occur the evening following exposure. If a person is sensitized, exposure to safe levels for nonsensitized workers will often cause a reaction.

D. Results and Discussion

The breathing zone sampling results for solvents (methyl chloroform and trichloroethylene) are presented in table I. The limit of detection for methyl chloroform and trichloroethylene based upon physical and chemical analytical method #127 was 0.01 milligrams respectively. Sampling results indicate that neither solvent exceeded the NIOSH recommended standard, nor the OSHA standard. Furthermore, an analysis of the bulk sample revealed that trichloroethylene was not a constituent of the "Quick Fix" compound.

The personal samples for airborne concentration of free isocyanates are listed in table II. All the levels were below the NIOSH recommended standard and the OSHA standard.

Several employees were administered non-directed medical questionnaires. All of the employees indicated that their health was in good condition. All the workers stated that they had not experienced any physical or mental discomfort when they applied "Quick Fix" to the outdoor plant enclosures.

V. RECOMMENDATIONS

1. It is recommended that supervisors be responsible for counseling the employees on: 1) the potential hazards of "Quick Fix" and 2) the proper spraying technique of "Quick Fix".

2. Employees should be counseled routinely on the use of protective equipment.

3. The worker should use a funnel when transferring "Quick Fix" from the five gallon container to the air liquid applicator.

4. It is recommended that the workers remain upwind whenever they spray "Quick Fix".

5. The spray nozzle of the liquid applicator should be cleaned on a daily basis in order to eliminate an accumulation of the "Quick Fix".

VI. AUTHORSHIP AND ACKNOWLEDGEMENTS

Report Prepared By:

Pierre L. Belanger
Industrial Hygienist
Industrial Hygiene Section
Hazard Evaluations and
Technical Assistance Branch
Cincinnati, Ohio

Originating Office:

Jerome P. Flesch
Acting Chief
Hazard Evaluations and
Technical Assistance Branch
Cincinnati, Ohio

Environmental Evaluation:

Richard Taft
Industrial Hygienist
Industrial Hygiene Section
Hazard Evaluations and
Technical Assistance Branch
Cincinnati, Ohio

Laboratory:

Measurements Support Branch
Cincinnati, Ohio

Report Typed By:

Linda Morris
Clerk-Typist
Industrial Hygiene Section
Hazard Evaluations and
Technical Assistance Branch
Cincinnati, Ohio

VII. REFERENCE

1. P&CAM Method No. 127, NIOSH Manual of Analytical Methods, HEW Publication No. 77-157-A, April 1977.

2. P&CAM Method No. 142, NIOSH Manual of Analytical Methods, HEW Publication No. 77-157-A, April 1977.

3. P&CAM Method No. 141, NIOSH Manual of Analytical Methods, HEW Publication No. 77-157-A, April 1977.

4. Marcali, Kalman. "Microdetermination of Toluenediisocyantes", Analytical Chemistry, Vol. 29, pp. 552, April 1957.

5. Hamilton, A. and Harriet L. Hardy, Industrial toxicology, Third Ed., Publishing Sciences Group, Inc., 1974.

6. U.S. Dept. of HEW, Occupational Diseases, A Guide to Their Recognition, Publication No. 77-181, Rev. Ed. 1977.

7. Documentation of Threshold Limit Values (TLV's), ACGIH, 3rd Ed., Cincinnati, Ohio 1971.

8. Encyclopedia of Occupational Health and Safety, International Labor Office, McGraw-Hill Book Co., New York, 1971.

TABLE I

SUMMARY RECORD FOR BREATHING ZONE DATA FOR SOLVENTS*

SOUTHERN BELL TELEPHONE CO.
FT. LAUDERDALE, FLORIDA

November 16 and 17, 1977

Sample Number	Area Description	Period (minutes)	Volume (liters)	Airborne Contaminant - ppm[1]	
				Methyl Chloroform	Trichloroethylene
1	Field Location	35	7.6	7.2	N.D.[2]
2	Field Location	100	19.6	9.4	N.D.
3	Field Location	190	8.8	4.2	N.D.
4	Blank	0	0	N.D.	N.D.
5	Field Location	90	18.8	N.D.	N.D.
6	Field Location	35	2.2	N.D.	N.D.
8	Blank	0	0	N.D.	N.D.
9	Blank	0	0	N.D.	N.D.
10	Field Location	30	6.9	3.2	N.D.
11	Field Location	30	5.9	2.8	N.D.
12	Field Location	40	2.2	1.7	N.D.
13	Field Location	20	4.0	1.8	N.D.

* NIOSH: Evaluation Criteria: Methyl Chloroform 200 ppm
Trichloroethylene 100 ppm

1) ppm - Parts of contaminant per million parts of air by volume.
2) N.D.- None Detected.

TABLE II

SUMMARY RECORD FOR BREATHING ZONE DATA FOR MDI AND TDI*

SOUTHERN BELL TELEPHONE CO.
FT. LAUDERDALE, FLORIDA

November 16 and 17, 1977

Sample Number	Area Description	Period (minutes)	Volume (liters)	Airborne Contaminant - ppm[1]	
				MDI	TDI
1	Field Location	35	35.0	N.D.[2]	N.D.
2	Field Location	30	30.0	N.D.	N.D.
3	Field Location	40	40.0	N.D.	N.D.
4	Field Location	35	35.0	N.D.	N.D.
5	Blank	0	0	N.D.	N.D.

---

* NIOSH:Evaluation Criteria: Methylene bisphenyl isocyanate — None
Toluene diisocvanate — 0.005 ppm

1) ppm - Parts of contaminant per million parts of air by volume.

2) N.D. - None detected.