

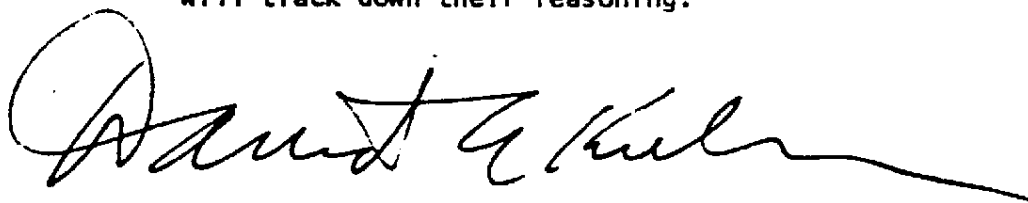
Interoffice Communication

To L. N. Vernon
From D. A. Kuhn
Date October 7, 1977
Subject Biomedical and Environmental Progress Report
Week Ending October 7, 1977

- (1) In a recent meeting with VCM/PVC industry leaders, high EPA officials stonewalled any attempts to withdraw the proposal or consider compromise. It appears EPA has bought the EDF idea of zero emissions. Our future course will be decided at the VCM/PVC Safety Committee meeting on October 20. In the meantime, the technical committee is trying to work out ways to mend the many deficiencies in the proposal. All considerations of possible compromises have been terminated. It looks as if everyone is getting into position to go to court.
- (2) Eleven companies have joined with Conoco Chemicals to sponsor the methyl chloride assay at CIIT. Two other companies are still considering joining. Actual test work will begin early in December.
- (3) OSHA has announced a generic carcinogen standard. If it's promulgated as proposed, a chemical found to meet certain testing specifications will be classified & automatically regulated. It's a way to shortcut the standard-making process that's been used for vinyl chloride and benzene, thus we would get more standards faster.

In a recent study, NIOSH considered chemicals with the greatest carcinogenic hazard to be, among others, formaldehyde, benzene, lead, kerosine, nickel, chromium and carbon tetrachloride. We are particularly concerned about the inclusion of kerosine and will track down their reasoning.

Note



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NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH RECOMMENDATIONS FOR WORKPLACE EXPOSURE TO REFINED PETROLEUM SOLVENTS

The National Institute for Occupational Safety and Health (NIOSH) recommends that employee exposure to petroleum ether, rubber solvent, varnish makers' and painters' naphtha, mineral spirits, Stoddard solvents and kerosene in the workplace be controlled by adherence to the following sections. The standards are designed to protect the health and provide for the safety of employees for up to a 10-hour work shift, 40-hour workweek, over a working life. Compliance with all sections of the standards should prevent adverse effects of these chemicals on the health of employees and provide for their safety. Techniques recommended are valid, reproducible, and available to industry and government agencies. Sufficient technology exists to permit compliance with the recommended standards. Although the environmental limits for the workplace are considered to be safe levels based on current information, the employer should regard these as the upper boundary of exposure and every effort should be made to keep the exposure as low as is technically feasible. The criteria and standards will be subject to review and revision as necessary.

Eye, nose, and throat irritation, dermatitis, and effects on the nervous system have been found in workers exposed to some refined petroleum solvents. Benzene, which has been shown to cause blood dyscrasias in humans, is present in small amounts in many refined petroleum solvents. NIOSH has concluded that benzene is leukemogenic. For further information on the hazards of benzene, refer to Appendix I. It is therefore recommended that, when benzene is found to be present in refined petroleum solvents, every effort be made to keep the benzene exposure as low as possible. The refined petroleum solvents examined in this document are for the most part complex mixtures, and the possibility of synergistic or additive toxic effects of the components of these mixtures should not be overlooked.

These criteria and recommended standards apply to occupational exposure of workers to the following refined petroleum solvents: petroleum ether, rubber solvent, varnish makers' and painters' naphtha, mineral spirits, Stoddard solvents, and kerosene, all included in the term "refined petroleum solvents."

The refined petroleum solvents considered in this document have a total aromatic content of less than 20%. Other hydrocarbon solvents such as thinners, whose total aromatic content may exceed 20%, are not discussed in this document. For the purposes of these recommended standards for refined petroleum solvents, the following definitions will apply to those solvents covered in this document:

"Petroleum ether" is a refined petroleum solvent that has a boiling range of 30-60°C and typically has a chemical composition of 80% pentane and 20% isohexane.

"Rubber solvent" is a refined petroleum solvent with a boiling range of 45-125°C and is composed of organic compounds whose carbon chain lengths range from C5 to C7. The chemical composition of a typical rubber solvent would be: 41.4% paraffins, 53.6% monocycloparaffins, 0.1% monoolefins, 1.5% benzene, and 3.4% alkyl benzene.

"Varnish makers' and painters' naphtha" is a refined petroleum solvent with a boiling range of 95-160°C and is composed of organic compounds whose carbon chain lengths range from C5 to C11. The chemical composition of a typical varnish makers' and painters' naphtha would be: 55.4% paraffins, 30.3% monocycloparaffins, 2.4% dicycloparaffins, 0.1% benzene, 11.7% alkylbenzenes, 0.1% indans and tetralins.

"Mineral spirits" is a refined petroleum solvent with a boiling range of 150-200°C. A typical chemical composition for mineral spirits would be: 80-86% saturated hydrocarbons, 1% olefins, and 13-19% aromatics.

"Stoddard solvent" is a type of mineral spirits with a boiling range of 160-210°C and is composed of organic compounds whose carbon chain lengths range from C7 to C12. The chemical composition of a typical Stoddard solvent would be: 47.7% paraffins, 26% monocycloparaffins, 11.6% dicycloparaffins, 0.1% benzene, 14.1% alkylbenzenes, 0.5% indans and tetralins.

"140 Flash aliphatic solvent" is a type of Stoddard solvent with a boiling range of 185-207°C and is composed of organic compounds whose carbon chain lengths range from C5 to C12. A typical chemical composition for 140 flash aliphatic solvent would be: 60.8% paraffins, 24.5% monocycloparaffins, 11.2% dicycloparaffins, 0.07% benzene, 3.03% alkyl benzenes, and 0.3% indans and tetralins.

"Kerosene" is a refined petroleum solvent with a boiling range of 175-325°C. A typical chemical composition for kerosene would be: 25% normal paraffins, 11% branched paraffins, 30% monocycloparaffins, 12% dicycloparaffins, 1% tricycloparaffins, 15% mononuclear aromatics, and 5% dinuclear aromatics.

"Deodorized kerosene" is a refined petroleum solvent that has a boiling range of 209-274°C and a typical chemical composition of 55.2% paraffins, 40.9% naphthenes, and 3.9% aromatics.

If exposure to other chemicals also occurs, the employer shall comply also with applicable standards for the other chemicals. In particular, special attention shall be given to the benzene content of the refined petroleum solvents being used.

The "action level" for petroleum ether, rubber solvent, and varnish makers' and painters' naphtha is defined as an airborne time-weighted average (TWA) concentration of 200 milligrams per cubic meter (mg/cu m) of air for up to a 10-hour work shift in a 40-hour workweek. The "action level" for mineral spirits and Stoddard solvent is defined as a TWA concentration of 350 mg/cu m of air for up to a 10-hour work shift in a 40-hour workweek. The "action level" for kerosene is defined as a TWA concentration of 100 mg/cu m of air for up to a 10-hour work shift in a 40-hour workweek. "Occupational exposure" to refined petroleum solvents is defined as exposure above the action level. Exposure to refined petroleum solvents at lower concentrations will not require adherence to the following sections, except for Section 2(a), 3, 4(a,b), 6(a,c-i), 7, and 8(a).

Section 1 — Environmental (Workplace Air)

(a) Concentration

(1) The employer shall control occupational exposure to airborne concentrations of petroleum ether, rubber solvent, varnish makers' and painters' naphtha, mineral spirits, and Stoddard solvents so that no employee is exposed at a concentration greater than 350 mg cu m of air, determined as a TWA concentration for up to a 10-hour work shift, 40-hour workweek. In addition, no employee shall be exposed to any of the above refined petroleum solvents at a ceiling concentration greater than 1,800 mg cu m as determined by a sampling time of 15 minutes.

(2) The employer shall control occupational exposure to kerosene so that no employee is exposed at a concentration greater than 100 mg cu m of air determined as a TWA concentration for up to a 10-hour work shift, 40-hour workweek.

(b) Sampling and Analysis

Procedures for the collection and analysis of workroom air samples shall be as provided in Appendices II, III, and IV, or by any methods shown to be at least equivalent in precision and sensitivity to the methods specified.

Section 2 — Medical

Medical surveillance as described below shall be made available to all workers subject to occupational exposure to refined petroleum solvents.

(a) Preplacement examinations shall include at least:

(1) Comprehensive medical and work histories.
(2) Physical examination, giving particular attention to the skin, appropriate liver function tests such as serum glutamicoxaloacetic transaminase; complete blood count; urinalysis, and tests of nervous system function.

(3) A judgment of the ability of the worker to use negative or positive pressure respirators.

(b) Periodic examinations shall be made available at least on an annual basis and shall include at least:

- (1) Interim medical and work histories.
- (2) Physical examination as outlined in (a)(2) above.

(c) During examinations, applicants or employees having medical conditions which would be directly or indirectly aggravated by exposure to these substances, such as chronic dermatitis, shall be counseled on the increased risk of impairment of their health from working or continuing to work with these substances.

(d) Initial medical examinations shall be made available to all workers within 6 months after the promulgation of standards based on these recommendations.

(e) In an emergency involving these substances, all affected personnel shall be provided with immediate first aid, followed by prompt medical evaluation and care. In the event of eye or skin contact with refined petroleum solvents, contaminated clothing and shoes shall be removed immediately and eyes and skin shall be flushed with copious amounts of water. The medical attendants shall be informed of the possibility of central nervous depression.

(f) Pertinent medical records shall be kept by the employer for at least 30 years after employment has ended. These records shall be kept for at least 30 years after employment has ended. These records shall be made available to the designated medical representatives of the Secretary of Health, Education, and Welfare, of the Secretary of Labor, of the employer, and of the employee or former employee.

Section 3 — Labeling and Posting

All labels and warning signs shall be printed both in English and in the predominant language of non-English-reading employees. Illiterate workers and workers reading languages other than those used on labels and posted signs shall receive information regarding hazardous areas and shall be informed of the instructions printed on labels and signs.

The following warning label and sign shall be affixed in a readily visible location on petroleum ether, rubber solvent, varnish makers' and painters' naphtha, mineral spirits, Stoddard solvents, or kerosene storage tank containers:

NAME OF SOLVENT (synonym)

WARNING! FLAMMABLE! (or COMBUSTIBLE!)
CAN BE FATAL OR CAUSE
SEVERE ILLNESS IF SWALLOWED

Keep away from heat, sparks, and open flame.
No smoking permitted.
Do not take internally.
Keep container closed.
Avoid prolonged or repeated breathing of vapor.
Avoid contact with eyes and skin.
Use with adequate ventilation.

In case of

Fire: Use appropriate foam-type, dry chemical (e.g., sodium bicarbonate), or carbon dioxide extinguishers.

Spill: Flush area with adequate amounts of water.

First Aid: In case of eye or skin contact, flush with copious amounts of water while lifting the eyelids. Change clothing if contaminated. In case of accidental swallowing, call a physician. DO NOT INDUCE VOMITING!

Section 4 — Personal Protective Clothing and Equipment

(a) Protective Clothing

(a) Appropriate protective clothing, including gloves, aprons, suits, boots, and face shields (8-inch minimum) with goggles, made of a material resistant to refined petroleum solvents shall be provided for and worn by every employee to limit skin contact. In addition, the protective clothing shall also be fire-resistant. This type of clothing shall be worn by employees removing clothing from drycleaning machines or performing spotting operations. In addition to being solvent-resistant, the gloves used in these operations shall also be of sufficient length to protect the forearms of the employees. Employees performing these operations should keep solvent-saturated materials away from their breathing zones as much as possible.

(2) Unless protective clothing is being worn, the employer shall ensure that a change of clothing is immediately available to be used by any employee whose clothes become wetted with solvents.

(3) Where protective clothing is required, the employer shall provide the employee with separate storage facilities for work clothes and for street clothes, preferably separated by shower facilities.

(4) Safety showers and eyewash fountains shall be provided in appropriate areas. These showers and fountains shall be checked periodically to ensure their proper working condition.

(b) Eye Protection

Chemical safety goggles (splashproof) and face shields

(8-inch minimum) meeting the requirements listed in 29 CFR 1910.133 and ANSI Z87.1-1968 shall be provided and worn in any operation in which there is a reasonable probability of a solvent being splashed into the eyes.

(c) Respiratory Protection

(1) Sparkproof engineering controls, such as local exhaust hoods, fans, or other ventilation systems, shall be used if needed to keep solvent air concentrations below the TWA and ceiling environmental limits. Compliance with the environmental limits may not be achieved by the use of respirators except

(A) During the time period necessary to install or test the required engineering controls

(B) For nonroutine operations such as brief exposures at concentrations in excess of the environmental limits resulting from maintenance or repair activities.

(C) During emergencies when air concentrations of the solvent may exceed the environmental limits

(2) When a respirator is permitted by paragraph (c)(1) of this section, it shall be selected and used pursuant to the following requirements:

(A) The employer shall establish and enforce a respiratory protection program meeting the requirements of 29 CFR 1910.134.

(B) The employer shall provide respirators in accordance with Tables I-1, I-2, and I-3 depending on the type of solvent used and shall ensure that the employee uses the appropriate respirator when needed. The respiratory protective devices provided in conformance with Tables I-1, I-2, and I-3 shall comply with the standards jointly approved by NIOSH and the Mining Enforcement and Safety Administration (formerly Bureau of Mines) as specified under the provisions of 30 CFR 11.

TABLE I-1

RESPIRATOR SELECTION GUIDE FOR PETROLEUM ETHER, RUBBER SOLVENT,
AND VARNISH MAKERS' AND PAINTERS' NAPHTHA

Concentration	Respirator Type Approved under Provisions of 30 CFR 11
Less than or equal to 3,500 mg/cu m	(1) Chemical cartridge respirator with half-mask facepiece and organic vapor cartridge* (2) Supplied-air respirator with half-mask facepiece operated in demand (negative pressure) mode
Less than or equal to 17,500 mg/cu m	(1) Gas mask equipped with full facepiece and organic vapor canister (2) Supplied-air respirator equipped with full facepiece (3) Self-contained breathing apparatus with full facepiece operated in demand mode
Greater than 17,500 mg/cu m	(1) Self-contained breathing apparatus with full facepiece operated in pressure-demand or other positive pressure mode (2) Combination Type C supplied-air respirator with full facepiece operated in pressure-demand mode, with auxiliary self-contained air supply
Emergency entry (into an area of unknown concentration)	(1) Self-contained breathing apparatus with full facepiece operated in pressure-demand or other positive pressure mode (2) Combination Type C supplied-air respirator with full facepiece operated in pressure-demand mode, with auxiliary self-contained air supply

*The service life of the organic vapor cartridge should be limited to 1 hour.

TABLE I-2

RESPIRATOR SELECTION GUIDE FOR STODDARD SOLVENTS AND MINERAL SPIRITS

Concentration	Respirator Type Approved under Provisions of 30 CFR 11
Less than or equal to 3,500 mg/cu m	(1) Chemical cartridge respirator with half-mask facepiece and organic vapor cartridge* (2) Supplied-air respirator with half-mask facepiece operated in demand (negative pressure) mode
Less than or equal to 17,500 mg/cu m	(1) Gas mask equipped with full facepiece and organic vapor canister (2) Supplied-air respirator equipped with full facepiece (3) Self-contained breathing apparatus with full facepiece operated in demand mode
Less than or equal to 30,000 mg/cu m	Supplied-air respirator equipped with full facepiece, hood, helmet, or suit in continuous-flow or other positive pressure mode
Greater than 30,000 mg/cu m	(1) Self-contained breathing apparatus with full facepiece operated in pressure-demand or other positive pressure mode (2) Combination Type C supplied-air respirator with full facepiece operated in pressure-demand mode, with auxiliary self-contained air supply
Emergency entry (into an area of unknown concentration)	(1) Self-contained breathing apparatus with full facepiece operated in pressure-demand or other positive pressure mode (2) Combination Type C supplied-air respirator with full facepiece operated in pressure-demand mode, with auxiliary self-contained air supply

*The service life of the organic vapor cartridge should be limited to 1 hour.

TABLE I-3

RESPIRATOR SELECTION GUIDE FOR PERSENE

Concentration	Respirator Type Approved under Provisions of 30 CFR 11
Less than or equal to 1,000 mg/cu m	(1) Chemical cartridge respirator with half-mask facepiece and organic vapor cartridge* (2) Supplied-air respirator with half-mask facepiece operated in demand (negative pressure) mode
Less than or equal to 5,000 mg/cu m	(1) Gas mask equipped with full facepiece and organic canister (2) Supplied-air respirator equipped with full facepiece (3) Self-contained breathing apparatus with full facepiece operated in demand mode
Greater than 5,000 mg/cu m	(1) Self-contained breathing apparatus with full facepiece operated in pressure-demand or other positive pressure mode (2) Combination Type C supplied-air respirator with full facepiece operated in pressure-demand mode, with auxiliary self-contained air supply
Emergency entry (into an area of unknown concentration)	(1) Self-contained breathing apparatus with full facepiece operated in pressure-demand or other positive pressure mode (2) Combination Type C supplied-air respirator with full facepiece operated in pressure-demand mode, with auxiliary self-contained air supply

*The service life of the organic vapor cartridge should be limited to 1 hour.

(C) Respirators specified for use in higher concentrations of solvent vapor may be used in atmospheres of lower concentrations.

(D) The employer shall ensure that no employee is being exposed to solvent air concentrations in excess of the environmental limits because of improper respirator selection, fit, use, or maintenance.

(E) The employer shall ensure that respirators are adequately cleaned and maintained and that employees are instructed in the proper use and in testing for leakage of respirators assigned to them.

(F) Respirators shall be easily accessible in work areas and employees shall be informed of their location.

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