in such systems may result.

10.1 HEALTH HAZARDS

10.1.1 Vinyl chloride monomer does not present a serious industrial health hazard provided workers are adequately supervised and observe the proper means of handling it. Under the Occupational Safety and Health Act, the U.S. Department of Labor has set a 500 ppm Ceiling Value on permitted employee exposures. ~~However, the American Conference of Governmental Industrial Hygienists, in its 1971 Notice of Intended Changes, proposes a time-weighted TLV of 200 ppm for the monomer vapor. Based upon animal and human observations, these levels provide considerable margin of safety for industrial exposures.~~

NOTE: A syndrome termed occupational acro-osteolysis, characterized primarily by Raynaud's phenomenon and osteolytic changes in certain bones, particularly the distal phalanges of the hands, has been noted among certain workers in vinyl chloride polymerization operations. The specific cause of this disease, and particularly any role played by vinyl chloride, is unknown.

Recent research studies reported from Italy indicate that repeated, long-term high level exposures of rats to vinyl chloride monomer vapor can result in the development of malignant tumors. However, many years of industrial experience with human exposures to concentrations frequently far above current standards have not demonstrated any carcinogenicity to humans.

10.1.2 Acute Toxicity

Levels on the order of 6,000 ppm for five minutes exposure are required to produce minimal symptoms resembling mild alcohol intoxication in humans. Levels approximately 16,000 ppm for the same length of time will produce varying degrees of intoxication with light-headedness, some nausea, and a dulling of visual and auditory responses in most humans.

10.1.3 Chronic Toxicity

The liver is the principal target resulting from excessive chronic exposure. The currently recommended ceiling level (OSHA) of 500 ppm is well below a level producing any signs or symptoms of toxicity.

9. WASTE DISPOSAL

10. MEDICAL MANAGEM

10.2 PREVENTIVE MEASURES

10.2.1 All operations in which vinyl chloride is used should be regularly evaluated and atmospheric concentrations kept, at all times, below 500 ppm. Sophisticated air sampling techniques are required; these include gas chromatography. Processes must be closed or ventilated sufficiently to achieve a concentration control low enough so that respiratory protection devices are needed only on an emergency basis.

10.2.2 Personal Hygiene

Vinyl chloride should be kept off the skin and out of contact with the eyes. If accidental contact to the skin occurs, immediate washing with soap and water is necessary; if to the eyes, immediate irrigation for a minimum of 15 minutes with water is required. The presence of skin and eye washing equipment in the areas where vinyl chloride is used is necessary.

Washing supplies and equipment should be maintained and always immediately available.

10.2.3 Physical Examinations

Preplacement examinations should be made on all workers having potential exposure to vinyl chloride, with particular emphasis placed upon liver and kidney functions.

10.3 SUGGESTIONS TO PHYSICIANS

Treatment for vinyl chloride intoxication is symptomatic; no special procedures are required. It should be recognized that the principal target of chronic exposures is the liver, with secondary effects, particularly in acute exposures, to the kidney. In acute overexposures the primary effect is on the central nervous system.

NOTE TO PHYSICIAN: Avoid use of epinephrine or related drugs in treating acute overexposure cases since vinyl chloride may sensitize the heart to the arrhythmic action of these drugs.

10.3.1 Oxygen Administration

Oxygen has been found useful in the treatment of inhalation exposures of many chemicals, especially those capable of causing either immediate or delayed harmful effects in the lungs.

In most exposures, administration of 100% oxygen at atmospheric pressures has been found to be adequate. This is best accomplished by use of a face mask having a reservoir bag of the non-rebreathing type. Inhalation of 100% oxygen should not exceed one hour of continuous treatment. After each hour, therapy may be interrupted. It may be

reinstituted as the clinical condition indicates.

Some believe that superior results are obtained when exposures to lung irritants are treated with oxygen under an exhalation pressure not exceeding 4 cm. water. Masks providing for such exhalation pressures are obtainable. A single treatment may suffice for minor exposures to irritants. It is believed by some observers that oxygen under pressure is useful as an aid in the prevention of pulmonary edema after breathing irritants.

In the event of an exposure causing symptoms or in case of a history of severe exposure, the patient may be treated with oxygen under 4 cm. exhalation pressure for one-half hour periods out of every hour. Treatment may be continued in this way until symptoms subside or other clinical indications for interruption appear.

CAUTION: It may not be advisable to administer oxygen under positive pressure in the presence of impending or existing cardiovascular failure. The use of adrenalin is not recommended because some chlorinated hydrocarbons can increase the risk of ventricular fibrillation after adrenalin therapy.

11.1 GENERAL PRINCIPLES

First aid should be started at once in case of acute intoxication with vinyl chloride. Immediately remove the affected individual to fresh air. Refer all injured individuals to a physician and give a detailed account of the incident.

11.2 CONTACT WITH SKIN AND MUCOUS MEMBRANES

Vinyl chloride, in concentrated form, is a skin irritant. All contaminated clothing should be removed at once; and this clothing, including shoes, if there is any evidence of contamination, should not be worn again until thoroughly dry. All affected skin areas should be thoroughly washed with warm water and soap. The individual should be referred to a physician.

11.3 CONTACT WITH EYES

If vinyl chloride has entered the eyes, prompt washing with copious quantities of water for at least 15 minutes should be instituted immediately. It is advisable to irrigate the eyes gently with water at room temperature in order to minimize additional pain and discomfort. Prompt medical attention should be obtained.

11.4 INHALATION

Promptly remove the affected individual from exposure, to fresh air. If breathing has ceased effective artificial respiration should be started immediately. If ozygen inhalation equipment is available oxygen should be administered, provided a person authorized for such administration by a physician is available. The patient should be comfortably warm but not hot. Stimulants will rarely be necessary where adequate oxygenation is maintained. Any such drugs for shock treatment should be given only by the attending physician. *Never attempt to give anything by mouth to an unconscious patient.*