

IM-94-08

**OREGON OCCUPATIONAL SAFETY AND HEALTH DIVISION
DEPARTMENT OF CONSUMER & BUSINESS SERVICES**

INDEXED MEMO

Indexed Memo IM-94-08

Issued(PD) February 15, 1982

Issued(IM) March 21, 1994

SUBJECT: Handling and Use of Ethylene Dibromide (EDB)

AFFECTED CODES/

DIRECTIVES: OAR 437-02-Sub Z, 1910.1000

(1) PURPOSE: To inform OR-OSHA personnel of the guidelines to protect
EDB-exposed workers.

2-) BACKGROUND: As an immediate response to the concerns that have been expressed
over the safe handling and use of EDB as a post-harvest fumigant,
a set of recommended procedures have been prepared which are
intended to serve as guidance for minimizing worker exposure to
EDB from fumigated grain, citrus, and other commodities.

(3) ACTION: These guidelines should be reviewed when exposures to EDB
are found in the workplace. Copies of this directive can be
given to affected employees and/or employers to inform them
of the guidelines for the safe handling and use of EDB.

2024-ORPDIR

Guidelines for Workers Handling Ethylene Dibromide Treated Citrus, Grain, and Other Commodities

1. Access to areas immediately surrounding the fumigation chambers should be limited to authorized personnel only.
2. Truck drivers, forklift operators and other workers required to enter fumigation facilities or other enclosed facilities such as trucks, ships, warehouses and grain elevators should wear half-mask, organic cartridge respirators. For EDB concentrations between 1 and 10 ppm a full-face respirator with organic canister should be worn, with the canister being changed every eight hours. Respirators should be adequately maintained and cleaned according to recognized industrial hygiene practices.
3. All workers handling fumigated commodities should thoroughly wash their hands before eating, smoking or applying cosmetics.
4. Whenever possible, fumigated commodities should be transported in well ventilated trucks.
5. Trucks, ships, and other vessels used to transport fumigated commodities can contain appreciable amounts of residual EDB. Truck trailers carrying fruit from a fumigation chamber on short runs to a destination or refrigerated trailers on short or long runs should be ventilated using high capacity exhaust fans for at least one hour before entry by forklift operators or other personnel. On trips one day or longer, if not hauling temperature sensitive commodities, ventilate as thoroughly as possible during transit and during loading and unloading to minimize EDB concentrations. The longer the ventilation period, the better.
6. Warehouse or packing plants in which fumigated commodities are stored or processed should be provided with exhaust ventilation systems unless the warehousing or packing is done in open shelters.
7. Every worker from the point after commodity fumigation through storage (excluding retail operations) should be instructed in the appropriate control procedures for limiting exposure to ethylene dibromide.
8. Warehouses, grain elevators and other facilities used for storing fumigated commodities should be provided with adequate exhaust ventilation.

RECOMMENDED PROCEDURES TO MINIMIZE
WORKER EXPOSURE TO ETHYLENE DIBROMIDE
FROM FUMIGATED GRAIN, CITRUS, OTHER COMMODITIES

INTRODUCTION: Various State, Federal, and International quarantine programs require post-harvest fumigation of certain grains, citrus, fruits, nuts, and 'vegetables' with ethylene dibromide (EDB) to prevent the spread of insect-or disease pests such as the Mediterranean Fruit Fly. This use of EDB began in the 1950's and increased significantly in 1974 when Japan required all U.S. citrus from Florida and Texas to be fumigated before export. Recent scientific evidence, derived from animal studies, has shown EDB to present potential health risks including cancer and reproductive effects. In light of this evidence and in response to concerns first expressed by the International Brotherhood of Teamsters and later other labor unions, OSHA has prepared the following recommendations for reducing worker exposure to EDB.

The current OSHA standard for worker exposure to EDB is 20 parts per million parts of air (8-hour, time weighted average). This standard was adopted in 1970 and was based on the acute (short-term) toxicity of EDB. Since this Federal standard was adopted, EDB has been shown to cause cancer when administered orally or by inhalation in rats and mice. Although human evidence is currently quite limited, however, it is appropriate to presume*that the current OSHA standard is not sufficiently protective.

The greatest potential for worker exposure to EDB results from 'its pesticidal uses, the major uses currently being:

- Pre-plant soil fumigation for crops including vegetables, fruits, grains, peanuts, cotton, and tobacco;
- Post-harvest commodity fumigation of grains, fruits, and vegetables including various State, Federal, and International quarantine programs on citrus, fruits, nuts, and vegetables;
- Fumigation of grain milling machinery and flour mills to control insect infestations.

Of these major pesticide uses of EDB, the post-harvest chamber fumigation of grains, citrus, tropical fruits, and vegetables presents the greatest potential for EDB exposure to workers. There are estimated to be 25 citrus fumigation stations in Texas, 13 in Hawaii, 4 in Florida, several in Puerto Rico and New Jersey, and a number of newly constructed chambers in California. The citrus or other produce is loaded into fumigation chambers on pallets or in truck trailers. EDB is then introduced into the chambers and circulated by use of fans for a sufficient period of time to kill fruit flies and their larvae. Grains are usually treated with EDB post-harvest to prevent insect infestation. EDB penetrates the fruit, grain, or other commodities during the fumigation process, and this EDB is released from the fruit over a period of hours and days after removal from the fumigation chambers. This release is called 'off-gassing' and is the source of EDB exposure to workers handling fumigated commodities.

Those potentially exposed include workers who unload the fumigated commodities from fumigation chambers, and workers involved in loading/unloading, transporting, crating, packing, or warehousing of fumigated commodities along the route to market, processing, or export. There is little evidence currently available on which to base estimates of the number of workers potentially exposed or the magnitude of that exposure. The limited sampling data available suggests that it may be possible for potentially harmful concentrations of EDB to develop inside warehouses, trucks, ships, grain elevators, and other enclosed storage, transportation and distribution facilities.

U.S. Department of Labor

Assistant Secretary for
Occupational Safety and Health
Washington, D.C. 202 10

Nov. 27, 1981

Mr. James R. Herman
President, International Longshoremen's and Warehousemen's Union
1188 Franklin Street
San Francisco, California 94109

Dear Mr. Herman:

As an immediate response to the ' concerns that have been expressed over the safe handling and use of ethylene dibromide (EDB) as a post-harvest fumigant OSHA has prepared a set of recommended procedures which are intended to serve as guidance for minimizing worker exposure to EDB from fumigated grain, citrus and other commodities. These recommended procedures are being sent to OSHA Regional Offices for distribution to Area Offices, State designated agencies, and interested parties. A copy of these recommended procedures is enclosed for your information.

OSHA has been evaluating the health risks of EDB exposure for several months. Included in our activities are a review of the animal and human data on health effects, meetings with other Federal and State agencies, and field investigations.

OSHA, working with USDA and Arthur D. Little, Inc., currently is investigating methods of post-fumigation handling of EDB-treated commodities to reduce worker exposure. On November 12, 1981, a truckload of grapefruit was fumigated with EDB in Florida and followed by an OSHA team of three investigators from Florida to California. To facilitate aeration, a bulkhead was installed and the 1100 cartons were loaded into the trailer on pallets. Forty-five cartons were arranged in an 8-stack configuration resulting in a chimney extending down through the stack. Air sampling was obtained inside and outside the fumigated truckload. Personal air samples for workers involved in transportation and off-loading of the grapefruit were obtained. The truck was ventilated with forced mechanical ventilation prior to departure and en route via vents in the front and rear of the truck. Thirty-five hours after fumigation, the vents were closed and the truck was refrigerated at 60 F. After 87 hours, the front and rear vents were opened until arrival at the destination in Irvine, California at 95 hours. Although preliminary results indicate high ambient air concentration of EDB inside the truck (150 ppb - 3600 ppb) en route, due to off-gassing, personal measurements of worker exposure were less than 30 ppb. These results indicate that effective control measures can significantly reduce worker exposure to EDB.

OSHA is continuing an assessment of the health risks associated with occupational exposure to EDB under various exposure conditions. In response to the need for a more protective standard, OSHA will issue an Advanced Notice of Proposed Rulemaking as the next step toward appropriate regulatory action.

We appreciate your previous offer to assist us in our efforts and hope that you will continue to share your information and comments with us. We look forward to working with you on this and on other matters of mutual concern.

Sincerely,

Thorne G. Auchter
Assistant Secretary

Enclosure