

HUMAN OCCUPATIONAL ILLNESSES DUE TO EXPOSURE
TO PESTICIDES CONTAINING METHYL BROMIDE
REPORTED BY PHYSICIANS IN CALIFORNIA
IN 1979

By

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SUMMARY

In 1979, California physicians reported 42 occupational exposures resulting from exposure to fumigants containing methyl bromide. There were 23 systemic illnesses, 7 eye injuries, and 12 skin injuries reported. Information for this report was obtained from Doctors' First Reports of Work Injury, other medical reports, and follow-up investigations completed by county agricultural commissioners' staffs.

INTRODUCTION

There were 42 cases of occupational illness resulting from exposure to methyl bromide reported by California physicians in 1979. This is up from the 35 reported in 1978. Six of these cases involved field fumigators setting down or taking up tarps. Six incidents involved faulty cans, hoses, couplings, or applicators. Three exposures resulted from improper use of 1-pound cans. Two other exposures involved open fumigation chamber doorways. Thirteen firemen (1 incident) were exposed to methyl bromide fumes while extinguishing a fire in a shed containing methyl bromide.

Methyl bromide is a colorless, nearly odorless gas which is applied from pressurized cylinders or cans in which it exists in the liquid state. The boiling point is 4.5°C.

Methyl bromide is a general-purpose fumigant used primarily for soil fumigation to control nematodes and weed seeds. It is also used as a commodity fumigant to control pests on grains, nuts, vegetables, and indoor plants, and as a structural fumigant to control insects.

Methyl bromide is applied to the soil as a gas, either by injection into the soil or by release under tarps above the surface of the soil. In most applications, the soil is covered with a tarp to prevent premature escape of the gas. Commodities are most often fumigated in an enclosed chamber. Granaries, trucks, ships, and structures may be fumigated under a tarp.

8,371,274 pounds of methyl bromide were reportedly used in California in 1979. This is an increase from the 5,585,020 pounds reportedly used in 1978.

Products known to have been involved in human exposure incidents in California in 1979 include:

1. Dowfume MC-2 (Dow Chemical: EPA Reg. No. 464-104-AA); methyl bromide 98%, chloropicrin 2%.
2. Dow Methyl Bromide (Dow Chemical: EPA Reg. No. 464-3-AA); methyl bromide 100%.
3. A-Gel TG-67 (Great Lakes Chemical: EPA Reg. No. 5785-50003-AA); methyl bromide 67%, chloropicrin 30.64%, inert ingredients 2.36%
4. Brom-O-Gas (Great Lakes Chemical: EPA Reg. Nos. 5785-4-AA and 5785-42-AA); methyl bromide 98%, chloropicrin 2%.
5. Terr-O-Gas 75 (Great Lakes Chemical: EPA Reg. No. 5785-40 AA); methyl bromide 75%, chloropicrin 24.1%, inert ingredients 0.9%.
6. Namco Methyl Bromide (Van Waters & Rogers: EPA Reg. No. 550-130 AA); methyl bromide 100%.
7. Namco Namfume (Van Waters & Rogers: EPA Reg. No. 550-131 AA); methyl bromide 99.75%, chloropicrin 0.25%.

8. Methyl Bromide 99.5 (Soil Chemicals: EPA Reg. No. 8536-12 AA); methyl bromide 99.5%, chloropicrin 0.5%.
9. Tricon 57/43 (Tri-Cal: EPA Reg. No. 11220-50005 AA); methyl bromide 57%, chloropicrin 43%.
10. Tricon 67/33 (Tri-Cal: EPA Reg. No. 11220-50006 AA); methyl bromide 67%, chloropicrin 33%.

SUMMARIES OF CASES OF OCCUPATIONAL EXPOSURES
TO METHYL BROMIDE IN CALIFORNIA IN 1979

Systemic Illnesses - 23

A farm worker helped to remove a plastic tarp from strawberry beds which had been fumigated a few days earlier. Two days after the exposure, he consulted a doctor, experiencing stomach pains, sharp head pains, and nausea. He missed 10 days of work.

An orchard worker failed to penetrate a 1-pound can of a methyl bromide-chloropicrin mixture with a clamp-type applicator. When a second attempt was made to penetrate the can, the spot where the first attempt was made broke open, spraying the contents in the worker's face. He was not wearing the required face shield or goggles. After showering, he was taken to a doctor. He experienced sore eyes, a headache, and tightness of the chest. He missed 6 days of work.

An employee of a chemical company was applying methyl bromide when the canister split along the vertical weld, spraying him with the contents. He was taken to a hospital immediately, experiencing abdominal cramps, eye irritation, and tightness of the chest. He missed 3 days of work.

A chemical company employee came in contact with methyl bromide. He missed 4 days of work. No other information was available.

A worker was applying methyl bromide to bulk walnuts. He was wearing a respirator. A leak in the fumigation hose allowed gas to escape. He experienced dizziness, nausea, abdominal cramps, and severe headache, but missed no days of work.

An employee of a nut packaging company was fumigating with methyl bromide. He became ill after inhaling fumes through a partially opened fumigation chamber door. He missed 2 days of work.

A worker was taping a tear in a tarp being used for soil fumigation when he inhaled some gas. He complained of a severe headache and nausea. He then went to a doctor who diagnosed the illness as bromide inhalation with skin reaction. The employee returned to work for the remainder of the day.

An employee of a warehouse company placed a cylinder of methyl bromide fumigant in a rice storage warehouse, and opened the valve. He inhaled a small amount of gas as he was closing the warehouse door. He was not wearing a respirator. He became ill and was taken to a physician.

An employee of a pest control company was responsible for arranging a tarp before soil fumigation. He inhaled some methyl bromide while working. He contacted a physician the next day, who examined him and diagnosed the illness as a slight pharyngeal infection with post-nasal drip. He lost no time from work.

An employee of a company that fumigates ship holds was exposed to methyl bromide while working. Nine days later, he consulted a physician. He had experienced dizziness and numbness in the first 2 fingers of each hand.

Thirteen firemen were exposed to methyl bromide fumes while trying to extinguish a fire in a golf course storage shed. The shed contained methyl bromide kept for maintenance of the course, and was completely burned. The firemen all experienced mild headaches. The physicians consulted diagnosed the exposures as mild methyl bromide inhalation. No work time was lost.

Eye Injuries - 7

A fumigator was adjusting a hose containing pressurized gas which was connected to a heat exchanger. Gas exploded from an allegedly faulty coupling. The worker's protective goggles were blown off of his face by the force of the gas, exposing his eyes. He was treated by a physician and released. He missed 1 day of work.

A worker at a tree nursery had finished shoveling soil over a tarp after completing a fumigation operation. The tractor used in the application restarted, and a stream of methyl bromide hit her eyes and the bridge of her nose. The exposed areas were washed immediately with water. She was treated by a physician and released.

A tractor operator was disconnecting hoses from a fumigation rig when some methyl bromide got in his eyes. He was not assigned to remove hoses. The methyl bromide tanks were turned off, but some of the methyl bromide remained in the lines. He missed 1 day of work.

A farm laborer, assisting in soil fumigation, sealed part of a tarp with soil after a tractor had applied fumigant. Methyl bromide and Trichlor splashed in his eye. He immediately washed the eye, but later experienced blurred vision. He lost no time from work.

An exterminator was attempting to open a container of methyl bromide. He customarily dropped containers to the ground with no apparent effect on the container. In this case, the container broke open, splashing the chemical onto the worker's face and eyes. He immediately washed his eyes, but experienced tearing and eye irritation. He lost no time from work.

A farm laborer was shoveling soil over the edges of a plastic tarp being used for soil fumigation when some methyl bromide gas escaped. He experienced some eye irritation, but missed no days of work.

A ranch manager was moving supposedly empty methyl bromide cylinders when he unwittingly encountered one with an open valve. Methyl bromide contacted his eye. He immediately washed the eye. He lost no time from work.

Skin Injuries

A farm worker was applying fumigant to tree holes by burying a can of methyl bromide in a hole and then puncturing the can with a rod while steadying it with his foot. He showered twice during the day, but by the next morning he had developed first and second degree burns on his foot. He was disabled for 8 days. He did not have the proper safety equipment or applicator for this job.

An exterminator removed a methyl bromide hose from a recently fumigated house and afterwards developed second degree burns on his fingers. He missed 3 days of work.

An exterminator was involved in the fumigation operation at a factory when his hand and foot came in contact with methyl bromide. He developed second degree burns in those areas. He was treated by a physician and released.

A supervising agricultural biologist was overseeing the destruction of a load of nematode-infested plants at a nursery. As part of this procedure, he fumigated the load with methyl bromide. Several 1-pound cans leaked because of the clamp type of applicator used. It was suspected that the inside of the protective gloves the worker wore were contaminated with methyl bromide. He developed second degree burns on one hand, missing 1 day of work.

An agricultural biologist was fumigating infested soil at a nursery. Although he wore protective gloves, the worker later developed second degree burns on his hands. It was again suspected that contaminated gloves caused the injury.

An exterminator was applying methyl bromide to a squirrel burrow when the applicator hose broke, spilling the fumigant on the worker's shoe. He was not wearing any safety equipment and was not authorized by his employer to use methyl bromide for this assignment. He cleaned the shoe, but did not remove it or wash his foot. Several days later, he developed second degree burns. The injury was treated by a physician.

A salesman for a chemical company developed chemical burns on his arms after being exposed to methyl bromide. He did not miss any days of work.

A farmer was fumigating replant sites with methyl bromide when the applicator nozzle he was using became obstructed. While unplugging the nozzle, the worker's finger contacted the chemical. He developed a chemical burn, but lost no time from work.

A farm laborer was fumigating tree transplants when his shoes and lower pants leg became contaminated by methyl bromide. He continued to wear the shoes until he consulted a physician 4 days later. His injury was diagnosed as contact dermatitis. The worker missed no days of work.

An officer at a correctional institution broke a manufactured glass tube containing methyl bromide, splashing it on his forehead and forearm. There was only minor irritation of the skin, and he lost no time from work.

While packing chemicals, an employee of a chemical formulating company contacted one chemical, possibly methyl bromide, and developed contact dermatitis on one hand. He lost no time from work.

A field fumigator was exposed to methyl bromide, and missed 10 days of work. No further details were available.

DISCUSSION

Methyl bromide is a commonly used fumigant throughout California for soil, commodity, structural, nursery, and greenhouse fumigations. Like any other pesticide, methyl bromide must be used in strict accordance with its registered label. All safety information must be rigidly followed to avoid worker injury.

The circumstances surrounding accidents reported during 1979 were similar to those reported in 1978. Accidents directly involving transfer or injection hoses decreased, but those involving tarp securement or removal increased. The total number of workers injured by methyl bromide was slightly higher in 1979, but included 1 exposure incident involving 13 firemen. Another reason for the higher number is that 2,786,254 more pounds of methyl bromide were reportedly used in 1979 than were used in 1978.

Lack of adequate safety and knowledge of proper application techniques contributed to some of the incidents. A dynamic employee safety program could alert the applicators to unsafe conditions or situations, decreasing the probability of worker exposure.

Equipment failure (i.e. transfer hose rupture, cylinder or valve failure) is difficult to prevent. By conducting a thorough preapplication inspection of all equipment, however, faulty units might be identified and replaced.

Continual safety education is the most effective way to avoid worker injury. It is imperative that all users be familiar with the hazards involved in methyl bromide fumigation. The product label will serve as a starting point for safety training. In particular, when and how to use respirators must be continually reviewed to ensure individual safety.

Only when proper safety and use techniques are followed can the worker's exposure be significantly reduced.

TABLE I

Occupational Exposures to Pesticides Containing Methyl Bromide in 1979
by Type of Fumigation and Type of Injury

<u>Type of Fumigation</u>	<u>Injury Type</u>			<u>Total</u>
	<u>Systemic</u>	<u>Eye</u>	<u>Skin</u>	
Commodity	3	1	2	6
Field	4	4	4	12
Manufacturing/Formulation	1	0	2	3
Structural	2	2	4	8
	<u>10</u>	<u>7</u>	<u>12</u>	<u>29</u>
	<u>13*</u>			<u>13</u>
	<u>23</u>			<u>42</u>

*The 13 firemen exposed to methyl bromide fumes from a burning shed are classified separately here.

TABLE II

Occupational Exposures to Pesticides Containing Methyl Bromide in 1979
by Injury Type and Days of Disability

<u>Days of Disability*</u>	<u>Injury Type</u>			<u>Total</u>
	<u>Systemic</u>	<u>Eye</u>	<u>Skin</u>	
None	1	4	4	9
1-3	2	2	3	17
4-7	3	0	0	3
8-11	1	0	2	3
Unknown	16	1	3	20
	<u>23</u>	<u>7</u>	<u>12</u>	<u>42</u>

*Days of disability are days of work missed, including hospitalization.

TABLE III

Occupational Exposures to Pesticides Containing Methyl Bromide in 1979
by County of Occurrence

Alameda	1	Sacramento	1
Colusa	1	San Bernardino	3
Humboldt	1	San Joaquin	2
Kern	4	Santa Clara	14
Los Angeles	4	Sonoma	1
Merced	1	Stanislaus	2
Monterey	1	Sutter	1
Orange	1	Ventura	1
Riverside	1	Yolo	2