

1990

38

15

Union Carbide in Bhopal, India The Lingering Legacy

Analyses of Carbide Related Toxins at the Former UCIL Site

National Toxics Campaign Fund
37 Temple Place 4th floor
Boston, MA 02111 tel. (617) 482-1477

Date of Report: April 24, 1990
Printed on 100 % recycled paper

Laboratory Test Results

Samples sent by the Bhopal community were analyzed by gas chromatography/ mass spectrometry. The purpose of the analysis was to determine whether any toxic materials associated with the now closed Union Carbide facility were still present in the environment. Tests were performed on three different media including:

- 1) Sediment from a waste storage area abandoned by Carbide
- 2) Surface soils proximate to the abandoned plant
- 3) Drinking water from the adjacent community

High levels of toxic materials were found in the samples from the waste storage area. One of the most toxic, dichlorobenzene, was also found in the community's drinking water. Dichlorobenzenes damage the liver, kidneys, and respiratory system. Polynuclear aromatic hydrocarbons (PAHs), a group of known cancer causing agents, were also discovered in the waste impoundment area. Phthalates were discovered in the surface soils and in the waste pond. Phthalates are toxic to the liver.

Additional toxins were also discovered in soil samples from the area. The results of the analyses are summarized below. All data are in parts per billion.

	<u>Waste Pond</u>	<u>Soil</u>	<u>Drinking Water</u>
Benzene, oxybis- *	7,890.	nd	nd
Dichlorobenzenes	87,500.	82.	722.
PAHs	2,340.	nd	nd
Phthalates	9,940.	109.	nd
Trichlorobenzenes	9,410.	17.	24.
Trimethyl Triazinetrione *	24,470.	nd	nd
1-Naphthalenol	59,090.	nd	nd

PAHs = Polynuclear Aromatic Hydrocarbons

* = Tentatively identified compounds, 95 % or better confidence limit

nd = not detected, less than 5 ppb

The Citizens' Environmental Laboratory is a project of the National Toxics Campaign Fund, designed to provide reliable, affordable, and unbiased testing services for citizens and environmentalists. The provision of this service has been made possible by tax exempt contributions to the National Toxics Campaign's Laboratory Endowment Fund.

Laboratory Test Results

Samples sent by the Bhopal community were analyzed by gas chromatography/ mass spectrometry. The purpose of the analysis was to determine whether any toxic materials associated with the now closed Union Carbide facility were still present in the environment. Tests were performed on three different media including:

- 1) Sediment from a waste storage area abandoned by Carbide
- 2) Surface soils proximate to the abandoned plant
- 3) Drinking water from the adjacent community

High levels of toxic materials were found in the samples from the waste storage area. One of the most toxic, dichlorobenzene, was also found in the community's drinking water. Dichlorobenzenes damage the liver, kidneys, and respiratory system. Polynuclear aromatic hydrocarbons (PAHs), a group of known cancer causing agents, were also discovered in the waste impoundment area. Phthalates were discovered in the surface soils and in the waste pond. Phthalates are toxic to the liver.

Additional toxins were also discovered in soil samples from the area. The results of the analyses are summarized below. All data are in parts per billion.

	<u>Waste Pond</u>	<u>Soil</u>	<u>Drinking Water</u>
Benzene, oxybis- *	7,890.	nd	nd
Dichlorobenzenes	87,500.	82.	722.
PAHs	2,340.	nd	nd
Phthalates	9,940.	100.	nd
Trichlorobenzenes	9,410.	17.	24.
Trimethyl Triazinetrione *	24,470.	nd	nd
1-Naphthalenol	59,090.	nd	nd

PAHs = Polynuclear Aromatic Hydrocarbons

* = Tentatively identified compounds, 95 % or better confidence limit

nd = not detected, less than 5 ppb

The Citizens' Environmental Laboratory is a project of the National Toxics Campaign Fund, designed to provide reliable, affordable, and unbiased testing services for citizens and environmentalists. The provision of this service has been made possible by tax exempt contributions to the National Toxics Campaign's Laboratory Endowment Fund.

THE NATIONAL TOXICS CAMPAIGN

working to solve America's environmental crisis



National Office
37 Temple Place
Boston, Mass. 02111
(617) 482-1477

Western Regional Office
P.O. Box 6607
Denver, Colo. 80205
(303) 733-9714

Northeast Regional Office
R.R. 1, Box 565
Poland Spring, Maine 04272
(207) 926-3434

Southern Regional Office
P.O. Drawer 1526
Livingston, Ala. 35470
(205) 652-9854

West Coast Office
2100 H Street
Sacramento, Cal. 95816
(916) 446-3350

Texas Office
3400 Montrose Street #909
Houston, Texas 77005
(713) 529-8038

Oklahoma Office
3800 United Founders Blvd. #125
Oklahoma City, OK 73112
(405) 524-3249

North Carolina Office
619 B. O'Brien Road
Raleigh, N. Carolina 27605
(919) 828-5509

Washington, D.C. Office
P.O. Box 28771
Washington, D.C. 20005
(202) 291-0820

California Office
P.O. Box 1447
Berkeley, Cal. 94601
(415) 232-0437

New Hampshire Office
22 Main Street
Salem, New Hampshire 03079
(603) 524-0447

Glossary of Toxic Pollutants in Bhopal Sample

AROMATIC HYDROCARBONS - gasoline-like solvents including di- and trichlorobenzenes, phthalates, naphthalenol, and polynuclear aromatic hydrocarbons (PAHs.) Many of these compounds are highly toxic and/or carcinogenic. The presence of these chemicals is indicative of industrial contamination. Normally absent in water.

BENZENE, OXYBIS - no toxicity data available: Formed by the oxidation of benzene, often as a byproduct of maleic anhydride production.

DICHLOROBENZENES - an insecticide and chemical intermediate. Damages the liver and kidneys. Also causes nervous system damage, eye irritation, weight loss, and sometimes death.

NAPHTHALENES - an aromatic hydrocarbon and constituent of petroleum. Often associated with combustion by-products. Lethal to fish at 1 to 10 ppm. Used as an insecticide.

NAPHTHANOL - a moderately toxic breakdown product of naphthalene.

PHTHALATES - including bis-2-ethylhexyl phthalate and others, used to soften plastics. Highly nonbiodegradable, can cause liver and kidney damage and birth defects.

POLYNUCLEAR AROMATIC HYDROCARBONS - (PAHs) These are a group of various aromatic (benzene-like) compounds. Many of these are carcinogenic. Most are very persistent in the environment.

TRICHLOROBENZENES - an insecticide, sometimes used in dye making. Toxic to the liver and kidneys. Very persistent in the environment.

TRIMETHYL TRIAZINTRIONE - triazines are a class of herbicides. May cause muscular weakness, ataxia, and convulsions at high doses. Toxic to fish. May inhibit reproduction in animals.
Ruminants are especially sensitive.

Source: Patty's Industrial Hygiene and Toxicology. 3rd Revised Edition. 1981. Clayton