

March 1, 1994

THE DOW CHEMICAL COMPANY
VINYL CHLORINE MONOMER STATEMENT

The Dow Chemical Company is evaluating claims that the manufacture of vinyl chloride monomer (VCM) causes the creation of harmful levels of dioxins.

Dow has established a VCM Quality Task Group. Its objective is to make sure that human health and the environment are not put at risk by any of Dow's VCM operations.

Dioxins are by-products of incomplete combustion and are derived from industrial sources as well as commonplace sources such as automobiles and trucks, cigarette smoking, barbecue grills, wood burning stoves, fireplaces and even lightning strikes.

These various sources of low-temperature combustion create dioxin that can be detected everywhere in extremely low background levels. Scientists have found no adverse effects on humans or the environment at current background levels of dioxin.

Stack sampling of the two Midland, Michigan incinerators, during regular operations and trial burns, have shown emissions well below any level of health or regulatory concern.

In addition, Dow will conduct VCM vent stack sampling at its three North American VCM plant sites (Fort Saskatchewan, Canada, Plaquemine, LA and Freeport, TX) within twelve months.

Dow believes that it has a responsibility to its employees, its neighbors, its suppliers and the environment, and takes that responsibility seriously. Dow's processes and technologies are state of the art, and the company spends millions of dollars each year to improve them. Dow's facilities operate well within the statutory limits set by federal and state regulators.

R&S 143551

Dioxin Testing Vinyl Chloride Monomer

Agenda

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3. Dow's Response
4. Industry's Position
5. Why testing? - Rationale for Testing at the Fort
6. What are Dioxins?/How do we get exposed to Dioxins?
7. Health Effects/Dow data
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9. Testing Process/Timing
10. VCM plant systems and recent improvements
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Purpose:

To provide information to Vinyl Chloride Monomer (VCM) employees and contract personnel on why the VCM plant will be testing for dioxins in early summer 1994.

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Background

- In May 1993, Greenpeace released its "Dioxin Factories" report, based on studies at Ethylene Dichloride/Vinyl Chloride Monomer facilities in the Netherlands, Germany, Sweden and Norway.

The report said:

- polyvinyl chloride (PVC) is the world's largest source of dioxins;
- extremely high levels of dioxins are found in emissions from EDC/VCM plants—the raw materials of PVC;
- dioxins, and therefore EDC/VCM plants, are responsible for serious human health problems.

Their conclusion:

Ban all chlorine & chlorine-derivative products,
including EDC/VCM.

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Dow Response

- Dow is committed to the health and safety of employees, the general public and the environment.
- We support the elimination of those compounds proven through science to be unacceptable from a health or environmental standpoint, e.g. CFCs, PCBs, methyl chloroform.
- We do not support a blanket ban on all chlorine products. Over 15,000 chlorinated compounds—each one with varying characteristics, behaviours, and benefits to our quality of life.
- We support further studies to identify and reduce possible adverse impacts caused by toxic, persistent, and bio-accumulative substances, SOME of which are chlorinated.
- Waste reduction at the source is the ultimate answer and must be increased in intensity.
- We work closely with industry groups (Chlorine Institute, CCPA), government (Alberta Environmental Protection, Environment Canada), environmental groups (New Directions Group), & the community to find ongoing solutions.

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Industry Position

- Vinyl Institute and ECVI asked ChemRisk (an environmental consulting company) for critique of "Dioxin Factories" report:

The report said:

- No scientific basis for concluding that PVC is the largest source of dioxins;
- Generalized the findings from 4 single facilities to all facilities worldwide, without regard for differences in regulations, facility designs, processes or operating practices;
- Generalized findings from a few limited compounds to over 15,000 different chlorinated compounds;
- Presented numerous unfounded conclusions pertaining to the amount of dioxins released to the environment;
- Exaggerated the amount of dioxins received by general population;

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Why does Dow want to test for dioxins at the Fort's VCM plant?

- To work with Environment Canada, and Alberta Environmental Protection, to assess the potential impact of our operations on health and the environment.
- To implement further process improvements if necessary;
- To provide valuable data for other VCM plants throughout Dow.

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Testing Process/Timing

WHAT

Finalize testing protocol with Environment Canada, e.g. which stacks to test, which compounds will be sampled and tested.

Prepare for accurate sampling, e.g. uncontaminated glassware, line up equipment and consultants.

Dry-run of testing and analysis - collect preliminary samples in order to pretest equipment and ensure accuracy, & make process improvements if required during shutdown.

VCM annual maintenance shutdown.

Environment Canada/Dow testing.

Send samples to labs for testing (lab to be approved by Environment Canada).

Communicate results to employees and local residents.

WHEN

March

March/April

April

May

June/July

July/Aug.

September/
October

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What are dioxins?

(Source: Priority Substances List Assessment Report No. 1 - CEPA Health Canada)

- term used loosely to describe two families of chemicals:
 - polychlorinated-p-dibenzo-dioxins or "dioxins" (75)
 - polychlorinated-p-dibenzo-furans or "furans" (135)
- toxic, persistent, bioaccumulative;
- great deal of inaccurate information about dioxins. Media often focus on toxic effects of just 1 of 210 compounds namely— 2,3,7,8-tetrachlorodibenzo dioxin (2,3,7,8-TCDD);
- 2,3,7,8-TCDD is the most toxic of all dioxins;
- toxicity of other dioxins and furans is up to 10,000 times less toxic than 2,3,7,8-TCDD;
- dioxins can be from natural phenomena or human activity: natural - volcano, forest fire; man made - pentachlorophenol wood preservative, incineration, pulp bleaching, PCBs.

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Health Effects

(Source: Priority Substance List Assessment Report No.1 - CEPA Health Canada)

- Dioxins are extremely toxic to some species of animal. Humans are much less susceptible.
- Much of our understanding comes from studying people with extremely high exposures.
- Some of their symptoms included:
 - Chloracne
 - Weight loss, loss of appetite
 - Skin discoloration
 - Liver damage
 - Neurological & Psychological effects (numbness, tiredness)
- Epidemiological studies of humans have not shown sustained toxic effects beyond prolonged chloracne;
- An animal carcinogen, but inadequate data to conclude that it is a known human carcinogen (IARC Class 2A - Probably carcinogenic to humans);
- Some uncertainty about effects on immune & hormonal systems, (EPA Health Risk Reassessment may address these issues)

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How do we get exposed to Dioxins?

*(Source: Priority Substance List Assessment Report No.1
- CEPA - Health Canada)*

- Dioxins occur everywhere in the environment: food, water, air, soil.
- Canadian lifetime allowable intake = 10 picogram/kg/day;
- Average adult Canadian exposure 2 to 4 picogram/kg/day;
- More than 95% of the exposure through ingestion (food, water);
- Smoking 1 pack of cigarettes a day = 0.5 picogram/kg/day;
- Comparatively speaking, dioxin exposure at work is insignificant.

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Does Dow have any health data?

- Yes, annual employee health reviews
- VCM employees receive more frequent tests, e.g. serum liver enzymes, lung function, kidney function.
- The lack of Hexachlorobenzene in a blood test indicates chlorinated organics are not accumulating in the body.
- No Fort Saskatchewan VCM worker has blood HCB above detection limit;
- VCM workers at Louisiana and Texas sites (operations since mid-1970s) have less cases of abnormal liver, lung and kidney functions than other workers in other Dow plants;

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VCM Process improvements

- Installed carbon monoxide (CO) analyzers to monitor combustion efficiency. The levels of CO indicate that VCM is operating under good combustion conditions;
- When efficient combustion occurs the likelihood of products of incomplete combustion forming, such as dioxins, are minimal.

In addition:

- Installed new flow transmitters to better monitor stack emissions last year.
- Process Control team made improvements in plant operation, resulting in 4 flaring incidents in 1994, down from 1/week in 1993. (Reduced plant "upsets" reduces the likelihood of products of incomplete combustion entering the environment).

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Follow-up Communication:

- All Fort Saskatchewan employees will receive information on VCM testing in *Fort Newsline* article.
- Test results communicated to employees and local residents in September/October.
- If you have any comments or concerns, please contact:

Denis Bisson, VCM superintendent

Prasad Puttagunta, VCM production supervisor

Ken Wong, Occupational Health supervisor