

Workers exposed to toxic chemicals

by Alison Thomson

Carcinogens (cancer-causing agents) and other dangerous chemicals in foods, the environment, and other media which affect the public have attracted a lot of attention recently.

Various consumer and environmental activist groups exist to combat these sorts of dangers to the public. An issue which has received less attention, however, is the effect of these chemicals on the people who are exposed to them in the first instance — the workers in the industries affected.

Benzene is a prominent example of a dangerous chemical to which workers are exposed. Benzene is both a raw material and an intermediate in the production of other organic chemicals such as dyes, drugs, and detergents. It is obtained through various petroleum distillation techniques.

It is also a carcinogen, and it creates several other types of health hazards. Benzene enters the body primarily by inhalation, although some absorption through the skin may occur.

Acute exposure to benzene results in symptoms similar to drunkenness. In high concentrations, death may ensue.

Acute benzene poisoning is relatively rare. Far more common are the blood disorders resulting from chronic exposure. Benzene damages bone marrow, resulting in anemia and shortages of white cells and platelets.

It also causes leukemia, a fatal blood cancer. It is also suspected of causing genetic damage, meaning a worker in a high risk industry might, without showing symptoms himself, pass on a tendency to leukemia to his children.

Because benzene is a carcinogen, there is no safe level of exposure. All efforts should be aimed at eliminating benzene from the workplace. For example, it ought never to be used as a solvent, as there are a multitude of other common organic solvents which are safe. If it must be used as a raw material, it ought to be enclosed and the workers ought to wear protective clothing.

Unfortunately, this has not always happened. At two Goodyear Rubber plants in Ohio, workers were involved in the manufacture of a film wrap which requires the use of large amounts of benzene. In a population where .38 deaths from leukemia would be expected statistically, seven in fact occurred. Occupational Safety and Health Administration (OSHA) in the United States attempted to bring in emergency safety standards with respect to benzene; however, the American Petroleum Institute and ten major oil companies were successful in delaying the effective implementation date of the standards.

The motive for this delay is fairly obvious — the American Petroleum

Institute announced that implementation could "run into billions of dollars." API also said "benzene control measures ... would be disruptive to the nation's economy and costly to the public."

A Shell Oil vice president later told wives of striking workers that "benzene won't hurt you unless you drink it or take a bath in it."

One can only conclude from this that a number of industries which have been criticized for their use of the chemical must have very strange manufacturing processes.

Benzene is not the only culprit. Workers in a plant in Puerto Rico, owned by Ortho Pharmaceuticals (which manufactures birth control pills) have suffered symptoms of excess estrogen absorption. This manifests itself as a decline in sexual drive in the men, and menstrual problems in women.

Similar problems were observed in a plant in Chicago Heights which manufactures diethylstilbestrol (DES) used in the "morning after" pill and in animal feed. DES has also been implicated as a carcinogen. In 1977, the lab was fined for violations of standards of safety.

Other examples abound. Acrylonitrile, used in textile plants, has been shown to be cancer-causing at various sites in the body. This is a long term effect, and only appears twenty years after the exposure, so the only data available refers to workers exposed between 1950 and 1955. The chemical has also been demonstrated to cause tumors in rats.

Workers in pesticide plants have been discovered to be sterile as a result of exposure to 1,2, dibromo-3-chloro propane.

Workers at a beryllium extraction plant have developed upper respiratory cancer as a result of exposure to the beryllium, a metal valued for lightness and heat resistance.

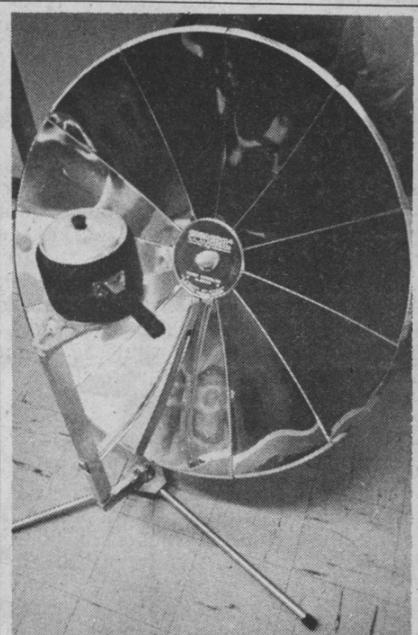
Petroleum workers are exposed to

high boiling petroleum oils, tars, creosote, and isopropyl oil, among other things. These chemicals have been implicated in skin cancers, and lung and larynx cancers.

And the list goes on and on — and on. Some of these chemicals are regulated by government authority, but the main protection for workers from these dangers to their health is the protection of their unions.

And will probably continue to be as long as it is financially advantageous for companies to continue to poison their workers.

The source of the information in this feature is *Lifelines*, the safety bulletin of the Oil, Chemical, and Atomic Workers International Union.



This parabolic cooker was part of the solar display at Corbett Hall last weekend. Heat is radiated by the mirrors onto a central point, in this case a heat-absorbing black pot.

Environment sickens students

MONTREAL (CUP) — Environmental studies continue at Dawson College's Richelieu campus following a rash of mysterious illnesses among the staff and students.

Envirobec began work February 14 to determine if the air and water in and around the campus are responsible for the numerous cases of dizziness, nausea and headaches which have been reported since last June.

Carbon dioxide, sulfur dioxide, carbon monoxide oxygen and dust levels were found to be within permissible levels. Further tests will be conducted next week to determine if ozone or microwave radiation are

responsible for the illnesses. An Envirobec official did report that the ventilation system in the main campus building was poor.

Dawson math teacher Lionel Geller said the tests were not conducted during peak operating times. Next week's tests will be carried out on Wednesday, when traffic is heaviest at the campus.

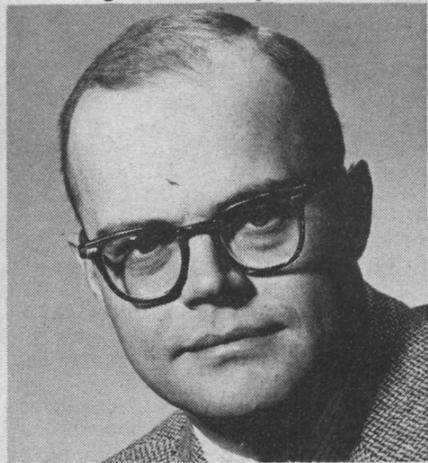
Geller said he had detected the odour of ozone in the electrotechnology lab at the campus. He also believes there may be some correlation between the recently reported sicknesses and the death from leukemia of a Richelieu teacher over the Christmas break.

Disposal site sought

by Mike Walker

The major danger associated with hazardous wastes is the lack of proper disposal facilities, according to a U of A zoology professor.

Dr. Ralph Nursall, chairman of the Environment Council of Alberta (ECA) panel on hazardous waste disposal, says social issues will be the most contentious at the panel's public hearings. Nursall made the prediction because of stiff public opposition to proposals by Kinetic Contaminants Ltd. to locate a waste disposal plant near Fort Saskatchewan or Two Hills. But, he says, "it will be of more use to dispose of wastes appropriately than to have them lying around stored or disposed of inadequately." The dangers associated with centralized hazardous waste disposal are small compared to the danger of non-regulation, he says.



Dr. R. Nursall

Alberta industry is "producing an increasing amount of industrial waste," he says, and many firms in small and medium-sized industries are not disposing of it properly. In many cases, waste is simply stored in oil drums, tank cars and surface ponds.

Hazardous waste disposal involves no acute dangers by comparison, he says. Most conversions of waste now release only harmless compounds such as water and carbon dioxide.

Transportation he says, is also comparatively safe, since wastes are usually transported in solid or semi-solid form in small quantities and at low pressures.

A hazardous waste disposal site should be centrally located, according to the Hazardous Waste Management Committee's report to provincial Environment Minister Jack Cookson.

The report, which Nursall says will form the basis of the ECA panel's hearings, recommends establishment of collection points around the province and transportation to a central location for disposal.

ECA information officers are now distributing the committee's report to the public in preparation for the panel's public hearings.

Sixteen hearings will be held from late April to June in locations around the province. Nursall says he hopes the panel will report to cabinet by the end of summer.

Other members of the panel are Bill Ross, a chemical engineer with Imperial Oil Ltd., Dr. Peter Ardie, former head of biomedical research at the Defence Research Establishment at Suffield and Alistair Crerar, ECA chief executive officer.

What went wrong at Three Mile Island? relative perspectives

by W. Reid Glenn

The next several articles will be concerned with the sequence of events on the morning of March 28, 1979 at the Three Mile Island No. 2 Plant of Metropolitan Edison. This particular pressurized light water unit was commissioned in May of 1978 and contained over forty tons of enriched uranium fuel in a reactor designed by Babcock and Wilcox.

Up until 4:00 a.m. the reactor was functioning normally, producing over 900 MWh of electricity. The operators were, however, experiencing continuing difficulty with the system which removed impurities from the condensed steam circulated in the plant. Normally heat from the reactor flows through steam generators to their secondary coolant side where the heat is put to work evaporating water at high pressures.

The resulting steam is harnessed by turbines and subsequently condensed at low pressure and river water temperature. The condensate is then cleaned and forced by several pumps, back to the steam generators. In order to clear the plugged resin bed, plant operators were simultaneously injecting compressed air and water into the tank.

Air was available at less than 100 P.S.I.G. while water pressure was higher than 150 P.S.I.G. This state of affairs led to water backing up into the compressed air piping from the injection connections on the condensate polisher tank. Eventually the water crossed over into the instrument air system through an intertie connection. Instrument air piping should supply dry, clean air to the many pneumatic valves and control loops in a plant but with water replacing

air, serious problems resulted.

Several valves, supplying pumps on the secondary coolant side of the plant, shut because water had infiltrated into the instrument air system. With their supply shut off, the pumps could no longer product flow and so automatically shut down. Thus after 4:00 a.m. at T.M.I. coolant flow was lost on the secondary side of the main heat exchangers.

Emergency coolant flow to these steam generators should have been immediately supplied but valves were incorrectly positioned. As a result, the heat still being generated by the nuclear core began to boil out the water remaining on the secondary side of these main heat exchangers. After 90 seconds to total loss of flow the steam generators were dry on the secondary side and so the primary side (the nuclear core) was not being cooled effectively.

Eight minutes into the incident an operator correctly opened the valves allowing emergency coolant flow to the steam generators. It is believed that the thermal shock of cold water on the hot tubes led to cracks and leaks in these heat exchangers.

Normal flow was reestablished on the secondary side within an hour of the initial trip and only then did the reactor begin to be cooled again. However, a much more serious problem was caused by this loss of feed water which was to result in the almost complete destruction of the reactor core.

NOTE: These articles have been based upon the Nuclear Safety Analysis Centre's appraisal of the incident; available from the Electric Power Research Institute in the U.S.A.