

# AIR

## and industry

The following is a short summary of a report entitled "Air Pollution in Edmonton" originally issued by "The Edmonton Anti-Pollution Group" and updated by Dr. E.E. Daniel of the "Interdisciplinary Committee for Environment Quality". Editing of the updated report was done by Louise Swift of S.T.O.P. (Save Tomorrow Oppose Pollution).

Edmonton is in a sub-arctic climate, with a long winter. The city is situated on a plain, with a small part of its area in the valley of the North Saskatchewan River. There is stable air (temperature inversion) over the city nearly every night, and in winter on over half the days as well. In stable air, little mixing of upper and lower layers takes place, and pollutants remain near the level at which they have been released. The city often creates a "heat island", in which the air is unstable in the low levels.

Unfortunately this heat island has vertical as well as horizontal limitations, so that the amount of air into which pollutants become uniformly mixed is still limited. Statistically, the heat island is shallowest with southerly and south-easterly winds, so that pollutant sources in those sectors would have the worst effect on the center of the city when such winds occur.

Our very cold winters result in formation of an "ice-fog" arising from large volumes of water vapour emitted from all combustion processes. This "ice-fog" tends to increase and extend temperature inversions.

Edmonton has light winds on the average, with only infrequent spells of strong winds, so there is no great amount of air "flushing" as in some parts of Alberta.

### Refinery Row

Special problems arising from the Texaco, Gulf and Imperial Oil refineries on Highway 16A East include emissions of hydrogen sulfide, SO<sub>2</sub>, and hydrocarbons.

There are at least two ways in which these problems could be monitored and controlled: either by (1) appropriately positioning monitors for SO<sub>2</sub>, hydrogen sulfide and hydrocarbons around the area and within it and correlating data obtained from these with meteorological data about inversion and wind conditions, or (2) monitoring effluents from the various plants and laying down limits on effluent emissions.

The air pollution approval for Texaco Canada Ltd. dated October 16, 1968 is the last one that has been made available to us. The approval states that on a total output per day of 17,300 barrels of crude oil, the total sulphur dioxide emission rate from all units shall not exceed 7.7 short tons of SO<sub>2</sub> per day during all operating days except for a two week period during either December, January or February at which time the maximum SO<sub>2</sub> emission rate shall not exceed 9.1 short tons of SO<sub>2</sub> per day. The reason for this exception is not clear and as no data have been provided by the government regarding emission from this plant, no excuses can be made for this dispensation clause.

In addition, the terms of the approval in other respects are vague in the extreme, for example, item no. 4 states "that odor and hydrocarbon emissions from the A.P.I. separator must be *minimized* as much as practical" and no. 5 states that "a vent scrubbing system which *virtually* removes all mercaptans from the two spent phenolic caustic tanks and the deep well disposal charge tank must be installed *as soon as possible*, but in any event not later than the next plant turn-around." (Our emphasis)

Item no. 6 of the approval states that a network of six hydrogen sulfide and total sulfation cylinder stations will be set up and maintained and that the results of these stations will be forwarded to the Provincial Board of Health (now the Department of the Environment) before the end of the month following a one-month exposure period. We have not been given any data from these stations, if they exist.

Since 1970, final air pollution approvals for Imperial Oil and Gulf Oil have been obtained. Imperial Oil approval is based on a maximum plant crude oil inlet rate of 41,000 barrels per day and the maximum release of sulphur dioxide from all sources at the refinery to the atmosphere shall not exceed 6.0 long tons per day. These conditions and requirements shall be in effect until November 1, 1974, or such other date as approved in writing by the Director of the Division of Standards and Approvals. At that time the plant capacity may be operated up to a maximum processing rate of 15% over the name plate input capacity of 140,000 barrels per stream day of crude

# SO<sub>2</sub> by the long ton

oil. The maximum release of sulphur dioxide to the atmosphere shall not exceed:

a. a concentration of 630 parts per million in the main stack or

b. a rate release of 2.82 cu. ft. per second (70 degrees F. & 14.7 pounds per sq. in. absolute) in the main stack.

The total release of sulphur dioxide permitted in a and b above together with that from other possible sources in any single day shall not exceed 18 long tons.

The Gulf Oil Canada Limited approval is based on a maximum plant crude oil inlet rate of 80,000 barrels per day and the maximum release of SO<sub>2</sub> from all sources at the refinery to the atmosphere shall not exceed 33.2 long tons per day.

Again, other terms of the approval are vague. Number 3 states "All aspects of the refinery operations shall be conducted in keeping with *good air pollution control practices* to minimize malodorous and particulate emissions to the atmosphere with the necessary maintenance of all air pollution control equipment and *general good housekeeping*." (emphasis ours)

In comparing the three refineries we find that Gulf is allowed a much larger output of SO<sub>2</sub> than Imperial. Imperial, with an inlet rate of 41,000 barrels per day, can release 6 long tons per day of SO<sub>2</sub>. We would expect then that Gulf, with a plant capacity of 80,000 barrels per day (nearly twice that of Imperial) would be allowed approximately 12 long tons per day. Yet they are allowed 33.2 long tons or nearly three times the emission rate at Imperial. Comparatively, Texaco, with a plant capacity of only 17,300 barrels of crude per day (less than 1/2 that of Imperial) can still put 7.7 short tons of SO<sub>2</sub> per day into the atmosphere and during a two week period in December, January or February up to 9.1 short tons of SO<sub>2</sub> per day.

### Chemcell

This plant is located north of Refinery Row on the Saskatchewan River near the Beverly bridge. As far as we know, no Provincial approval has been issued to Chemcell defining air effluent limits. The Province has supplied data on levels of hydrocarbons and total aliphatic aldehydes from measurements at the Administrative Building and analyses from the high volume samplers.

Clearly there is no basis for assuming that measurements made at the Administration Building or at the high volume sampler bear any relation to Chemcell emissions since they include contributions made by automobile pollution, the oil refineries, and many other sources. Thus the reader will have to draw his own conclusions about the significance of the absence of a final air pollution approval in respect to Chemcell emissions. Since 1970, a portion of the Chemcell plant has been taken out of operation. However, since contributions of Chemcell to the total air pollution problem is not known, no comparison can be made to the present contribution.

### Inland Cement Plant

The contribution of dust fall from the cement manufacturing process carried out by Inland Cement could in previous years be approximated by looking at the total dust fall and percent of calcium in monitoring stations in the City of Edmonton located distant from the source. However, since December, 1971, only monitoring stations 5, 8, and 9 are analyzed for calcium content and these three stations are located in areas close to the cement plant or in areas where batch concrete operations take place.

Before December, 1971, five stations were located peripherally around the Inland Cement Plant. Of these five stations, only one (8) is still in the same location. This makes it impossible to compare total dustfall for 1972 to previous years. It is worth mentioning that during 58% and 40% of 1969 respectively, dust fall at stations located at 149 Street and 115 Avenue, and at 156 Street and 129 Avenue exceeded even the industrial standard, often by huge amounts (up to 239 tons/sq. mile/30 days).

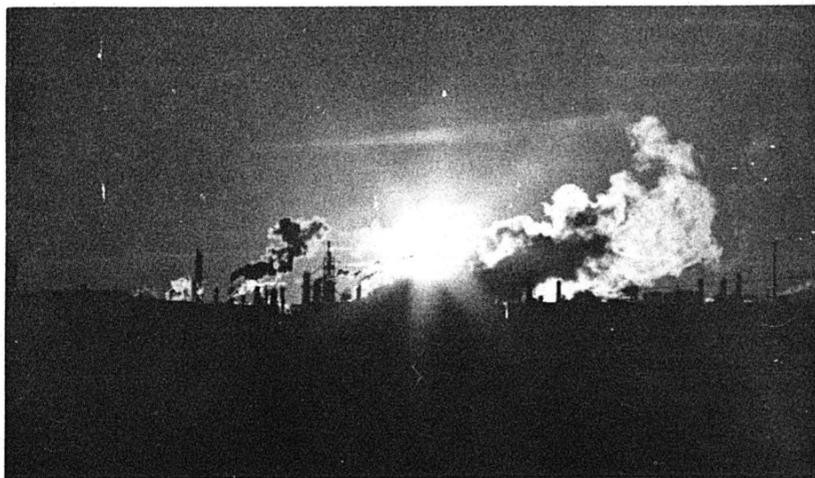
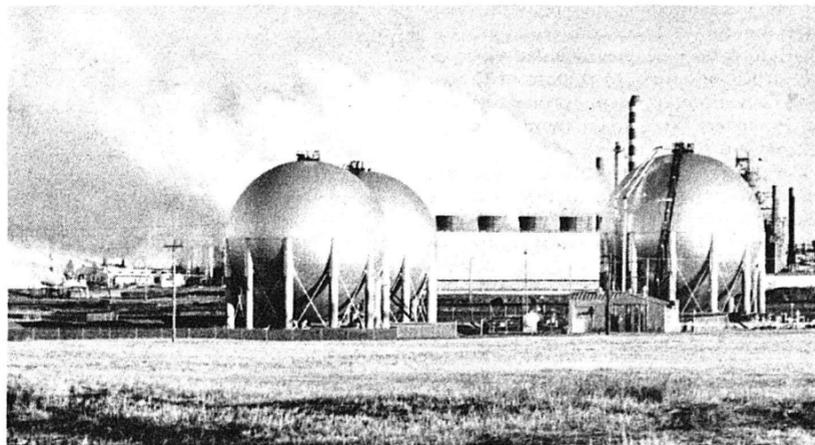
### Incinerator Practices in Edmonton

There is probably no real knowledge of the number of illegal incinerators operating in Edmonton. However, there are approximately 390 legal incinerators in the area.

In reply to a question asking how the Department of the Environment measures emissions and their effects from incinerators in Edmonton, the Department reported that to date (November, 1972) emissions have been measured from only *one* incinerator. In the future, visible emissions will be measured by certified personnel who have been trained to read the Visible Emission Chart on a smoke generating unit. No mention is made of what times these readings will be taken but we suspect that incinerators are operable other than during Department of the Environment office hours.

It is apparent that there is little or no enforcement of regulations in respect to the incinerators in the Edmonton area and there is no regulation or plan of regulations so far regarding shutting down incinerators depending upon the presence of an air inversion.

A report by S.T.O.P. (Save Tomorrow Oppose Pollution) entitled "The University as a Polluter" states in part: "There are a total of eight incinerators on campus, excluding the University Hospital which is not under the jurisdiction of University Administration. Five are pathological incinerators and three are ordinary waste incinerators. Though these incinerators are inspected and reported on monthly by the Physical Plant, there have been no emission checks on them. This means that the *University has no idea whether or not its incinerators comply with*



the Provincial Department of the Environment Regulations regarding the emission of particulate matter, smoke and odour. The emissions from the University Hospital incinerator are notorious as to smoke and odour and again no check on emissions is carried out either by the Hospital or by the Department of the Environment.

### Stelco Edmonton Plant

Final Air Pollution Approval for Stelco issued November 20, 1970 states as follows: "2. The total plant operations shall be carried out in a manner respecting good air pollution practices in order to *minimize* the emission of *gaseous* and *particulate pollutants* that are *not passed through the control equipment*." (emphasis ours)

No standards are set for any pollutants that are not passed through the control equipment. However, item 6 states, "The particulate emission rate from the dust collector shall not exceed the limit specified in Section 14-4-3 of the Provincial Board of Health Regulation for the Control of air Pollution." We would assume then that those pollutants passed through the dust collector are controlled but if there are any that do not pass through the control equipment these shall be "minimized" but there is no explanation as to what this means.

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