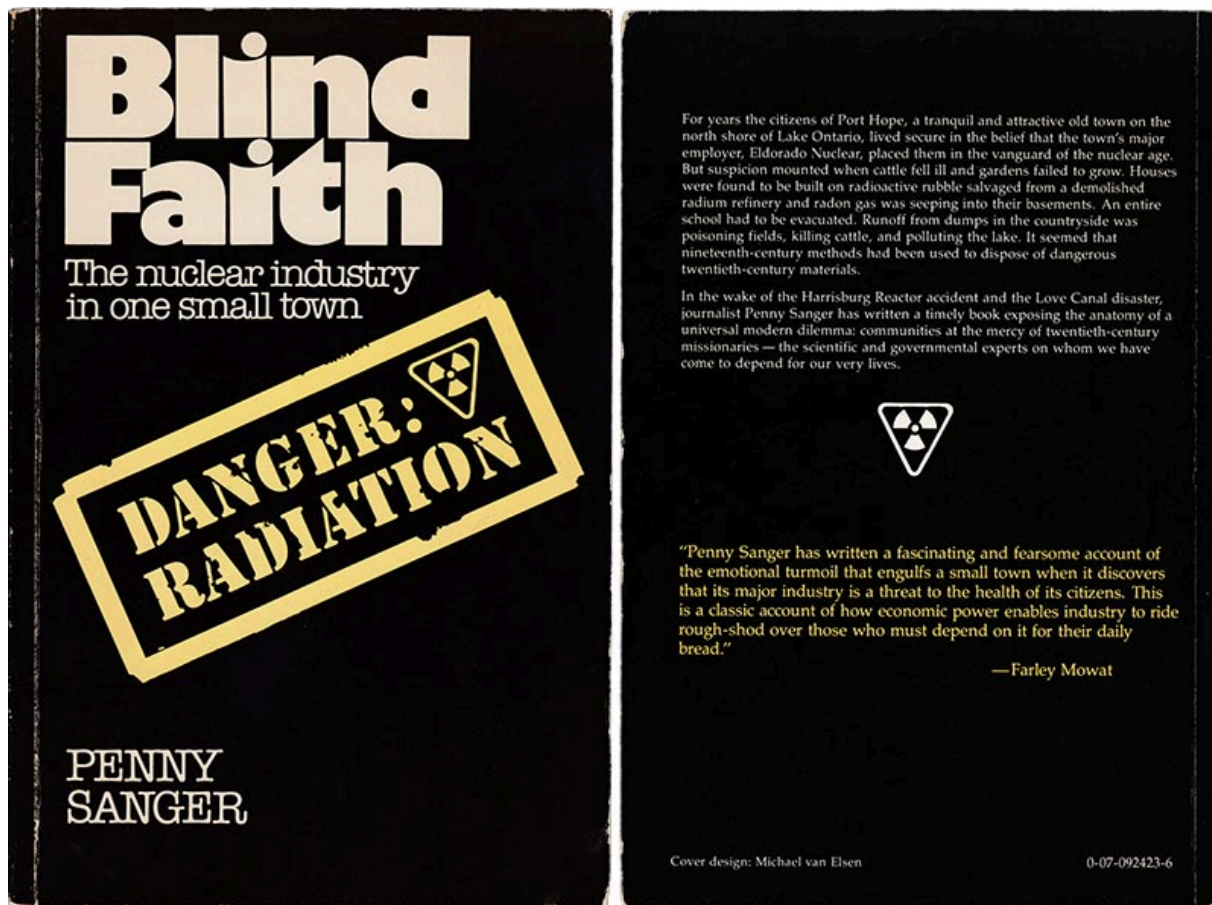




Blind Faith, published in 1981, remains the best account of the troubling history of the nuclear industry in Port Hope. Everyone living in Port Hope, and anyone thinking of moving here, should read this book to see how people in Port Hope and Hope Township have been treated over the years by all levels of government and Eldorado/Caneco.

Read a letter of concern Tom Lawson wrote to a local newspaper in 1999 [here](#).



Penny Sanger and, to the right, her sister Pat Lawson
cursor over a face, or tap to see the names

Penny Sanger was born in Framingham, Massachusetts to Canadian parents.

She came to Port Hope in 1933, age two, when her father, Philip Allan Cheyne Ketchum, became the first non-clergyman Headmaster of Trinity College School.

Part of her schooling took place at Central School and PHHS on Pine Street.

Early work as a reporter for the *Port Hope Evening Guide*, the *Cobourg Sentinel-Star* and the *Peterborough Examiner* led to a career as a freelance journalist.

Penny and her husband, [Clyde Sanger](#), lived in Ottawa. They have four sons.

Obituary

from The Globe and Mail July 22, 2017

PENNY SANGER (née Ketchum) March 18, 1931 - July 13, 2017

Vibrant and healthy all her life, Penny cycled around her Ottawa neighbourhood and canoed throughout Nares Inlet in the Georgian Bay well into her

80s.

She died surrounded by friends, family and Clyde, her husband of 58 years and loving caregiver, after being diagnosed with pancreatic cancer. The youngest of three girls and elder sister to three boys born to Philip and Otilie Ketchum of Port Hope Ontario, Penny was a tomboy, equally in love with books and the outdoors.

She ventured beyond her fortunate circumstances to live and work as a journalist and activist in Zimbabwe, Kenya, Britain and Canada. She wrote for many publications including the *Peterborough Examiner*, the *New Internationalist* and founded the *Glebe Report*.



She authored *Blind Faith*, a book about the toxic legacy of the nuclear industry on her hometown of Port Hope.

Penny helped launch and run numerous peace and social justice organizations, including the Canadian chapter of the *International Defence and Aid Fund for Southern Africa*, the *Ottawa Miles for Millions Campaign*, *Group of 78*, *Canadian Friends of Burma*, the *Make Room for Peace* campaign, and *Educating for Peace*.

She raised four sons, setting an example of living with joy and conviction, opening her heart and house to many. She introduced them—and many other new Canadians—to the beauty of the land she loved.

Cyclist, skier, skater, sailor, environmentalist, inveterate skinny-dipper, canoe-lover and tripper, late-night reader, befriender and supporter of underdogs (including Moto), her values and passions live on in all who loved her. She is sorely missed by Clyde, brothers Tony and Nick, sons Matthew, Richard, Toby and Daniel, her beloved daughters-in-law Mary, Debbie, Narissa and Catherine, ten very lucky grandchildren Ariel, Maeve, Malcolm, Claire, Louis, Tommy, Alia, Adam, Antoine and Eliza.

Many thanks to Dr Gluszynski and the staff at the Ottawa Hospital, for their superb and compassionate care. A celebration of Penny's life will be held on September 24 from 4 to 6 p.m. at the Glebe Community Centre in Ottawa. We suggest donations to Mines Action Canada or another of the many other organizations Penny

supported.

THE BOOK: DEDICATION

This book is for my sister Pat and the small band of Port Hope people who have the vision and the courage to swim against the tide.

PREFACE

Researching and writing this book has reinforced my conviction that most people have basic instincts for thrift and the care of their surroundings. Tossing out garbage wherever it is convenient is neither a rational nor a natural act. "It's going to catch up with you sooner or later," Clark Dickinson says in this book. Or, if not with you, certainly with your children and their children.

Eldorado's wastes have caught up with Port Hope and are spreading into the countryside nearby. As industrial wastes they are typical of a problem that has suddenly become acute in the Western world. Because they are radioactive the responsibility for disposing of them lies with the federal government. The dilemma in which this leaves the people of Port Hope is described in this book.

But the book's major purpose is to tell how these wastes came to be in Port Hope's ravines and scattered throughout the countryside, and why the people of Port Hope have tolerated them for so long. The forces that led to this situation and compelled the town to keep silent still largely direct our lives. Simple awareness of the crisis of wastes that these forces have generated is not enough to solve them. It is only the first step along a very difficult path that may, with luck and hard work, lead to a regeneration of respect and care for the basic elements that nourish us all—earth, air and water.

Among the many to whom I am indebted in the writing of this book are people, listed among others here, for whom these values are paramount. They are people who live and work in the countryside near Port Hope and who have watched Eldorado's slow encroachment into, and defilement of the land over several decades. We are dependent on these people for food. And they, in turn, are dependent on the earth and water and air that we have so blithely undervalued. It is high time we listened to them.

This book could not have been written without a great deal of help from many people. First among them is my husband, Clyde Sanger, who was a strong and steady support professionally, domestically and in every other way, despite his own publishing deadlines. Our sons Richard, Matthew, Toby and Daniel gave their enthusiasm and concern as well as much practical help. To my family and friends in Port Hope, particularly members of the SEAP and the Port Hope Environment Group who were consistently generous with their information and time, I am particularly grateful and I hope they approve. Without their long struggle, the citizens of Port Hope and Port Granby would be in a far worse position vis a vis Eldorado than they now are.

The debt I owe to past writers on the Port Hope *Evening Guide*, my old paper, goes without saying. At times during these years the paper took a brave, even eloquent stand that made me proud to be a journalist.

I am also grateful to the Canada Council for its financial help.

Some of the people who helped with this book prefer not to be mentioned. Among others, the following helped in large ways or small and I am grateful to them:

Prof. Douglas Andrews, Margery Ashby, Ken Ashton, Paul Bailey, Edgar Barrowclough, Edna Barrowclough, Clement Baschenis, Gwen and Harold Best, Anita Blackwood, Orville Calhoun, Sally Cleary, Jim Cutting, Mrs. Aleda Dickinson, Clark Dickinson, Roger Eaton, Gordon Edwards, Bud Elliott, Stella Elliott, Mrs. Everson, Bob Fair, Paul Falkowski, Jack Foote, Jack Goering, Rod Hendrickson, Bea Hills, Peter Hughes, Dr. Peter Hunt, Doug Humphrey, John Jardine, Jon Jennekens, Ron Jessup, Mr. and Mrs. John Kimball, John Klenavic, Dr. Geoffrey Knight, Ishbel Lambert, Reg Lang, Pat Lawson, Linda Leighton, Mr. & Mrs. Ivan Lewis, Warren Lowes, Kirk Makin, Mandy Martin, Marilyn McHolm, Paul McKay, Dora Nichols,

Bill Peden, Elisabeth Pereira, Percy Phillips, Anita Pochon, Ruth Rood, Foster Russell, A.K. Sculthorpe, Robert Sculthorpe, Suzanne Skinner, Bruce Smart, Hugh Spence, Norm Strong, Rod Stewart, Rosemary Tisnovsky, Gerry van Houten, John and Isabel Veldhuis, Paul Waghorn, Ernie Webster, Horst Wittman, Roger Wilson, David Wong, Michael Wladyka, Bill Wyatt, Gail Young, Joanne Young.

GLOSSARY

CHAPTER ONE

Port Hope used to be called the most beautiful little town in Ontario. The leafy streets, the big Victorian houses, and the sweeping curve of the beach bordering Lake Ontario are the same as they have been for decades. But now townspeople smile apologetically at the extravagant phrase.

In 1975 they discovered that their ravines and some of their hilltops were strewn with chemical and radioactive wastes. Their health was threatened by cancer-causing radon gas that was trapped in many of their houses, and by chemically contaminated soil in some of their gardens. The very air they breathed was dangerous, it seemed; many worried about the water they drank.

The source of this pollution was one of the town's most valued and prestigious industries, and Canada's only uranium refinery, federally owned Eldorado Nuclear Limited (ENL). It produces nuclear fuel for Canada's CANDU reactors and more highly processed uranium hexafluoride for export. As the town's major employer, it employs hundreds of people. It is situated on the lakeshore at the end of one of the town's main streets, just west of the mouth of the Ganaraska River.

Like most small towns, Port Hope is cautious and conservative. Strong links with the past predominate: in the carefully preserved nineteenth-century houses and main-street architecture, as well as in the old Loyalist families whose descendants are still active in town affairs. Colonel Arthur Williams, a native son who went off to fight a rebellion in western Canada in 1885, still commands, imposingly, the town park from a plinth flanked by guns from the Crimean War. A large portrait of Queen Victoria dominates the town hall's entrance lobby, and nearly everyone remembers fondly the visit of the present Queen during a weekend she spent at the nearby country house of a former Governor General.

Norm Strong is himself one such link with the past. His family has been doing business in Port Hope for 160 years; his own newspaper and candy store on Queen Street, next door to the movie theatre, is remembered by generations of Port Hope children who used to stop by before the show. Norm is a big, kindly and patient man, who believes the town needs the Eldorado plant. But it was he who, by a chance conversation in his store, catapulted the issue of radioactive waste into Port Hope's consciousness.

His house is next door to St. Mary's primary school. Both properties extend along a pleasant residential street running south to the lake from the main street. In the ravine that separates them, a small stream runs through stands of willow, birch, and bulrushes. The school is at the top of the ravine bank, the Strong's house at the bottom.

In 1960 an addition was built on the school. In order to provide enough playground and parking space, the sloping site had to be levelled, and loads of fill—rubble, brick, cement—were brought in from the Eldorado Nuclear plant a few blocks away. The plant had been installing new equipment and buildings during the late 1950s and some discarded construction materials and rubble were available. Norm Strong watched what was going on with interest. He had given the school board a strip of land from the northern edge of his property so that construction could proceed. A screen of cedars and century-old maples and birches grew on his property just south of this strip; south of the trees ran the little stream.

Soon after the new building was completed there seemed to be something wrong. The Strong's carefully tended garden at the bottom of the new school parking lot began to sicken. Flowers wilted, grass died, even the 100-year-old trees eventually succumbed. Within a few years, nearly half the property was lifeless; only the section south of the stream continued to thrive.

"I knew the fill came from Eldorado. There was nothing I could do. I didn't get any recompense and I didn't ask for any," he says. Acids and poisons from the material used to level the site for the addition had slowly leached down the bank and into his garden.

The devastation continued. Years later, when Norm was standing in his shop one winter morning, he heard a local reporter describe how Eldorado had moved a town family, the Lewises, out of their bungalow because high levels of radon gas had been found in it. He put two and two together: both the bungalow—which stood at the edge of another nearby ravine—and the school were surrounded by fill from Eldorado. If radon gas was in one, it was likely to be in the other.

The next moves are not very clear. In a small town news travels quickly but circuitously: who told whom what, and when, often becomes rapidly obscured. Norm Strong, who was working part-time at Eldorado as well as running his store, remembers telling someone he knew at the plant about his fears. Within a few hours the company technician took readings of gamma radiation levels in the school parking lot. They were high enough to convince the management that the interior of the school had to be tested. These tests showed concentrations of radon gas in some areas that were twenty times the maximum permissible level.

Next morning, on Friday December 12, 1975, the school was abruptly closed. It was not particularly surprising news for a rural town on the north shore of Lake Ontario, where winter snows occasionally clog roads, closing schools and businesses. But there was no snow storm that morning. The reason for the school closing, parents were told, was a fault in the ventilator. By Monday the school was still closed and Port Hoppers learned more. The school was shut not because of faulty ventilation but because high levels of radon gas had been found in it. It was suspected the gas came from radioactive fill used in the school's construction.

A week later, under a barrage of publicity, counterbalanced by soothing statements from health officials, some townspeople realized there was serious trouble looming. Several other buildings had been found to be contaminated by radon gas and it was likely there were more—many more. The gas came from waste materials from Eldorado Nuclear which had been getting rid of its waste in different parts of the town and neighbouring countryside for over thirty years.

Most of this waste contained only low levels of radioactivity. But the gas it produced as it decayed in unventilated areas concentrated the radioactivity and could be a dangerous carcinogen. It had induced the lung cancers that killed a startling number of uranium miners in Elliot Lake, Ontario, as a

provincial royal commission was just then discovering. From the early years of the century, before Eldorado opened its Port Hope refinery in 1933, the dangers of radiation from such apparently harmless materials had been known to medical and scientific researchers.

So it was a worried Christmas for many Port Hoppers, especially those parents of the small children who had been exposed to the gas at school. Health officials from the provincial government and spokespersons for Eldorado and the Atomic Energy Control Board, the regulatory agency responsible for licensing the refinery, tried—without alarming the parents—to explain their reasons for closing the school. But the combination of official reassurance and reticence with abstruse scientific terminology resulted only in confusion and contradiction.

An editorial writer in *The Port Hope Evening Guide* referred to the townspeople's feeling of "peasant ignorance" in the face of the experts' attempts at explanations:

They used expressions like ionizing radiation, gamma rays, significant risks, daughter products. We are left in a position of having to accept or reject statements not on a logical informative basis, but on trust.

Five years later the people of Port Hope were still in a position of helplessness. They had coped with experts of every stripe, with the apparent threat that Eldorado might close up and leave town, with a voracious national and international media, and with a resident clean-up crew that had dug out some 400 properties. In 1980 they knew a lot more about gamma rays and ionizing radiation. But they still had to rely on the conflicting advice of experts on what to do about the contamination. And they still had more than 200,000 tons of radioactive waste scattered through their town. Port Hope is in a vulnerable and highly strategic position. It is at the eastern edge of a quickly growing concentration of nuclear power facilities that will put Canada seventh (after the United States, France, the U.K., the Soviet Union, West Germany, and Japan) in the score of countries throughout the world which operate energy-producing nuclear reactors—both productive and planned. Eldorado Nuclear produces all the fuel for Canada's CANDU reactors and exports more than three-quarters of its production as uranium hexafluoride, a material which after further treatment becomes the fuel used in foreign reactors. Eldorado is the world's smallest refinery of nuclear fuels now; it is hoping to become the largest.

But the problem is what to do with the wastes—both from the reactors themselves, with their highly radioactive "spent" fuel rods, and from the refinery and the mines, whose massive amounts of low-level radioactive wastes no one wants buried in their back yards. Port Hope's waste problem largely pre-dates this one: most of the low-level radioactive materials lying around its ravines originated in the period when Eldorado was processing radium, not uranium fuels. But because the company must continue to produce fuel for the CANDU reactors and for its contracts abroad, because the wastes from this process are rapidly filling up the last waste dump in the area, and because in spite of its history the company is determined to expand its operation in Port Hope, there seems little chance now that Port Hoppers will ever be able to get rid of the "hot" material from the earlier era.

In late 1979 the tiny Port Hope Environment Group issued an appeal:

Serious questions regarding the health of many citizens in Port Hope remain unanswered:

- *We do know that in 1978 the Workmen's Compensation Board acknowledged that exposure to radioactivity contributed to the death of a worker at Eldorado Nuclear;*
- *that in December 1978 the Ministry of the Environment registered 30 picocuries per litre in the Port Hope Harbour resulting from an accidental spill of radioactive material;*
- *that a ravine in the centre of town still contains large pockets of ash and residue with gamma levels typically in excess of 5 millirems per hour...*
- *we do not know whether our health has been or will be affected by the refining of radioactive material in Port Hope;*
- *whether the lake water we drink is safe;*
- *whether the government's safety standards are adequate.*

Few Port Hoppers could quarrel with these statements, but even fewer supported their publication. The fear of job loss was dominant. By mid 1980, when it seemed clear that Eldorado would not only remain in Port Hope but would build a new plant next to its present lakefront site, even though it meant the loss of the town beach and a baseball diamond, the town council was grateful.

Other factors also emerged to strongly influence the townspeople. In the late 1970s the nuclear energy debate throughout Canada and the world grew steadily more polarized, and the town was the target of a spate of contradictory reassurances and warnings. In the face of these, its corporate characteristics of loyalty, tradition, and respect came to the fore. But added to them were the easily aroused fears that too much criticism would drive Eldorado, the major employer, out of the town.

"You will see a hundred houses empty, you will see holes in the main street, you will see skilled people leaving," the mayor, Mike Wladyka, warned when the federal environmental assessment board ruled that the company should not expand into a neighbouring community. He feared that, denied its local expansion, the company would build its new refinery in northern Ontario near the uranium mines, and that eventually the entire Port Hope operation would follow it.

Port Hoppers have had no clear evidence of how their health has been affected, since it can take twenty years or longer for lung cancer to develop after exposure to radioactivity. Faced with such uncertainties, most have remained loyal, at least implicitly, to the refinery. Complain as they might about the company's troubles in Port Hope, Eldorado management could not have hoped for a more complacent populace.

All the same, there have been danger signals for many years. An apparently healthy young engineer died in 1956 from a massive cancerous attack after being accidentally exposed to large amounts of radioactive dust from some laboratory exhaust ducts that were being dismantled. A young man who as a boy used to play in a stream later found to be contaminated by an Eldorado dump developed a cancerous thyroid. The residents of about forty houses that used to stand next door to the Eldorado plant were quickly and quietly bought out by the company. Local talk and some medical opinion indicates that there might be a high incidence of cancer among them. A surgeon whose practice includes patients from many communities in the Port Hope area has said publicly that it was his clinical impression that there was a higher incidence of malignancy from the Port Hope area.

For years Eldorado had been dumping chemical and radioactive wastes in poorly protected dump sites around the town. Children played in gullies and slid down hillsides that contained dangerous chemicals and carcinogens. Unknowingly, their parents had built houses, foundations, garages and driveways using radioactive rubble from the plant. It was this rubble that gave off, as its radioactive elements decayed, the odourless, tasteless radon gas that causes lung cancer.

As this became known in 1975 and 1976, some of Port Hope's genteel charm began to fade. House prices began to soften, and quite suddenly the upbeat appeal of local names—Port Hope, Welcome Corners, Eldorado—began instead to sound ironic. But most of the citizens remained loyal to the town

and to the refinery.

"Eldorado built this town, I don't know where we'd be without it." The old timer who said this in late 1979 had the tacit approval of people from most age and income groups in the town.

"Don't you have any trust?" a town official finally asked. It was the end of a long interview, during which he wondered why anyone would want to see around the Eldorado plant. At issue, however, was not trust but responsibility. Forty years of blind faith in the uranium refinery had won Port Hope the reputation of being, not the most beautiful, but one of the most polluted little towns in Ontario.

In 1932, when Eldorado Gold Mines, as it was then called, took over an old grain shed in the Port Hope harbour and turned it into the world's second radium refinery, Port Hoppers thought they were favoured. It was the Depression, jobs were scarce, and money was in short supply everywhere. Thirty men were taken on at the plant, where they crushed and mixed chemicals with the pitchblende ore that had been mined on the shore of Great Bear Lake in the Northwest Territories and shipped nearly 4,000 miles across Canada.

Heavy, dark, and shiny, this ore contained uranium as well as minute amounts of radium. But it was radium that was the miracle substance of the day. Proclaimed as a cure for cancer and many other afflictions, it sold, because of its scarcity, for fabulous amounts of money. The "waste" uranium was stored in bins and heaps around the plant. Some was dumped into the harbour itself.

Extracting the radium from the ore and chemicals was messy and laborious. There were many stages of boiling, distilling, and crystallization, and most were carried out, at first, by hand. After four years of work the first ounce of Canadian radium was produced.

Then, in 1942 there was a sudden, secrecy-shrouded switch to uranium production. Experiments were taking place in the United States that eventually resulted in the explosion of the first atomic bomb and, subsequently, the end of World War II.

These experiments required all the uranium oxides the free world could produce, and only Eldorado could refine it. The switch to uranium set the company on a path that led it to producing fuel for reactors that used a controlled atomic reaction to produce peacetime power. Especially after the energy crisis of the early 1970s, this business boomed.

Growth, then, was inevitable. The plant has expanded from its grain shed to cover several acres on the Port Hope waterfront. It employs over 500 workers. Many of these people have played key roles in the development of the town, serving on the town council, in the local Red Cross, on service clubs, the chamber of commerce, and children's aid committees. So it was hard for Port Hope people to put the blame on their fellow townsfolk when the full impact of the plant's waste mismanagement unfolded, just as it was hard for them to admit the possibility of getting cancer from breathing the air in their own houses. Even while their backyards and basements were being dug out to dispel the radioactive gases, they encouraged Eldorado's plan to use a particularly pleasant stretch of countryside just west of the town as the site for a second plant.

Mike Wladyka, the former mayor of Port Hope, was at the helm of that fight to allow Eldorado to build its new refinery. He is a strong believer in nuclear power, which he sees as a bulwark against Russian aggression. He connects nuclear energy with a passionate defence of the values of the free world, and of the town that he governed so successfully. On a more immediate and local plane, he does not believe you should knife a friend when he is down, and he puts the Eldorado plant into that category. Mike Wladyka's principles and decency are typical of Port Hope.

When St. Mary's school was closed down, it was a decisive moment for Eldorado. Although both the company and the Atomic Energy Control Board had finally realized that something had to be done about the dangerous amount of waste material that lay scattered about the town, and steps were being taken to track them down, most Port Hoppers were not worried. But having 214 children suddenly sent home from school a few days before Christmas catapulted the problem into a frightening issue of national importance.

It was certainly not the company's first warning. Since the mid-sixties there had been evidence from the company's own investigations and complaints from neighbours that poisonous substances were leaking out of the several dump sites the company operated in the town and nearby countryside. In 1966 a nuclear engineer had warned the company, its workers, and the AECB that these dumps were a threat to public health. During the previous summer there had been a spate of publicity about Eldorado's handling of its wastes. But little had been done apart from the removal of some material and quiet negotiation with anyone who complained.

The wastes affected property belonging to Dr. Pete Hunt, one of Port Hope's most popular doctors. Friendly and direct, he and his wife still live on one of the town's elegant old streets where, for many years, they, like Norm Strong, watched their trees die as the soil on their property became soggy with toxins. Behind the Hunt's house stretches six acres of ponds, woods, and garden paths—a private yet open domain built with love and skill. In the 1950s part of this property began to wither and die. Nearly all the trees on the slope north of the property had to be cut down. The underbrush was dead.

Pete Hunt knew that the poisons saturating his land must have come from a small dump, the so-called Monkey Mountain dump, used by Eldorado. It was at the north end of his property, just across a road from the once-wooded slope. Used for the potent wastes from the radium plant during the years 1945 to 1948, it contained arsenic, one of the chemicals used in the refinery process. The dump was situated on a hillside so that its poisons drained downhill, south and east, into neighbouring properties. There had been other complaints in the area: two ponies belonging to a former resident were said to have died as a result of the chemicals that had leached out of the dump into the water and soil; a market garden once in the area had been abandoned, although it wasn't clear whether the dump's contaminants were the cause. When Dr. Hunt's lawyer pointed out the damage to Eldorado in 1965, both were surprised at the company's prompt and generous response. He was paid \$4,000 without even arguing much, he said. And when, a few years later, he was able to pick up two acres of land adjoining his property from Eldorado for only \$4,000 he was equally gratified.

Neither Dr. Hunt nor Norm Strong apparently saw anything sinister in the fact that the soil on their property was killing, not nurturing, life, and that the reason for this was the waste disposal practices of a local industry. Was Pete Hunt, as a doctor, not worried about the poisons seeping into his land and water?

"I was much more worried about some children coming in and drowning in the pond," he maintains. Yet two years after he was recompensed by Eldorado for the damage to his land, monitoring figures showed that the radium content of one of the springs that fed his ponds and stream was at times

three times the maximum permissible concentration for drinking water; the average arsenic content in another spring was 200 times the maximum permissible limit for drinking water. The ponds and stream drain directly into the Ganaraska River.

Dr. Hunt says that his friends and their children do not swim in his ponds much any more. "It's too cold—anyway, I tell them not to drink the water."

But his property was still being monitored for contaminants in 1980 and there were further troubles. The spring floods of that year ravaged part of the town's main shopping area, also exposing an estimated 15,000 tons of Eldorado waste in an open, undeveloped road allowance directly to the north of the Hunt property. Toxins from this waste were emitting gamma radiation in the spring of 1980 at an estimated rate of 1 millirem an hour—and in some places more. Much of this waste was unfenced.

Another man faced property damage from Eldorado's chemical and radioactive wastes. He was Carlus Dickinson, a farmer whose property ran toward Lake Ontario from a comfortable farmhouse edged by firs and lilac four miles west of Port Hope. Mr. Dickinson kept cattle and, in the early 1950s, he began to have problems with them. They didn't thrive; they were skinny, their hair was falling out, and they aborted their calves. Soon the reasons became obvious. The Dickinson pasture land is fed by a creek, Brand's Creek, which rises about a mile northeast in wooded high land near Welcome Corners. It flows northwest, then south through the Dickinson land and other properties, eventually emptying into Lake Ontario.

The high land in which the stream rises was used as a dump for Eldorado wastes and discarded materials for six years, from 1948 to 1954. Almost daily during those years, trucks from the plant brought loads of thick yellowish sludge and poured it onto the Welcome dump site. The stream became contaminated and carried the poisons down through the Dickinsons'—and other farmers'—pastures. Carlus Dickinson's widow, now age eighty-three, recalls that fish died in the stream, and the grass along its banks was brown and brittle. When a vet finally made some tests, the Dickinsons were told that traces of arsenic had showed up in their cattle's hair.

For years during the 1950s Carlus Dickinson tried to get adequate compensation from the company. He wrote to lawyers, vets, and the government. Sometimes he got replies, sometimes he didn't. One correspondent told him arsenic was good for his cows and, anyway, Eldorado employed the best scientific brains in the country, so he shouldn't worry. Eldorado itself maintained there was no danger from radiation or arsenic poisoning.

Some of their neighbours were compensated by the company for damage to livestock and crops, but Mr. Dickinson considered the amounts they were given to be insignificant. "It didn't amount to a row of pins," Mrs. Dickinson now says. Finally, Carlus Dickinson took his complaint to where it could not fail to be heard—the floor of the House of Commons. Through local Liberal MP Johnny James he got a question asked on behalf of his fellow farmers. C.D. Howe, then Minister of Trade, replied for the government, admitting that the arsenic caused trouble. Mr. Dickinson's lawyer, Stuart Ryan, received a letter from Eldorado lawyer (and later Liberal MP) Russell Honey, along with a cheque for \$1,000. The money was explained as \$200 damages for three seasons plus \$400 thrown in for good measure. Since Mr. Dickinson refused to rent better land elsewhere, Mr. Honey implied, he couldn't expect to get more.

That remark still rankles in his widow and his daughter, Margery Ashby. "It just burns me up to hear them talk about Eldorado being a good corporate citizen," Mrs. Ashby says. Her father owned his land. When a man has worked hard to acquire his land, and to tend it and keep it productive, to be told to go and rent land someplace else by the people who are poisoning it seemed one arrogance too many.

Carlus kept up the fight. By September 1956, Eldorado was promising to drain off the toxic wastes by laying a pipe from the Welcome dump down to Lake Ontario. Under his prodding, the Ontario health department had confirmed arsenic levels, some of them high, and the federal department of agriculture admitted he could have a problem.

"As soon as the run-off is returned to its original purity the pipeline will be discontinued," they told him twenty-three years ago. The pipeline is still there and the original purity is still a dream.

Carlus Dickinson was a fighter, the sort of fighter that is in short supply these days in Port Hope, at least in connection with the Eldorado case. Anyone who visits his house in Hope township is forcibly reminded of this by his collection of stuffed birds and animals that even now fills an upstairs bedroom and hallway. It is a record of the wealth of wildlife that used to be found in this increasingly urbanized area.

Dominating the display, however, is a stuffed goat with curved horns which stares angrily out of its glass case. As a young man Carlus drove that goat and cart around the countryside, but the unyielding wills of man and beast clashed once too often and Carlus killed the goat. Then he stuffed it. Just as a reminder. It's the sort of reminder that a few Port Hoppers think Eldorado Nuclear needs.

Although it remained poorly fenced and accessible to neighbourhood children for many years after, the Welcome dump site was closed by Eldorado in 1954. By then the company had acquired land for its waste disposal further west on the lakeshore, near the little settlement of Port Granby. Farmers were suspicious and protest meetings were held, but they were assured by federal government officials and politicians that new techniques were being used and that the waste was completely harmless. When they expressed their concern that the waste would pollute the lake and lakeshore, they were promised that a concrete retaining wall would be built to prevent the material sliding into the lake.

Over the next twenty years the people of Port Granby learned the falseness of these promises. They saw the beach become fouled and unusable at times. Their cattle broke through fences and died from the wastes. They watched the dump site turn into a wasteland as toxins leached down the eroded cliffside and into the lake.

"You can't go on throwing your garbage out your back door too long or it's going to get you," Clark Dickinson said one day, some twenty-five years after his father Carlus first took on Eldorado. But he knew it was still an up hill fight. In spite of the accumulating evidence of personal and environmental damage done in Port Hope and its surrounding countryside by the company's waste, Eldorado seemed to most citizens to be unassailable and unrepentant.

"Port Hope will have to decide what it wants to be—a retirement town or an industrial town," Eldorado president Nicholas Ediger said in exasperation when, in late 1979, public pressure was mounting for a health study in Port Hope.

But part of Port Hope's appeal is its successful fusing of a modern industrial base with the tranquil charm sought by retired executives from Toronto and Montreal. The comfortable grace of Bedford, Dorset, Augusta, and King streets took shape in the days when distilleries, lumber, and grain were the town's chief sources of revenue. Their big old houses have been maintained, many for well over a century, by the labour of a few industries. Around these have grown up all the paraphernalia demanded by a slowly growing population in the twentieth century: the stores, print shops, law firms, schools, cleaners, hospitals, and old people's homes. These services have flourished as more people moved in, to retire or commute, following the building of Highway 401, the new high-speed Toronto-Montreal route.

The central importance of industry, and especially of Eldorado, to Port Hope remains: to the town's tax base, of course; to its economic life; and also to its social mix. The Nicholson file factory's whistle no longer blows at noon, a one-time work signal that it was time to stop for dinner. Now at midday Walton Street comes to life with honking pickup trucks and a stream of traffic going "downtown," or home, to eat.

Pleasure craft now fill the harbour where the grain and timber ships once loaded. Many people still walk to work at the local factories and there are lunch buckets, just as the liquor store has probably the best imported sherry selection between Toronto and Montreal.

To take away any one branch of the town's life would be to distort its growth. It's a fair guess that if any Port Hoppers had heard Nick Ediger's "retirement-town" comment, they would have been horrified. But they would have politely ignored it, as they have ignored so much else that Eldorado has thrown at them. Like Norm Strong, they would have been careful to show their appreciation of the plant itself. Generations of Port Hoppers have worked there. And you don't play games with over 500 jobs and the best wages in town.

This subject is a very touchy one and people who talk about it in Port Hope are not popular. But it has to be confronted if Canada continues to place an increasing reliance on nuclear fuel to sustain our appetite for energy. Every phase in the production and use of this fuel is potentially a serious and long-lived threat to health. The federal-provincial health study belatedly commissioned for Port Hope still had not begun its work in early 1981. Nor has there been any resolution of the waste problem: What can be done with the millions of tons of chemical and radioactive waste that are spewed out in the nuclear-fuel production process? Can they be anything other than an enduring threat to this earth and to our children who will inherit it?

These weighty questions do not loom very large in Port Hope. Most people there want to get on with the business of living, to repair the damage already done to them, to get back to normal. But their story should be read by other threatened communities and by our decision-makers, because one small town is not strong enough to tackle such dangers.

CHAPTER TWO

"Beautiful old Port Hope—the town that radiates friendliness." So proclaimed a billboard that stood for many years on one of the highways leading into the town.

In 1979, as it lurched sideways into the ground, that forgotten sign summed up more succinctly than anything else the full swing of opinion about radiation. In forty years the term radiation had undergone a drastic change in meaning; no longer did it symbolize pride and healing, but rather danger and confusion. Radiation had been used to treat cancer but it also caused it, Port Hope people now knew. Moreover, the complex and costly extraction processes and the waste materials they created were themselves dangerous, and were polluting many parts of Port Hope.

Real estate sales were falling off. At least one local factory complained that it could not attract skilled workers; they did not want to bring their families to the town that the media said was contaminated. Eventually someone gave the old billboard a discreet and overdue burial.

In 1932, when Eldorado Gold Mines was setting up its new refinery in Port Hope, the picture was completely different. Radium and radioactivity were then prized throughout the world for their healing properties and their ability to arrest cancers. The National Radium Products Company of New York lauded the new discoveries in a series of booklets (accepted by the American Medical Association) that promoted the different medical uses of the new wonder product:

Radioactive substances, in small doses, stimulate the heart muscle and lessen the residual blood... The value of radium is unquestionably established in chronic and sub-acute arthritis of all kinds... radium emanation increases the amount of hemoglobin.

An American company, National Radium Products, was trying to sell its patented radium emanator "manufactured in strengths of 18 1/2 microcuries and upward" which was to be used "to charge ordinary drinking water the world over with Radium Emanations." Illustrations in a company brochure show a wooden case with double glass tubes attached to a stoppered vial; it was to be used for internal radium therapy "to cure the stubborn chronic diseases that come on in midlife," and many other complaints.

External radium therapy was by then well known. In France, Henri Becquerel had discovered the radioactive properties of uranium in 1896. The biological potential of radiation became apparent to him when he accidentally burned himself while carrying a vial of radium in his pocket. His student Marie and her husband Pierre Curie, after two laborious years, had isolated radium and polonium from uranium ore. The use of beta and gamma radiation to "cure" cancers soon became known and two radium hospitals were set up in Paris.

In Canada, an early publication of Eldorado Gold Mines, *The Romance of Canadian Radium*, proclaimed that:

Radium cures cancer... Furthermore, radium cures by touch. Stranger still, it touches without direct contact. Nothing is observed to happen when radium is brought close to a cancerous growth. But a few days later the growth begins to shrivel; eventually it disappears without a scar and terribly disfigured parts become normal... Radium is more than a magic mineral. It is a talisman.

There was no doubt that radiation could stop the growth of cancers—although we now know that some patients eventually died from the radiation administered to heal them. And there is plenty of historical evidence that radioactive hot springs have for centuries alleviated the pains of rheumatism, gout, and arthritis, although no one knew precisely why. So the mystique of the substance grew and, by the mid 1920s, it could be expected to cure almost anything from acne to heart diseases—at least, according to the National Radium Products Company. With radium isolated and obtainable, although at great cost (in 1920 a gram cost \$125,000), its future to its promoters seemed limitless in the confident, expansionary years at the beginning of this century. Into this atmosphere of opportunity came the Canadian prospector and entrepreneur, Gilbert LaBine, who was soon to gain the mixed reputation of saviour, gambler, and hard-headed businessman.

Anyone who has read about the history of mining in Canada knows the names of Gilbert and Charles LaBine. Their parents were French and Irish and they were brought up in the little Ontario town of Westmeath in the Ottawa Valley. Gilbert, born in 1890, finished as much schooling as he thought he needed by the age of sixteen and started on a life of prospecting and mining. In later years he called himself a "minemaker" but his particular talent seems to have been in the hunt for minerals. Before he was twenty, he had explored all over northern Ontario and the Ungava region of Quebec. He resumed his education briefly at a mining school in Haileybury, to learn some of the theory of prospecting from the Ontario provincial geologist, Dr. Willet Miller. That was when he first saw pitchblende, the shiny black ore that contains radium.

Pitchblende had been known in Europe since the early sixteenth century. Heavy (eight times heavier than water) and harder than steel, it seems that it was used for building purposes in the important sixteenth-century silver mining centre of Jachimov in Bohemia, now Czechoslovakia. But it was not commercially mined. In 1789, a German chemist, Martin Klaproth, isolated from it a new element that he named after the recently discovered planet Uranus, which means "son of the earth." (Later uranium was found to be present in many different minerals.) When Klaproth discovered that uranium could be used to colour glass and ceramics, the mining of pitchblende got under way in Jachimov. This town was still the world's only source of uranium ore a century later, when Becquerel and the Curies were working on their famous radium experiments in France.

The subsequent boom in demand for radium, as well as skyrocketing prices, spawned a search for new sources. Other radium-bearing orebodies (e.g. carnotite) were opened and new mines started up in the United States, England and the Belgian Congo (now Zaire). Although radium had once fetched \$200,000 US per gram, the price fell to \$73,000 in the 1920s when the Belgian Congo was the chief supplier. But it was still the most precious matter in the history of mankind, and to search for it was well worth tramping around Canada's north.

LaBine cannot have been the only Canadian prospector looking for radium-bearing ores. But he was one of a very few who knew exactly what they were looking for. Dr. Miller's sample of pitchblende, most likely from Jachimov itself, told him that the ore would probably be found in conjunction with silver, and LaBine knew that Canada's Pre-Cambrian Shield was a likely hunting ground for both.

Nonetheless it was only silver and copper he was looking for when, after reading a geological report on the area, he hired a plane (a wildly expensive proposition in those days) to fly north. He and an assistant, Charles St. Paul, were soon struggling across the southeast arm of Great Bear Lake, not far from the Arctic Circle, in Canada's Northwest Territories. It was the early spring of 1930. They dragged a homemade sled carrying 1600 pounds of supplies and, after some days, St. Paul went temporarily snow-blind. While he was resting LaBine poked around and, as he described it later: *I was following around the shore of an island and I discovered what I considered a beautiful-looking vein. I started out and followed it up and felt sure investigation would prove it to be silver. As I looked over to the shore a distance of about 300 or 400 feet I noticed a great wall there that was stained with cobalt bloom and copper green. I walked over to this place and investigated it carefully and found all the associated ores of cobalt, including some silver. Following along I found a tiny dark piece of ore, probably the size of a large plum. Looking more closely I found the vein. I chipped it off with my hammer, and here it was, pitchblende.*

LaBine gave this account of his discovery when, in 1935, the production of the first ounce of radium from Great Bear Lake ores was being celebrated in Ottawa. His methodical words give no hint of the excited spate of exploration and development that moment caused. The grip of the Depression was tightening in Canada and, when word got out that radium and silver had been found near Great Bear Lake by Eldorado Gold Mines, the northward rush began. As journalist Fred Peet described it in the *Victoria Daily Colonist* (March 5, 1978):

The unemployed and dried-out farmers, anxious to get off relief, formed the majority who answered the irresistible call.... They converged on every tributary of the Mackenzie River system in the spring of 1932. Working long hours they built the crudest and clumsiest of crafts that ever floated.... Lured and drawn forward by the dreams of riches at their journey's end, driven and pushed onward by the nightmarish realities they had left behind they floated down the mighty Mackenzie River, then paddled and poled by the treacherous, tortuous ice-filled Great Bear River and across Great Bear Lake....

Five thousand claims had already been staked before this zany stampede arrived, and jobs were scarce in the only mine—LaBine's—then being developed. For the out-of-work professionals, the farmers, orphans, and the entrepreneurs of many nationalities (including a Maltese princess married to an exiled Russian duke turned cattle rancher), the "Trail of 32" was devastating.

Mining began on the eastern shore of Great Bear Lake at the newly-named Port Radium in 1933. Money to start it came from the rich silver ore found in conjunction with pitchblende (some of it lying loose on the surface of the land), and from the amazed shareholders of Eldorado Gold Mines, who voted LaBine a million and a half shares to support his work at Port Radium. Their stock rose from a penny to \$8.00 a share in two years.

Not long afterwards an observer hired by the company to write a promotional pamphlet could enthuse from the dank depths of the first dug veins: *At the end of a tunnel one gazes upon a treasure the likes of which no pirate, no rajah, no Croesus ever saw. There on the wall is the vein inlaid with heavy tracteries of pitchblende interlaced with silver.*

"The Arctic generously compensates its conquerors," the writer bumbled on, claiming that one hundred men in the camp blasted out one hundred tons of ore a day. From this amount, two tons of pitchblende concentrates, after their two-month journey across Canada, would produce 200 milligrams of radium, 1,800 pounds of uranium and 2,000 ounces of silver at the Port Hope refinery.

The figures were easy to list. But neither they nor the company writer's purple prose could convey the immense difficulties of those early years. Ever since he stumbled excitedly out of the bush clutching the evidence of his pitchblende find, LaBine's worst adversary had been time. The ore had to be assayed, other prospectors discouraged, claims staked. LaBine mailed his samples to a friend in the US Bureau of Mines, and to Ottawa, and finally learned that it contained 40 percent uranium, almost twice the richness of the next most productive ores. Early the next year a group of men, including Charles LaBine, were flown back to the site to stake more claims and keep possible rivals at bay. But from this remote, inhospitable country, with air transportation still risky and expensive, even the mechanics of establishing his claims were time-consuming.

LaBine, with his persuasive Irish tongue and native determination, persevered. He soon told his stockholders that he had secured for them "what looks like the biggest mining camp ever discovered in Canada," and they believed him.

The next difficulty was to get in the necessary equipment—machinery, building supplies, and food—to start serious mining. Weather and about 1,400 miles of turbulent lakes and rivers that stretched between the mining site and the nearest railhead, at Waterways, Alberta, were immense obstacles. The

first loads were brought in by canoe and barge. The route they travelled was down the Athabasca River to Lake Athabasca, then down the Slave River, including a sixteen-mile portage around the rapids between Fitzgerald and Fort Smith, to Fort Resolution on Great Slave Lake. Then they crossed to Fort Providence, where the Mackenzie River flows out of Great Slave Lake and nearly five hundred miles down the Mackenzie to Fort Norman, where the Great Bear River and more rapids connect with Great Bear Lake. The final lap of the long voyage was 180 miles across the stormy Great Bear Lake from Fort Franklin to Port Radium. The water route was only open, that is, ice-free, for a few weeks in the year.

The ore, when it was finally dug out, was transported by retracing this laborious route, taking two months to reach its destination in Ontario. In the winter it was often flown to Waterways; as time went on, and the Eldorado company acquired its own planes as well as boats, aircraft played a larger role in transportation, as indeed they did in the whole opening up of the north. But the costs were enormous. The first transportation charge for ore concentrate, just from the mine to the railhead in Alberta, was over \$400 per ton. Only the richness of the find made it worthwhile: the ore had been assayed at one gram of radium per six and one-half tons of ore, compared to one gram per ten tons of the best Belgian ore and one per 128 tons of US ore.

After the difficulties and expense of getting the ore to the railhead, why was it then transported halfway across the continent to be refined?

Each ton of ore concentrate required, for refining, seven tons of chemicals, which made (and continues to make), the enterprise in Port Hope as much a chemical industry as a refinery. Southern Ontario in the early 1930s was already the centre of the chemical industry in Canada. The towns along the north shore of Lake Ontario had good rail access to both Toronto and Montreal, as well as to northern points, and a huge supply of water for industrial purposes on their doorsteps. But why was Port Hope chosen above the rest?

The decision to locate in Port Hope, rather than any other small town along the Toronto-Montreal transportation route, was a matter of chance. The Sculthorpe family, who are today still prominent in Port Hope affairs, had owned for many years a seed mill on the Port Hope waterfront. Because of one family member's financial problems, the mill came into the hands of Charles Morrow, who one day happened to meet Gilbert LaBine in the lobby of the King Edward Hotel in Toronto. LaBine mentioned that he was looking for a place to refine the ore, which was then beginning to be mined 4,000 miles away; Morrow promptly offered him the defunct seed mill in the Port Hope harbour. By July 1933 the deed was done. Morrow traded his mill for 9,000 shares of Eldorado stock, and by the end of that month its value had quadrupled.

The accidental nature of that choice is still evident. There is a random quality about the company's John Street site, where the imposing new uranium hexafluoride plant presides over a topsy-turvy collection of buildings, some of them decades old. The seed mill has long gone, but the plant has spread across the mouth of Port Hope harbour. But back in 1931 the young company's biggest difficulty was the long and complex problem of how to get the radium out of the ore. Belgian interests were secretive since they operated the only other refinery in the world, and feared (correctly) a slump in prices if another refinery came into operation. So a group of research scientists at the federal Department of Mines in Ottawa had to start from scratch, working out their own methods by trial and error. They first leached the ore with acid and by a series of separations removed the impurities. Further separations and crystallizations began to isolate the radium from the solution. Eventually they produced a tiny amount of radium bromide in a laboratory-scale procedure that paved the way for the work that was to take place at the refinery in Port Hope.

"Paved the way" is euphemistic. The process was laborious and messy and always remained so. Five hundred tons of ore yielded up only a single gram of radium, and that reluctantly, and only with the aid of huge amounts of chemicals and much dissolving, boiling, and filtering. The last process—fractional crystallization—separated the microscopic quantity of radium from the barium, the latter having been added (in a proportion of 500,000 to 1) to give the radium bulk and stability through the refining process. The whole process started in huge vats and ended in a thimble-sized vessel.

Photographs of the Port Hope refinery from this period are horrifying. Young workers, bareheaded, lean over buckets and pans of steaming precipitates, with clouds of steam surrounding their heads like haloes. Wearing nothing more protective than lab coats, there is an air of heroism about them, rather like those goggled and booted young pilots standing beside absurdly frail World War I airplanes or early bush planes. We now know that the "haloes" were highly carcinogenic vapours laden with radium salts. The workers were issued with facemasks and rubber gloves, but often failed to wear them because they were uncomfortable.

It is often said and believed in Port Hope that the health dangers of radium and uranium were unknown until recently. This is not true. Of course, in the 1930s and 1940s knowledge of radiation was far cruder than it is today: even the instruments (some of which were developed in Port Hope) that measure the levels and intensities so hotly debated today were not dreamed of then. But starting with Becquerel's burn and including the many scientists and workers—Marie Curie among them—who died of the mysterious "radiation sickness," the malevolent aspect of the wonder element was inescapable.

Dr. Marcel Pochon, the first manager of the Port Hope refinery, was especially aware of this fact and was outspoken about it. "Radium is highly dangerous," he told a Port Hope newspaper reporter in 1933. "The slightest fraction of a milligram taken into the system leads to cancer, anaemia, and disease of the hip bones. Not a doctor on earth can save the unfortunate Person who is affected."

And an article in *The Port Hope Evening Guide* in January 1933, a few months after the plant had opened, described what went on there: *Every precaution has been taken to assure the safety of workmen.... For radium, although perhaps the greatest cancer-cure known, is a deadly poison.... From the radium, gas emanates constantly. Too, there are radiations which burn. Hence precautions are necessary. In the tiny tubes containing the mineral are fine platinum wires which "ground" the radiations, and fans everywhere carry the poisoned air from the factory and the laboratory to the outdoors.*

Even the pitchblende, the tar-like substance from which the mineral is derived, is dangerous because of the dust. That is why, according to M. L. Pochon, French scientist who is in charge of the local refinery, miners at Great Bear Lake use wet drills. That is why, too, men who grind the pitchblende at the factory here will operate their machines only one day in seven weeks.

Each Saturday, M. Pochon explained, two men will be taken from the plant to grind the week's supply of pitchblende, and the same two men will only be required to perform their dangerous duty once in seven weeks.

"Could the miners and grinders not wear masks?" he was asked.

"Yes, they could. But if you know men you know the answer. They would wear the masks while we were there, but just as soon as we left the masks would be discarded," he replied.

He stalked into a darkened building. There were piles and piles of pitchblende stacked in small bags. It felt and looked like tar, crushed into small

pieces about the size of furnace coal. It felt and looked harmless, ordinary.

"That" said M. Pochon, "is radium bulk. There are about seven grams in that pile. We have not yet installed the fans."

"Fans? Why? Surely that isn't dangerous. Those bags are harmless, are they not?" the reporter asked.

"Well—I wouldn't want to sleep in there overnight," said M. Pochon.

In subsequent articles that the Port Hope newspaper ran from time to time in an attempt to explain to its readers what was opening at the Eldorado plant, Dr. Pochon never failed to stress the dangers as well as the benefits of radium and uranium. He was at the time the only survivor of five men who had started the study of radium under the Curies. The rest had died of "radium poisoning."

A Frenchman, Dr. Pochon had been managing a small uranium mine in Cornwall, England, when the LaBine brothers lured him to Canada to manage their new uranium refinery. He arrived with two tons of laboratory equipment—crucibles, quartz vessels, all the materials he did not expect to find in Canada—and a brave but reluctant wife who had been told that there was no room left for the family furniture. The pair lived quietly in Port Hope for the rest of their lives, their continental manner distinguishing them from the rest of the townspeople. He was tall, greying, and courtly, as befitted the only scientist alive who had worked with Madame Curie.

Their daughter Anita, a handsome and articulate woman who is a school librarian in Toronto, returns regularly to the house where she grew up. She says her father used to test the water daily in the Port Hope harbour, near where the refinery still stands. Today the water is again tested, exhaustively, by the company and by the province. But the carelessness that took place during some of the intervening years, as well as the plant's position on the waterfront near the municipal waterworks, makes the town's water supply especially vulnerable.

In 1946 Marcel Pochon was charged with criminal conspiracy by the federal government along with two other company officials. The charges involved the disappearance and unauthorized sale of ore when the wartime uranium rush for the development of the atomic bomb was on. The criminal charges were later withdrawn and a civil action was undertaken in the state of New York. The case was settled out of court, with the defendants paying \$2 million to the government.

Dr. Pochon died in 1958 of lung cancer; he was in his seventies and had been a heavy smoker. The small building on the corner of John and Dorset Streets that he used as a laboratory has been pulled down—one of the first actions taken after the storm of publicity and fear about radon gas levels broke over Port Hope. The building was heavily contaminated.

Pochon's home—an attractive house halfway up the Dorset Street hill, overlooking the harbour—was still being monitored in 1980 by the Atomic Energy Control Board.

Marcel Pochon now has one of Port Hope's new residential streets named after him. But few Port Hoppers realize that he, more than anyone else in those early days, had tried to warn them about the dangers of the new substance on which so many fellow citizens were staking their lives and livelihood.

Percy Phillips, now a retired senior citizen living in Port Hope after forty years' work with Eldorado, remembers those days when wages were thirty cents an hour and conditions were primitive.

"It was a close little family affair," he recalls, and money was sometimes short and equipment out-of-date. The ore boiled and steamed for hours in hundred-gallon crocks, which occasionally broke. Most men didn't wear the goggles and masks that were supplied because they were uncomfortable.

"But our defences were pretty good. If you get a bit of caustic on you once, you don't let it happen again in a hurry." There were thirty or forty men working at the plant in those days. Did they know they were working on the frontiers of science, in dangerous conditions?

"The odd person was intensely interested," Mr. Phillips says. "Others couldn't get out fast enough. They didn't like the wet or the smell of ammonia. Nowadays," he adds severely, "they'd be on welfare. Remember though, it was the Depression. You got people in there who'd had careers, who were broken-down experts from other businesses."

Phillips, who joined the plant as a youth four months after it opened instead of becoming a tap-man at the local hotel, leaves no doubt that the Eldorado "family" has been good to him. "I can hardly get in here sometimes for the cheques," he jokes, sitting at his kitchen table. But no one who was familiar with the work at the plant in those days claims that it was easy. The ore concentrates had to be crushed, ground, mixed with chemicals and boiled, almost all by hand. Sometimes the gravity system broke and buckets of slurry had to be carried laboriously upstairs. There were layoffs as well; they occurred when enough ore feedstock did not get through before Great Bear Lake froze up for the winter, or when the price of radium dropped. But even at 1937 prices, which had dropped to \$25,000 a gram, radium rewarded some of its conquerors handsomely, while it took its long slow revenge on others.

The Romance of Canadian Radium includes several photographs of Gilbert LaBine: in baggy pants and open-necked shirt standing beside the sled he and St. Paul had dragged to Great Bear Lake; in white tie and tailcoat with the Governor General, Lord Tweedsmuir, at a dinner in Ottawa to mark the production of the first ounce of Canadian radium. Later, looking considerably more portly, we see him in a velvet-collared coat and bowler with the Lieutenant Governor of Ontario and Sir Frederick Banting, the discoverer of insulin, at the opening of a new building at the Port Hope refinery. It was then 1937; the boy from the Ottawa Valley had come a long way in seven years and he had clearly enjoyed the trip.

By 1939 radium's hectic career was almost over. Eldorado Gold Mines, as it was still called, had broken the Belgian cartel, producing more radium than the world had ever seen and slashing the price from \$75,000 to \$25,000 per gram. With the outbreak of World War II, and as the Nazis overran countries that had been the Port Hope company's largest customers, business dried up completely.

By June 1940, the order came to shut off pumps that kept the Great Bear Lake mines dry, and water seeped back in. The Port Hope workers were laid off for six weeks. LaBine tried to raise a loan using the company's inventory of ore as collateral but the banks refused. He and his brother Charles eventually pledged personal securities of nearly \$1 million to keep the company alive.

This is a shadowy period in the company's history. The refinery re-opened but radium sales were severely reduced. In a documentary film about Eldorado, *The Secret Years*, company treasurer Carl French says that he approached the federal government at this time to buy up for stockpiling the waste uranium from the radium-refining process. But he was treated, he said, like "another Bay Street promoter." The material that was to change the face of the world—and save the company—stayed in waste heaps around the Port Hope harbour. It was evident that some had already been dumped in the harbour because there was no room for it on the plant site.

Meanwhile, Gilbert LaBine was keenly aware that uranium, then selling at \$2.50 a pound, was a valuable asset. He told a shareholders' meeting in 1939, "Research has been most active with uranium... much work is being done on the development of energy through its fission." He talked with

chemists working on the problem in Britain and the United States, and sent them samples of his uranium ore.

At that time, some of the greatest minds in Europe and America were trying to solve the problem of how to split the atom—and release the energy they knew could be obtained from it—in a continuous, controllable manner. The physicists and chemists involved in this work included: Otto Hahn in Germany; Lise Meitner exiled to Sweden; Niels Bohr in Copenhagen; Robert Oppenheimer in Berkeley; and Nobel prizewinner Ernest Rutherford, who had returned to England in 1908 after nine years working on the theory of radioactivity at McGill University in Montreal. With World War II on the horizon, the quest very soon became a race and, for the first time, there was talk of a "super-bomb." A short while after war had broken out, Albert Einstein was coaxed by some worried physicists into writing to President Roosevelt, warning him that atomic energy had been discovered in Germany, and pointing out the tremendous destructive potential of nuclear fission. Whether or not Germany presented any real threat, there was always hope and a good deal of oratory among the Allied leaders that a partnership would develop between Britain and the United States in the critical new field of atomic research.

In all this Canada played a central role, not only because of her refining capacity at Port Hope and her uranium resources (which could be used as a lever in negotiations between the two big powers) and heavy water (the United States financed the building of a heavy-water plant at Trail, BC, in 1942), but also because of the pioneering work of some Canadian physicists and chemists. One of the earliest attempts to create a fission reaction using uranium took place in 1940 at the National Research Council laboratories on Sussex Drive in Ottawa. Dr. George Laurence built an experimental atomic pile and tried unsuccessfully to initiate a chain reaction from natural uranium oxide moderated with carbon. Although none of his attempts were really successful, the experiments did show that, with materials of greater purity, a chain reaction might be possible. Other Canadians were deeply involved with similar work at the universities of California and Chicago.

With the entry of the United States into the war, uranium became a vital war material. Belgium, the only other supplier of ore and refined oxides in the West, had been overrun by Germany. So Eldorado, aided by the federal government, became essential to the supply of uranium for the top-secret experiments taking place under Enrico Fermi's direction in an old squash court beneath the stands of Stagg Field, at the University of Chicago. Later the Manhattan project, as it came to be called, moved to Los Alamos in New Mexico. Under the direction of the United States Army, the scientists there developed the most potent instrument of destruction the world had ever seen.

Although the Anglo-American partnership never really flourished, both countries needed Canadian uranium and the Port Hope refinery for their work. When in 1941 the United States government ordered eight tons of uranium oxides directly from Eldorado Gold Mines in Port Hope, then still a private company, the British became concerned that the Americans would corner the available supply of uranium.

Prime Minister Mackenzie King disclosed in his diary in June 1942 that he "had an interview with Malcolm MacDonald [the British High Commissioner in Canada] and two scientists from England" about "the acquisition of some property in Canada so as to prevent competition in price on a mineral much needed in connection with manufacture of explosives." This was the first step towards making Eldorado a crown corporation. The demand for uranium was rising; already King's government had summoned LaBine to Ottawa and ordered the re-opening of the flooded mine at Port Radium. A company history reports that:

Aided by government priorities, the company geared all its facilities—mining, milling, transportation, refining—for high capacity production.

By mid-May fifteen pumps were at work on 12 million gallons of water and ice that had flooded the mine since it shut down in 1940. By July 1 the mine had been cleared and mining resumed. The effect on the refinery in Port Hope was immediate and irreversible. Eldorado started full-scale production of uranium oxides late in 1942, adapting its processes accordingly:

"They started to expand all the facilities, to bring in new equipment, hundreds of fancy pumps, chemicals being pumped around the plant," Percy Phillips recalled in *The Secret Years*. The refining process itself had to be refined so that the product would attain the level of purity required for the new uranium production.

But the British were still anxious. By the end of 1942 Eldorado had contracts with the US Army for 700 tons of uranium oxides, and ore was being flown in from Great Bear Lake. And in late June the following year Dr. C. J. Mackenzie, acting president of the National Research Council, recorded that British High Commissioner Malcolm MacDonald was "very much upset by the lack of exact knowledge on the LaBine-US Army contracts" and that C. D. Howe, the famous Minister of Munitions and Supply, was "very much fed up with the suggestion that he is selling the British Empire down the river, etc. etc."

The immediate result was that the Americans were finally persuaded by Canada to deal directly with Mr. Howe's Department of Munitions and Supply rather than with Eldorado, thereby ensuring that there could be no price exploitation, and that the government would be fully informed about the uranium supply situation. Dealing in a strategic commodity with a private company in Port Hope, under tense wartime conditions, was proving to be a tricky business. And the sad truth was that although they supplied both uranium oxide and heavy water (from the plant in Trail, B.C.) to the Manhattan project, the Canadians had to fight to obtain enough of these resources for their own work, then concentrated in Montreal.

The Montreal laboratory, set up and partly staffed by the British when they moved their heavy-water research team there in 1942, was particularly interested in plutonium extraction. A group of emigre and Canadian scientists worked on the design of a reactor that would generate this substance as a by-product for possible use as a bomb component. This work led to the famous NRX (National Research Experimental) reactor at Chalk River, the first in the world that could "breed" nuclear fuel. It is the direct antecedent of our present CANDU reactor.

The full story of this period in Port Hope may never be told. It seems clear that the government efforts to keep track of all Eldorado sales did not work; there were later reports of illegal foreign deals, which culminated in the charges against Dr. Pochon, the former company secretary, Carl French, and Eldorado's New York sales agent. Eventually a full-scale inquiry into the company was launched in 1945.

Despite these alleged deals, the government take-over of the company in 1944 probably was inevitable because of Canada's "honest broker" role between Britain and the United States. From January 1, 1944, Eldorado Mining and Refining (its name had already been changed) became a crown corporation. Its former shareholders were paid \$1.35 a share by the government.

A few Port Hope old-timers who held shares or used to work at the plant still grumble about these terms. Gilbert LaBine, however, seems to have taken the change in his company's status with equanimity—in spite of the fact that, because of the new arrangement, he lost refinery manager Marcel Pochon,

who retired the following year.

For Port Hoppers in general, the take-over made little difference. Workers at the refinery were too busy to notice, with increased orders and rushed schedules. They and their fellow citizens were more concerned about the security measures that had intruded into their lives. Friends and corner-store managers were being questioned by the RCMP about the habits of company personnel. There were now RCMP patrols around the refinery site and security checks upon entering and leaving the premises. For most townspeople, these trends simply increased the mystery surrounding the plant that was supposed to be producing the world's latest healing miracle.

A few people realized that something crucial to the war effort was going on and that the local refinery was central to it. But secrecy was paramount. "We weren't even allowed to mention the word uranium in those days," a retired chemical engineer in Port Hope recalled.

The notion that Eldorado was closely involved in the research that led to the mass destruction of life at Hiroshima and Nagasaki, instead of the business of healing, would have been difficult to accept for most citizens of Port Hope at that time. Indeed, it is doubtful that they have ever really confronted it. The billboard that proclaimed "the town that radiates friendliness" signified, at least in part, the need of these decent people to forget the hard truth that their biggest industry had been involved in death-dealing activities.

It has been estimated that more than 80 percent of the uranium used in the Manhattan project came from the rich Belgian Congo ores delivered before that country was occupied in World War II. Certainly there is no evidence that any uranium from Eldorado went into the atomic bombs that were dropped on Hiroshima or Nagasaki. But it is scarcely a comforting thought. The boom that started in Port Hope in 1942—the rush to process uranium oxides, the research to achieve a level of refinement never before obtained, the concern over sales and the tough security measures—were all aimed at one main objective: supplying uranium for the research at the University of Chicago and then at Los Alamos under Dr. Robert Oppenheimer. That research culminated, in mid-1945, in the explosion of an atomic bomb on the desert flats of Alamogordo, New Mexico. A few weeks later, another bomb was dropped on the people of Hiroshima.

In Canada, the first small, experimental reactor set up at Chalk River, Ontario, with the help of the British, started operation a month after the bombing of Hiroshima and Nagasaki. The NRX, the main Canadian reactor, and the world's first heavy-water reactor designed to produce plutonium from uranium, did not go into operation until 1947. So the work that was originally set up for military purposes has since been applied to peacetime research and commercial development. The CANDU reactor, Canada's pride in the energy-hungry world of the 1980s, grew directly out of this wartime research. It was partly financed by the US Atomic Energy Commission, which had agreed to buy the plutonium output of the reactor for the first few years of its operation.

Whether for war or for peace—for the atomic bomb or the CANDU reactor—the uranium produced at Port Hope left an indelible mark on the town. The careless habits regarding the disposal of waste during the war years were not adequately corrected. And partly because Gilbert LaBine's Eldorado had become a branch of the federal government, the Atomic Energy Control Board—the regulatory body formed in 1946—which should have been overseeing the refinery's activities, instead for many years virtually ignored them. The two were, as a critic later said, cosily in bed together.

CHAPTER THREE

Professor Douglas Andrews is a man to be reckoned with by Eldorado Nuclear and the Atomic Energy Control Board in public debates on nuclear issues. He has prestige: he was the architect of the nuclear engineering programme at the University of Toronto and was a member of the early reactor design team in Britain, where he specialized in radiation safety. He is well-informed and outspoken, rattling off standards and measurements at top speed. He is not at all inhibited by having received help from his adversaries in the past; his programme at the University of Toronto's department of chemical engineering was once given three tons of natural uranium by Eldorado, a gift he continues to acknowledge.

Above all he is passionate about his subject and loves talking about it in public—on TV, radio or an auditorium platform, in a small town coffee shop or a university faculty club. Unlike most of his colleagues, he assumes his listeners will understand him. He is also, naturally, pro-nuclear.

It was Professor Andrews who, in 1966, at the request of the RCMP, conducted the first independent measurements of radiation levels at the major Eldorado dump sites in Port Hope and the neighbouring communities of Welcome Corners and Port Granby. He reported his findings to Eldorado Nuclear, both management and workers, and to the Atomic Energy Control Board.

"The board was annoyed. They told me the measurements were confidential. They did some peripheral cleaning but did not get rid of large quantities of radioactive waste," Professor Andrews recalled.

He had been asked to check the dump sites for security reasons, among others, because of official concern that there could be a theft of strategic materials. There was a possibility, it was thought, that the Atomic Energy Control Act could be violated: people were able to wander at will through ill-kept fences that surrounded the dump sites and help themselves to discarded construction items and other materials. The RCMP wanted to know if there was any risk that enough uranium or other material could be taken to constitute a security risk—to build a bomb or fuel a reactor.

Professor Andrews could assure the authorities after touring the dumps that there was no such risk. Although radium was present there was little or no uranium. A peculiar feature of the Act is that to prove a violation it is necessary to prove that someone has received an excessive radiation dose—a near-impossibility. He could find no proof that the Act was being violated. He did find high radiation levels and poor fencing. That was enough to start him on a long, often stormy, but wholly committed relationship with the people of the town of Port Hope.

His geiger counter showed such high accretions of radiation on or near the surface of the dumps that he feared for the health and safety of the people living nearby. He did not at the time try to prove that anyone had absorbed more than the allowable limit of radiation, beyond trying to establish exactly where the material came from. He was concerned about a public health hazard and he tried to warn those responsible about what was happening. But he received no official reply from the AECB. When questioned, the board told him his report was confidential and could not be discussed. The RCMP lost interest in the matter once it had been established that there was no security risk.

At that time public awareness of the risks of radiation was high, particularly in the United States. Radioactive fallout from weapons testing was the main issue, particularly milk contamination by strontium-90. In Canada, the Voice of Women organization had urged members to send it their babies'

first teeth to check for evidence of strontium-90. There was, for a time, extensive media coverage of this issue and of the situation in Port Hope, as a result of which the Ontario health and environmental authorities conducted a review of certain dumps, including the Port Granby site. But the issue was soon dismissed—by most of the public, by government, and by industry.

Eldorado management maintained that the waste in the Port Hope area was safe. The town water supply was being monitored and, apart from individual cases like Carlus Dickinson and Dr. Peter Hunt, there had been no complaints. Reaction from most officials was to do nothing.

Professor Andrews is not someone who gives up easily. He is not a large man but he is jam-packed with energy. He walks quickly and his speech comes out in a rush. He thought from what he had seen and measured in Port Hope that AECB regulations were being disregarded by Eldorado. The high levels of radiation at the edges of its Port Hope dumps and the poor fencing and inadequate signposting that enclosed them led him to this conclusion.

He offered suggestions to the board as to how the dumps could be cleaned up, but no action was taken, he says. He told them it was unwise to allow radioactive wastes to be piled on hilltops where contaminants could leach out and run down the hillsides into the town. They became annoyed—but did remove another load of waste from the Monkey Mountain site that was polluting Dr. Hunt's property.

Douglas Andrews bided his time, showing all the patience of an aggressive terrier waiting for a chance to pounce. But the pounce did not come for another nine years when, in the late spring of 1975, he returned to Port Hope with a crew of investigators from the CBC. With members of Energy Probe, an activist environmental organization that was also working on the problem, he found the dump sites basically unchanged. There were broken-down fences and few warning signs. In some places at the edge of a dump it would be possible to absorb in one month the maximum radiation dose allowed under international standards for one year.

A combination of events led to this visit. They included the discovery of radioactivity in a Toronto office building, and the death of some cows from a Port Granby farm after they had wandered into the nearby Eldorado dump. The subsequent airing of a TV programme that was made about Port Hope led to promises of action by the federal minister of the environment. The AECB, which had already started its own hunt for dangerous, unregulated waste sites, stepped up its activity.

Professor Andrews also took more readings. In 1966 he had found, in one spot on John Street at the perimeter of Eldorado property, high radiation levels that could threaten the health of a member of the public. By 1975 the level had been reduced, but "hot spots" remained, lower down below the surface.

The plant management didn't want to do anything, Andrews reported later. They even questioned whether they then owned the waste, or whether it belonged to the AECB. Clement Baschenis, then senior vice-president, wrote to say that the company was advised it had broken no law. The plant union did not take any action.

Evident at the time was the characteristic reluctance of many Port Hoppers to make a fuss, to believe the worst about a valued employer, or to look an uncomfortable truth in the face. And there were other less clear circumstances that helped shield Eldorado's careless disposal habits from official scrutiny—and had done so for many years. They had to do with the nature of the nuclear industry in Canada and, more particularly, with the role of the Atomic Energy Control Board—the only body with the expertise and power to supervise and license Eldorado Nuclear.

Canada's nuclear industry is not a major employer but it enjoys great prestige in domestic technological circles. It is one part of our economy's technological sector that is a world leader. In the past Canadian scientists have played important roles in the discovery and implementation of nuclear fission. At a conference in Quebec during World War II, Prime Minister Mackenzie King pledged our expertise and resources to the US atomic bomb project, code-named Manhattan Engineering District, at the urging of Roosevelt and Churchill. Since that holocaust, Canadian leadership has endured, chiefly at Chalk River, Ontario, where medical isotopes are now produced on a large scale. One of the world's most successful experimental reactors, the NRX (National Research Experimental—a heavy-water reactor that is an efficient plutonium producer), is located there. It is a direct antecedent of the CANDU—our successful family of power reactors which are fuelled with natural uranium and moderated with heavy water. It was a small and cosy group of people who knew about this work in detail, and who took the decisions that influenced it. This "family" mentality still remains today.

The main components of the industry are the Atomic Energy Control Board, the regulatory agency and at one time the general booster of the nuclear industry; Atomic Energy of Canada Limited, another crown corporation and the industry's main commercial arm with responsibility for sales, contracting, research and development; Eldorado Nuclear Limited, which mines uranium and makes nuclear fuels, and the provincial electrical utilities that have gone nuclear—Ontario Hydro, Hydro Quebec, and the New Brunswick Hydro Electric Commission, of which Ontario Hydro is by far the biggest.

As well there are privately owned mines and mills, fuel fabricators, consultants, engineering groups, and equipment suppliers. Also involved, of course, are several other branches of the federal government, including the National Research Council and the National Energy Board. On the whole, however, two city blocks in downtown Ottawa form the core of the industry: Eldorado Nuclear Limited occupies part of a tower on Albert Street; around the corner on Slater Street is Atomic Energy of Canada Limited and in between, directly across the street from Eldorado, is the Atomic Energy Control Board.

The arrangement, it is now clear, has been far too convenient for far too long. It reflects the contradiction that lies at the heart of the Atomic Energy Control Act of 1946, which set up the control board and gave it the authority both to regulate and control atomic energy, materials, and equipment and also to promote atomic energy research.

These duties soon conflicted. The small size of the nuclear establishment in Ottawa, the fact that the president of Eldorado used to sit regularly on the six-man control board along with the heads of AECL and the National Research Council, as well as the closed-door aspects of the board's operations—with very few public hearings or reporting mechanisms—all meant that it was easy to ignore what was going on in Port Hope. Although it had shown some concern for the health and safety of workers, there is no record in the AECB's summary of its regulatory activities of it imposing any conditions whatever on the disposal of radioactive waste in Port Hope until 1965. Moreover, the monitoring of this disposal was largely left up to Eldorado, with occasional checks by the province.

As a result, the poisons that were seeping into the gardens and farms around Port Hope could be ignored. If Eldorado refused to take responsibility for cleaning up its dumps, there was no one else to order the company to do so. A few complaints from private citizens were not enough to crack the barrier of secrecy and complacency surrounding Canada's nuclear establishment.

It is not so easy to understand another event that occurred in Port Hope. In the early 1950s, during the "cold war," the town was chosen by the Canadian army as an appropriate place to conduct radiation training exercises. Because of its known areas of radioactive contamination it was used, on two occasions, to train soldiers of the Royal Canadian Engineers in nuclear detection techniques. The training unit made a grid of the town and surveyed it for radiation levels, using jeeps equipped with radiation counters. Then they came back, two years later, and practised using their equipment on the Eldorado dump sites.

When this story became known in 1976 an army spokesman said that clearance had been obtained from Eldorado Nuclear before the exercise got underway. He "assumed" the Atomic Energy Control Board had been informed. The levels of radiation found at the time were, he said, still classified information.

Neither Eldorado nor the AECB could find any record in their files of the army training exercises. During the 1950s the company had made profitable sales of fairly large quantities of waste from the dump sites on the lakeshore, at nearby Monkey Mountain and at Welcome Corners, to be used for further metals extraction. And on the national scene Canada's nuclear experts were laying the first plans for the development of an atomic power reactor, with a mandate from Ontario Hydro. No one apparently had time to bother about the effects the radioactive wastes might have on the town. Certainly no one thought to warn the people of Port Hope about the health hazard in their midst, or to clean up the dumps on their behalf.

Twenty years after the army exercises, in 1975, the radioactivity levels in the three acres of beach—or lakeshore—dump were still from two to forty times the safe exposure level, according to AECB figures. This area is immediately adjacent to the town beach, where generations of Port Hope children and their families have enjoyed themselves swimming, sunbathing and playing in the sand. That year some 15,000 cubic yards of contaminated waste were moved off the beach site. "We seem to be saddled with cleaning up the happenings of the past," lamented Jon Jennekens, then director of operations for the Atomic Energy Control Board, which had—finally—ordered the clean up.

The scanty public records of the AECB and Eldorado give little hint of what was happening to the people of Port Hope. But by looking at these records, it is possible to gauge the public and business pressures that influenced Eldorado's growth, and to see how the regulatory agency responded.

If the 1930s were Eldorado's start-up years, and the 1940s, the war years—with the switch to government control and all-out commitment to uranium production occurring about midway through them—the 1950s were the years of expansion.

New mines opened at Beaverlodge, Saskatchewan, and at Elliot Lake and Bancroft in Ontario. New processes came on stream. In Port Hope a solvent-extraction method of separating uranium from the ore was introduced, replacing the old smelting process. It was a cleaner, more efficient method and got rid of the heavy, arsenic-laden fumes that used to go up the chimney stacks. But it used large amounts of kerosene, with which the extractant tributyl phosphate was mixed, and this itself was to cause problems.

The demand for uranium in the 1950s reflected, of course, the Cold War that was being waged between the Americans and the Soviets, and the arms race this rivalry spawned. Nuclear secrecy was almost a paranoia. Ever since the passage of the McMahon Act in the USA in 1946, American scientists had been forbidden to share their nuclear discoveries, even with their former allies. It was the decade of secret weapons tests, radioactive fallout and hard-line diplomacy. It was not a time for Port Hoppers to ask hard questions and expect honest answers.

Eldorado discontinued all radium production in the middle of the decade, and gradually dismantled the old plant. Bill Young, an engineer in his thirties, worked on the dismantling of some air ducts known to be contaminated with alpha particle radioactivity in the summer of 1954. He was accidentally exposed to a cloud of contaminated dust. Two years later he died suddenly of reticulum cell sarcoma—a type of cancer whose symptoms are similar to the cancer that killed thousands of Japanese victims two to eight years after the Hiroshima/Nagasaki bombings. In 1959, construction materials from the old plant were sold off as the site was cleared and space made for new processes. The foundations of many Port Hope garages, basements and driveways, as well as St. Mary's school, were built with this material.

The 1950s were also the decade of the Campaign for Nuclear Disarmament, the Albert Einstein-Bertrand Russell manifesto, the first of the Pugwash conferences—all efforts to awaken citizens and scientists to the growing nuclear impasse. President Eisenhower gave his famous Atoms for Peace address at the United Nations in 1953, and in Canada, later in the decade, physicists and chemists at Chalk River began thinking about what was to become the CANDU power reactor.

Uranium prices were high. Eldorado began selling off some of the residues in its Port Hope dumps for re-processing for metals extraction. It closed down the Welcome dump site and started a new one at Port Granby, assuring residents they had nothing to fear from the new processes' wastes. At the end of the 1950s the company's profits had increased almost tenfold.

The year 1959 heralded the end of the good times. World production of uranium had overexpanded and Eldorado's main buyer, the US Atomic Energy Commission, decided to drop its option on Canadian production. The Port Radium mine, which was running out of viable ore bodies anyway, closed down in 1960. The Port Hope refinery shortened its work week and reduced annual production to 3,000 tons, the lowest figure since 1956. Eldorado president William Gilchrist warned:

The sixties will be a difficult time for all uranium producers. It is expected that the world need will not equal the existing developed capacity to produce until the early seventies... but with the doubling of world power requirements every ten to twenty years the long-term future of the industry is bright.

The company's annual general reports during the early 1960s continue this air of determined optimism. But there was a sharp reduction of work in the Port Hope plant and fifty employees were laid off. The government announced a stockpiling programme and research efforts went into finding new non-nuclear uses for uranium.

In 1962 Eldorado began handling enriched uranium for research work at Chalk River. (Enriched uranium contains high percentages of the fissionable U235; the company's feedstock came from the USA) This much more dangerous work resulted in the Atomic Energy Control Board issuing, for the first

time, licences governing "criticality safety in the plant" (that is, danger from nuclear reaction) as well as health and safety conditions for workers.

It was the first time the AECB had intervened in company affairs for health or safety reasons except for one inspection of the plant by an AECL team from Chalk River in 1947. At that time, it was agreed that, given the nature of the work in Port Hope and "pending the cessation" of certain radium operations, no further board concern was necessary. Eldorado should administer its own health and safety operations in collaboration with Chalk River personnel.

But the health and safety conditions laid down in 1962, which were recommended by the federal Department of National Health and Welfare, were general and monitoring plans were vague. According to the AECB itself, the conditions imposed regarding health and safety were minimal until 1964. At that time, the conditions took up all of half a type-written sheet of paper; a year later, they covered one and a half pages. The board issued no regulations at all regarding waste until 1965. Then it required only that "all active waste shall be collected and disposed of by procedures specifically authorized by the AECB."

What those procedures were exactly is not set out in the directive. More important—for Port Hoppers—is the fact that there was little provision for finding out whether or not they were being followed. To quote the agency itself again, "[the] AECB carried out minimal participation in compliance monitoring." At the time this meant that the broken-down fences and leaking dump sites that were to horrify Professor Andrews a year later continued to exist, despite the fact that the AECB was beginning to get interested in waste disposal.

In retrospect, the board claims, with justification, that it was simply not big enough during this period to carry out adequate monitoring and regulation of the Port Hope plant. In 1961 it employed a total of twelve people, including support staff. By 1975 there were still only sixty employees with no vehicles, no regional offices, no facilities for field examinations. Obviously it had to rely heavily on other agencies and departments, as well as part-time people, for this sort of work. In matters relating to health it was, it says, sensitive to the claim that health is a provincial responsibility and, until the mid-sixties, it virtually abdicated its responsibility in this field.

In an evaluation of the board's procedures written in 1976 for the Law Reform Commission, G. Bruce Doern wrote that this reliance on provincial health personnel "led to an uneven performance at best and non-existent at worst. The real day-to-day compliance and inspection processes and functions of the AECB are too important to be sacrificed at the altar of jurisdictional uncertainties. The AECB had constitutional authority to appoint its own inspectors and compliance officials."

If the board did not recognize this during the fifties and sixties—and it did not—no one else would. So Eldorado continued to truck its waste into the Welcome and then the Port Granby dump sites. The thick yellowish raffinate from the uranium production processes often spilled off along country roads. It was not as dangerous as the arsenic-and-radium-laden wastes from the earlier processes; but in the dumps it lay heaped on top of these until, in later years when a clean-up was being attempted, no one could tell where the most toxic wastes were buried.

It should not be assumed that Eldorado was not itself carrying out safety and health procedures nor that it failed to monitor wastes in these years. In 1958 the company started regular sampling of Brand's Creek and, starting in 1960, it took regular water samples of the run-off from the Monkey Mountain and Welcome Corners dump sites; seven years later it started doing the same at two locations in the Port Granby dump. In 1977 it made public a four-page summary of its current health, safety, and environmental monitoring programs, including procedures for air and water effluent and waste disposal. But the seriousness of the contamination from its dump sites was never revealed to the people of Port Hope by the company. Eldorado's efforts to control it—by removing some of the waste from Monkey Mountain and installing a drainage pipe at Welcome—did not get to the root of the problem.

Eldorado had other problems to contend with in the 1960s, problems of its own that doubtless seemed far more important than those of the people of Port Hope. Production and refining contracts continued to decline as did prices, and profits plummeted. For more than half of 1964 the solvent-extraction process worked at only one-quarter capacity. By the end of the decade the company reported its first loss since 1945; it was over \$1 million. A year later its loss increased to nearly \$2 million.

This was happening during the time when the Western world was beginning to move seriously into the age of nuclear-fired power production. The concept of using a controlled nuclear chain reaction instead of coal or falling water to turn the turbines that generate electricity ("exploding a bomb to boil water," as one irreverent critic observed) was taken seriously. Ontario Hydro completed its first commercial CANDU generator in 1966 at Douglas Point. Having urged its customers to more and more extravagant uses of electricity through its multi-million-dollar advertising programme, it planned to make the province dependent on nuclear stations for two-thirds of its energy consumption before the end of this century.

Dr. Arthur Porter's Royal Commission on Electric Power Planning and the Ontario Select Committee on Hydro Affairs have analyzed in exhaustive detail Ontario Hydro's forecasts and building programmes. All that needs to be said here is that the cost of nuclear-fired electricity, like that produced by Ontario Hydro in oil-fired turbines, has driven the average Ontario consumer's electricity bills up more than 125 percent in the ten years since 1969. One reason could be that thermal generating stations, especially compared to hydroelectric ones, are notoriously inefficient; they are able to convert only 30 to 40 percent of the energy released as heat into electricity. Even among thermal generators, nuclear-fired stations are slightly less efficient than their coal-fired counterparts.

In any case the CANDU power reactor's need for nuclear fuel, the relatively simply produced uranium dioxide which Eldorado started producing in 1958, did not make the company's balance sheet look significantly better during the 1960s. Developments abroad, however, particularly in the first part of the decade, gave Eldorado's managers hope for a better future. By 1965 Britain had eleven power reactors in operation, and in the United States the initial trickle of reactor orders had turned into a flood, running to between twenty-five and thirty new orders annually by the end of the decade. Public power utilities in the US paid up to \$7 a pound for uranium in 1967, compared to about \$2.50 in 1940.

If Eldorado was to pull itself out of its slump it had to cash in on this market. But all reactors are not the same and the model that was becoming increasingly popular in the US was the light-water reactor, so-called because it could use ordinary water, rather than the very expensive heavy water, as a moderator and to keep the core cool. This type of reactor uses a more highly enriched form of uranium fuel than the CANDU—that is, its fuel has a higher than naturally occurring content of U235, the fissile isotope of uranium that is necessary to sustain a chain reaction. To "enrich" ordinary uranium for this fuel is a complex business, usually undertaken by a process of gaseous diffusion carried out on a massive scale in plants that cover

many acres of land. There are no enrichment plants in Canada. But before uranium can be enriched by gaseous diffusion it must be converted into uranium hexafluoride, and this is where Eldorado saw its opportunity. In 1968 plans were drawn up in Port Hope for a uranium hexafluoride conversion plant. Less than ten years later the processing of this fuel—for export only—accounted for four-fifths of the Port Hope plant's production.

There is no doubt about the continuing importance of uranium hexafluoride to Eldorado's economic health. In spite of Ontario Hydro's expansionary vision there are simply not enough CANDU reactors in Canada to keep the company solvent, and reactors sold abroad do not carry contracts for fuel supplies. Of all the attempts to find new uranium uses during the 1960s (a vacuum furnace was installed for making uranium metals and alloys; a plant was constructed to produce zirconium—a sand-based substance used for fuel rods—but soon failed) the uranium hexafluoride plant was by far the most successful. Proof of this lies in the enormous amount of money and time that, from 1974 on, the company has put into obtaining approval for expanding its uranium hexafluoride capacity. Its proposed uranium hexafluoride plants in Port Hope and Saskatchewan would more than triple existing Port Hope production.

There is visual proof of this importance, for Port Hoppers, in the stark grace of the John Street building that houses the uranium hexafluoride production process and dominates the rest of the plant and harbour. Up close, however, it is less appealing. Uranium hexafluoride is a dangerous compound, easily vaporized and highly corrosive. On contact with air its crystals give off hydrofluoric acid, a poison that in high concentrations can cause fluorosis—a disease that affects bone calcium in animal life and causes damage to plants. As a liquid it is also very difficult to handle, because any spillage is dangerous and hard to contain. Most Port Hope citizens see it only in the heavy steel cylinders filled with solid hexafluoride which are hauled in enormous trucks through the town.

Obviously there could be serious dangers for the town from this new process if it is not carefully controlled. One threat could be a spill while loading or hauling the cylinders—(each of which holds thirteen metric tons) through the town's built-up areas. The hydrogen fluoride emissions from the plant's chimneys can damage nearby grain fields, as well as the health of people and animals, unless many precautions are taken. The danger is particularly acute since the prevailing westerly winds blow across the factory and the harbour and sometimes into the well-populated residential districts in the east end of the town. Partly because of these dangers, by 1968 the AECB began to examine more closely its responsibilities in Port Hope. Perhaps also the board was prodded on by Professor Andrews' needling, or by the growing public concern about reactor accidents all over the world, or even by its own growing strength. In any case, the board was concerned that the new plant's design and operation should meet its safety criteria. A committee of experts from the relevant federal and provincial agencies as well as Eldorado itself was formed to report to the agency. From this time, and especially from 1970 when the new hexafluoride plant's operating licence was issued, the board has taken an increasingly close interest in the refinery.

The conditions of the new plant's licence itself were more demanding than for previous licences. For the first time the health and safety of the general public, as well as that of Eldorado employees, and the plant's effect on the environment, were at least listed as concerns. Eldorado had to submit to the board an annual safety report on its plant and to consult it or its advisors in the event of "unusual occurrences." The fulfilment of other environmental procedures, such as those of the Ontario Water Resources Commission, was required. As well, the board conducted "safeguards" inspections of the plant to check on how the small amounts of dangerous highly enriched uranium were being handled, and established a committee to review the conditions of work in this special area.

In 1966 regular monitoring of the cooling effluents that the plant emptied into the Port Hope harbour was begun by the Ontario Water Resources Commission. It also started monitoring the Welcome dump area in that year. Not until 1971 was regular monitoring of air emissions undertaken by the province, and then only for fluoride from the hexafluoride plant. "High-volume" monitoring for general particulates in plant emissions was not started until 1975. As for the plant workers, although Eldorado had had since 1957 a private arrangement with the Radiation Protection Bureau of the Department of National Health Welfare for the monitoring of its employees' radiation exposure, this did not come under the supervision of the AECB until 1970.

It is difficult for many people, especially in Port Hope, to understand why it took so long for the authorities to implement such basic health precautions. The first century of the nuclear age was almost three-quarters finished, men had been on the moon, and vistas of a cheap energy future for all were being promised by the nuclear industry before that industry and its regulators began to show serious concern for the people who built it.

When trying to explain the laxity of these years, control board representatives later pointed to the agency's lack of clout over a crown corporation. At issue was the dilemma of the crown licensing and controlling the crown. Although separate licences for particular processes were issued earlier, it wasn't until 1976 that the board gained meaningful control over all of Eldorado's activities, when it issued its first "fuel processing facility operating licence." Even now, under present legislation, the board has to operate largely by mutual agreement with the company, since it hasn't the power to take another crown corporation to court.

But public uneasiness about other aspects of the nuclear industry was also beginning to be felt in North America and Europe by 1970. By then there had been major accidents in Canadian (at Chalk River in 1952), American, Swiss and British reactors, although nothing as serious as the more recent event at Three Mile Island. It looked as if the honeymoon with nuclear energy was over.

Public protest had forced the shelving of plans for major new reactors in the United States and was partly responsible for a new legislative hurdle for the industry—The National Environmental Policy Act—which required any new nuclear installation in the United States to file an environmental impact statement assessing all its anticipated environmental effects.

In 1970 Eldorado's president, William Gilchrist, acknowledged this increased public concern. He said in the company's annual report that it *stemmed largely from lack of public understanding of the minimal effect nuclear power plants have on their surroundings... Obviously, it is the responsibility of governments and the nuclear industry to inform the public... and to assure the public that standards acceptable for human and ecological safety are being maintained.*

He had reason to be concerned. Most of the opposition was focussed on the dangers of the light-water reactors, on which Eldorado's uranium hexafluoride contracts depended. The public, in its efforts to increase its understanding as Mr. Gilchrist had urged, was making a collection of what Canadian nuclear physicist Walter Patterson calls "nuclear folklore" in his thorough and readable guide to the industry, *Nuclear Power* (Penguin, 1976). This collection of disasters and near-disasters included reactors with burst steam pipes which were said to threaten their containment structures; control rods installed upside down; corroded condensers endangering reactor cooling systems; and, in one case, a forgotten welding rig found inside a reactor

pressure vessel. No wonder there was, at the turn of the decade, a precipitous drop in US orders for new reactors and a dramatic shrinking of the projected use of nuclear power.

It didn't last long. By 1972 Eldorado, in its annual report, could point to fifty-six new reactors on order throughout the Western world. (The next year there were fifty-six operable reactors in the US alone). And in 1973 Eldorado predicted that a decade later 45 percent of electrical power in Canada would be nuclear generated. Spurred on by the oil crisis of 1973, this optimism increased immeasurably; however, the troubles with light-water reactors continued, leading to dozens of delays and cancellations in 1974. Now, as 1983 draws nearer, there is again a sharp drop in reactor orders, the world market for uranium has weakened, and Eldorado is once again pulling in its horns.

But for Port Hoppers the ups and downs of reactor orders and the vagaries of public opinion had much less impact than the question of jobs. Unemployment statistics in the Port Hope area hovered around the 7 to 8 percent mark during the early seventies, well over the national average, and hopes were pinned—vainly as it turned out—on the huge new oil-fired generating station to be built six miles west of the town at Wesleyville. As municipal leaders hunted more and more anxiously for new industry to come to the town any expansion, nuclear or not, looked good.

Moreover, the initial success of the early CANDU reactors that were installed at the Pickering generating station, located on the lakeshore just east of Toronto, calmed any public fears there might have been about contributing to Canada's nuclear growth. Until mid-1974 these heavy-water reactors seemed increasingly successful on the international reactor scene. Then in August one of the reactors sprang a pressure tube leak and a long series of CANDU troubles began. That winter and the following spring more and more Ontarians discovered how deeply they were being committed to the nuclear option. They began to have serious doubts about it.

Citizens faced with the imminent prospect of having a neighbourhood uranium mine or reactor began to ask questions and, frustrated by industry secretiveness, sought to find their own answers. Decoding and interpreting that information became a full-time job for organizations such as Energy Probe and the Canadian Coalition for Nuclear Responsibility. Concurrently the AECB and Eldorado, spurred by this public discontent, began their long hunt for the discarded radioactive wastes that had been contaminating various parts of the province and Port Hope for several decades.

In the summer of 1975 Professor Andrews and the CBC-TV crew appeared in Port Hope to start a public discussion about nuclear responsibility that has not yet ended. What changed everything that year was the discovery that large quantities of these contaminated wastes had been used for landfill in the town, and that houses and a school had been built on it. Radon gas and the threat of lung cancer added a new and frightening dimension for Port Hoppers to the debate about nuclear power.

Central to the nuclear-energy debate, as it gathered steam and controversy in Port Hope, was the idea of safe levels—the "standards acceptable to human and ecological safety" that Eldorado president Gilchrist had referred to a few years earlier. People in Port Hope found they were living in radioactive homes; some of their children were going to a radioactive school. Gardens, ravines and the beach were also discovered to be radioactive. But how dangerous was it? They wanted to know. What would radioactivity do to them? How was it measured?

The industry and its allies are quick to point out that man has always lived with radiation, that we are likely to receive far higher annual doses from medical X-rays and jet travel than from nuclear reactors or waste. But nuclear opponents and many medical authorities maintain that any increase in radiation can be harmful to people, and they quote figures showing increased deaths and mutations wherever there has been exposure to abnormal amounts of radioactivity, even at low doses.

Underlying these conflicting claims is a set of international standards that recommends allowable doses for the public and for nuclear workers. Periodically revised, these standards have been established by the International Commission for Radiological Protection (ICRP) and are endorsed by Canada, the US (usually) and Britain, as well as by other countries. The ICRP starts from the principle that any increase of radiation is harmful to some degree and recommends that increases should be kept "as low as is reasonably achievable, economic and social considerations being taken into account."

The ALARA principle, as it has come to be called, has been hotly debated, for it shows the difficulty of combining public safety with nuclear expansion. The ICRP tries to strike a balance between public health and the promotion of nuclear power and, as it says in its 1966 recommendations, *this limitation necessarily involves a compromise between deleterious effects and social benefits.... It is felt that this level provides reasonable latitude for the expansion of atomic energy programmes in the foreseeable future. It should be emphasized that the limit may not in fact represent the proper balance between possible harm and probable benefit.*

Whatever the "proper balance" it is clear from the above that the ICRP hinges public safety to the benefits nuclear power is expected to bring. And that is a decision about which the Canadian public has not been consulted. Additionally, enforcement of these allowable doses depends on each country's nuclear regulatory agency to translate them into detailed regulations and codes of practice, and then to monitor these. As we have seen in this chapter, the AECB's track record in this regard over the years in Port Hope is lamentable.

But for most of the citizens of Port Hope in 1975 and 1976, the important thing was the allowable dose—what it meant and how it was measured. Then the trick was to compare this dose against the measurements of radiation that were occurring in their town, once these were established and meaningful.

The ICRP allowable dose per year for a member of the public is half a rem, or 500 millirems. (For a nuclear-industry worker it is ten times this because, it is assumed, he chooses and is paid for his work). "Rem" stands for Roentgen Equivalent Man, and it measures the biological effect on people of absorbed doses of radiation. (Wilhelm Roentgen was the discoverer of X-rays.) Most measurements of radiation in Port Hope were in rems. The standards eventually worked out by the federal-provincial task force which was established to clean up the town were derived from the ICRP 500-millirem annual limit.

But there were many hurdles of terminology and understanding to be cleared before this stage was reached. Rod Hendrickson, the amiable, level-headed army engineer seconded by the Atomic Energy Control Board to Port Hope, said—not entirely in jest—that he spent half his time convincing two-thirds of the Port Hope people that the problem was more serious than they thought, and the other half trying to convince one-third of the population that it was less serious than they believed.

Part of the problem was that the first measurements of radiation were expressed not as dosages in rems, but as activity, in picocuries. This was because radon gas from the landfill had seeped into people's houses and public buildings, and the amount of radioactivity in the air had to be measured. A curie (the name comes from Marie Curie, who discovered radium), is the unit of measurement of radioactivity. It is equal to 37 billion disintegrations per second, or the amount of disintegrations one gram of radium undergoes in that time. A picocurie is one million-millionth of a curie and it equals 0.037 disintegrations per second, or a little more than two disintegrations per minute. To sample the radon gas in Port Hope houses, vacuum flasks were opened at different spots, particularly in the basements where radon was initially released, and then measured under controlled, laboratory conditions.

But it is not quite as easy as that. The danger in radon comes chiefly from its decay or "daughter" products, which emit alpha and beta radiation. Alpha particles carry an electrical charge and cling to dust particles that may be swallowed, inhaled, or even—some researchers now believe—work their way into the body through the pores of the skin. They in particular are the source of the lung dose that may cause the lung cancer associated with radon gas. Gamma radiation is also emitted by radium, the source of radon and its daughters. Although highly penetrating, like an X-ray, gamma radiation has a much less intense effect on the body than the alpha particles, because its irradiation is spread more widely. Because the danger in radon is chiefly from alpha radiation, it became necessary to find another unit of measurement that expressed the concentration of radon daughters in a litre of air.

Ontario's uranium miners had been exposed for years to high levels of radon gas, as the Ham Commission, a provincial commission which investigated the relationship between uranium mining and lung cancer, discovered. In the uranium mines the concepts of working level (WL) and working level month (WLM) were introduced to measure, respectively, the concentration of alpha emitters in a litre of air, and the amount of exposure a miner would receive in a working month.

But some Port Hope citizens were living, not just working, in high concentrations of radon. It was a totally new problem for the experts who flocked to the town to assess what should be done. New standards had to be found that would measure the level of danger to the public and would guide clean-up crews who had to check practically all of the town's 3,500 homes.

"First thing I did when I arrived here was to ask what the guidelines are," Rod Hendrickson remembered. "I was told that there are none."

A consultant was flown in from Grand Junction, Colorado, where homes, schools, and hospitals were found in the 1960s to have been built on radon-emitting uranium mine tailings. It took a year before a set of workable standards could be agreed on for Port Hope.

Briefly, these standards meant that if tests in any building showed more than 3 picocuries of radon per litre, or 0.01 WL, it had to be investigated; more than 7 picocuries per litre, or 0.02 WL, needed action; levels of 50 picocuries per litre or more, or 0.15 WL, required "prompt interim action"—that is, the inhabitants had to be moved out promptly and the radioactive material removed.

Rod Hendrickson thinks these standards far too stringent. He points to a cross-Canada survey which shows that 2 percent of the homes in eight major cities registered higher than the 0.02 WL standard. But continuing evidence about the particular dangers of low-level radiation calls this attitude into question. The risks are still uncertain, perhaps, but certainly not negligible.

It was the rem that became, in the end, the most familiar unit of radiation measurement in Port Hope, since it expresses the biological effect of radiation. The levels of contamination in the dump sites, the town beach, the Eldorado plant periphery and ravines, were all calculated in rems. Port Hoppers learned to assess the potential damage of their surroundings by comparing the allowable ICRP and AECB dose with the hourly rate of millirems they would receive if they stayed in these areas. Any spot emitting more than 0.057 millirems an hour was capable of inflicting a dose over the ICRP/AECB limit of 500 millirems a year.

Eventually the entire town had to be divided and meticulously surveyed on a ten-foot grid. The task force decreed that remedial action would be necessary if potential or actual radiation dose rates exceeding 1 millirem an hour were found nearby outside, or 0.05 millirem an hour inside. This was comparable, the AECB felt, to the ICRP limit of 500 millirems a year, since no one was likely to spend all day every day in the same spot, outside or inside.

Ten years earlier, Douglas Andrews had estimated that the inhabitants of one particular house near an Eldorado dump site were getting 8 to 10 millirems an hour of radiation, which worked out to 70 rems a year if they were in it 100 percent of the time—compared to the AECB-ICRP limit of 0.5 rem annually. Furthermore, he judged that the people living full-time in houses next to the refinery would be getting between 2 and 8 rems annually. The company subsequently bought and pulled down these neighbouring houses.

The continuing problem of how to dispose of radioactive waste means, though, that there are still many "hot spots" created by the 200,000 or so tons of refinery waste still in the town. In late 1980, emissions in some areas of wasteland were regularly up to and sometimes exceed the 1 millirem an hour limit. In another there were bits of broken crocks and ceramic material that measured 5 to 10 millirems an hour working their way to the surface. As provincial politicians discovered during an inspection tour in October 1980, most of this waste is inadequately fenced, some is unfenced, and all of it is poorly sign-posted.

So the ALARA principle, to some Port Hope people, seems to mean As Low As can Reasonably be Achieved, given the continued dominance of the industry in the town, the need for jobs, and the failure of the experts to solve the waste problem.

The international recommendations adopted by the AECB since its inception in 1946 became known only gradually to the people of Port Hope. It took a while, too, for them to become familiar with the different kinds of radiation—alpha, beta, and gamma—and the different threats posed by each. The town's daily newspaper, *The Evening Guide*, played an important role in trying to explain the meaning of the unfamiliar language—rems, rads, roentgens, curies, picocuries, and working levels—which suddenly sprinkled its columns in early 1976.

Not all of its baffled readers appreciated these efforts. There was a spate of letters to the editor complaining that the paper was becoming unintelligible, that there were too many stories about radiation, and that the whole business was being blown out of proportion.

The *Guide* tried to make amends by running, intermittently, a column called "Radon Chuckles." But even that was not exempt from criticism. An eight-year-old reader wrote to complain that it included "rude words." It was clear by then, that rems, picocuries, and millirems had attained the status of

swear words for a lot of Port Hoppers.

CHAPTER FOUR

The day before St. Mary's primary school was abruptly closed in December 1975, officials at the Ontario Ministry of Health in Toronto received an urgent call from Eldorado to come to Port Hope. The company wanted the air in the school tested for radioactivity because high gamma levels had just been found in the school's parking lot. When the samples were measured back in the Toronto laboratories there was no question about what had to be done. The children would have to be kept out. Some samples ran as high as 63 picocuries per litre, more than twenty times higher than the level later considered safe by the federal clean-up team. In the end, the school was extensively rebuilt. All the contaminated fill that had been used to build up the ravine site had to be dug up and carted out of town. The children were sent to temporary classrooms and squeezed into other schools until, nearly two years later, at a cost of almost half a million dollars, the new St. Mary's reopened its doors. By then either radon gas or excessive radiation had been found in 550 Port Hope homes. Major work—excavating, ventilating and rebuilding—was done in about 400 of these, at an average cost of \$10,000 each to the federal taxpayer. The cost in worry and controversy to Port Hope townspeople is still immeasurable.

But at the time of the school closing, radon gas was still unknown to most people. A few citizens were aware that Eldorado was going over its old records, and that the Lewis family had been moved suddenly out of their bungalow at the top of Dorset Street, where they had also built up their ravine-edge property with fill from the plant. Most parents, however, accepted the school's explanation that it was closing temporarily that Friday because of ventilating problems.

On Sunday the parish priest, Monsignor Cleary, told his parishioners that there would be no school on Monday; the school had been closed "as a precautionary measure." There was still no mention of radon gas.

That afternoon members of the building and property committee of the Peterborough Separate School Board, which has charge of Port Hope Roman Catholic schools, were being briefed in an emergency session in Peterborough by Dr. Geoffrey Knight of the Atomic Energy Control Board and Dr. Harry Aitken, chief health physicist with the Ontario Ministry of Health. The doctors told school board members of the high levels they had found and suggested that the contaminated areas of the school—the gymnasium, the kitchen and two changing rooms—be closed. The school board, with the support of the local medical officer of health, insisted the entire school be closed.

Worried by unfamiliar measurements and substances, and by their responsibility for the lives of young children—who were especially susceptible to radon—the board decided to leave the announcements and explanations to the experts at the AECB and the Ministry of Health. That evening the school board's director of education, Peter Roach, appeared on local TV to say simply that the school would be closed until further notice because radon gas had been found in it.

For most people, though, the first real information about what was going on at St. Mary's school came in Monday's edition of the *The Evening Guide*. Radiation levels above "normal background level" had been found in the school gymnasium, the front-page story told readers. The source was probably the fill that had been obtained from Eldorado Nuclear and used in the building of the school addition fourteen years earlier. Both the Superintendent of Schools, Dan Quinlan, and Dr. Aitken were quoted as saying that there was no real danger. But they feared an "emotional reaction" from parents, and would not release the radon levels.

Another story, under the headline "Radon Gas can be Controlled," quoted Stan Frost, Eldorado Nuclear's health physicist, as saying that the levels of radon in the school would probably not be hazardous, even to the children who had spent five years at the school. Mr. Frost explained that radon came from decaying radium, and had a half-life of 3.8 days; in three to six weeks the radiation would dissipate to background level. He said radon gas can usually be controlled "without too much problem." Neither story explained that the danger from radon gas is from the alpha particles that are emitted by radon's daughter products, and which can be highly carcinogenic.

In a *Guide* editorial appearing the same day were listed the parts of town where, it was now known, high radiation levels had been found: the Lewis house; Marcel Pochon's laboratory on John Street; a loading ramp at the old rail yards, and another dump site which was near the plant, the beach and the town's water works. The editorial concluded:

We are glad Eldorado is beginning to clean up the mess... at the same time there must be some form of reprimand for allowing the possibly hazardous situations to exist for so long. Were this in some other field we believe it is possible that reprimand might come from the courts.

With that statement under its belt, the *Guide* proceeded to run front-page stories on the radiation issue all week. An unnamed informant told the paper that during the 1950s he had seen large quantities of radioactive waste being dumped in the Port Hope harbour. Gordon Colborne, plant manager for Eldorado, told a *Guide* reporter that he could not deny it; neither did he confirm it. Stan Frost, no doubt trying to be reassuring, said water was a good insulator against radioactivity. No one commented on how the waste might have affected the town's drinking water.

On Wednesday the Ministry of Health confirmed that 63 picocuries per litre had been found in one spot in the school, but at the same time said the children were not exposed to higher than recommended levels. New Democratic Party opposition members of the Ontario legislature called for health tests on the St. Mary's school children. Ministry of Health and AECB officials said tests would be useless; nothing would show up in these children for several years.

At the end of a confused and confusing week an information meeting was planned for St. Mary's school parents and school board and health officials. It was held on Monday, December 22, in the high school auditorium. In retrospect, useful facts and sound predictions were aired at this meeting. But at that time there was a gap between the experts and the people, a gap in knowledge as well as communication, that was so large that fear and antagonism began to build.

The school board members were bolstered for the encounter by representatives of the Atomic Energy Control Board, the Ministry of Health, and Eldorado Nuclear—ten officials in all, strung out along the platform, confronting 135 parents in the half-empty auditorium. Anxiety started to show as everyone strained to understand.

The level of radon gas contamination was explained as being one-and-a-half to twenty-one times the acceptable dose. But AECB's Dr. Geoffrey Knight,

in the course of the evening's clearest attempt to explain the problem, said students would not have been exposed to doses higher than those recommended for the general public. Dr. Knight mentioned lung cancer and the possibility of getting it from radon-daughter products. But these, he said, only linger in the air a few hours. He would not be afraid to send his children to the school.

Dr. Jan Muller, senior advisor to the Ontario Ministry of Labour, said he thought the doses the children would have absorbed were low and not dangerous—but that long-term effects were not known. At the back of the auditorium the federal MP Allan Lawrence sat alone and worried. He said afterward he was appalled the officials did not know where the radon gas was coming from, and he predicted correctly that all the fill would have to be removed.

A teacher who had once worked at Eldorado as a technician persisted in his questions about the level of radioactivity in the fill and was eventually told that these measurements had not been taken. Five years later, he still remembered his annoyance at the way, he said, the experts "played on people's ignorance and tried to pull the wool over their eyes."

The officials, all ten of them, had set themselves an impossible task: they wanted both to explain the problem and to allay fears it created. Each had a different set of perceptions and concerns, and each had a different understanding of what had happened and what had to be done. But all were united in one purpose: the effort to prevent an emotional reaction from the parents.

Most of the parents were not interested in reasons or solutions. They wanted to know what was wrong and how serious it was. They felt they had trouble getting straight answers.

The AECB moderator, Jon Jennekens (now president of the AECB) was accused three times of failing to answer the questions asked. Plans to install a new ventilating system were derided as "band-aid" solutions, and Mr. Jennekens was told he sounded like a protector of vested interests.

One mother said at the end of the meeting, "I just don't know. There was so much technical jargon and qualifiers. It would have been easier if they had just said 'Yes, it is safe' or 'No, it is not safe.'"

"I came in fear [to the meeting] and I'm leaving in some degree of terror," said another parent.

Was the school dangerous or not? The scientific expertise of some of the presentations was enough to calm the fears of several parents, who felt assured that they were getting the best possible advice. Ruth Rood, who had two daughters in the school at the time, one in kindergarten, was one of those. Five years later she still thought there was "more commotion than necessary" about the issue.

"People over-reacted to it... there was bad publicity. I really felt the kids weren't exposed to radon that much. The classrooms weren't that bad," she said.

Mrs. Rood, whose husband is chief health inspector in the area, describes herself as someone who doesn't get excited. "Let's assume the kids have absorbed a certain percentage of radiation. No one knows, maybe they'll survive better."

Unfortunately, that's not what medical research has shown about radon gas. It is a known carcinogen, established as such in 1930 when doctors investigated the illnesses of miners working the pitchblende deposits at Jachimov, in what is now Czechoslovakia. Adequate ventilation and the use of masks can prevent the energy-charged alpha-emitting particles from being inhaled into the soft and vulnerable linings of the lungs. But these preventive measures were not taken in the early days of uranium mining in Czechoslovakia or in Canada; the high death rate from lung cancer among uranium miners in Elliot Lake has been well documented in the Report of the Royal Commission on the Health & Safety of Workers in Mines 1976. Nor, of course, were preventive measures taken in the school. The children of St. Mary's school were being exposed to exactly the same substance as the uranium miners. In the mines it came from natural ore bodies and air trapped far underground, with dusty conditions that gave the ionized (electrically charged) particles something to adhere to. In the school it came from the radioactive fill used in constructing the addition to the school. Although the school children were exposed to less dusty conditions than the miners, their young bodies were more vulnerable.

Radon is one of the so-called "noble" gases—a group of six elements once thought to be extremely rare as well as chemically inactive. They are colourless, odourless, non-inflammable and tasteless. Of them all—helium, neon, argon, krypton, xenon and radon—radon is the heaviest. For fourteen years it had been seeping into the school through the basement floor. Once inside, it continued to decay, producing its alpha-emitting daughters. These daughters live for only about half an hour before the decay chain continues. The alpha particle itself very rapidly loses its punch and danger; at rest it is harmless. But if radioactive decay occurs inside the lung, from the alpha particle impacting into the lung lining when breathing, lung cancer may result.

None of the officials at the meeting stated the situation quite so baldly, of course. It was a complex subject and they were worried about parent reaction. No doubt they were also concerned with the other responsibilities that each of them had in different ways to different segments of the community. How had the radioactive fill got there in the first place? Who was in charge of waste disposal at Eldorado? What were the AECB's responsibilities?

But the parents had come to the meeting to hear the problems explained and to assess the health dangers for themselves. Most left scratching their heads.

Summing up the meeting next day, the *Guide* editorial writer struck a note of exasperation in a colourful description of the gap that was obviously widening between the townspeople and the experts who had been called in to explain their problem to them:

[We have] a feeling of peasant ignorance, of being some other tribe now in the process of being visited by a higher more advanced civilization... the language the visitors used seemed incomprehensible at times... they used phrases like ionizing radiation, gamma rays, significant risks, daughter products... We are left in the position of having to accept or reject statements not on a logical, informative basis but on trust... akin to a religious acceptance. They were the missionaries of the 21st century.

Port Hoppers want to learn more about the nuclear field to rid ourselves of the degrading position of child-like acceptance caused by ignorance.

The brave resolve of those words carried over into the *Guide's* careful and comprehensive reporting in the first months of Port Hope's long struggle with radioactivity. But they didn't take into account the deep divisions there would be in interpreting the issue and the response of the people of Port Hope to it.

The radioactive fill, as we have seen, came from Eldorado Nuclear. In 1953 the company stopped producing radium and, as it expanded its uranium production throughout the 1950s, new processes were added. Several old buildings were pulled down to make room for new ones; it was rubble from this operation that was acquired by the separate school board to fill the ravine site needed for its new addition. It seems that before allowing the demolished material to leave the plant, Eldorado graded it into three categories; material that was so radioactive that it had to go to a company dump; less radioactive material that should be disposed of in some dump, either municipal or company; and "clean" material that was suitable for re-use and could be sold.

A contractor from the neighbouring town of Cobourg, Orville Calhoun, was awarded the job of demolishing the buildings and disposing of most of the materials. He sold much of the clean material from the site itself, he later said. And he recalled being warned about radioactivity and told to change his clothes before leaving the plant site.

But aware as the company was of some of the potential danger, it was at this stage that Port Hope's troubles with radon gas really began. Either some of the contaminated material designated for the dumps was intercepted before it got there or some of the "clean" material later used by private citizens was really not so clean—at least not when used in unventilated areas. However it happened, radioactive material from the demolished plant site got sidetracked and spread throughout the town at this time. As well, several of the town's ravines and waste areas were used as dump sites for discarded and heavily contaminated equipment, and much of this material still lies there. A map produced twenty-one years later by James F. McLaren Ltd., the firm hired by the AECB to conduct the cleanup of the town, showed the contaminated areas and once-contaminated areas dotted like a rash all over the town.

Mr. Calhoun is now retired. In January 1976, when the radon gas scare flared up in Port Hope, he was besieged in his Cobourg bungalow by newspaper and television reporters as well as Eldorado staff members. They all wanted to know where he had sold the demolished material. He had kept records of most of the bigger sales, and these were tracked down. But not everything was traceable.

Included in this latter category were the quantities of rubble or fill that had been sold to another cartage firm in Port Hope and ended up under St. Mary's school. How many truckloads of this material went into the school site is now debated.

Some school board estimates put the number at 2,000 truck-loads. But Monsignor Cleary, for many years parish priest and closely involved in the school's affairs, estimated that "only a small part" of the fill came from Eldorado. Whatever the amount, the gas it exuded built up inside the poorly ventilated parts of the school, particularly in the gymnasium and a kitchen used by teachers, until it was a threat to health.

A member of the school board who was also Eldorado's purchasing agent at the time helped arrange for the transfer of the fill. "At the time people didn't know there was any harm in the material," Monsignor Cleary said later, when talking about this period. "Or they thought it would be buried deep enough under the cement not to cause any harm."

This conciliatory explanation is now typical of Port Hope. Few people want to admit publicly either to the seriousness of the radiation problem or to the fact that Eldorado is to blame. Many even seem to feel guilty about it (a response that students of mass behaviour would surely find interesting) because much of the contaminated material left the plant "informally"—that is, without the official permission of the company.

It is true that the standards of safety twenty years ago were considerably more lax than they are now. Eldorado scientists will point out that they themselves developed some of the instruments now used for measuring levels of radioactivity that most people were unaware of many years ago. The Ontario government's report on Elliot Lake miners shows how quickly the dose limits for uranium miners were tightened, between 1967 and 1975 going from twelve working level months to four. And pressure in this new science continues, from many quarters, to try to lower even more the maximum acceptable levels of public exposure, on the grounds that any increase in radiation is dangerous. Others, Rod Hendrickson for example, would have certain levels raised.

Although knowledge of the dangers associated with refining radioactive material has increased enormously in recent years, the argument that Eldorado had no knowledge of these dangers of the waste is just too easy. Marcel Pochon gave an unequivocal warning to the citizens of the town as early as 1933. Radon gas had been known to be carcinogenic since 1930, when medical studies were done on the Jachimov miners suffering from "Bergkrankheit" or lung cancer. Damage to plant and animal life from toxic chemicals in the company's waste dumps had been obvious, on Carlus Dickinson's and Dr. Hunt's land, since the early 1950s.

In later years, when outsiders tried to pinpoint responsibility, much was made by company people and others about the "informal" disappearance of waste material from the plant. In a small town, as most people know, if someone needs a couple of loads of fill or the odd bit of building material, there usually isn't a problem getting it. A friend at work, a borrowed truck, will see the job done. And at Eldorado in the late 1950s, with so much demolition and rebuilding going on, there was an obvious source of building supplies. Sometimes permission was sought, sometimes it wasn't.

Many people who obtained building materials in this way were reluctant to admit they had them. A few refused to allow their houses to be tested at first. One or two—when radon gas was found—initially forbade access to the clean-up crews. These were among the citizens Rod Hendrickson had to convince of the problem's seriousness. Others wondered why the company should be blamed if people took materials that did not belong to them. Together with the much-invoked principle of a householder's right to privacy, this secretiveness added to the confusion about who was responsible and what should be done.

Some people who tried to cut through this confusion called themselves the Concerned Citizens Group. Numbering about twenty in all, their members included people whose houses were found to have high radon levels, scientists from the nuclear industry, business people, doctors and teachers. Their aim was to find more objective information, to arm themselves with facts. They began meeting regularly in January 1976.

Until that time, as one of the group's members, Elisabeth Pereira, later explained, the town had done little but react to a continuing barrage of experts' opinions and publicity. Mayor "Bus" Hewson had said publicly that he was worried about the effect on property values in the town, but that he didn't know what was going on. "They're not telling me a thing," he told a *Toronto Star* newspaper reporter.

No citizen action or ratepayer groups had sprung up to search for unbiased information. But every day there were more announcements and more rumours about houses where high levels of radon gas had been found. They were not identified to the public for fear of affecting their real estate value. Some residents were moved out of their homes; other were told they could stay.

By the middle of January the AECB had found sixty-four such hot spots. Some were already known to everyone in the town. Besides St. Mary's school and the Ivan Lewis home, these included the public tennis courts, the town beach, a John Street plumbing company, and a private house near the plant.

There was no real health hazard to the citizens of the town, the Ontario health minister Frank Miller said at a press conference a week later. But his assurances were weakened at the same press conference by his joke, reported in the *Evening Guide*, about doing a "snow job." It was snowing at the time, as it happened, but it was hardly the moment for facetiousness. The health minister also attacked the AECB for not taking its share of the responsibility for the mess the town was in. The experts and commentators continued to arrive and make pronouncements.

To clear the air, one member of the Concerned Citizens Group wrote to the town council suggesting that a public meeting be held at which independent experts, as well as those from the AECB, the industry and government, could speak and respond to citizen's questions. Only one councillor objected. Rene Racine, an employee of Eldorado, was quoted by the *Evening Guide* as saying that, in his view, opinions should come from those who know and not those who guess. But he was over-ruled and plans for the meeting went ahead.

Not in the way the Concerned Citizens hoped, it soon turned out. Word reached the little group that only representatives of the nuclear establishment and government were to be invited. The *Evening Guide*, at that time keeping a close eye on what the Concerned Citizens were up to, protested: *Town council and the Ontario Ministry of Health are currently planning a public meeting. To date the experts invited to attend the meeting represent only one side of the debate: those who see little danger, but great economic benefit from the nuclear industry. Such a biased meeting will hardly resolve the nuclear debate, or assuage the concern of local residents.*

We are like the Vietnam peasants, squeezed on both sides by communists and capitalists. Our health and our homes are caught in the middle of the radiation debate. We desperately need a resolution of the conflict. We will not accept a cover-up or whitewash of the facts. In order to attain a firm resolution, a forum is necessary to both sides to discuss the problem. No answer to any question can be reached with one side facing a row of empty chairs.

But by the time he reached the end of his article the writer backed off this challenge, proposing instead an international symposium to be held in the spring. "The meeting currently proposed by the town council and the Ministry of Health should serve some purpose," he ended lamely.

The meeting finally took place on February 17, 1976. Of all the meetings held to discuss radiation in the town, this is the one people remember. "The public meeting" it is called, and Port Hoppers know exactly what you mean. Undeterred by having not one of their resource people invited to join the panel, the Concerned Citizens held a dinner party before the meeting. It was one of the few times that people representing both sides of the widening spectrum of opinion on radiation in Port Hope sat down to eat together during this period. Stan Frost, Eldorado's health physicist, was there, as was Dr. Fred Knelman, the professor and outspoken nuclear critic from Montreal. Representatives from the labour unions and environmental organizations—groups with sharply differing aims, as later events in Port Hope were to show—listened to Professor Andrews expound on what he had found in the town.

When they arrived at the high school auditorium they found more than 600 people squeezed into the aisles and balcony.

Someone, remembering the meeting with St. Mary's school parents a couple of months earlier, had tried to close the communication gap between experts and audience. Instead of sitting on the raised platform, the panel sat at a table in the front of the hall. But their language had not changed and the psychological distance between those who spoke and those who were spoken to was just as evident as before.

Chairman for the evening was Dr. Gordon Martin of the Ontario Ministry of Health. Two colleagues from the ministry, both radiation experts, Dr. Harry Aitken and Dr. Jan Muller, were also on the panel, along with Port Hope mayor Bus Hewson and deputy reeve Charlie Wallace.

It was soon clear that Dr. Martin intended to keep a firm grip on the proceedings. He announced a two-hour limit and asked for written questions. Both requests were soon ignored; even so, the people had a hard time getting their questions answered.

As it had been at the earlier meeting, health was the main concern. The first question was about the safety of eating vegetables grown in contaminated soil and the second was, "What are the safe levels of radon gas?"

"The question is how important is that risk in the context of other risks of daily life," the *Guide* reported Dr. Muller as saying. "It is our feeling at the present time that we are eliminating those situations where the risk might be significantly increased... once we get an overview of the situation we might be in a situation of finding out what is normal for the area. The greater the dose the greater the risk but [there are] quite low and acceptable risks here."

"Are there other radiation dangers in the town?" someone else asked. Not significant ones, he was told. Another questioner wanted to know the "magic number" above which people were evacuated from their homes and how it was set.

"The only number we make use of as an action number," Dr. Aitken replied, "is 50 picocuries, decided a few months ago with AECB. It means the evacuation of the homeowner at that level. We admit that these numbers are set arbitrarily and are very much a matter of judgement."

There were soon long lineups at the microphones as thoroughly alarmed and skeptical questioners tried to make sense of what they were hearing. Among them were the people invited by the Concerned Citizens Group: Professor Andrews and Dr. Knelman, Barry Spinner from Energy Probe, Heather Mitchell from the Canadian Environmental Law Association, and Professor Sam Nagarwalla, a nuclear physicist.

Ken Valentine of the United Steelworkers Union, Eldorado's union, asked why the officials had chosen a new level—50 picocuries per litre—as that above which prompt remedial action would be taken to clean up a radon-contaminated house, when the similar level in the mines was 33 picocuries per litre. People spent longer stretches of time at home than in a mine, he pointed out. He also warned that ordinary household ventilation was not as good as in the mines and children were much more susceptible than adults.

What was an "acceptable risk"? someone else wanted to know. Faye More, whose father as a councillor had made some strong moves to get Eldorado to

clean up its waste, said the people of Port Hope were having a "so-called acceptable risk" imposed on them by the government. That same government ran Eldorado, she reminded them.

But it was Dr. Knelman and his talk of genetic mutations who stirred up the deepest feelings. He told a reporter that it was a foregone conclusion that, eventually, genetic mutations would show up in the descendants of people who had been exposed to above-normal levels of radiation. And he also said that the Ministry of Health "safe" levels for radon were unsatisfactory.

The provincial government doctors disputed this and within a few days the *Evening Guide* ran a detailed letter of refutation from the president of the AEBCB. But Dr. Knelman's remarks were widely publicized with horrific headlines in the local and national press. After that, the Concerned Citizens and the experts they had brought to the meeting came under bitter public and private attack. In a letter to the *Evening Guide* they were called "a secret society that thinks they are the elite of Port Hope." "Crawl out from under your rocks," the writers shrieked, accusing the group of bringing professional agitators into town and causing a media rumpus without regard for the majority of the towns-folk. Parishioners of the church in which the Concerned Citizens met brought pressure—unsuccessfully—on their minister to close the premises to them. At least one member was privately advised to stop attending the group's meetings. The *Evening Guide* itself accused the organization of secrecy and urged it to plan town-wide action. But a watershed had been reached, and this appeal only inspired more vitriolic letters. The group soon lost momentum and ceased to meet. The most serious loss was the group's initiative in seeking out the truth about the effects of radiation on the health of Port Hope people.

Although any danger from carelessly handled wastes had been discounted by the Ministry of Health as "relatively minor and acceptable," this was certainly not the view of all experts. A Science Council of Canada report asked in 1976 how this waste problem could have happened. "The effects on human health of radiation were well-known at the time," it said. "It happened because no one was charged with disposing of these materials in a manner consistent with human health."

After the public meeting, fears and controversy were raised to a fever pitch, and most of the citizens were anxious to believe that what the industry and the government told them was the truth. Attempts to listen to both sides ceased. They simply beheaded, figuratively, the bearers of bad news—the Concerned Citizens Group. From that time on all the efforts of the town, the government, and the industry were concentrated on the clean-up, on getting rid of the contaminated fill.

One member of the Concerned Citizens Group, Elisabeth Periera, wrote a poem about that public meeting that emphasized the universal implications of Port Hope's dilemma. It warned in part:

*but our town will come to the world
our today
is your tomorrow
tell this to the world
messengers
you who will endure tomorrow
have the right to know
ask questions today
ask questions:
if we eat and live today
will our children eat and live tomorrow?
ASK!*

CHAPTER FIVE

If you drive west out of Port Hope towards Port Granby following the old maple-lined Lakeshore Road, you suddenly find yourself surrounded by the wide skies and grain fields of southern Ontario farmland. On your left the vast, silent presence of Lake Ontario reflects back sun and space. The road curves around headlands and dips into cedar swamps, but the traveller seldom loses sight of that huge expanse that was, until a hundred years ago, a livelihood and major transportation route for all the small communities that lie along this road. The lake shaped people's lives then. Now it seems to be little more than a shifting backdrop to the rural calm and stability of lakeshore farming, while the rush of twentieth-century commercial life hurtles along the multi-lane highway farther inland.

Many of the same families have farmed along this road since the days of sail. Farming methods have changed, as they have everywhere, but there are a handful of mixed farms left, with cows and pigs, sheep and chickens, vegetables and fruit trees. For the most part large corn fields and pasturelands slope down towards the lake. There are also market gardens, with acres of onions, cucumbers, peppers and tomatoes. And there are the smaller operations of part-time farmers who combine food production with jobs in Toronto, Oshawa, Port Hope, or other centres.

The moderating influence of the lake on the local climate is a major reason why so many farm families have stayed here. Spring comes a little later along this strip of rich farmland, but the growing season goes on longer. Frost regularly hits inland fields a week or so before it claims lakeshore crops, and for some farmers this can mean extra earnings of hundreds of dollars for each day's respite.

As well, for the millions of people who live around both sides of the lake, in New York State and in Ontario, it provides drinking water, irrigation, a stable rainfall, and recreation. The big fishing fleets of the past have gone, as has sail-driven commerce. Nowadays in summer the lake is dotted with pleasure boats. Sport fishing is increasingly popular; and far out from the shore, ocean-going freighters and tankers haul goods to inland ports along the 2,300-mile St. Lawrence Seaway.

Lake Ontario is much more than a backdrop, then. It sustains and enriches the lives of the people who live around it just as it always has, although in different ways. It is still, as John Veldhuis puts it, the drinking cup of southern Ontario. John Veldhuis is a teacher and an activist. He is not one of the Lakeshore Road's old-timers, having come only eight years ago with his family to a house overlooking the lake in the tiny hamlet of Port Granby. He and his wife used to drive down from Toronto every year for the spring smelt run: now they think they're living in heaven.

Heaven doesn't include one of his near neighbours, however. An Eldorado waste dump, twenty-eight acres of it, lies along the lakefront east of the

Veldhuis place, separated from it by the farm that belonged to the Elliott family for more than a century. But Elliott finally sold out in disgust a few years ago after years of problems with sick and dead cattle. The dump is still there, a sore spot for local residents and a focus for one of Eldorado's—and the country's—most intractable problems: what to do with chemical and low-level radioactive waste.

If it were not for John Veldhuis and the people of Port Granby the seepage from thousands of tons of waste, some of it highly toxic, would probably still be flowing unchecked into Lake Ontario, while Eldorado and the AECB wondered what to do about it. The calcium fluoride from Port Hope's uranium hexafluoride plant is still being dumped there. Often the newly installed pumps fail and contaminated groundwater again flows through the eroded cliffs into the lake. But John Veldhuis and his friends—and some of his detractors, too—have made the Port Granby dump into a national as well as a local issue.

"I guess I'm still a stubborn Dutchman," he laughed once, when he was asked why. And he's learned something that he didn't know when he first asked questions about the dump—that even a government-regulated company will occasionally pollute and contaminate the land and water where it operates, in the interest of convenience and profit, unless there is a public outcry against it. Soon after the Veldhuises came to Port Granby, John started to ask questions about the dump next door, and to listen to some of his neighbours' stories about it. Information about what the dump contained was hard to get. He started a small organization named Save the Environment from Atomic Pollution (SEAP) to monitor what was going on and to raise the interest of others.

When Eldorado's plans to build an \$80 million uranium hexafluoride conversion plant just down the road from the dump became known, public interest intensified. The new plant was to refine uranium into a chemical form ready to be enriched and then used in foreign light-water reactors, principally in the US. The mildly radioactive waste would be buried on the site.

"I think I'm typical of most people and I had no idea then, naive as I was, that a federal agency would do anything contrary to the public good," John Veldhuis explained in 1980. As the scope of the fight he had taken on widened, and the target shifted from a few close-mouthed executives at the Port Hope plant to the provincial and the federal government, he had to take a different kind of action. He read chemistry textbooks and talked to lawyers. He canvassed his neighbours and brought AECB officials and nuclear and legal experts to the hamlet. At one point he took two weeks unpaid leave from teaching at the Newtonville public school to become a full-time activist.

In the autumn of 1977 and the early winter of 1978 he was SEAP's spokesman at the federal government's environmental review of Eldorado's proposal to build a new plant in Port Granby. The company's plan was rejected. In the first ever such recommendation, the review board told Eldorado that the Port Granby site was unsuitable for a hexafluoride plant, mainly because of the waste-disposal problem. John Veldhuis had won. But his victory was short-lived; the company immediately began to look for other sites nearby. In 1980 Eldorado proposed to build its new plant half a mile from the middle of Port Hope. And the old waste dump is still there, at the edge of the lake in Port Granby, containing as estimated 500,000 tons of waste and 1,000 curies of radiation.

There had been twenty years of grievances among the Lakeshore Road residents against the company and the way it disposed of its waste.

In 1954 Eldorado Mining and Refining had bought twenty-six acres of pastureland from Frank Moore, a farmer whose land bordered the Lakeshore Road just east of Port Granby. The company's private dump at Welcome Corners was full by that time and seepage from it was causing problems for local farmers. A new site was needed within trucking distance of the Port Hope plant. Port Granby seemed the ideal place. Nine miles west of Port Hope, it was a village of some forty people, mostly farmers who lived in the low, rolling hills bordering the lake. The acreage for the new dump lay south of the Lakeshore Road and included a huge, naturally eroded gorge that drained through two major streams and many smaller ones directly into the lake. Today, after twenty-five years of use, the gorge is no longer there. Filled with sludge and discarded material, it has grown into a bank that almost obscures the view of the lake beyond.

Not surprisingly, the company dump was unwelcome in the farming area from the outset. Brand's Creek, which drained the poisons from the Welcome dump into the lake, was only a few miles east of Port Granby along the Lakeshore Road, and Carlus Dickinson's problems with sick cattle were well known. In 1954 the prospect of having a dump on their doorstep—and even closer to the lake—worried many Port Granby farmers. They were assured by the company that there would be no problem. But in March 1956, less than a year after the Eldorado trucks started hauling the sloppy wastes along the Lakeshore Road to the new dump site, a group of angry local farmers organized a protest meeting in the Wesleyville school house.

They were mainly concerned about the run-off from the dump, which they said was polluting the whole lakeshore area. "Filthy slime" from the sludge, they said, was draining directly into the lake. What would be the effect on their health, on their animals and on their land values? They were skeptical of the assurances given them by their MP, John James, that the plant wastes were harmless. Eldorado's Port Hope manager, J. C. Burger, sent word that new processes introduced to the refinery—the solvent extraction method—meant that there would be far less arsenic in the Port Granby waste. They were even more skeptical when Mr. Burger, who had promised to meet with them, did not show up—on orders, it was said, from Ottawa.

Nor did they believe an announcement made in Ottawa about the same time, by William Bennett, president of Atomic Energy of Canada Limited, that no danger from radiation or arsenic poisoning could come from the dump.

"If it's so harmless why the high fences around it, and why the warning signs?" one resident asked. Another objected to the company's careless haulage practices: The uncovered waste slopped off the backs of the trucks, endangering barefoot children and others who walked along the Lakeshore Road.

The farmers left this meeting unsatisfied. And with reason, as it turned out. The concrete retaining wall they understood would be built never materialized. During the next twenty years arsenic, nitrates, and other chemical and radioactive poisons that are formed as by-products of the refining process contaminated the land and seeped into the lake from the dump site.

In the meantime they continued their fight against the dump with a petition, presented in late March 1956 to the Ontario legislature. They claimed, in the archaic language of such a form, that the dump was detrimental to all the surrounding farming country and to the immediate lakefront property, and also:

...that the waste matter is conveyed by a small stream and springs in said same dump area and this uranium sludge remaining suspended in the water is being conveyed along the shoreline and onto the beaches, leaving a greasy odorous deposit.

Wherefore your petitioners humbly pray that your Honourable House may be pleased to request that the aforementioned company remove the dump to some more remote area or abstain from using the present site for the deposit of uranium waste and, as in duty bound, your petitioners will ever pray.

The petition was signed by eighteen local farmers and residents and presented to the Honourable John Foote, minister of reform institutions in the Ontario cabinet, who promised a meeting with Eldorado. He suggested the possibility of imposing regulations on the company, or even an injunction forbidding further use. A week later, in an article contributed anonymously to the *Cobourg Sentinel Star*, it was argued that the farmers were confused about the nature of the residue. There was much less arsenic going into the Port Granby dump than there was in the Welcome dump. There could be no effect on the water from the sludge on the lakeshore, the writer claimed.

But subsequent happenings only increased the farmers' immediate concern. In 1959 a cow belonging to Howard Payne, whose farm used to border the dump (he later sold his property to Eldorado for its proposed plant), wandered onto the dump site to graze and died soon after. He got \$5,000 compensation but said, "I'd rather have the dump the hell away from here."

Two years later three cows belonging to Harwood Elliott started staggering after getting into the site through a broken fence. When one of the cows died, a veterinarian gathered feed samples from the dump and had them analysed. Faced with the evidence of poisoning from its wastes, Eldorado again paid up. Mrs. Elliott later remembered what she called a "heavy hint" from the company representatives who came to the farm that, in return for payment, they didn't want the incident talked about.

The Elliott's property bordered both the west side of the dump site and the lake. Their cows had wandered into the dump from the beach, where the lake had eroded the cliffside and the company fence hung loose. In fact, it was impossible to fence the site adequately because of constant erosion, both from the waves and from the springs that drained out of the waste-filled gorge.

Unknown to Port Granby citizens, the dump was being used in the late fifties for heavily contaminated wastes that had been lying in Port Hope dumps since the early days of radium extraction. And because those wastes were still rich in metals, large quantities had been sold in the late fifties for re-processing; they went to an American firm and to the Deloro Smelting and Refining Company in eastern Ontario. The rest went to Port Granby, as did hundreds of loads of heavily contaminated building and refinery scrap from those early years.

Late in the fall of 1966, the people of Port Granby lodged another complaint. This time dust was blowing off the uncovered dump site and causing skin rashes, they said. The plant manager was again adamant; the company was extremely careful with its waste and he was sure it was causing no harm to people or animals. But some straw was put down on the dump site, just in case.

With this sort of background in dealing with Eldorado, Bud Elliott knew exactly what he had to do one early morning in the spring of 1974 when he found four of his cows dead on the dump site. Before telephoning the company he borrowed a neighbour's camera and photographed the dead animals. Later two more cows, part of the herd that had wandered through a broken fence, died. The company again compensated the Elliotts, but not before it issued a public statement saying it suspected that the cows had grazed where a soluble agricultural-type chemical had been dumped. "This chemical, nitrate, is a common constituent of fertilizer," the statement added. What the statement didn't say is that nitrate is also a salt derived from the corrosive nitric acid used in the first stage of uranium extraction. Local farmers laughed at the company's inference that it was harmless. But most of them resigned themselves, after the cattle poisoning incident, to putting up with Eldorado's dumping practices, and to watching the slow contamination of the lake.

In 1974 few citizens were aware of Ontario Hydro's expanding nuclear-reactor program or of the huge problem of radioactive wastes it would spawn. But that summer saw the beginning of an official hunt for all former unregulated deposits of radioactive waste in the area. Revised Atomic Energy Control Board regulations that became effective in June required that all residue-disposal areas currently or previously operated by Eldorado become licensed. The company was required to track down places where waste had been dumped up to forty years previously and also to upgrade its dump operations.

An immediate result of this regulation was a report on Eldorado's four major dump sites, carried out by the company's health physicist, Stan Frost. The report noted the years in which these dumps were used, as well as some of the readings taken in monitoring tests. But it had little public circulation and was not published in the *Evening Guide* until a full year later. Even then, the section on Port Granby was omitted.

It was the last time any report on Eldorado's dump sites slipped by the people of Port Hope so easily. By the summer of 1975 citizen awareness about the dangers of radioactive waste was rising. During the previous winter high radon gas levels had been found in a Toronto office building where a former Eldorado executive, Carl French, had once run a private radium business during the late 1940s. Media reports about the building had come to light as a result of the new AECB regulations. The board's newly hired health physicist, Dr. Geoffrey Knight, was on the trail of forgotten waste dumps throughout the province, and Canadian innocence about the cost of the nuclear age was about to be shattered.

Dr. Knight's next discovery was that of a huge radioactive and chemical waste dump in the small eastern Ontario town of Deloro. There a man called Ted Galloway, whose house bordered the dump boundary, was dying of lung cancer. Some of the waste in the dump had come from Port Hope back in the days of Eldorado's radium processing. It was still heavily contaminated with arsenic, as well as being radioactive, and Dr. Knight knew there must be much more such waste in and around Port Hope.

Alerted by these scattered events, a CBC-TV newsmagazine team turned its attention to the town where the wastes had originated. Researchers for a programme called *This Monday* toured the Port Granby, Welcome and Monkey Mountain dumps, jumping over fences and carrying geiger counters with them. The CBC team also brought along the unflagging Professor Andrews, whose nine-year, one-man crusade to alert Port Hoppers to the dangers of radioactivity was at last getting public—if not official—attention. They found loose piles of waste, environmental devastation in some places, and high levels of radioactivity.

"I jumped a mile. I thought all my kids would have four toes, three eyes, and feathers down their backs," Bill Peden, a researcher for Energy Probe (and later a Toronto Hydro commissioner) who accompanied the CBC team recalled later. His geiger counter's warning alarm went off in the Welcome dump near a large greyish pile of heavily radioactive, uncovered waste.

Viewers of the programme, broadcast on June 23, 1975, saw dead trees and scarred vegetation at Port Granby; they were told that much of the land around the dumps would not be fit for human use for 4,000 years. The use of agricultural land for this sort of purpose was, the CBC said, "irrational and impossible."

Front-page headlines in local papers, especially in Port Hope's *Evening Guide*, focussed attention on the company and its waste-disposal habits for several days. A public inquiry into the company was urged. Allan Lawrence, the federal MP for Northumberland riding, asked the Minister of the Environment for an immediate investigation. The reply was that the AECB had asked Eldorado to "look into" its waste disposal. Finally, on June 27, Eldorado broke its silence with this statement:

During the past few days Eldorado Nuclear Limited's waste-management operations at Port Hope have been criticized in the local press and on a CBC television program by a Toronto-based group known as Energy Probe. Eldorado has operated in Port Hope a refinery for uranium and radium concentrates since 1933. During this period a number of waste products have resulted from the processing methods used at various times.

The Company's waste management program, currently carried out by a full-time professional staff, has always been conducted with the greatest concern for the safety of residents of the area and the protection of the environment.

Eldorado has co-operated fully with the representatives of the Atomic Energy Control Board and the provincial and federal ministries responsible for health and environmental matters.

Routine sampling and analytical programs are carried out by the company and the regulating agencies to ensure that relevant standards are maintained.

It is understandable that, in a highly technological field such as that of nuclear fuel, regulatory standards have changed since the early days of the company's Port Hope operation. Many of these standards have become more stringent and Eldorado has consistently upgraded its current waste-management operations and its older residue areas to meet them.

This policy will be continued and expanded as technological improvements become available.

Five days after this hardnosed statement was issued to the people of Port Hope by Eldorado, Dr. Geoffrey Knight of the AECB and Stan Frost, Eldorado's health physicist, inspected the company's Port Hope and Port Granby dump sites. They found broken fences, infrequent warning signs, high gamma radiation exposures and contaminated water discharges. Because there were no guidelines governing acceptable radiation exposure rates at the dump boundaries or limiting water contamination from the dumps, Dr. Knight recommended these be established. He also listed six additional steps toward the proper management of the sites, from better fencing and clearer signs to tighter monitoring procedures.

The problem was not only the contamination of land and waters that were accessible to the public but the lack of criteria governing acceptable standards. AECB regulations control the radiation dosage received by individuals but not emissions at specific places. If continuously exposed to 0.057 millirem an hour for a year, a person would accumulate 500 millirems to the whole body; this is the maximum permissible annual dose allowed by the Atomic Energy Control regulations. Dr. Knight recommended that 0.060 millirems an hour be used as guideline when measuring exposure to contamination at the boundaries of disposal sites. Since there were no houses on the boundaries and no one would be likely to spend their entire time there he considered the extra fraction reasonable.

But some spots at the Welcome dump boundary measured as high as 17 millirems an hour, giving more than 280 times the permissible dose. Eldorado's own figures showed that 150 times the maximum concentration of radium was being discharged from the Port Granby dump into Lake Ontario. The hot spots Professor Andrews had found earlier near John Street had been cooled down but they were still toxic. And later years were to reveal further hot spots in ravines and on hillsides, where contaminated waste had been dumped and forgotten.

As well, uncovered radioactive and chemical waste could blow freely about in two of the dump sites; fences and warning signs were wholly inadequate at the Port Granby, Monkey Mountain, and Welcome dump sites.

Port Granby people were not, of course, aware of these standards and measurements in 1975. Most knew that the dump was full of poisons and their brief fling with national publicity only confirmed this. When they did learn a year later what had been going on, thanks to the efforts of SEAP, Eldorado's claim to have always operated "with the greatest concern for the safety of the residents of the area and the protection of the environment" sounded hollow. It was one more in the long line of bland assurances local residents had learned to expect from the company.

In the summer of 1975 there were many other developments up and down their stretch of the Lakeshore Road that intruded on the lifestyle of the people of Port Granby and the surrounding vicinity. Based on energy-consumption patterns from the expansive years of the 1950s and 60s, Ontario Hydro—the provincial electrical utility—committed public money to the construction of two huge thermal generating stations in the area. For one of these, the oil-fired Wesleyville station six miles west of Port Hope on the lakeshore, it had already bought out 1,500 acres of farmland; the first of its 500-megawatt units was scheduled for service in 1981. Steeply rising oil prices, together with growing evidence that it had seriously overestimated demands for electricity in the province, eventually forced Hydro to mothball the \$300 million plant. (In early 1981 a hydro official predicted it would be converted to nuclear.) Already, however, a new access road had been built through the countryside and hundreds of acres of land was taken permanently out of agricultural and recreational use. And further west, at Darlington, near the town of Bowmanville, another massive electrical generating station was getting under way.

The Darlington generating station, thirty miles west of Port Granby, was to be the biggest nuclear generating station in the world at the time it was planned. Four huge 850-megawatt CANDU reactors were to be built over ten years, starting in 1977, at a cost of \$3 1/2 billion. It was to cover 1,200 acres, including nearly two miles of shoreline.

Like the Wesleyville plant, Darlington offered thousands of temporary construction jobs to the surrounding communities, as well as other permanent jobs. Public information meetings were held in the area by Ontario Hydro, but in 1977 the provincial government specifically exempted the utility from having to submit to a public environmental assessment review. Reduced electricity [sic] have since scaled down the project, and work has been stopped on it from time to time. Darlington has become a symbol of the irresponsibly high use of energy expected of Canadians a decade ago, and it is now the site of the biggest annual anti-nuclear demonstrations in the country.

Darlington's significance to Eldorado, however, is obvious. Its CANDU reactors will be fed with the uranium dioxide produced by the Port Hope plant. As Ontario Hydro's empire burgeoned, so did business for Eldorado. And people in the lakeshore communities eventually realized that more CANDU reactors meant more fuel, more wastes, and more trucks sloshing along their country roads. So Eldorado's tough statement to the public in the summer

of 1975 did not hold back the flood of attention and criticism that was building up in the area. One immediate consequence of the June television programme was Dr. Knight's visit to Port Hope, to examine the company's waste dumps. His report described the dumps and gave a record of the monitoring and sampling that had been done by the company. It is out of date now, but it is still the only reliable public guide to Eldorado's dumping record. At the time, although his visit took place in July 1975, the final report was not made available until February 1976.

In the meantime, Eldorado had done some investigations on its own, under the requirements of the new AECB regulations. By advertising, by interviewing retired employees, and by searching old records and generally trying to puzzle out where the wastes from earlier years might have been deposited, it came up with a string of contaminated public and private places in the town.

They included ravines, a railway siding, the beach, a store, and private houses. But it was the discovery of radon gas in St. Mary's school that turned the spotlight of publicity on Port Hope. For months the town made front-page headlines across the country and was featured on national and international TV programs.

In Port Granby, for the time being, life returned to normal for most people. As they watched Port Hope come under the scrutiny of the TV cameras and read about its plans to dig out thousands of tons of radioactive fill, their own worries of a few months earlier seemed to have been a nine-day wonder. They drove past the dump almost every day and nothing had changed. Some, watching what had happened to neighbours in the Welcome and Wesleyville areas, became increasingly worried about what would happen to their farms. But the television crews had left and they were, it appeared, once more on their own.

Then the news that Eldorado was trying to buy more land in their area percolated slowly through the small, winter-bound community.

"We just couldn't believe it at first," one long-time resident said later. "It seemed that right when you'd think they'd be pulling in their horns, here they were trying to build more, and in our area."

Nobody knew or was willing to tell at first who it was that was selling the land to Eldorado. The official word was that the company was looking for a dump for the contaminated waste from the clean-up then getting underway in Port Hope. Gordon Colborne, Port Hope's plant manager, maintained that the new purchases were "primarily for the disposal of material from the Port Hope clean-up." When queried about the Port Granby land options, he was quoted in the *Evening Guide* as saying that "there has to be a place found soon to put the low-level contaminated waste from Port Hope."

By early spring of 1976, however, it became official that something more than another dump was in the wind: the town council of neighbouring Newcastle passed a motion inviting Eldorado to discuss its plans with the municipality. Offers to purchase 530 acres had been made to area farmers, on the condition that it be re-zoned for industrial uses. Efforts by local people at that time to find out just what Eldorado was up to were mostly unsuccessful. John Veldhuis said he phoned company personnel and politicians, but was either fobbed off or ignored.

The truth was that as far back as the previous June, the month in which the CBC had brought Port Hope's plight into the public eye, Eldorado had been looking for a site for a new uranium hexafluoride plant. American public utilities were ordering increasing numbers of light-water reactors, which used the uranium hexafluoride feed stock that Eldorado had started to produce at the beginning of the decade. Increased demand for the enriched fuel had already led to the expansion of the Port Hope plant to 5,000-ton annual capacity from the previous 2,200-ton capacity.

Now the company needed a new plant to take advantage of the boom that was expected to continue in the face of high oil prices—this despite the incidence of light-water-reactor accidents in the United States. Eldorado's own poor economic performance in the early 1970s must have spurred on these plans.

It was difficult to discover exactly who first approached whom with offers to buy or sell land for the new plant in Port Granby. According to Eldorado, the company was approached by Port Granby landowners who wanted to sell nearly 500 acres near the dump site. Eldorado told the subsequent environmental hearings that "It was only after some property owners in the area of the Port Granby site approached ENL concerning the possible sale of land, and the fact that relatively few landowners were involved, that ENL added Port Granby to the list of potential sites." In the spring of 1976 Eldorado was being pressured by the government, for political and economic reasons, to build its new plant in northern Ontario, where the uranium was mined and where unemployment is traditionally high. Sites at the towns of Blind River and Spragge, both near the Elliot Lake mines, were being considered. But it was soon clear that Port Granby was where the company wanted its new plant to be. It was familiar and convenient; no one would have to be moved up north. In the summer of 1976 it acceded to AECB pressure to try to clean up the dump there, perhaps because it had no choice, but perhaps also—as many Port Granby people believe—in a bid to win support for the new site.

The company began work on a pump-and-lagoon system that was intended to trap all the contaminated ground water and process it through purifying lagoons before it went into Lake Ontario. This system has not proved reliable. But at the time, the work focussed the attention of Port Granby people again on the dump.

John Veldhuis, who was already worried by what he had heard about Dr. Knight's report on the dump sites, phoned Eldorado to ask what, exactly, was in the Port Granby dump. He remembers being told that it was just limestone, and was perfectly harmless. Neither he nor his friends believed this.

Doug and Barbara Humphrey, who farm a piece of land just up the road from the Veldhuises, wrote to the Minister of Energy, Mines, and Resources in Ottawa to ask for more details. The letter was handed on to Eldorado's president, Nick Ediger. Mr. Ediger replied in a letter dated June 3, 1976, that there was radioactive material on the site but that the radiation levels were "very, very low." He wrote also that chemical pollution, in the form of run-off into Lake Ontario, was so small that it had been judged insignificant by the environmental authorities who monitored the situation closely. He assured the Humphreys:

The site is being carefully managed by ENL in a manner which meets and even exceeds the very stringent requirements of both the AECB and the federal and provincial environmental authorities.

In view of the facts, this is an extraordinary letter. Mr. Ediger failed to mention that within the previous year the AECB's investigator, Dr. Knight, had found from Eldorado's own sampling that arsenic and radium in concentrations many tens of times higher than the provincial drinking water maximum were flowing from the dump site into Lake Ontario; that there were hot spots measuring up to ten times the acceptable limit at the southern boundary of

the site; that the AECB had found the company's fencing and signposting of part of the area inadequate and had twice ordered repairs; that in spite of the above—and in spite of the fact that the AECB had issued the company a so-called "Waste Management Facility Operating Licence" for Port Granby the previous December—conditions were still so serious that retention dams and ponds were being dug that summer to try to intercept the toxic discharge flowing from the dump into the lake.

That same summer a month after Mr. Ediger wrote his letter, the AECB warned Eldorado, in the strongest action against the company it had yet taken, that because of the general shortcomings of the Port Granby dump its licence to operate it would not be renewed when it expired at the end of January 1977. This threat has never been carried out. Port Granby had become the only place left to dump most of Eldorado's wastes; fuel production at the plant would have to halt if it were closed. The dump is not yet being successfully controlled. In 1980 the Board recorded discharges well in excess of the provincial limits and required Eldorado, yet again, to apply stricter controls, particularly to the pumps, which break down regularly from over-silting. Major storms in the spring had led to the discharge of about one million gallons of contaminated water directly into Lake Ontario.

But after the Humphreys received Mr. Ediger's letter, SEAP—the organization started by John Veldhuis a few months earlier—began to get into gear. On Canada Day, July 1st, 1976, it held its first major event—a picket line outside the gates of the Port Granby dump. It was a good-humoured affair (one couple celebrated their fiftieth wedding anniversary by waving placards) that did not stop any trucks. Inspired by the challenge, the organization then set its sights on Eldorado's regulatory body, the AECB.

A few days later the group's pickets were marching around the Atomic Energy Control Board in Ottawa. John Veldhuis led a delegation that was invited inside to talk with the board's president, Dr. A. T. Prince, about their worries concerning their farmland, the dump, and the proposed refinery. They were assured that the operations of the company at Port Granby would be thoroughly scrutinized before a licence extension to operate the dump was granted. And later they learned that the dump would be closed on AECB orders, from the end of the following January.

From that time on, SEAP never looked back. As its mandate expanded from finding out what was in the dump to stopping the building of a new refinery, its activities and membership also grew in size and scope. It attracted the sympathy and help of major environmental bodies and citizens' action groups all over the country. It raised thousands of dollars for lawyers' fees, and was instrumental in having citizen experts appointed to the federal environmental-assessment panels. It also sought an injunction against Eldorado (unsuccessfully; it was thrown out of the Ontario Supreme Court on a technicality) for gross infringement of provincial and federal water criteria.

At the outset of the SEAP campaign, though, there were some people in the area with different ideas.

The hamlet of Port Granby is technically within the boundaries of the town of Newcastle, a municipality of some 33,000 people a few miles west. Certain councillors and residents of Newcastle were, inevitably, dazzled by the promised economic benefits of the \$80 million Eldorado refinery and waste dump being talked about in the spring of 1976. A petition urging Eldorado and the Minister of Energy, Mines and Resources to locate the new refinery and dump in Port Granby had been circulated briefly among ratepayers of Newcastle in the early summer. The petition asked that the new dump be situated away from the lake and that a "technically suitable" method of storage for the wastes be found.

The petitioners were lured by what was then going on in Port Hope: in a public-relations effort that followed a winter of embarrassing revelations about its past waste-disposal habits, Eldorado was supporting the building of a \$2 1/4 million sports complex. The company had donated the land on Highland Drive, next door to one of its disused dump sites; a former general manager, Jack Burger, headed the fund-raising campaign. The Newcastle petition concluded with a proposal that money from the proposed refinery's licensing and dumping fees be used to build a sports complex for their town.

The fledgling SEAP hit back hard. In a letter to the local newspaper *Barney Boisvert*, a school bus driver from Port Granby, condemned the petition as "a contemptible bribe where Newcastle people would reap benefits from the misery of Port Granby people." She continued:

This petition pits neighbour against neighbour. It is a despicable bit of business and does not deserve the consideration of fair-minded people. The writer has been called a radical by some people. To this I reply, if standing firm for what one believes is to be a radical, then they are right.

Her letter set the confident, clarion mood of SEAP. After a busy summer of farm work interrupted by picketing, and an even busier harvest, the organization had grown and its attack was growing sharper. Information meetings were held, neighbours canvassed, and members began tussling with the arcane language of millirems and picocuries.

Then, in January 1977, Port Granby was struck with a double blow. Within the same month Eldorado announced that it had acquired 650 acres near the hamlet for its new refinery and waste dump, and the AECB—backtracking rapidly from its previous commitment to close the existing dump—renewed the company's dumping licence there. SEAP members were aghast. John Veldhuis threatened a court injunction to stop the building of the refinery. He accused the government and the company of saying one thing and doing another, "They have no business in Port Granby," he declared, "It shows no respect for the people."

Through its newly hired lawyer, David Estrin, SEAP had learned earlier that the dump might never be closed. It had tried, but failed, to discover the board's reasons for reversing its earlier undertaking. In July an AECB press release explained that, on the advice of its waste advisory committee and staff members, the board had decided the dump's use should be discontinued the following January because of five geographic and geological shortcomings: the site has a high water table; it is near public waters; it is eroding; its lakefront slopes are unstable and its soil is permeable. Six months later it was unlikely that any of these shortcomings could have been rectified. But when SEAP asked for more information, the AECB president, Dr. A.T. Prince, referred its lawyer to the Eldorado information office.

The company's dumping licence for Port Granby was extended on January 31. SEAP decided to take legal action: the court was one place where the shroud of secrecy that had been drawn by Eldorado and AECB around the company's future plans could be penetrated. They asked the Federal Court of Appeal to rule on whether the board had acted properly in reversing its earlier dumping prohibition without hearing from local residents. Barry Spinner of Energy Probe swore an affidavit on behalf of SEAP that Eldorado was grossly infringing the AECB's own radioactivity safety criteria, the Ontario Water Resources Act, the federal Fisheries Act, and several other provincial and federal statutes by continued use of the Port Granby dump.

Eldorado and the AECB launched a counterattack. If SEAP won and the dump had to be closed, where would the company put its wastes? The operation of the whole nuclear fuel business was being threatened. In the end SEAP's application was quashed on the grounds that the Federal Court of

Appeal did not have the authority to require the AECB to hold a hearing on an administrative matter. The court said there were no provisions in the Atomic Energy Control Act requiring the board to hold a public hearing or follow judicial procedures on an application for a licence such as the Port Granby dumping licence. It ruled that in such cases the board was acting in an administrative and not in a judicial capacity.

In granting the dumping licence extension, the AECB argued that to find another site would be "costly, unwieldy and controversial." It noted that Eldorado had stopped dumping liquid nitrates there, as had been ordered, and it was trying out the new lagoon treatment system. Anyway, the board concluded, Eldorado had committed itself to cleaning out the dump and removing the wastes from Port Granby. Exactly when and where this massive operation would take place was not stated. In 1980, as more and more communities became alert to the problems caused by toxic wastes, the possibility of it ever happening seemed remote.

So the dumping at Port Granby continued, and the company had already acquired the land for its new refinery. The owners of two dairy farms and a tobacco farm had sold out; the regional land zoning had been changed; and provincial environmental regulations had been by-passed, on the grounds that a federal crown corporation does not need provincial approval.

From the beginning, land had been a contentious issue. It was an early body blow to SEAP when word got out that one of its members, Bud Elliott, had given Eldorado an option on his land. Rosemary Tisnovsky, a market gardener who lives just up the hill from the Elliott's place, couldn't believe the news when she heard it. She was setting out onions behind the tractor, but she stopped everything to rush home to phone him.

"Bud said he didn't want to live next door to it, to the dump, any longer," Mrs. Tisnovsky recalled later. "I told him, 'I don't, either,' and he said, 'Sorry.'"

The laconic interchange signalled the end of 100 years of Elliott family farming on the Lakeshore Road. But Bud and his mother remained members of SEAP until they moved away to a farm thirty miles north.

At that time in Port Granby more than one agent was approaching landowners to try to pick up land options. A boom was in the wind. Mrs. Tisnovsky and her husband were threatened with expropriation if they did not sell by one dealer who later turned out to have nothing to do with Eldorado. But they resisted successfully. You don't move a thriving, fifteen-acre market garden operation away from the rich soil and moderate climate of Lake Ontario just because someone is talking big money, she explained. The next act of the Port Granby drama took place in the public environmental hearings called to discuss Eldorado's proposal. The company had mounted an "information" campaign in the area; it had no doubt its proposals would be accepted.

When the hearings opened in September 1977, it turned out that five Port Granby families, some of them SEAP members, had hired a lawyer to act in their interests. He argued that his clients were worried about the effect of the refinery on their land and that although they preferred to remain in Port Granby, they might be forced to sell. In reply, the Eldorado lawyer revealed that one of these families had formed a corporation and recently purchased land near the refinery site which it was at that time trying to sell to Eldorado for four times the purchase price. In the end the land was not sold.

At the outset of the environmental hearings SEAP threatened to withdraw unless it could get the proceedings postponed. It had been scouring Ottawa and Toronto for grant or loan money to fund preparatory research, without which, it said, it could not possibly take on Eldorado. The company had already spent over \$1 million on a public information programme in the area and on the preparation of an environmental impact statement that outlined the case for siting the new dump and refinery in Port Granby. SEAP's lawyer told the hearing that his clients needed an expert to cope with the flood of technical data submitted to the panel by Eldorado. Neither the postponement nor the money were granted; so SEAP dropped its lawyer and went into the hearings on its own.

SEAP people, who spent most of their days working the land or at other jobs, suddenly found themselves spending their evenings in meetings. It meant coming home early, hurrying through chores, supper, and a shower, before driving thirty miles to the motor inn on the highway near Bowmanville where the environmental hearings were first held. The room was often hot and crowded, the presentations technical or fiercely argumentative, or both. SEAP delegates had to remain alert to the jargon and had to be ready to plunge in with questions and counterarguments. Afterwards there was the drive home; they were up early the next day to catch up on chores left undone.

The hearings fell into two phases. They were set up, as the chairman John Klenavic explained at the outset of almost every sitting, to inform the panel so that it could recommend to government whether or not the project should proceed, or, if it should proceed, with what modifications. To do this they were to listen both to expert and technical advice on the proposal, and to the concerns of the public. The first phase of the hearings, which took place over six days in two different locations, was to clarify the issues—to listen to public concerns and to identify deficiencies in the proposal. The second phase concentrated on technical briefs and specific topics. It was held over six days in January and February 1978. By then the core SEAP group who attended, led by John Veldhuis and Warren Lowes, were almost experts themselves on the major points of the proposal; they dealt with the company and other technical witnesses on their level.

The information amassed in these sessions is lodged, verbatim, in twelve thick blue paperbound volumes. It covers every shade of expertise, opinion and prejudice on the subject and it demonstrates a great deal about human nature and about power. To read it is successively interesting, moving, funny, and stupefyingly boring.

As they struggled to find out what would happen to the wastes from the new refinery, conscious of the stream of toxins pouring out of the dump that was already on their doorstep, SEAP had to contend with tortuous explanations like this, from Eldorado's environmental impact statement to the panel (prepared by James F. MacLaren, Toronto, consultants):

The Port Granby site embodies many desirable features that make it favourable for near-surface disposal of refinery wastes. It is doubtful, however, that unrestricted underground residence time would be long enough to guarantee the required low-concentration of radio-nuclides at points of ground-water discharge, by natural radioactive decay alone.

Whatever that actually meant, it sounded menacing. One early submission from an Oshawa trades group, which was pressing for the immediate building of the refinery without any environmental assessment, was titled "Has Alastair Gillespie Joined Greenpeace?" Arguing that the hearings were preventing people from getting needed jobs, the group's spokesmen set a standard of invective that the following speakers never equalled: *These hearings are a stalling tactic using high-priced nit-pickers (on the government dole) to defend aging hippies and decrepit radicals who are more concerned with ground squirrels than with human beings... Nuclear power is safe, clean, and necessary. It is certainly safer than coal or living next to a*

member of Greenpeace.

It soon became clear to SEAP, as the hearings wore on, that in spite of the group's lack of time, expertise, and money, the sessions were set up precisely to hear people like themselves: people like Bud Elliott, who gave up struggling with conditions in the neighbouring dump and sold his family land; people like Dora Nichols, who researched the subject of emissions from the proposed refinery and found that its fluorides were most damaging to forage crops, on which her family dairy farm depended; people like Margery Ashby, whose lack of faith in Eldorado date from the days twenty years earlier, when her father tried to get his farm stream cleaned up.

The promise of jobs—and the whole economic benefit of the refinery—was an underlying argument in most of the discussions. Dr. Friederike Prantl, of the Radiation Protection Bureau at the federal Department of National Health and Welfare, put it succinctly:

Eventually the decision about the proposed refinery will have to be made on the basis of weighing benefits from the project against acceptability of the risk, be it economic, environmental or related to occupational or public health.

Referring to the ALARA (As Low as Reasonably Achievable) principle, Elisabeth Pereira had pointed out earlier in the hearing:

this statement of policy [of the AECB, deriving from the ICRP] may be interpreted to mean that practically any level of radiological pollution may be justified if the social and economically perceived need exists for more nuclear power.

Dr. Prantl, in fact, had many doubts about Eldorado's proposal from the point of view of radiological protection. As spokesman for her department, she entered fifty-one technical points of objection, clarification, or concern. The final exchange on health matters, which involved Dr. Prantl, Stan Frost, the Eldorado health physicist, and Sister Rosalie Bertell, a cancer research scientist from Roswell Park Memorial Institute in Buffalo, New York, was one of the most interesting sessions in the entire hearings.

Sister Bertell was invited to the hearings by SEAP. She argued against the international ICRP exposure limits on the grounds that they were set on the basis of five false assumptions about the health effects of radiation: that human health damage could not be measured or detected at exposures below 30 rads (a rad is a unit of radiation like a rem); that if radiation was slowed down, the damaged organisms would repair themselves; that increased low-level radiation exposures are not any worse than living in an area with a high natural background of radioactivity; that there is only slight genetic damage from low-level radiation; and that there is only a slight risk of getting leukemia or other cancer from low-level radiation and a large chance that nothing will go wrong. All these assumptions, she argued, are wrong. She produced evidence from her own work as a specialist in the health effects of X-rays and from neutral studies, such as the American tri-state study of leukemia, the US BEIR (Biological Effects of Ionizing Radiation) report, as well as from individual researchers. She concluded:

I think if it had been money at stake rather than health, a day-to-day audit of gains and losses together with continued testing of the assumptions... would have been made... The nuclear industry has been operating under false pretenses relative to health damage from the beginning.

Dr. Prantl asked her if it was possible to pinpoint the amount of statistical error involved in judging the human body's variations in immunity. In other words, when studying why some people get cancer in the presence of low-level radiation and others don't, was it possible to put a figure on the percentage of mistakes that might be made by the researcher because of the presence of factors other than low-level radiation? Sister Bertell was reluctant to give precise figures. She argued that, as well as the observable clinical effects of radiation, it caused a generalized, systemic "aging" effect on the body.

Stan Frost, for Eldorado, tackled Sister Bertell's evidence on several grounds. He argued that genetic repair did take place if the radiation dosage was slowed down or withdrawn. They reached a stand-off on that subject, with Sister Bertell agreeing that some repair took place but that cells did not return to normal.

Mr. Frost then produced an American study which claimed that people living in states with high background levels of radiation had in fact a lower cancer risk than those living in states with low radiation backgrounds. He attacked the methods used in the well-known Mancuso and Stewart study of workers at the oldest nuclear installation in the US, at Hanford, Washington; the study had shown that cancer rates rose as relatively low exposure levels accumulated. Frost submitted more studies that proved these workers had in fact a lower rate of cancer than the rest of the US population.

It was all very confusing for the lay listener. Dr. Prantl turned to the subject of Port Granby, asking Sister Bertell for her opinion, "What can we expect in terms of health effects from this particular project?" Sister Bertell:

I think we have moved into a very highly sophisticated technology and we don't have the highly sophisticated health monitoring system to match it. The two things are out of whack. What I am saying is... if you really want to get away from the fact that we are guessing what the health effects are going to be... you must have good monitoring of the worker and good monitoring of the general population, and we are not doing that.

Certainly there had been no health monitoring of the citizens in the Port Hope-Port Granby area, who had been exposed to decades of low-level radiation from the Eldorado dumps. And despite Sister Bertell's plea, the subject of health was scarcely mentioned publicly for another year and a half, although Eldorado was doing a study of its workers. This discussion on low-level radiation was an eye-opener for those who took the time to listen. It showed the divisions that existed, as well as the inconclusive state of knowledge in a field that would involve people's health and livelihood for many years to come. Once again, figures could be used to prove anything. But while the experts politely debated, people's lives in Port Hope and Port Granby were being affected, who knows how severely, by a substance they could neither see, smell, nor taste.

Health was the major concern underlying much of the discussion of the hearings. But it did not often come to the surface to be discussed explicitly, for its own sake. The concrete, yes-or-no issue that really dominated the hearings was waste: how the proposed refinery would deal with its garbage, and what would happen to the company's present dump in Port Granby.

The Eldorado lawyer tried to get the waste issue confined to the second stage of the hearings, when technical topics would be addressed—and (presumably) fewer citizens would be there to listen. But he failed and, thereafter, few days went by when the company's present or proposed waste-disposal practices were not debated.

Under attack by SEAP and others was Eldorado's plan for disposing of the solid wastes from the new refinery. These would amount to some 1,700 tons annually of dry solids, including arsenic, calcium fluoride, solvent-extraction sludge and large quantities of sulphate and phosphate residues from the

raffinate system. These would be mildly radioactive. They were to be collected in plastic bags, stored in metal bins temporarily, and then—every three or four months—buried in a ditch. Up to fifty-two acres of these ditches would be interleaved with soil and covered with a "blanket" of bentonite and sand. Bentonite is a type of highly absorptive clay; Eldorado predicted that with proper contouring and drainage only a minimal amount of water would penetrate it. Animals were not expected to burrow into it, the company said. The material had been tested often as a liner in waste disposal areas, but not often as a protective cover.

The company said that escape of contaminants from under this blanket was impossible in the fifteen to thirty years expected as the life of the refinery. What would happen after that time was not explored by Eldorado, other than to claim that the area would be fit for recreational purposes, although building on it would not be allowed.

It would be a big recreational area. The company had also proposed that the 500,000 tons of wastes—and roughly 1,000 curies of radioactivity—in the existing Port Granby dump should be dug up and moved to the new disposal site. No details of this massive operation were given, other than in the admission that some contamination of groundwater might be expected from the excavation.

The waste plan was met with skepticism from the start. Professor Andrews said:

What is immediately striking about this [waste management] section is its streamlined treatment, in eleven pages and one table, of a part of the nuclear energy industry which has taken the attention of its best brains for many years and will continue to do so until the next century.

The spokesman for the regional municipality of Durham, of which Port Granby is part, noted its concern with the possible "adverse environmental effects" from the proposed waste management facility especially, it emphasized, because of the failure of Eldorado to run its existing Port Granby dump safely, even when it knew there was environmental trouble there.

SEAP members simply hooted derisively at Eldorado's "glad-bag" scheme. It was a question of laughing or crying. Now that they knew the seriousness and extent of the radioactive and chemical pollution in the Port Granby dump, the prospect of storing these long-lived wastes in plastic bags until the end of time was a macabre joke.

In the end, the AECB stepped in with a ruling that the new refinery's waste could not be permanently disposed of on the site. Because there were no proven techniques for dealing permanently with radioactive wastes, the material would have to be stored temporarily under the board's licensing regulations. This confused the issue: could the waste be stored in the bentonite—covered trenches and retrieved within thirty to fifty years? Would Eldorado plan a new system? What would happen to the existing Port Granby dump if permanent disposal was not allowed on the new site? No one knew the answers.

It was partly on the basis of the company's plans for waste disposal from the new refinery that its application was eventually turned down. The environmental panel also concluded that the company's proposal would be an unwarranted intrusion into agricultural land and life. They recommended that wastes should not be stored either permanently or temporarily at Port Granby. For this reason, and because the refinery would be intruding into agricultural land, it advised that the project not proceed. This recommendation was not in the end a very surprising conclusion to the hearing; the tide had been running strongly against the company. But it was the first time a federal environmental assessment panel had ever ruled against a proposal and it was therefore a landmark decision.

CHAPTER SIX

The environmental review panel's decision not to allow the refinery to be built in Port Granby elicited one unmistakeable reaction in Port Hope. Fear that the new plant would be built in northern Ontario, and fear that eventually the whole Eldorado operation would move out of town, drove Port Hope's leaders into a frenzy of counterattack.

Apart from SEAP people and Eldorado representatives, practically no Port Hoppers had attended any of the Port Granby hearings. The mayor was there for half a day, during which he praised Eldorado for being a good corporate citizen. Nevertheless, Port Hope businessmen and politicians fired off petitions, pleas, and letters to anyone they thought might help them in reversing the panel's decision.

On February 28, 1978, the day after the Port Granby decision was announced, a meeting of sixteen leading Port Hope townspeople was held in the town hall. A telegram endorsed by Mayor Wladyka and the council, and signed by representatives of all the major business associations, service clubs, the chamber of commerce, and two unions, was sent to Pierre Trudeau, the Minister of the Environment, and the Minister of Energy, Mines and Resources. It said that the signers had received the news of the rejection of the Port Granby site "with utter disbelief" and continued:

The average citizen feels the economic advantages to the community far outweigh the social impact to a very few farmers left in the Port Granby community... We feel the report may be politically biased... We seriously question the interpretation of the data. We fear the view of a few dissidents may have led the panel to believe they represent the view of the majority... The recommendation of the panel will have a disastrous effect on the economy of the community.

The reference to "a few dissidents" echoed the previous day's *Evening Guide* editorial, which had accused "self-seeking environmentalists" of influencing the Ottawa bureaucracy. In an *Evening Guide* news story the mayor named names, saying that the actions of SEAP leader John Veldhuis were "stepping far beyond any call of duty he has himself." Wladyka added:

We know there is pressure on the government to get it [the new plant] up to Sudbury... My gut feeling is that, wherever the new refinery is built, there also will follow all the other aspects of the industry.

Port Hope has a heavy dependence on Eldorado, both economically and socially. It has brought opportunity to Port Hope. If we see it forced out of this area you can foresee a hundred houses left empty; you can see holes in the main street... and you will see many skilled people leaving this town.

During the same town hall meeting a citizens' committee was set up. Within a couple of days 100 volunteer canvassers had offered their services to the chairman, car salesman Tom Wood. They blitzed the town over the weekend, calling on two-thirds of the homes in the town with a petition asking the federal government to overturn the environmental panel's recommendation and "to rule in favour of the construction and operation of Eldorado Nuclear's Limited's refinery and waste site at Port Granby."

They collected over 3,000 signatures and said only 5 percent of the people refused to sign.

It was the lone voice of Elisabeth Pereira who reminded the citizens that Eldorado was unlikely to move and that, after all, the Port Granby plant would have provided the town with only seventy or eighty jobs at most. "The mass hysteria over the dismissal of the Port Granby project seems hardly warranted," she wrote to the *Evening Guide*, "especially in the light of the assurances given by Eldorado during the hearings that their outcome would not affect the position of the existing refinery." But no one was listening.

In the face of rising emotions, there was also confusion about exactly what the town wanted. At a hastily organized townhall meeting in early March, the federal MP for the area, Allan Lawrence, held out little hope for a reversal of the panel's recommendation against the Port Granby site. The plant should be built in the Port Hope area, he said, with the waste-disposal site located somewhere else. But at the same meeting the mayor, town council and newly formed citizens' committee all favoured continuing the pressure for a reversal. Even the municipal council of Hope township—which later would fight to have the refinery built in its own jurisdiction—sent a telegram off to Ottawa.

Eldorado's own role at this meeting was non-committal. Gordon Colborne, general manager of the Port Hope plant, told the audience that Eldorado could not advise the town on a course of action.

"We are a crown corporation and therefore we don't feel we can tell you what to do," he explained. "All we can suggest is that you do what you think is necessary." But he also said that the company was looking for a plant site in other parts of Ontario besides the Port Granby area. And after the meeting he told a reporter that it would be hard to find another site in the area that, in the light of the panel's rejection of Port Granby, would meet the required regulations.

Predominant among these regulations was the one regarding the size of the site. It was widely believed (although nowhere explicitly stated by AECB) that control board regulations demanded a minimum of about 500 acres for a plant such as that proposed for Port Granby. Available land of that size was hard to come by in the Port Hope area.

What Mr. Colborne did *not* say about a plant site, however, was far more interesting. He failed to tell his listeners that his company had already done some detailed economic, engineering, and environmental studies on a site close to hand—470 acres owned by CP Rail in Hope township, a rural farming area some five kilometres east of Port Granby. Nearly two years earlier, in 1976, this property had been selected as one of the three most suitable sites for the new refinery, out of fourteen spots in different parts of the province. In the end, the first choice had been Port Granby. But no one mentioned this alternative at these early meetings.

The prospective site in Hope township is uniquely beautiful. It contains areas as close to being true wilderness as anything that can now be found in southern Ontario. Its 470 acres included ravines, streams, meadowland, and woods. Brown trout, families of deer, foxes, and wolves, rare plants, and century-old trees make it a favourite place for both local people and visiting naturalists.

In 1974 CP Rail and Metro Toronto won the Ontario Ministry of the Environment's approval to use it for what was called "sanitary landfill"—a dump for Toronto's overflowing garbage. Many Port Hoppers organized with other residents of the area to defeat the incursion on the grounds that, since the land was a unique wilderness pocket only an hour's drive from Toronto, it should be preserved. At the time a biologist described the site as one of "ecological maturity and diversity that was rapidly becoming uncommon in southern Ontario." It was visited regularly by birdwatchers and people in search of wild flowers, and was the "climax" forest our settler ancestors knew. A local scout troop had its camp there.

It wouldn't be very long before the company was again eyeing this Hope township site. During that time the fear of losing jobs gathered momentum, overpowering any environmental concerns. In early March 1978 there appeared an early straw-in-the-wind, a vague hint of what was to come, published as an editorial entitled "Full Circle" in the *Evening Guide*:

Was it just over four years ago that the citizens of the Port Hope and Hope township areas rose up and protested the plan to establish a dump site in Hope township for Metro Toronto's garbage?

Some elected representatives from the area seem to have very short memories. They seem not to remember that very vocal and adamant battle, the provincial hearing decision against it, and the victory celebrations afterward.

Now, not even five years later, the Northumberland County Council is planning to option the land for its own use. The county says another series of hearings will be held if it proceeds with the plan.

What's the story? If it's metro's garbage we don't want it. If it's our own...

The editorial left the question hanging. And no one picked it up. Fears that the plant would leave town continued to build up. On March 21 plant manager Gordon Colborne told *Guide* reporter Paul Cohen that Eldorado was no longer looking for a site in the Port Hope area.

"Port Granby is still our primary choice," he said. "But, if we can't have that, we don't see how we can locate in the area. If someone could tell us of a thousand acres around here that is not near farmland we'd certainly be grateful."

When he was asked whether the entire plant might move away if a new site was chosen out of the Port Hope area, the manager was non-committal. "We can't guarantee anything," he said. "At this time Eldorado has no plans to close down."

And he added elliptically: "We might see a change in the Port Hope plant from a chemical to a metallurgical basis. Only time will tell."

The same issue of the *Guide* ran a lead story about Sudbury officials who had been visiting Ottawa, lobbying the industry and politicians to locate the new refinery in their area. "Our odds are very good," one was quoted as saying after a visit with Eldorado president Nick Ediger and the Minister of Energy, Mines and Resources.

It was all very frightening. The loss of Eldorado and its jobs would be a crippling blow to the town. Most readers simply ignored a letter in the *Evening Guide* from a professor who pointed out that each of the jobs in the proposed new refinery would cost \$500,000 in capital investment—or about fifty times the cost of conventional manufacturing jobs.

Widespread approval was given instead to the opinion expressed in another letter to the *Evening Guide* that Eldorado's long association with the area proved beyond any doubt that it was a good corporate citizen "of the very finest tradition." The writer continued:
Certain problems which recently came to light, stemming from the early days of this industry [the clean-up of hundreds of fill-contaminated properties was then in full swing in the town] have been put right in a prompt and positive way. Let us now give them the opportunity to build the kind of refinery and waste-management plant that can be closely observed, operated and continually improved for the benefit of this community, and for Canada as a nation.

These were stirring times, indeed. Frightened Port Hoppers were fighting back.

That same week Mayor Wladyka was host at a Port Hope meeting of mayors, reeves, wardens and councillors from a dozen neighbouring municipalities. He was still trying to get the Port Granby decision reversed and he wanted their support. If the refinery went somewhere other than Port Granby, he argued, it would only be a matter of time before the existing Port Hope plant followed.

"If that did happen," he said, "then the entire area would suffer, Port Hope most of all." He estimated a loss of \$10 million and 500 directly associated jobs, as well as the possible loss of other industries linked with Eldorado. He outlined the generally detrimental effect of all this on the area's small business and services.

The mayor was supported by nearly all his colleagues. Mayor Cam Wasson of Peterborough talked about the "crippling effect" of procedures like the environmental review process. But the mayor of Newcastle was still doubtful; and the town's council, responsible for Port Granby, was remarkable throughout the long Port Granby hearings for its indecision. The mayor stated his councillors were not yet fully convinced of the impact that a new refinery might have on their area.

In Port Granby, SEAP—fresh from celebrating its David-and-Goliath victory—was now having to face the wearying prospect of another struggle. Port Hope's efforts to have the panel's decision reversed had not escaped its members. A week before Mayor Wladyka's Port Hope meeting, the mayors and reeves who planned to attend had received a letter from SEAP, to be read in open council session. It asked that they oppose the pressure from Port Hope:

We in this small community live in an entirely separate area, we have no vote in Port Hope, we pay no taxes to Port Hope or Northumberland County. We therefore have no representation in their deliberations... Democracy is not served here... In calling this meeting the mayor of Port Hope not only continued unjust pressure on the people of Port Granby, he insulted the council whose members we elect and the mayor of the community in which we live.

We therefore request that you... firmly insist that they [Port Hope] end their campaign to force us into accepting an industry we don't want.

SEAP members had also written to the *Evening Guide* defending the panel's decision and urging a more reasoned approach. Warren Lowes and Bill Clarke wrote:

SEAP members are not opposed to industry and technology. Indeed we respect them both as contributors to our generous living standards. However we think that it is becoming increasingly clear that new and safer technologies are on the horizon—technologies that will run our machines, help produce our food and heat our houses, but without poisoning the earth, polluting the water systems, and causing premature death to both animal and human life. Surely Port Hope has had its taste of living dangerously.

But the blood was up among the pro-Eldorado forces who continued to gather more strength in the town and who seemed to want the new refinery and conversion plant anywhere as long as it was near home. The fact that millions of dollars of taxpayers' money was at the moment going into Port Hope, to clean up the mess caused by the present refinery and its predecessors was ignored. The SEAP spokesmen were attacked as "Knights in shining armour" who were "as biased as any other group involved in the matter." They were, one letter-writer wrote, "a group of comfortably off people... bent on saving us from an evil that may in fact be a blessing."

"Eldorado will not cause as many problems to our children and our children's children... as drugs, booze and tobacco. Why doesn't SEAP tackle that growing problem?" a pseudonymous writer asked.

Such attacks only reflected the prevailing mood. Allan Lawrence, whose riding includes both Port Hope and Port Granby, sent out a questionnaire to 5,000 area households asking for opinions on where the refinery and waste dump should be sited. The results showed that most Port Hope respondents wanted the panel's decision over-ruled and to have both the refinery and its dump situated in Port Granby. But most (76 percent) Port Granby area respondents were definitely not in favour of having another permanent waste dump in their area and they were almost evenly split on the issue of whether the refinery should be built there.

Not unexpectedly, a large majority of respondents from both communities said there should be government-controlled waste dumps, far away from settled areas. On another question of whether there should be a new dump "in the Port Hope area," barely a majority of Port Hope replies were opposed. Clearly Port Hoppers were registering a vote of confidence in Eldorado.

Or was it that they wanted to make sure of getting the new refinery and its jobs in their area at the expense of their rural neighbours in Port Granby? SEAP members like Warren Lowes thought so, claiming the Port Hope business community wanted the new plant's profits and didn't mind it leaving its garbage in someone else's backyard. Other SEAP members complained publicly that they and several supporters in Port Granby never received the questionnaire.

But Allan Lawrence claimed the questionnaire results showed a substantial majority of people in the areas affected supported the new refinery. He said in a news release:

Response to the questionnaire was extremely strong [it was about 35 percent higher certainly than most questionnaires elicit] and demonstrates beyond question that a substantial majority in those areas most directly affected support the new refinery. That is something the federal government just cannot ignore.

The *Evening Guide* protested that nothing like a substantial majority of Port Granby residents, who were after all the most directly affected, wanted a new refinery. In fact there was only one more vote cast in favour of the plant than those that were opposed. It reprimanded the MP and warned its

readers about the meaning of democracy in the following editorial, published April 24, 1978:

A disturbing result arising from the Al Lawrence Port Granby questionnaire is the fact that, although a majority of Port Hope residents would object to a nuclear waste dump site in the Pope Hope area, another majority of Port Hope residents would not object to such a facility in the Port Granby area. It would seem that Port Hope residents are prepared to accept the benefits such a project might bring but are not prepared to accept any of the possible risks involved.

At the same time, a majority of Port Granby residents would object to a nuclear waste dump site in either area.

The response to another question reveals a similar split in opinion between the large neighboring area and the area which will be most affected by the construction of the proposed refinery. Approximately 75 percent of the Port Hope responses favoured the government over ruling the Environmental Assessment panel's rejection of the Port Granby site, while opinion in the Port Granby area was split half and half.

These two responses indicate that the "substantial majority in those areas most directly affected (by the proposed refinery)" Al Lawrence speaks about, is not really as substantial as it may appear. While there is a clear majority of Port Hope people who would like to impose their beliefs on the smaller Port Granby area, the residents of the area to be affected most are not quite so positive about such plans.

The issue of a majority attempting to assert its will upon a minority has been a major concern in this entire refinery business. Should a large segment of a population have the right to dictate to a smaller segment of a population, even though the smaller number might not be in agreement with the majority view?

The question is a crucial one which pertains to our perceptions of the democracy we live in.

Any democracy should follow the wishes of the majority in pursuing its course through history. If the majority is not listened to, then the meaning and value of the democracy must be questioned.

But if the issue(s) involved do not particularly affect the status of the majority, then the views of the minority should be given as much weight, if not more, than that of the majority.

In this case, the construction of the refinery could seriously affect the environmental and social structure of the Port Granby area. But its construction will not affect the environment or social make-up of the town of Port Hope.

There has been talk that the implications of a refinery not being built at Port Granby might affect the Port Hope area, in that the existing facility would move to the new one. Although those arguments might have merit, despite constant Eldorado denials, those arguments are conjecture and should not hold as much import as the negative or split responses from the Port Granby residents.

While there was a split in the Port Granby-Newtonville opinion on an overruling of the panel's rejections, a slim majority favoured construction in the Port Hope area. We presume that they would favour such a construction only if the residents in the area to be affected did not object.

In the end, this is one of the fundamental matters that supporters of the refinery should concern themselves with when approaching this whole matter. If the Port Granby site is rejected, then efforts should be made to locate a site that would satisfy an environmental panel, as well as a clear majority of the residents to be affected. It would not look good on our record if we were to unload such a project on a community that didn't want it.

But within a month of the Al Lawrence poll, the whole issue of a Port Granby refinery dropped out of sight when Eldorado received a request from Hope township to consider building its new refinery there.

The request was not unexpected. The land that Hope township offered was already familiar to Eldorado. It was the same 470 acres once designated for a Metro Toronto garbage dump, then fought for and preserved by local people. It was the same land the company had surveyed two years earlier. Already the Hope township council was drawing up a by-law to rezone the area from agricultural use to general industrial use, with a special open-space zoning regulation thrown in to protect the ecologically vulnerable ravines.

The executive of SEAP was appalled when it heard the news—"almost numb with disbelief" its newsletter said:

Has anyone read and studied the (Port Granby) panel report? Is a uranium refinery any more appropriate in a farm community in Hope township?...

Agricultural land is not just a term we trot out, to be disregarded every time someone makes a more lucrative offer. Farm land will never be able to compete in the free market with prices that are paid for industrial uses and so we must resort to strict zoning or jeopardize the future. Generations yet unborn have no economic power... their political clout is zero. We who have been entrusted with their wellbeing must anticipate and plan for their needs now... nobody can survive on a diet of uranium hexafluoride...

Possibly, the work of SEAP is not yet complete... from rumblings we hear, a new environmental organization may be coming to life in the township of Hope.

SEAP was wrong. What it heard were not the rumblings of environmentalists but those of a steam-roller. The Hope Township Steering Committee, formed to lobby for the new plant to be sited in Hope township, was an efficient, well-planned group with the support of every major municipal body in both the town and the township. It was led by Roger Wilson, an energetic township councillor and Port Hope real estate dealer, and it was organized by the same people who, fearful that Eldorado was about to leave town, had been circulating petitions.

The Port Hope citizens' committee came under its wing. The chamber of commerce and businessmen's organizations gave enthusiastic support. The steering committee was soon in high gear: service clubs were addressed, meetings were organized, lobbying trips to Ottawa were undertaken. It was clear that the town of Port Hope wasn't going to take any chances that a new, Hope township centred SEAP might emerge, giving rise to difficult decisions about majorities and minorities. Using many of SEAP's own tactics it set out to convince its citizens, and Hope township residents especially, that they wanted a new refinery in their neighbourhood. By comparison with SEAP, however, the Hope Township Steering Committee seemed to have almost limitless resources.

By June 1978 Eldorado was not making any more bones about being a crown corporation and therefore unable to advise Port Hope about what to do. A note to the steering committee organizers from Gordon Colborne puts the role of the corporation at this stage sharply in focus. In spite of the aspirations of the northern Ontario uranium-mining communities there was no doubt about where the company wanted to be. It was Hope township.

Mr. Colborne's letter is titled "Notes on a public information programme." In it the Port Hope plant's manager suggests ways the steering committee could convince area people to support Eldorado's refinery in Hope township.

"It's obvious we did something wrong in communication, especially with the SEAP people," Mr. Colborne wrote, looking back at the Port Granby decision. He suggested the organization of teams, made up of Eldorado representatives and steering committee members, to visit every household that might be affected in the site area. He also proposed that subcommittees be set up to research and present information on all the issues relevant to the refinery, such as traffic, housing, emissions, the environment.

"All the people in the area must be fully aware of our plans," he wrote.

It was a much more personal, grass-roots campaign than the company had conducted in Port Granby, where two public information centres had dispensed facts, plans, and reassurance to those who sought them. With the help of township municipal officials almost everyone in the area was approached, one way or another, with the steering committee's (and Eldorado's) side of the story. Most were invited to small, informal gatherings at the farmhouse home of some amenable neighbour, where the benefits of the proposed refinery were served up with tea, coffee and cookies.

Hope township families, having survived the many pressures against small farmers in the area, are generally solid, sensible citizens. It was they, however, who provided the final push that led to the success of the Hope Township Steering Committee's efforts.

Marilyn McHolm wins baking prizes at the annual Port Hope fall fair and sells her produce at the town's farmers' market. She and her family live west of Welcome Corners on Highway 2 in Marsh's Tavern, an old inn-turned-farmhouse, with a ballroom on the second floor. They grow apples, raise dairy cattle, and somehow Mrs. McHolm also finds time to sit on the Hope township council. As well, she chaired the steering committee group that investigated the environmental impact of the proposed plant on Hope township. There was no reason to doubt that the plant's wastes would be responsibly handled, the group found. It also considered that the company's waste dump at Port Granby was being handled responsibly. For someone who was concerned enough about the environment to want to start a garbage reclamation centre in the township, as Mrs. McHolm was in 1980, it was a surprisingly uncritical statement. But she was not alone.

Lloyd Kellogg, who had raised dairy and beef cattle for many years on lands adjacent to the Welcome dump used by Eldorado, said he was confident that the toxins from the dump were being confined to the waterway and that the company was trying to rectify the mistakes of the past. Nuclear energy could be used for good in many ways, he believed, and he had faith that the nuclear specialists would not build industries that were harmful to citizens or to their communities. He also had faith that the waste problem would be properly dealt with.

With other farmers echoing these statements, it was clear that Eldorado was going to be facing a very different population than it had found in Port Granby. The Hope township people were more trusting and complacent, and were led by a council that was determined to win what seemed to them a prized industry.

Hope township then had a population of 3,500 people, occupying nearly 62,000 acres. It was heavily agricultural, with an assessment ratio of over four to one agricultural/residential as against commercial/industrial. The prospect of Eldorado's promised grant-in-lieu-of-taxes (a crown corporation does not pay taxes) of some \$350,000 in the first year, to be shared with Northumberland county, was tantalizing. The township finance committee promised "long-needed tax relief" if the refinery came in, estimating a 20 percent tax cut in the first year. Moreover, they claimed there would be a work force of 200 at the plant and many more during its construction.

The steering committee listed the following additional reasons why it thought the refinery should be built: the proposed site affected no individual's property or housing; the refinery was supported by council; it would abut land already zoned for industrial use (part of the site was contiguous with Ontario Hydro land bought up for the ill-fated Wesleyville generating station); the site was served by existing rail and roadways; it would appear to meet all the criteria; and such a move would keep the refinery in the Port Hope area.

Besides, the committee said, tackling the tricky question of agriculture head-on, the new refinery would actually benefit agriculture in the area. This conclusion was reached by a rather round about logic: since agriculture was becoming less labour-intensive, there was an oversupply of labour in the area; therefore more industry was needed. Anyway, this logic continued, the site's agricultural potential was low, since the soil was poor. In addition, existing farms in the area would be outside the proposed buffer zone and, the committee judged, they would be subjected to only a "minimum negative effect" from the plant emissions.

The same type of optimistic approach was applied to other assessments of potential environmental impact on the area. Much was made of the fact that the big, \$300-million (but not operating) Wesleyville generating station, which was directly south of the Hope township site, had already started the area's swing toward industrialization. Another industry, it was implied, would not make any difference.

On the issue of transportation, the steering committee explained that already a big new road to the generating station from Highway 401 sliced through the area. This would take much of the Eldorado traffic. Socially, the effects of a couple of hundred Eldorado employees would not be as significant, it was argued, as the 1,500 once planned for Wesleyville. And anyway jobs were needed. From the planning point of view, the steering committee admitted Hope township had no industrial park and the proposed site was designated rural. But that, it argued, was not a permanent designation and, anyway, the site was not suitable for crop production.

This argument ignored the fact that in its conclusions on Port Granby the panel had dwelt in detail on the need to preserve agricultural land. Of the four conditions it advised the company to adhere to in its choice of another site, two warned against using land suited to agriculture, "unless there are exceptionally compelling reasons to the contrary." The new Hope township acreage had unquestionable potential as agricultural land. Although the actual building site was sandy, the area had once supported several mixed farms. Most recently it had been used by neighbouring farmers for grain growing and pasturage.

The carefully prepared campaign for support could not be matched by SEAR John Veldhuis was teaching school again, and the unpaid hours and effort needed to re-group and go to battle again could simply not be found. Time and again SEAP members argued that the site, next door to Port Granby, had much the same characteristics of high soil permeability and erosion potential as in Port Granby. But they could not convince their neighbours in Hope township of these dangers.

In July 1978, the federal government asked Eldorado to draw up environmental impact statements on three possible sites for the new refinery: Hope township and the two northern communities of Blind River and Dill township near Sudbury. The Hope hearings were held during five days in early November in Oddfellows' hall just outside Port Hope.

Some SEAP members waded in valiantly again. They started by arguing the foolishness of going through the whole expensive environmental procedure

again. Pat Lawson, the SEAP vice-chairman, rose on a point of order at the outset of the hearing. She argued that the panel was about to hear five days of debate on a proposal it had already decided. The Hope township site was less than three miles from the Port Granby site, and she quoted from the panel's Port Granby report:

Agriculture is the most significant land use and constitutes a major part of the economic base in this area... the panel concludes that there is no compelling reason why this project should locate in an area that is now predominately agricultural and which seems likely to remain so... the project would not simply remove a few acres of prime agricultural land, it would establish a trend away from agriculture to industry.

She noted that more than \$2 million had been spent on the environmental impact statements, the hearings and reports:

Are we to allow another expensive and lengthy hearing, in a time of governmental restraint? How come Eldorado is allowed a second bite at the same apple? Who pays for this? Eldorado can go on forever; they have limitless resources, at the taxpayers expense. Is it a case of wearing out the opposition?

But the hearings went on. During five days, nearly 1,500 pages of evidence was collected. Many of Eldorado's arguments had been heard before, at Port Granby: the company's need for more uranium hexafluoride contracts, the area's need for more jobs, the assurances of safety and lack of impact on the surrounding agricultural community. Similarly, the environmentalists again argued their concern about inflated energy consumption levels, their worries about the slow poisoning of Lake Ontario, as well as the effects of more traffic and fumes on the surrounding farmland.

The difference in the hearings this time was important in two main respects. First, Eldorado had learned that public communication in rural areas could not be bought by hiring consultants, running surveys and handing out pamphlets at public information centres. That experiment had failed at Port Granby. In Hope township, along with the backing of local farmers and its expensively prepared environmental-impact study, the company was able to summon up the support of Port Hope and Hope township municipal officials and citizen groups. In newspaper ads the citizen action committee urged that the public attend the hearings to support the company. The eight months that had passed since the Port Granby decision, and the subsequent fear that Eldorado jobs would eventually leave the community, had served the company well.

During the hearings the pressure in favour of the refinery mounted. "We Support Eldorado" buttons sprouted on citizen lapels; there were similar signs in virtually every store window, and at the entrance to the town off the main highway. The campaign reached such a pitch that some people who declined to wear buttons said privately they were made to feel like traitors in the town.

The second important difference was that the problem of waste had changed markedly in the year since the Port Granby hearings. At that time a group of local people whose beach lands had been threatened and whose cattle had been killed because of a local dump were being asked to accept another waste dump and a new refinery in their midst. They had lived through many years of troubles since Eldorado first promised that the dump was harmless, and so they had declined this second opportunity.

The proposed Hope township plant would produce both raffinate wastes from the refining process (24,000 drums a year) and calcium fluoride waste from the uranium hexafluoride process (under 3,000 drums).

But by this time, prodded by the AECB and the poor image its dumping methods in Port Hope had projected, Eldorado was hard at work trying to cut down the volume of these wastes and their toxicity. Most waste from the Port Hope plant comes from the first stage of the uranium refining process, when nitric acid, then sulphuric acid are added to the uranium ore concentrates, or yellowcake, allowing the uranium to be extracted. This process leaves behind a thick, yellowish sludge, or slurry, called raffinate. Raffinate contains all the impurities from the extraction process—mainly sulphuric acid, metal salts, and nitric acid, as well as uranium and traces of radium and thorium. In the past this sludge was loaded onto trucks and taken to the Port Granby dump. It was the substance Mrs. Dickinson and others complained about when it sloshed over the country roads along which barefoot children walked. According to Eldorado it was the nitrates in this sludge that killed Bud Elliott's cows.

The company, faced with an AECB order to store this material in drums instead of pouring it into the ground, finally saw the wisdom of trying to recycle it. Apparently, the raffinate did contain enough uranium for recycling to be profitable, even though the country folk near Port Hope had been told it was harmless when they complained of it on their roads. At the time the Hope township hearings opened, the company was in the middle of a trial recycling period with Rio Algom Mines, at Elliot Lake. Port Hope wastes were trucked to Elliot Lake and recycled through the Rio Algom mill to recovery the leftover uranium. Although the company was paying Rio Algom for the processing, it hoped the procedure would be profitable; the uranium content of the raffinate was comparable to that of most ores being milled there, and it did not have to be mined or crushed or ground.

It was also convenient for Port Hope because it got rid of the company's waste problem to the mill up north and also, the company claimed, it would help solve a huge new waste situation that was looming—the problem of mill tailings. The type of yellowcake—ammonium diuranate—that came from Elliot Lake was causing severe environmental problems there, partly from the ammonia left in the mill tailings. This could be eliminated, the company claimed, if the mills switched to a different type of yellowcake—magnesium diuranate. But the production of this material would instead create larger quantities of waste at the Port Hope refinery stage of the cycle. If, however, all the wastes were to be profitably recycled back to Elliot Lake, Eldorado could live with this new volume of wastes.

It was too early, at the time of the Hope township hearings, to say much about these experiments with raffinate. Dr. Ron Dakers, an Eldorado Vice President, briefly described it as well as another waste experiment that prepared raffinates for permanent intermediate-depth burial by immobilizing them with silicates or oxide compounds to prevent leaching.

Not all the panel members were impressed. Reg Lang, a planner and one of the two non-governmental members on the panel, said the experiments seemed to him a step backward, not a step forward:

We are looking at something which removes the waste from one community to another. To me that step backwards only makes sense if one has faith, or believes to be credible the eventual solution down the line... and that really isn't provable at this point in time.

It wasn't provable nearly two years later either, for Eldorado was still continuing to pay the mining companies to carry out the recycling experiment. There had been problems with mill workers who did not like working with the waste material. In the early trial stage one worker had been knocked out, allegedly by the fumes, and for a time Elliot Lake workers tried to blockade the trucks bringing the waste from Port Hope. Most important of all, the huge problem of the mill trailings was not being addressed. More and more northern communities, like Atikokan near Thunder Bay, were resisting

being used as radioactive waste dumps.

But Hope township was rightly named. Most of the people at the hearings there had hope—if not blind faith—in what Reg Lang called "the eventual solution down the line." They were not particularly worried by the prospect of having storage sheds filled with 5,000 tons of drummed waste (one year's worth) in their neighbourhood, although some experts worried that corrosion from the acidic contents was inevitable.

A greater problem for many participants was that of the plant's effluent—the waste water and fumes. Eldorado's plan left a great deal to be desired in its proposed handling of contaminated waste water. In particular, people wondered what would happen during spring floods, or rainstorms, if a "process upset" (Eldorado's term for an accident) occurred, and untreated water overflowed the holding lagoons. To make matters worse, little account seemed to have been taken of the nature and direction of the flow in the site's groundwater system. As the AECB pointed out, the direction of groundwater flow through bedrock had not been established, and this could lead to the contamination of local wells. The stability of the bedrock and the direction of groundwater had to be assessed, it emphasized.

But it was the fumes from the plant, especially hydrogen fluoride gas, that posed the most immediate threat to farmers in the area. John Nowland, of the Land Resource Research Institute of Agriculture Canada, told the panel that this gas was absorbed by growing vegetation; in large enough quantities it could inhibit growth, and even cause disease (fluorosis) in people and animals. Two crops grown in the Hope township site area—corn and strawberries—were especially vulnerable. Neither he nor representatives from Environment Canada were satisfied with the company's sketchy predictions of how far these fumes might travel or what concentrations might build up during very stable weather conditions. Since neighbouring Port Hope was particularly vulnerable to these temperature "inversions" and its citizens consequently suffered from industrial fumes, it was a surprising omission. Nowland finally concluded that Eldorado's proposal should be allowed to proceed, on the grounds that the land it would occupy was relatively unproductive and the impact on nearby farms would be minor. But first he got in some scathing criticism of the company's treatment of critical details like soil characterization, geology and the dispersal of pollutants on farmland. These he called sketchy, repetitive and inadequate. As he argued his way toward agreement with the plan his own turmoil was painful to witness:

I find myself in the position of being a bit of a fence-sitter here. I don't like sitting on fences. I like to be unequivocal. But the fact is that there is no question in my mind that the building of a refinery here does involve putting a major industrial intrusion into a farming area despite the prior existence of this generating station to the south. In Ontario we have seen a lot of this expansion of industry by implantation of cells at further and further distances from the main Toronto-centred region, which then fill in later, and the justification is then given for more industrial growth, more industrial agglomeration in the same area, and one has to balance this really in terms of what one's own personal views are on the future landscape.

He noted that the land on which the plant would be built was not fertile, and he finally concluded that the fears of the farming community were unwarranted. But he added, "it is a delicately balanced thing" and proper planning was all-important. As the hearing wore on, though, he asked that a shift in his conclusion be noted; his faith in the planning process was diminished. "Is it adequate to cope with this industrial intrusion? I just don't know, I just don't know."

Well might he hesitate. At the time of the Hope township hearings, food-producing land in Canada—most of it in eastern Canada—was disappearing at the rate of 900 acres a day. Canada's food import bill had been rising steadily for years, and its self-reliance in that most basic of all commodities was being severely eroded. Eldorado itself would not physically displace any farmers, but the industrial intrusion it represented was undeniable.

The Ontario Federation of Agriculture's spokesman at the hearings was more forthright. Speaking for the biggest farm organization in Ontario, he asked how many more times the company was going to apply for land in an agricultural area.

"How many times must we come before you before a decision is made?" he asked, noting the Federation's earlier opposition to the Port Granby site. "Are these hearings intended to continue in the agricultural area until Eldorado is successful?"

But most farmers in the area supported the proposal. Like George Stapleton, a resident for fifty years and a municipal councillor for almost half that time, they recognized its convenience for the company and the assets it would bring the township. Some were close neighbours to Port Hope, where hundreds of private homes were still being decontaminated of the radon gas emitted by Eldorado's radioactive fill. But they ignored this problem. "I consider the new plant will be as well managed or even better managed and therefore have even less effects than from the present plant," Mr. Stapleton said.

Robert Sculthorpe, who with his brother farms 700 acres near the proposed site, was one of only a handful of farming people to sound a note of caution. He worried about increased traffic, hydrogen fluoride levels, and the combined effects of industrial emissions on township farms. "I feel it is irresponsible to locate an industry of this nature in an area of Canada which has one of the highest population densities and some of the best farmland in Canada. ... Eldorado has not proven to our satisfaction that any problem they may have will not extend from the land they own," he concluded.

But the Eldorado case triumphed from the outset. Municipal officials and general boosters lined up in support of the company's 200-page environmental-impact statement to echo Eldorado's assurances to the panel that the refinery would have minimal impact.

Indeed, the company consultants argued, the land was safer in the hands of Eldorado than it was if left "unprotected." As part of the plant's buffer zone, and controlled by the company, the ravines—with their wealth of wildflowers, animals, and trees—would be accessible to naturalists and responsible citizens, they claimed.

A star witness for the company's case in this environmental argument was Roy John, a naturalist. He is an Eldorado employee and a former fighter for the preservation of the Hope township site against the CP Rail/Metro Toronto garbage dump proposal. His testimony inspired both applause and dismay. Mr. John is a naturalist with an objective, scientific approach that contrasted sharply with the emotionalism that cloaked the arguments of some laypeople. He noted the difference between Eldorado's plans for the site and those for the earlier garbage proposal. He appreciated the company's proposal because it would preserve the migratory bird flyways and the ravines which, he believed, would be threatened by farming. In any case, he added, in his opinion the woods were not particularly valuable. Naturalists would not be interested in preserving them.

It was this last point that drew gasps from some of the audience, who remembered Mr. John's earlier help in preserving that same land. At that time it was described by another naturalist as botanically unique with an "overall maturity and species diversity that is rapidly becoming uncommon in

Southern Ontario." The area has a wide range of plant and animal life, and magnificent stands of beech, pine, and hemlock. Mr. John's submission emphasized the divisions that had developed in the community. People who a few years earlier had acted together, motivated by the same interests and values, now found it difficult to speak to one another.

The people who would have to live closest to the plant, only a few hundred yards from the buffer zone boundary and a mile downwind from the refinery itself, had a more personal interest in the proposal. Gwen and Harold Best have known the site all their lives. They know where to find Ontario's spectacular wild orchid, the showy lady slipper, and they are keen walkers and observers of bird and animal life. They run a mixed farm, growing strawberries, vegetables, and flowers. They had already watched with dismay the effect on their lives of the building of the Wesleyville generating station. As Mrs. Best told the panel:

I feel the area should be left in its natural state. Is it or is it not important to preserve such areas so close to town, when the trend today is more and more back to nature and there are fewer and fewer places to go? Once gone it is gone forever. If Eldorado does build this plant in the proposed area how many acres will be absolutely shut off to the public, with high chain-link fences and No Trespassing signs?... Our little community of Wesleyville is gone... Whether this is good, bad or indifferent it is still an impact on a once quiet, happy, country community. I do not feel we need any more.

Chris Beatty, Ontario Field Director for the National Hikers and Campers Association, summed up the thoughts of some of those who sat across the table from Eldorado and its consultants:

As long as we continue to define progress as increasing materialism, new inventions, improved production and developing technology, we can only move toward eventual disaster. We must protect our land and our waterways for future generations.

In February 1979—only ten months after the federal Minister of the Environment, on the recommendation of the Port Granby review panel, rejected Eldorado's application to build its new refinery and waste site in the little lakeside village—the same panel ruled that the same refinery should be allowed to proceed in Hope township.

The panel's decision was predictable. Public support had been overwhelming. It concluded that although some farmers may be disrupted, the socio-economic benefits to the larger area would be substantial. The two conditions it attached to this decision were that Eldorado preserve the ravines that run through the site and that the company help protect the Indian archaeological remains found there. It also recommended—to any one who might listen—that all the appropriate ministries and municipalities should try to prevent "any further non-agricultural activity" within the vicinity of the site.

The panel, also ruled in favour of the two other sites—in Northern Ontario—that it had been asked to consider for Eldorado's refinery. And Environment Minister Len Marchand endorsed these recommendations in early March. It was up to Eldorado, and the contending political forces in Ottawa, to decide which would be chosen.

In July 1979 the Company announced it would build in Hope township. But in 1980 the Hope township site was still empty. A new paved road has been constructed between the cornfields and a large area bulldozed flat where the refinery would have been. It has been seeded with grass to keep the dust from flying around. But the much-scrutinized site for the plant that might have been built here has since been changed twice.

After the Liberals defeated Prime Minister Joe Clark's Progressive Conservative government in February 1980, pressure from Ottawa succeeded in shifting the proposed plant, with its promise of jobs, to the northern Ontario town of Blind River. Not only did the town have a high unemployment rate, it was also near the Elliot Lake uranium mines. Later Eldorado—obviously discontented with that decision—announced that the new plant's operations would be divided: a uranium trioxide refinery would go to Blind River and the uranium hexafluoride conversion operation would stay in Port Hope. A new UF₆ plant was to be built in the parking lot of the ten-acre site; it would wipe out a baseball diamond, a beach house, and the beach park used by generations of Port Hoppers.

The uranium trioxide refinery is the first stage in fuel processing. It takes the yellowcake from the mines and refines and converts it, with the addition of nitric acid and the solvent tributyl phosphate, to stages ready for conversion to the CANDU fuel uranium dioxide and uranium hexafluoride. It is this process that caused most of the chemical emission problems in Port Hope; it also gives off the sludgy raffinate wastes that contain nearly all the impurities, chemical and radioactive, from the ore. The uranium hexafluoride conversion plant which is now slated for Port Hope produces less solid wastes. Its environmental dangers are mainly from the fluorides emitted through the plant's chimneys.

It would have been hard, many people thought at the time, to find a place less appropriate for the construction of a uranium refinery than the deep forest and untouched meadowland of the Hope township site. Perhaps only Port Hope's one remaining beach and lakeside recreation area could qualify. And yet at the time the decision to build the plant was announced, there was no outcry, only victorious statements from the Port Hope's mayor and councillors that the plant was staying in town.

The company has let it be known that there will be no federal environmental review of the proposed Port Hope conversion plant site. As a proprietary crown corporation, it is not compelled to submit to such a procedure. But if a licence to build is granted by the Atomic Energy Control Board a mockery is made of the whole hard-won environmental review process, and of the millions of dollars and thousands of hours spent on it. With no environmental review there will be no public, technical scrutiny by independent experts. Since the Port Hope site is much too small to allow for a buffer zone—that essential (according to earlier reported statements of both the company and the AECB) exclusion area around the plant which protects people and other living things from radiation, chemical fumes and effluents—citizens may wonder how they will be protected. The Ontario Select Committee on hydro affairs wondered too, when it toured the town in late 1980. Recommendation 27 of its final report Mining Milling and Refining Uranium in Ontario calls on the federal Minister of the Environment to prepare a panel for an expeditions environmental hearing on Eldorado's proposed plant in Port Hope. It further recommends that Eldorado voluntarily submit its plans to such a review.

CHAPTER SEVEN

In 1976 a Peterborough surgeon wrote to the provincial Ministry of Health to tell them that it was his clinical impression that the incidence of malignancies in the Port Hope area was disproportionately high. In reply he was told he was not a statistician and shouldn't get involved in such matters.

Dr. Alan Levy is a well-known chest surgeon in Peterborough, a small city some thirty miles north of Port Hope. His practice draws on the many small

towns and villages in the area, as well as Peterborough itself. His suspicion that a disproportionately high number of his patients were coming from Port Hope increased when he organized a search of medical records in the area. What he found led him to believe that the number of cancer cases in the town might be high. He suspected that years of exposure to radioactive wastes was the cause.

On this basis he wrote to the Ministry enclosing his figures. But Dr. Jan Muller, a radiation specialist with the Ministry of Labour, discounted his research and produced figures in contradiction, which showed that Port Hope actually had somewhat fewer cancer deaths in a thirteen-year period than might be expected.

Later, Dr. Levy was quoted as saying he was "given the old flim-flam. They blinded me with figures." But he counterattacked, arguing that the ministry's figures were inaccurate because they were based simply on cancer deaths and did not include people who had been diagnosed as having cancer but had recovered from it. At the same time he suggested his own figures might have erred by being too low: they did not include cancer cases which had been referred to doctors in Toronto, Kingston, or Oshawa, or less serious cases that were treated in Port Hope.

Dr. Levy is a person who is familiar to many Port Hoppers. For several he has been a final resort in times of personal crisis. Beatrice Hills and May Coker both remember him with respect and affection: both are widows whose husbands died of cancer. Bea Hills remembers his anger when her husband Ron was sent back to his former job in the oldest part of the Eldorado plant after Ron's lung cancer had been diagnosed, and how he wrote to the management saying Ron would have to have an outside job.

Mrs. Coker, sixty-eight years old in 1980, and her husband Albert lived beside the plant for thirty-three years. Then they were bought out by Eldorado in 1976, when the company said it needed a bigger parking lot. Albert Coker died three years later. The cancer "rampaged through his system like wildfire" his widow said. His side of the family had never had cancer before, she said.

Ronnie Hills was fifty when he died. He was brought up in that same area, three short blocks of houses, now flattened, directly across from the Eldorado plant. The younger man and the older are only two of several cancer deaths, occurring at about the same time, from that area.

The affection and respect that many Port Hoppers like the Hills and the Cokers have for Dr. Levy is now not returned—at least not to the town of Port Hope as a whole. In October of 1979, Dr. Levy—who had never made his figures public—was attacked by the Port Hope town council, which asked the College of Physicians and Surgeons to review his actions. The council accused Dr. Levy of making unprofessional statements which were damaging to the community of Port Hope.

The charge was rejected as having no merit and Dr. Levy was completely exonerated. But in mid-1980 Dr. Levy was still being advised by his lawyer not to speak publicly about the matter. His own bitterness was undisguised. During the whole episode, he said, he had had support from only a handful of Port Hope residents, including one doctor. The affair had cost him heartache and financial loss.

The issue of individual and public health flared up in Port Hope during the late summer and fall of 1979. There had been weeks of hot, humid weather during which noxious fumes from the Eldorado smokestacks were caught in a temperature inversion over the town, causing distress to many townspeople. Two people were hospitalized, briefly, with bronchial trouble; it was a result, their doctor said, of the fumes. But attempts to persuade the company to scale down its emissions failed. It was not until one of those who were suffering went deliberately to radio, TV, and the press that they won action. And in the resulting outcry about Eldorado's record in Port Hope, the need for a health study of its inhabitants was raised publicly for the first time. It was three years after Dr. Levy had first tried to alert the provincial health ministry about his suspicions and four years after the first trouble with radon gas in the town. The \$6 million clean-up was reaching an end, but thousands of tons of radioactive and chemically contaminated waste still lay about the town, with no prospect of it being disposed of safely.

An editorial in the *Toronto Globe and Mail*, whose reporter Kirk Makin had investigated and exposed many of the townspeople's concerns, was incredulous:

Who would have suspected that in the infancy of our experience with the potential threat of radioactive wastes a close watch would not be kept on a community of 10,000 whose main industry, Eldorado Nuclear Limited, had been dumping the stuff nearby since the 1940s?... It is nothing less than appalling to find that the health checks have not been done... If ordinary human concern for the well-being of the residents of Port Hope was not enough to prompt monitoring, one would have thought that the sketchy nature of our understanding of long-term low-level radiation would have prompted some action.

The Port Hope *Evening Guide*, however, took another view of the renewed public interest in the town. In an editorial entitled "Too Long at the Pillory Post," it complained of "pea-brained attacks" and "scare articles" by the Toronto-based media. "We have had five years of scrutiny, of ever-breaking new issues regarding ENL's operation, and the time has come to stop." But it asked for help of "national stature and scope," in coping with the crisis.

Finally there was a response from Eldorado. Senior vice-president Dr. R.G. Dakers wrote to the *Globe and Mail* and to the *Evening Guide* to say that the reasons advanced for a full-scale health study were doubtful. His company was "deeply aware of its responsibilities in the area of health and safety" and was in fact conducting its own health study of present and past employees.

In his reports, Kirk Makin had cited fifteen cancer cases in Port Hope and the nearby area that, he implied, were at least likely to have been caused by Eldorado. Mr. Dakers denied the company's responsibility for eleven of these on the grounds that they were cases of leukemia, thyroid cancer, and other unspecified cancers, and that the only cancer proved to have been caused by radon gas was lung cancer. He also said that the four remaining cancer deaths, which were of people who had lived close to the Eldorado plant or dump sites, were not alarming because the provincial health ministry figures had shown that cancer deaths in Port Hope were below those statistically predicted for a similar size community.

On the same grounds he rejected Dr. Levy's allegation and asked that the doctor make his figures public. "Any health risk that may have existed in Port Hope has been small," Mr. Dakers concluded. "The removal of contaminated material since 1975 should reduce the risk even further."

The trouble was that much of the contaminated material hadn't been removed at all: it had been simply shifted around to different parts of the town. But this fact slipped by unnoticed in the general outcry and alarm. For the second time in four years Port Hoppers were in the national spotlight, and were about to be exposed again to all the allegations, denials, and confusion they had already experienced when radon gas was first discovered in their town.

After a meeting of public health officials who had been fortified with Dr. Muller's cancer-mortality figures showing Port Hope deaths from cancer to be within normal limits, the existence of unsafe levels of radiation in Port Hope was denied. Dr. Donald Mikel, medical officer of health for the area, was quoted as saying that the town had been cleaned up. To add to the confusion, he next said that a health study was needed to discover whether or not current cancer cases were caused by radiation.

But a day later, in an *Evening Guide* interview, Dr. Fred Knelman, the Montreal nuclear critic and author, said:

Muller and the nuclear industry are putting the burden of proof on the people of Port Hope, who are the victims, and giving the benefit of the doubt to the corporations. It should be the other way around. The benefit of the doubt should go to those least able to defend themselves.

"There is no scientifically safe level of radiation," he declared. He said that going by AECB's ALARA standard—"as low as can be reasonably achieved"—was the same as talking about a "permissible risk."

"Who is to say what radiation level is reasonable or permissible?" he asked. He said that the nuclear industry set "safe" levels without adequate concern for the potential victims, and that safety standards were set by an elite and not by the people who would be first affected.

And a few days later Professor Douglas Andrews, the University of Toronto nuclear engineer who had battled for years to get Port Hope cleaned up, warned the town that Dr. Muller's figures could be "the calm before the storm." He explained that because many people who had been living in Port Hope since the late 1950s were just then reaching the end of the twenty-year latency period for cancer, it would be foolish to base cancer predictions on past statistics. A proper scientific investigation carried out over an entire generation was needed; further procrastination would be dangerous.

"We'll all be happy if no unusual increase in cancer occurs," Professor Andrews said. "But we have to be prepared in case it does." He was quoted as saying that it was possible that lifelong residents of the town "might have their death certificates delivered with their old age pensions."

Within a week both Professor Andrews and Dr. Levy had been publicly castigated by the council for making "unsubstantiated" and "unprofessional" statements that were damaging to the community. The town council was clinging fast to a new study of Port Hope death rates (released in October by the federal Department of Health and Welfare) that showed that there were fewer lung cancer deaths among males than might be expected in the period from 1966 to 1977. It asked that the two men's statements be referred to their professional associations—the Association of Professional Engineers and the College of Physicians and Surgeons. The motion was passed unanimously.

"I'd like to see people like Professor Andrews and Dr. Levy in Peterborough come up with the facts. We have been constantly vigilant in this town and we have been given a clean bill of health," Councillor Roger Carr, a co-sponsor of the resolution said. The mayor, Bill Wyatt, said the council would have to fight harder to win public favour against what he described as born-again anti-nuclear activists. Councillor Carr added that the record of past and present councils showed that they had been responsible in taking actions to counteract adverse publicity.

Professor Andrews, who had been trying for thirteen years to alert the town, the industry, and its workers to the dangers that were being spewed out among them, told a reporter that he would welcome a chance to appear before the council to justify his statements. He explained:
I'm not an anti-nuke. If I were I wouldn't have been in nuclear engineering for the past thirty years. But I do know that nuclear programmes can be run safely and that bad management can reflect on the totality of the nuclear programme as well as having grave human consequences.

He was never asked to appear before the council. And the Association of Professional Engineers threw out the town of Port Hope's complaint against him, as the College of Physicians and Surgeons dismissed its complaint against Dr. Levy.

But by late 1979, Dr. Levy's concerns about the health of the people of Port Hope were lost in the welter of personal charges and countercharges that once again swirled around the town. Were too many Port Hope people dying of cancer or were they not? In the absence of any other figures most people clung to the comforting but hurriedly provided death statistics provided by provincial and federal health departments.

Called by many a health study, the province of Ontario's figures were really a rough set of mortality figures covering the period 1960 to 1973 in Port Hope. They were first produced two years earlier by Dr. Jan Muller when he was appearing at the Port Granby hearings for the provincial labour ministry; at that time he cautioned against regarding them as a study. They accounted for the causes of death in Port Hope and showed that there were 195 deaths among men and women from all types of cancer in the thirteen-year period. The estimated average Ontario figure for cancer deaths in a similar-sized community was 204, so Port Hope's deaths were fewer—not more—than might have been expected. Broken down into types of cancer, however, the figures showed that for leukemia and cancers of the lung, bronchus and trachea, the Port Hope death rate was higher than the estimated average rate by over 10 percent.

But Dr. Muller warned against taking these latter figures seriously. The numbers were so small (they varied between four and twenty-eight deaths) that the difference between them and average figures was not significant. In fact he said that his department's figures, as a whole, were not significant enough to identify a cause-effect relationship in Port Hope. He refused to call them a study. But he said that although no significance was being attributed now to the Port Hope figures, that did not mean that there was no significant difference.
We feel that the data in twenty or thirty years' time might perhaps be able to find some difference somewhere... all I'm saying is that from the data we cannot conclude the measure or effect. I would never dream of saying that we have proved that there is none.

It was all very muddling to anyone who hoped for a quick concrete answer. And the muddle only increased when the federal Department of Health and Welfare rushed out its set of mortality figures on Port Hope. These compared Port Hope deaths with averages in the rest of Canada and also to those in thirteen Eastern Ontario communities comparable in size, during the period from 1966 to 1977. It showed there was a lower rate of deaths from cancers among men and women in Port Hope compared both to the whole of Canada and the thirteen communities.

Whereas in the whole country, a town of Port Hope's size might expect 209 cancers, and the average for the thirteen communities was 212, Port Hope's figure was 193. Deaths among men from lung cancer were also lower, coming to twenty-four in the eleven-year period in Port Hope, compared to twenty-eight in Canada and thirty-two in the thirteen communities. Male leukemia deaths were also lower in Port Hope, but less markedly, this study reported.

Surprisingly, deaths from lung cancer and leukemia were slightly higher among Port Hope women than in the rest of the country and the thirteen towns. They amounted to nine lung cancer deaths in the period observed, as compared to seven in both the thirteen communities and Canada, and five leukemia deaths compared to four in the comparison groupings.

The significance of these small numbers was downplayed by the epidemiological experts who issued them. Others emphasized that, without correlating them to individual radiation exposures, they were not meaningful. And soon after they were released an assistant deputy-minister in the Department of Health and Welfare was quoted as saying it was too general a set of figures to take seriously. Dr. Alex Morrison said that an in-depth study would be needed before any conclusions could be drawn about the effects of radiation on Port Hope residents. Neither the provincial nor federal figures included people who had had cancer but were cured, those who were presently suffering from cancer, or those who had died elsewhere.

Nevertheless, both sets of statistics were seized upon by the company and the town council as proof that Port Hoppers were not under any particular risk. They had been published just in time: by November 1979 the sod was being turned for the new uranium hexafluoride plant in Hope township. Such unpleasant things as lung cancer or the company's waste-disposal problems were brushed aside by the town's visions of the new \$100-million plant and the beaming faces of visiting Eldorado top brass.

The company took advantage of the moment to reach out to ordinary Port Hoppers, too. In an unusual public relations gesture it hosted a not very open house tour of its John Street plant, taking out full-page ads in the *Evening Guide* to invite citizens: "Drop in and visit with us," the ad urged. "See our new facilities... special displays describing the processing spectrum... a photo presentation of the nuclear fuel cycle and Eldorado's role in this vital energy-producing process. We'll be on hand to answer your questions..." Children were welcome and refreshments offered.

But in all the surface jollity and the underlying tension about which figures meant what to Port Hope, one fact remained buried. Crude as they were, both the provincial and federal statistics showed that Port Hope had a high number of deaths from all causes—particularly from circulatory diseases such as heart attack and stroke—compared to what might be expected in the rest of Canada.

The provincial figures showed 354 deaths from circulatory disease among males in its thirteen-year study period, compared to an expected 326. Among women, though, the Port Hope figure was lower than expected. The national Health and Welfare figures showed a substantially higher number of circulatory deaths for both men and women—340 and 326, respectively—compared to 271 and 287 in the rest of Canada. (In relation to the thirteen communities, these figures were just about average.)

Age was not a contributory factor to these high figures, although Port Hope is a favourite town for retirement, because they were adjusted for the town's age distribution.

Some, especially people who lived far away from Port Hope, wondered if there might be significance in these elevated figures. Dr. Lester Van Middlesworth, a professor of medicine, physiology, and biophysics at the University of Tennessee, said in an interview that radiation could change the whole chemistry of the body, making it more susceptible to other diseases. Counting up cancer deaths was not enough to determine the effects of low-level radiation, he believed. Sister Rosalie Bertell had already warned publicly, during the Port Granby hearings on Eldorado's application to build its new uranium hexafluoride plant, that low-level radiation had a generally aging effect on the body. Closer to home, in Toronto, the health and safety director of the United Steelworkers of America, the union at the Eldorado plant, had questioned the diagnosis of disease in Port Hope. Paul Falkowski suspected that medical knowledge about radiation was still at such an early stage that many Port Hope diseases and deaths may have been attributed to the wrong causes.

Did this mean that Port Hope's "excess" number of deaths from cardiovascular and circulatory illness could be traced to the deleterious effects of low-level radiation? The question hinged first on whether in fact the number was excessive, or statistically significant, and second on whether low-level radiation could be a factor in this sort of disease. Only a full-scale health study could begin to provide this long-needed information.

Meanwhile, of course, some of the people in Port Hope continued to get sick and to die. Were the numbers unduly high? The town's own doctors were undecided.

Dr. Paul Hazell, chief of staff at the Port Hope hospital, said they had received a lot of contradictory information. There were ten doctors in town and probably ten different opinions, he said. "All we can do is look into our own practices and surmise. You can do a head count... but you also have to look into a person's background, his job, and so forth. It hasn't ever struck me that I see a lot of cancer or lung cancer here," he concluded.

But another doctor thought differently. Dr. Geoffrey Harrison was the only medical man in town to have openly heeded Dr. Levy's concern about Port Hope's health. He had written to the federal minister of health saying that although he was aware the evidence of one doctor's practice was not statistically significant, he was concerned about the effect of radioactive waste on the town. He urged the minister to initiate a full-scale health study. Some of Dr. Harrison's patients had lived in the blighted area next door to the plant. About thirty families there had been bought out by Eldorado in 1976 when high levels of radon gas were found on some of their properties. The community, especially during the 1940s and 1950s, was regularly swept over by clouds of chemical and radioactive fumes. One former resident counted up four deaths from cancer, including his wife, among people who lived on those streets in the 1970s.

Dr. Harrison was upset that the people there had been exposed, without their knowledge, to unknown levels of radiation that might be dangerous. "I certainly wouldn't choose to live across the road from Eldorado," he commented.

Michael Terbenche, who used to live in the blighted area, was outspoken: "You can't buck the government," he charged, in an interview with Kirk Makin of the *Globe and Mail*. "No one's going to stick their neck out. They've got everything sealed and bottled-up here." Mr. Terbenche worked for Eldorado in the late 1930s, until his doctor told him the only way to restore his health was to quit. He did, but he continued living next door to the plant until the company bought him out.

Others didn't quit in time. Just ten days before he died, in January 1978, Frank Hendricks was told by the Workmen's Compensation Board of Ontario that he would receive compensation from the company for the lung cancer that was killing him. Mr. Hendricks used to clean out an industrial oven in

the old Eldorado extraction process and later handled the dust bags from the ventilation system.

He told the *Globe and Mail* that during the first ten years of his employment he had never seen anyone doing tests for dust concentrations, although in the 1950s and 1960s "the nitric acid fumes from the process were unbearable and the uranium dust in the air was terrible."

"We just took it for granted," he said. He was sixty-three years old when he died, and had worked almost half his life at Eldorado.

Two weeks after Mr. Hendricks' death, Ron Hills, at the age of fifty, died of lung cancer after an eighteen-month struggle. He had worked for more than twenty years at Eldorado. Dr. Levy removed a tumor from the lower lobe of his right lung in late 1976 and he went back to work at his old job for a time, despite the surgeon's request that he be transferred to somewhere less dangerous. The cancer spread. In the spring of 1977, at the Princess Margaret hospital in Toronto (which specializes in cancer), Ron Hills was told that there was nothing more that could be done.

"There's no way I could be bitter," said his widow Beatrice. Since her husband's death, she has worked as a cook in the Port Hope hospital. She cites the summer jobs her children have had at Eldorado. Her youngest child, Pam, graduated in 1980 from Queen's University as a teacher and was about to go back to work at the plant for the summer. Two years after Ron's death both mother and daughter were restrained and philosophical about it. Unlike Mrs. Hendricks, who had moved to work at the Eldorado office in Ottawa after her husband died, the Hills would not leave Port Hope. It was where they had always lived and where Ron had been raised—in the polluted neighbourhood across the street from Eldorado.

"I try not to talk too much about it. I try not to think," Bea Hills explains. "But people stop me at work and say 'Bea, they didn't do right by you.'"

"They" is both the company and the Workmen's Compensation Board, which did not award Ron Hills compensation. He had not, it was claimed, been exposed to enough radiation for long enough. Although Ron Hills' urinalysis showed a higher uranium content than Frank Hendricks' and although Hills smoked a good deal less than Hendricks, the claim was rejected both initially and on appeal.

It was a long, tough fight, according to Paul Falkowski, health and safety director for the United Steel Workers of America. He took both cases to the WCB at the same time. The decision in favour of awarding compensation to Hendricks was precedent-setting; it was the first time the link had been recognized between cancer and the sort of above-ground low-level radiation found in the refinery. But knowing the level of radiation to which a worker had been exposed was essential, according to the board, to determine whether his cancer was caused by radiation or by other factors for which the company could not be held responsible. And information about past working conditions in the plant, which was the only way the degree of radiation exposure could be judged, was hard to come by. There had been no widespread monitoring of working conditions for health and safety by the AECB until the first fuel processing facility operating licence was issued in 1976.

The union had taken both the Hills and Hendricks cases to the board in July 1977, a year after Ron Hills got sick and six months after Hendricks' cancer was diagnosed. By October nothing had happened; the men's files were almost empty in the board offices, according to Falkowski. A board doctor said at the time that they were waiting for information from Eldorado about plant processes and radiation levels. "We are dependent on these people for information," he explained.

Meanwhile the union issued studies showing the connection between lung cancer and low-level radiation, and it met with the members of its Port Hope local to try to explain them. An article appeared in *The Miners' Voice*, a union publication, criticizing federal radiation-exposure standards and questioning safety procedures at the Port Hope plant. But it immediately ran into trouble. Vern Elliott, a past president of the local, described it as "a lot of bullshit." Plant manager Gord Colborne denied he ever said that a few workers sometimes got more than their allotted maximum of 5 rems annual exposure.

Finally, the local union executive went to the WCB with Paul Falkowski to argue with its chest specialist Dr. Charles Stewart on behalf of Ron Hills and Frank Hendricks. According to Paul Falkowski they were told, first, that the two men's cancers were caused by smoking, and second, that two cases alone were not "significant."

"I said to him, 'You're telling me we need to show more bodies from Port Hope?'" Falkowski recalled. "The Port Hope people were really shocked—it was then they began to fight."

They used the statistics then available from Elliot Lake and Sudbury, which showed that among miners exposed to radon gas in the mines there had been twice the number of deaths from lung cancer as those expected in non-exposed populations. Eventually, with union sick benefits running out for Hills and Hendricks, Falkowski took the story to politicians and to the press. Questions were raised by Stephen Lewis, then leader of the New Democratic Party, in the Ontario legislature, and there was extensive coverage of the issue in the *Globe and Mail*, including pictures and an interview with Frank Hendricks.

After that, according to Paul Falkowski, things began to happen. Charged by the union with deliberately dragging its feet, the board was urged by its chairman to speed up its investigation. Dr. Stewart maintained that it was impossible to hurry because the board was having to set new guidelines and rules. Data was needed to establish the cause-effect relationship, but it was hard to find.

Who would have such data? Past working conditions at the plant were still the key. The company, which was responsible for paying compensation in all claims upheld by the WCB, was not likely to search its collective memory with great time and effort in such a cause. The provincial Ministry of Health said it had had health hazards in the plant brought to its attention in the past but, because Eldorado was a crown corporation, it had had no legislative authority to monitor it. The Ontario Ministry of Labour explained that it was responsible for safety but not for health. And the AECB said that, although it had radiological responsibility, it had no records because no licences had been issued until recently.

Nevertheless, three days after Christmas in 1977, a WCB official journeyed to Port Hope to tell Frank Hendricks that his claim had been granted. On that same trip he visited Ron Hills to tell him that his claim had been turned down. Before the end of the following month both men were dead. The union immediately determined to appeal the Ron Hills case.

Dr. Stewart had said that because so little data was available the workers would be given the benefit of the doubt in the assumptions that would have to

be made. But his words sounded a little hollow in the hearing rooms of the WCB, when, for the Hills appeal case, Eldorado came in with a battery of lawyers and doctors flown in from Chalk River, Ontario, and Europe. They argued, successfully in the opinion of the WCB, that Ron Hills' exposure to radioactive substances was not enough to cause lung cancer. Specifically, it was claimed that his cumulative exposure was 10.8 working level months, and experts were quoted to prove that the threshold of danger to health was 12 working level months. (This was not consistent with the Ham Commission findings which postulated a "threshold" of below 10 WLM). How Ron Hills' exposure level was determined was never made clear publicly. Paul Falkowski, who had the right to search Hills' WCB file, said he met with obstruction and empty files, and for a long time he never saw the supporting material. When he finally did, some of the flimsily identified readings taken of radioactivity in the plant during the years 1952 to 1956 showed concentrations of up to 1,600 picocuries per litre.

There is no evidence of exactly where these readings were taken, so their significance is difficult to judge. As evidence in the Ron Hills case, therefore, they were not strong. But it is worth noting two important facts about them; they were taken during the period when the company was changing over to the solvent-extraction process and the old smelting process equipment was being discarded. It was also the time when Bill Young, a design engineer, was working in the plant.

Eldorado has consistently denied any responsibility in the sudden death of this man from an acute form of cancer four years after he started work at the plant and two years after he was allegedly exposed to large quantities of alpha radiation. According to his account at the time, he tried to stop a plumber from throwing to the ground old ventilating ducts, which he knew to be contaminated, thus sending up clouds of dangerous alpha-laden dust particles. While doing this Bill Young breathed in some of the dust. Two years later he died from reticulum cell sarcoma, which had spread rapidly throughout his body in four months.

Most medical authorities believe it is impossible to develop cancer in two years. But Paul Falkowski, who has also worked on Bill Young's case on behalf of his widow, claims that the young engineer's symptoms were remarkably like those described in published accounts of Hiroshima and Nagasaki victims who died of radiation within two to eight years after the blast. And there is company evidence that even before the ventilating duct incident Mr. Young had been exposed to high gamma and radon levels—although these were within the laxer tolerance levels of the time.

Thresholds of danger in radiation exposure are highly controversial, as we have seen. In seven years the standards used in Ontario uranium mines (and often ignored, some miners charge) were tightened three times, going from 12 WLM per year to 4 WLM. Even 4 WLM is lax by most standards. The ICRP has recommended 3.6 WLM since 1959. In Sweden, where the standard of 3.6 is used, exposed workers were still found to be three times as likely as others to die of lung cancer according to labour commentators. Ontario's labour minister in 1976, Dr. Bette Stephenson, forecast additional cancers from 4 WLM and wondered publicly whether or not there is any "safe level." And the Saskatchewan government insists on a much higher standard of 1.2 WLM a year, a limit which would imply a lifetime maximum of 60 WLM, based on a 45-year working lifetime. This is also the maximum likely to be recommended by the British Columbia government's investigation into the uranium industry, the Bates commission.

Paul Falkowski has not given up on the Hills or the Young cases, but he is bitter about what he considers to be the board's prejudiced stand toward Eldorado workers. He says the board discounts the work of such experienced doctors in the field of radiation medicine as Victor Archer of the U. S. National Institute of Occupational Safety and Health, Dr. Thomas Mancuso of the University of Pittsburgh, and cancer research specialist Sister Rosalie Bertell—all well-known names to those who are concerned about nuclear health hazards. It is his opinion that the board listens only to nuclear supporters—that it has become a victim in the increasing polarization of the nuclear debate. "Don't bother playing the numbers game," he says. "Low-level radiation has been proven to cause lung cancer. Every worker who has been exposed to a dangerous level should therefore be compensated. What constitutes a dangerous level can be agreed upon."

His own personal conviction about Port Hope is that for decades, because of lack of medical experience, many illnesses among employees at Eldorado have been wrongly diagnosed. Deaths among long-time workers that may have been attributed to cardiovascular or circulatory disease may in fact have been caused by long-term low-level radiation exposure. This would explain Port Hope's high record of deaths from these diseases.

This still leaves us, though, with the problem of deciding what a dangerous level is and how it is to be determined. Evidence of the quality of working conditions, in years as recent as the late 1960s and early 1970s, is slipping away as workers' memories fade with passing years. It has become increasingly clear that it is going to be evidence of cancerous bodies, as Paul Falkowski predicted, that counts.

Gerry van Houten worked for Eldorado for ten years, mainly in the metals-fabrication division, working with enriched uranium. He was happy there; his attractive Cavan Street bungalow, filled with mementoes from foreign travels, attests to a good life. "It's a nice factory," he says of Eldorado, "they handle you well there."

But Gerry now knows he has 100 percent lung burden—the industry's term for lungs that are badly contaminated with radiation. He is likely to develop lung cancer. Working with enriched uranium a few years ago, when masks were flimsy and uncomfortable and the ventilation inadequate, was a risky business.

To add to his troubles Gerry turned sixty-five in 1980 and retired from the plant at the beginning of July. In the months before then, when he was no longer allowed to work because of his illness, he was fighting to get his case put on file at the Workmen's Compensation Board. If he developed cancer in his retirement he wanted to have a chance at least of being compensated.

But it was a struggle. Neither the union or the WCB wanted to have his file submitted. As he says, "the company wanted to tell me I was going out a healthy man."

Even though his case was finally accepted by the board, the latter's track record in these instances is not hopeful for Gerry van Houten. Although Eldorado's expensive new lung counter can tell him exactly what it is that is contaminating his lungs—1.3 percent enriched uranium that he undoubtedly inhaled in the dusty conditions of Eldorado's enrichment facilities—Gerry van Houten believes that the likelihood of the company paying him for his disability is small.

The union at Eldorado, local 13173 of the United Steelworkers of America, was instrumental in getting the company to buy this lung counter. Ron Jessup, an executive member, says that there has been a new awareness of workers' health since the union negotiated health and safety conditions into the contract a few years ago. But he maintains that, "the technology has only been developed recently. All we are trying to do is make damn sure they

[the company] do what they can do."

There is a long way to go. The old section of the plant in Port Hope is notoriously dusty. Better masks would lessen the workers' reliance on lung counters and urine tests, methods that are useful only to measure that radiation which has already been absorbed by the body. Also helpful are personal alpha-radiation dosimeters, which record daily exposure; these are in use in some parts of the industry in France and in the province of Saskatchewan, and could be used in Port Hope.

Paul Waghorn, who has worked at Eldorado for several years, is quite satisfied with the company. He has worked in both the old and new sections of the plant as well as in shipping. Every three weeks he gets a urinalysis test to measure the amount of uranium his body has absorbed. Like all workers, he also has a personal dosimeter (a plastic badge to measure gamma radiation doses) which is sent to be read and returned every two weeks. Each year he is examined in the company's new lung counter, which measures the concentration and determines the type of material that might be trapped in his lungs. If he's worried about having been exposed to extra radiation between test dates he can request any of these tests again.

The hitch, of course, is that these expensive, complex machines only measure the damage after it has been done to the body. Methods of controlling the conditions that cause this sort of damage are less reliable, although the company has apparently spent large amounts of money on dust collectors, and on lighter, more comfortable masks, as well as on other equipment designed to keep the environment cleaner. Also there are now regular inspections by the province and the Atomic Energy Control Board.

People are fallible, however. They become inattentive, impatient, clumsy—and mistakes are made. An example of this is the acid spill in Port Hope harbour that occurred early in December 1978. A pipe through which radioactive sulphuric acid was being pumped into a tanker truck broke and several hundreds of gallons of acid drained into the Port Hope harbour, less than a mile from the intake pipe for the town's water supply. The Port Hope Water Commission building and works are situated on the lakefront a little to the west of Eldorado. The new intake pipe stretches half a mile out into the lake. The spill was not reported to company authorities by the workers involved. The provincial Ministry of the Environment did not know anything about it until more than a month later when routine water tests showed a radiation level of 30 picocuries in the harbour, about ten times the provincial standard for drinking water at that time. The maximum fine was \$5,000 a day. In 1979 the Ontario Ministry of the Environment charged the company under the Ontario Water Resources Act with failing to report the spill.

Company officials later said that the employees concerned thought it had been cleaned up. The case was dismissed because Eldorado is a crown corporation and therefore not subject to provincial regulations.

But by the latter half of 1980 the province was preparing to resubmit the charges. It was determined that the company, which applies regularly for provincial environment ministry approval of its air emissions and solid-waste and sewage disposal, should also adhere to provincial water regulations.

Mistakes are made in other parts of the plant, too. During the summer of 1979 Port Hope residents complained about the heavy fumes from the plant that hung in the air over the river valley along which the town is built. For days they caused coughing, eye irritations and pneumonia-like symptoms among many citizens. The fumes were caused by a process that boils off ammonia and by the production system using nitric acid. The two chemicals were thought to have combined in the air after leaving the plant chimneys. A spell of humid, stagnant weather intensified their effect.

When problems with fumes from the plant had started in June, the Ministry of the Environment asked the company to conduct a study of the chemical emissions coming out of its stacks. Eldorado was also asked to close the plant if weather conditions made the fumes objectionable to its neighbours in the town. It was to submit a report on its study to the ministry by the end of August. Apparently, the company was also having difficulty in fulfilling its fuel contracts and was reluctant to interrupt production. By the latter half of August the combination of almost non-stop production and a stretch of damp, windless weather made conditions practically intolerable for some citizens.

David Wong, a lab technician who had worked in the plant for seven years, said that the company's pollution-control equipment did not always work properly. Mr. Wong lives across the harbour and downwind from the plant; he said he had often complained about the emissions, but nothing was done.

The fumes continued to hover over the town, causing physical distress and eventually anger. And the company's failure to respond to complaints led some citizens to take the matter to politicians and the media. The resulting furor reached a climax with Dr. Levy's public concern about cancer rates and ended only with the subsequent government commitment to a full-scale health study of the town.

Eldorado promised to install new pollution-control equipment and to reduce the volume of some emissions by up to 90 percent by the end of the year.

"Why should we have to wait that long?" asked local teacher Suzanne Skinner at a ratepayers' meeting on August 21st. She and her family, including three young children, lived on King Street South, a residential area badly affected by fumes. It is located directly across the harbour, a quarter-mile—and usually downwind—from the Eldorado plant. The blue, chemical-laden haze could often be seen drifting across the water towards the homes there. Already one of the Skinner children had been hospitalized by the effects of the fumes and all summer the family had been suffering from respiratory ailments caused, said their doctor, by the polluted atmosphere in which they lived.

On August 16, Mrs. Skinner had sent off copies of a carefully documented list of complaints to anyone she felt could help—from the Prime Minister and the Minister of the Environment to the local health inspector and newspaper and television offices. Her "Calendar of Problems" listed four months of illness and frustration in dealing with the company and the Ministry of the Environment. It showed how she was patronized and soothed by Eldorado. She was assured there was no health problem from the emissions and that it was just the summer humidity that was getting her down. The Ministry of the Environment admitted there was no way it could test the air for the ammonium nitrates that were causing the problem.

Finally, two weeks after Mrs. Skinner sent her letter, she received a detailed reply from plant manager Gordon Colborne. He explained the emissions problems and the steps being taken to solve them. He said her reiterated concerns had produced efforts to eliminate the smog, but the company had "apparently failed to keep her informed of its progress to date." He noted that according to the company's information the emissions were mildly irritating, but not carcinogenic.

By then, in response to the surge of publicity elicited by Mrs. Skinner's complaints, the company had been directed by the Atomic Energy Control

Board and the government environmental agencies to stagger the start-up of its ammonia concentrator and uranium dioxide and trioxide production systems, which had been closed for their annual maintenance period. It was also ordered to closely monitor the plant's emissions and to report on these to the regulatory agencies.

Newspaper headlines and television and radio interviews kept the subject boiling. A month later Kirk Makin, who had been covering Port Hope and its problems for the *Globe and Mail* since the radon gas story broke nearly four years earlier, wrote a full-page feature on the health of the town's residents.

He quoted Dr. Alan Levy's concern about the incidence of cancer in the town. Another doctor who had been treating the thyroid cancer victim Stephen Saines urged that the town's health be studied.

A direct result of this media attention, and particularly of the *Globe and Mail* story, was the commitment by federal and provincial health ministers to combine on a full-scale health study of the town.

Over Eldorado's doubts, and in spite of its assurances that it was doing its own study of the health of its workers past and present, the study was to go ahead. It was almost exactly four years after the first problems with radon gas were revealed and it took yet another year to agree on the contracts to do the complex study. The study was to take two years and would be both retrospective and prospective. Records of earlier times would be matched against current and future health statistics. Medical in broad concept, it would also require statistical correlations, computer record matching, field surveys, and radiation measurements. The lack of such records from the past would be an on-going problem. But as Kirk Makin wrote: *The town of Port Hope is packed with human guinea pigs: people who have breathed, drunk, even touched radioactive material for long periods of time... perhaps the prospects for scientific knowledge can prevail where other concerns [about their health] have not.*

With the promise of a health study it looked as if Port Hope's most serious problem with Eldorado was at last being taken seriously. But for many townspeople, like those sturdy citizens who boasted of exhaling radon gas with every breath and those who worried about the town's image, the prospect was more a threat than a promise.

Mayor Bill Wyatt spoke about the idea grudgingly. He told a visiting reporter that real-estate sales had fallen off badly during the radon gas scare and that he didn't think there had ever been anything detrimental to people's health in the town. Anyway, everyone had a right to look after his own health, he said.

A correspondent to the *Evening Guide*, however, said in a letter that it was high time the town stopped trying to hush things up. Jack Goering, a science teacher, warned that the town had to face the fact that Eldorado was causing problems. He agreed with the mayor that everyone had a right to look after their own health but "some people just do not want Eldorado to be the determiner of their health style nor that of their children."

But the argument soon died out. The health-study proposal disappeared into the bureaucratic machinery of Ottawa and Toronto for more than a year. In May 1980 a nine-page description of the study was published, but it was written for epidemiologists and had very limited circulation in Port Hope.

By then, however, there had been another string of Eldorado-related problems in the town and more were to come. As usual the citizens' attention was diverted away from the painful issue of their own health to more immediate problems. After the outcry over the plant's nitric acid fumes, which had been five to six times the company's own boildown-stack standard at times during the summer of 1979, Eldorado promised to cut emissions of the most irritating pollutants by Christmas. For the people suffering from these and other chemical emissions, this four-month timetable seemed leisurely. At the end of October the company installed a new condenser in the boildown stack of the uranium trioxide process, from which most of the nitrates were emitted. Although there were ongoing difficulties with the new equipment, Environment Canada announced in November that the rate of nitrate emissions from the chimney had been lowered.

But by early 1980, the measurement of nitrates in the stack was still between one and three pounds per hour. [The provincial "guideline" is 2 1/2 pounds per hour]. It was not until the fall of 1980, after substantial new work on a "total" condenser during the summer, that the company was able to make good on its promise of a year earlier. Then the Ontario environment officials revealed that the plant's fluoride emissions had been regularly exceeding provincial criteria—in spots at certain periods by eighteen times.

Both Environment Canada and the provincial environment ministry seemed during the fall of 1979 to have taken a sudden new interest in the town. Monitoring of Eldorado emissions became a priority for the agencies, and citizens were encouraged to phone in their complaints if they noticed unusual smells or irritations. Government travel budgets swelled as staff members tried to keep up with the challenge of measuring Eldorado's fumes. Meetings were held at which, reportedly, the various odours of Eldorado were demonstrated to visiting experts.

Unknown to many townspeople, another change was quietly taking place that fall at the Eldorado plant site. With remarkably little fanfare the company built a new \$10 million uranium dioxide processing plant on the southern side of its property, to replace the old 1950s plant that had combined production facilities for both uranium dioxide and uranium trioxide. The production of uranium dioxide, the fuel used in CANDUs, had been expanding at record levels—nearly three million pounds in 1978—and requirements appeared to be growing. It was predicted that the new circuit would be capable of processing enough fuel annually for all Canadian reactors until the end of the 1980s. As well, the new system would be substantially cleaner and more dust-free for employees.

The very few public references made in Port Hope to all this construction were to do with the new plant's siting—on the side of the company property facing the lake and away from the uranium trioxide process. People who had noticed hoped this meant that the nitrates given off by the uranium trioxide production and the ammonia from the uranium dioxide would be less likely to combine in the air over Port Hope and create obnoxious fumes and irritation. But the new uranium dioxide circuit, although completed at the end of 1979, was still being tested ten months later, and production continued in the UO₂ plant. So it was not clear whether this separation of chimney stacks would solve the problem.

The fact that this big new facility could be built and put into production in Port Hope with so little public knowledge or consultation with town authorities gives some idea of the isolation and impotence of townspeople in the face of Eldorado. And yet, during the very months it was being constructed, a few Port Hope citizens were trying to set up a public committee to monitor the plant and to gain some control over their immediate environment.

The idea of a monitoring committee that would be accountable to the citizens of the town evolved out of the environmental assessment hearings at Port Granby and at Hope township. It first came up at Port Granby, where citizens were trying to break through the reluctance of both Eldorado and the AECB to come clean with the results of the monitoring being done around the Port Hope plant and the Port Granby waste dump. The Port Granby environmental review board suggested that there should be a public body to receive, interpret, and disseminate this data, and to monitor any corrective measures that were needed.

At the time, Eldorado agreed only to consider the establishment of such a committee, but after its proposal had been turned down at Port Granby, and by the time of the Hope township hearings, it had a change of heart. It suggested that monitoring data could be regularly presented to a public forum in language everyone could understand, and the industry's response could be explained.

By then, however, the environment review board—now considering the Hope township site—and skeptical citizens such as Elisabeth Pereira wanted more. They stressed the need for public accountability. It was not enough, they argued, for the company to plan to give citizens monitoring data and the reasons for it. They wanted this, but they also wanted to become the town's watchdog on radiation stands. Such a committee had to be responsible to the citizens who lived with the plant and were exposed to its emissions and wastes.

During the summer of 1979 a small group called the Port Hope Environment Group pushed ahead with the idea. Although they were ignored at first by the town they found some support from the AECB and from Eldorado. But there were problems regarding jurisdiction and money. Neither the federal nor the provincial environment agencies or the AECB were willing to finance a monitoring committee, and no one other than town councillors wanted to take money from Eldorado for it. At this time the group also felt that a monitoring committee should be independent of the town council, which had never public committee to monitor the plant and to gain some control over their immediate environment.

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When complaints about Eldorado's fumes grew louder and public attention again became focussed on the town, the plan gathered new impetus. The town council at last showed interest. The AECB and both government environmental agencies pressed for the establishment of the committee and said that it should be under the jurisdiction of the town council, although not financed by it. Eventually it was decided, over the objections of the environmental group, that the financing should come from Eldorado, although the company (like the AECB) would attend meetings only as an observer.

It was eight months, however, before the monitoring committee started meeting. And by that time the town was facing yet another challenge from Eldorado: In the summer of 1980 the company announced that it intended to lease a neighbouring ball park and beach area in order to build the long-planned uranium hexafluoride plant on its cramped John Street site.

The first meeting of the monitoring committee tried to deal with this new challenge, and it was a disaster. Mrs. Pereira proposed that public environmental hearings should be held on the company's proposal. The representative of the town waterworks commission exploded: "Do you want this place to become a ghost town?" he asked. He had lived in Port Hope with Eldorado all his life, he said, and he thought no one was hurt by air emissions. He accused the monitoring committee of being a political scare tactic.

Later meetings were calmer. By the fall of 1980 the monitoring committee had begun to represent a small but firm step forward in Port Hope's attempts to deal with Eldorado. It had no legislative power and it could be—and was—used to paper over serious weaknesses in the town's position vis a vis the industry. Both those bodies now boasted of it. But at last it showed that some Port Hope citizens were prepared to act officially and independently on the Eldorado issue.

By the fall of 1980, as municipal elections approached, there was a just-discernible willingness by a few politicians in the area to stand up to the company. The mayor of Newcastle and his council strongly opposed any further use by Eldorado of the Port Granby dump, which came within their jurisdiction. At least one Port Hope councillor (who subsequently retired from the race) was preparing to campaign for re-election with a platform based on opposition to current plans for the new refinery and the continuing problems of radioactive waste in Port Hope. He was joined by a few more Port Hope citizens as they raised their heads above the trenches to look at what was happening to their town.

It was not an encouraging sight. The previous year had been filled with more crises for the town—most of them related to Eldorado. Nationally, it was the most intensely political period in recent Canadian history. The short-lived Progressive Conservative government, elected in May of 1979, was defeated in the House of Commons the following December. The Liberals came back to power in February determined to entrench their hold on the country. The expansion of Eldorado into employment-starved Northern Ontario was part of the plan.

The Hope township environmental ruling that the refinery should be allowed to build its new plant in any of the three proposed sites—Hope township or the two northern Ontario communities—had been made while the Liberals were still in power. But by May, 1979 when the Progressive Conservative squeaked in with a minority victory under Prime Minister Joe Clark, there was change in the air.

Politically, the change of government had been good news for Port Hope. Allan Lawrence, the local riding MP for seven years, was a Conservative; he was made Solicitor General and Minister of Consumer and Corporate Affairs in the new government. More important, he fulfilled his election promise to keep the new uranium hexafluoride plant in his riding if his party came to power. In July the new cabinet approved Eldorado's choice of Hope township as the site of the proposed \$130-million plant. But the new government quickly ran into trouble. By Christmas it had taken a severe pounding, mainly for its tough economic proposals, and was defeated on a non-confidence motion. On March 31, 1980, barely six weeks after the Liberal victory in the February federal election, the new Minister of Energy Mines and Resources, Marc Lalonde, halted work on Eldorado's Hope township site.

Lalonde's decision was certainly a political move as had been, at least in part, the Conservatives' previous decision to build in Hope township. Both of the northern Ontario sites chosen by Eldorado—Blind River, near the Elliot Lake uranium mines, and Dill township, near Sudbury—were in constituencies represented by Liberals in the federal House. One of these members, Dr. Maurice Foster of Blind River in Algoma riding, had campaigned hard to get the plant. The new junior Minister of Mines was a northerner, elected in what amounted to a Liberal sweep of northern Ontario.

But beyond the politics, there were other serious reasons for the decision. Northern Ontario's unemployment rate was perennially high and the Liberals were publicly committed to resource development in the area. More and more, the experts who were charged with the task of finding a permanent depository for radioactive wastes were eyeing northern Ontario's granite shield, and more and more they were being rebuffed by the unaccommodating citizenry. It seemed only reasonable that the people who mined the ore and were being asked to accept its wastes should be given some of the productive industry associated with it.

The timing of the announcement, however, was particularly hard for Port Hope. Only ten days before, the town had been hit by its worst spring flood in thirty years. Ten million dollars' damage was done when freak spring rains swelled the Ganaraska River and ice floes tore out a bridge and many downtown businesses. As it picked itself up from this blow, the town ran into the new and unwelcome prospect of losing the heavy investment and 200 to 300 jobs that the Eldorado plant was then promising.

Another steering committee, another letter-writing campaign, and rotating phone calls to Ottawa were organized. Form letters were made available in Port Hope businesses, and the chamber of commerce sped them to Ottawa. Delegations were sent to argue with the Minister, Marc Lalonde, that Port Hope's unemployment rate was even higher than northern Ontario's because of the recent flood and the work stoppage at Ontario Hydro's Wesleyville generating station.

But by the end of April the full weight of the blow fell. Eldorado was ordered to build its new uranium hexafluoride plant and refinery in Dr. Foster's constituency on the north shore of Lake Huron, at Blind River, near the big uranium mines at Elliot Lake.

Port Hopers immediately started totting up the cost. Work crews had been busy on the Hope township site for weeks, a road had been built and the land levelled. It would cost the taxpayers, they said, at least twice the \$15-million loss to which Lalonde had admitted. Both Allan Lawrence—who was back as an MP for Durham-Northumberland—and a spokesman for Eldorado were quoted as putting the figure at about \$34 million. In Hope township, estimates of the loss escalated to \$60 million as disappointed officials added in the extra costs of building in the north, the contractors' penalty charges, inflation, and anything else they could think of.

"A stab in the back"... "blackmail"... "Port Hope, the disaster capital of the world" the *Evening Guide* exclaimed. Mayor Bill Wyatt said immediately that he would apply for DREE (Department of Regional Economic Expansion) funding, the Ottawa incentive payments usually reserved for economically depressed areas—certainly not for the fat industrial heartland of southern Ontario.

But the chief response of the citizens was anger at what they perceived as the treachery of the federal Liberals. Many agreed with Allan Lawrence, who declared:

The government is telling the people of my constituency and everyone else in Canada that because they don't vote Liberal they are being punished. Now the people of the Port Hope area and the taxpayers of Canada will have to foot the exorbitant bill for this gift from the pork barrel.

Wreaths lamenting the passing of Eldorado hung in store windows. Port Hopers commiserated with their fellow citizens who would have to move north to Blind River. Bill Stinson, the manager-designate of the Blind River refinery, felt compelled to write to the *Evening Guide* pointing out that his new home town was not exactly the boondocks. It had sewerage and a piped water system, he pointed out, and plenty of schools and hospital facilities. *Sure a resident of Port Hope for 25 years, like myself, would have much preferred to see the plant in Hope township. But Port Hope should welcome, not attack this later member of the "nuclear communities club."*

He was not the only Eldorado executive who did not look forward to the move to Blind River. In Ottawa the lobbying and scurrying to and fro between the corporation and its government masters reached a fever pitch. Besides the money loss, Eldorado officials argued, the switch to Blind River meant the duplication of many operations that could have been combined in Hope township with the Port Hope operation, which would have been only three miles away. As well, there would be the added danger from tankers hauling hydrofluoric acid for the uranium hexafluoride conversion an extra 250 miles from the chemical plant in Amherstburg, Ontario, to Blind River. And what about the jobs that Lalonde had promised would be made up to Port Hope?

The only solution was an industrial one, which would also win political acceptance. Looking after both its economic and political interests, Eldorado announced in early June that it would divide the new plant's operations. The uranium hexafluoride conversion plant, a largely chemical operation, would be built in Port Hope; the uranium trioxide refinery—and eventually its Port Hope counterpart—would go to Blind River.

With the dirtier refining operation slated for faraway Blind River and a spanking new uranium hexafluoride plant in Port Hope—exactly where it wasn't at first revealed—it seemed to many townspeople that Eldorado had finally hit the jackpot.

Town officials were jubilant. The new \$100-million plant would give the town an increase in its annual grant-in-lieu-of-taxes from the company. By

1985 the troublesome uranium trioxide refinery would be gone. And most important, the 570 jobs that Eldorado currently maintained would be secure, as the new uranium hexafluoride plant would absorb the lost trioxide jobs. With such an investment in their town, Port Hoppers were sure they no longer needed to worry about the entire plant moving north.

No one seemed to be asking too many questions about exactly where the new plant would be built. It was summertime, and many people were away on holiday. Perhaps the others were thoroughly tired of trying to keep up with the Eldorado melodrama. Many citizens vaguely assumed that the plant would go back to Hope township.

But the see-saw pattern of events continued. In July 1980 the company revealed its preliminary plans for the new Port Hope uranium hexafluoride plant. It would be built in the current company parking lot, a block from the lake on John Street South. The first plans required that the town lease to Eldorado a ball park, beach house, and the access to its beachfront.

At a town council meeting held to discuss the plans, councillors and members of the harbour, waterworks, and parks commissions—who had in private meetings with the company already agreed in principle to co-operate—tried to explain their actions to the townspeople. Eldorado had promised to help establish a new beach and playground further west, the mayor said. The company argued that to locate the conversion plant in Hope township, as originally planned, would now be too expensive. Gordon Colborne, the company's Port Hope manager, reminded listeners that the new plant would be subject to Atomic Energy Control Board approval.

One objector asked about a buffer zone. The plans for the plant showed it to be scarcely two blocks away, across the railway tracks, from the nearest residential area and just over half a mile from the town's main shopping area. The question of buffer zones had been emphasized at both the previous public hearings. They were necessary, industry spokesmen had indicated, to protect people and vegetation from harmful emissions—particularly the hydrogen fluoride from the uranium hexafluoride process, which in sufficient concentrations could inhibit the growth of grains and cause disease in animals and people.

But now Colborne pointed out that the board nowhere lays down a specific measurement for a buffer zone. There was no permanent dwelling in the immediate area of the new plant; the company would meet the criteria for low-level radiation at its boundaries, he said. A buffer zone, it now seemed, was unnecessary.

"A person would be able to stand stark naked [there] 365 days of the year without exceeding the permissible level," Colborne assured the meeting. The skeptics in the audience remembered an earlier manager's assurance that the waste the company was dumping at the Port Granby site was good enough to eat—although he hastily declined when a farmer brought him a sample on a plate. For them, Gordon Colborne's image was not a particularly convincing one.

But there was little outspoken opposition to Eldorado's plan. A week later, an *Evening Guide* editorial protested that the council had been too hasty in agreeing to lease the beachfront property.

"Where does the big give-away end?" it asked. "Lakefront given away today is beach gone forever." Without objecting in principle to the company expansion, it argued that Eldorado should not be given approval to build on the basis of one public meeting. More information was needed by the citizens, the writer claimed.

Not until the company's further designs on the lakefront became known did a nucleus of opposition begin to build up.

The immediate issue was a strip of land jutting out into the lake from the mouth of the Ganaraska River, which runs through the middle of Port Hope. It formed the central pier of the town's harbour in the old days, and had once been the site of the R. Crane Company ceramics plant. Eldorado had it on lease from the town until 2005, using it as a dumping ground and storage area.

But Port Hope's planning board, in an effort to reclaim and beautify the waterfront, wanted to change the zoning of the property and eventually open up the central pier for recreational use. It was an imaginative and overdue plan that fitted in with the town's efforts to increase its tourist trade. Lake Ontario's growing band of sailing enthusiasts were already objecting to the way Port Hope's excellent harbour facilities were overshadowed by the Eldorado plant on one side, with its unpleasant smells, and the piles of rusting scrap metal on the other. If the town was ever to regain control over the waterfront, this was an obvious place to start.

But the central pier's inclusion in the planning board's broad re-zoning proposals was held up in October 1980 and seemed to have been killed by Eldorado. The company said it needed the property "in the light of its present plans to expand the uranium hexafluoride operation in Port Hope," and could not agree to rezoning. Privately, a town councillor later reported, a company vice president threatened that the uranium hexafluoride plan would not go ahead unless the central pier was retained as an industrial zone.

The matter died as a public issue almost as soon as it had flared up. The prospect of losing the plant brought the town council, as always, to heel and the central pier rezoning was dropped from the amendment. Later, in November, the beach property was sold by the town to Eldorado for \$432,000. But for a few citizens Eldorado was beginning to go too far.

There had been no explanation of why, suddenly, a new uranium hexafluoride plant could be accommodated on a few acres of their beachfront with no buffer zone. Why had there been no public environmental hearings? They had not been asked if they were willing to give up their ball park or beach. Now it was rumoured that Eldorado wanted to retain the central pier even beyond the lease expiry date of 2005. The *Evening Guide* asked: *In all honesty, do ENL officials really believe their track record is one that gives the average Joe a whole lot of confidence in any future projects they may propose? We are still trying to sort out the disastrous effects of past operations... All the conflicts of ideology in the world will not erase the facts as they exist in Port Hope's history.*

The paper argued strongly that public environmental hearings must be held on the proposed new plant.

Along with the loss of their beach park and the central pier plan, along with the polluted piles of wastes that were becoming part of the permanent

landscape, Port Hoppers that summer had taken a much more personal blow from the crown corporation.

On July 24, a few days after the beach expansion plans were announced, Ron Dakers, the company's senior vice-president, arrived in town to conduct personally the largest mass firing of management employees that the town had ever witnessed. About thirty of Eldorado's senior and middle-management staff—including some, like general manager Gordon Colborne, with more than a quarter-century's service to the company—were summarily dismissed.

The news stunned the town. The first announcement, sharing the front page of the *Evening Guide* with an article on the adequacy of school erasers, gave a simple account of the company's reasons for the firings: the new production arrangements required a different, more centralized, management. But as further details emerged the speculation widened. The men had been called in individually by Mr. Dakers, told they were fired, informed of the terms of their settlements, given half an hour to pick up their belongings, and then asked to leave. According to some, as this story raced around the town, they were accompanied by security guards to their offices and then to the front gate of the plant. They were told they could come back under supervision the following Saturday to collect the rest of their belongings.

The brutal manner of these dismissals was almost unbelievable to Port Hoppers. People who had enacted Ottawa's policies, who had for years absorbed and deflected the reaction of their fellow citizens to them, people who were largely responsible for the town's remarkable record of acceptance of Eldorado's mistakes, and who were widely known and respected in the community, were suddenly being treated almost as petty criminals. Even those most opposed to the company felt a twinge of sympathy for its ex-leaders.

"Any intelligent appraisal of it showed the company was on a disaster course," one of the victims said after the bloody event. The balance-sheet explanation was convincing. Profits in 1979 had declined dramatically from over \$17 million in 1978 to under \$400,000. The June quarterly report was equally gloomy. Uranium sales were down, the company was tied to long-term contracts signed when prices were lower, and production costs continued to rise. Even finding people to mine the uranium was becoming difficult. The company had spent millions on automated equipment and had had to go to Europe for miners. It had spent \$16 million on a Boeing 737 aircraft to replace the DC-3's and DC-4's used on its runs to its growing operation at Beaver Lodge, Saskatchewan.

Were these the real reasons for mass firings of senior executives? Some thought so, but others put the blame on a potentially serious explosion that happened in July in the plant's uranium trioxide refinery.

The accident had occurred when workers were under heavy pressure to fulfil production targets, as indeed they had been throughout the year. There were no injuries (the accident happened during a shift change), but mildly radioactive uranium and chemicals spewed onto the walls and ceiling after a twelve-foot-high vessel containing uranyl nitrate burst open. As a result, the entire uranium trioxide circuit was closed down almost two weeks for repairs.

It was the final straw, according to Ken Ashton, the union local's vice-president. He was quoted as saying that a management change was due after all the trouble there had been at the plant, and the accident put the cap on it. "It just came to a head faster than anyone expected."

Perhaps he was right, although none of those fired worked in the uranium dioxide/trioxide plant. The company's precarious financial state helped sharpen the sword. But the style of management personified by Gordon Colborne and some of his colleagues was another reason for the clean-out. As Eldorado grew bigger and bigger, competing internationally in a continually expanding technology, the Port Hope refinery—the crucial link in the enterprise—threatened to become a bottleneck. The plant itself was old and had been added onto here and there in a topsy-like way to keep up with the expansion. According to some critics, its management techniques matched its physical layout.

Gordon Colborne knew each facet of the Port Hope refinery inside out, and liked to keep tabs on everything. He was, some said, a benevolent dictator. Although he had been subject to harsh action and criticism from unionists and environmentalists for policies that he did not set, he remained, most people said, "just too nice."

"Gordon was at all times a gentleman," one of his colleagues explained. "He was not tough enough. He tried to encompass the whole operation and maybe he lacked business discipline. He was too nice a guy really, out of sync with Ottawa."

"A nice guy, out of sync with Ottawa"—the phrase crystallized one view of the company that started life producing a cancer cure and that had become a critical link in Canada's large nuclear energy establishment. The nice-guy approach had served it well over the years, with a judicious admixture of secrecy as the company tried to stave off any display of public discontent. But Eldorado had outgrown this approach, and bigger conflicts lay ahead, between the ordinary needs of the Port Hope townspeople—for jobs, for clean air and water, for agricultural and recreational land—and the demands of an expanding nuclear industry.

Port Hope is on the eastern edge of Canada's biggest concentration of nuclear power. Eldorado Nuclear supplies all the fuel that produces over 2,000 megawatts of electrical power from Ontario Hydro's nuclear generating plant at Pickering, some forty miles away. The refinery's output grew 60 percent in the latter half of the 1970s and it will continue to grow, if the eight new reactors Ontario Hydro plans for Pickering and the new plant at neighbouring Darlington come into operation. In ten years' time, the utility predicts, half of Ontario's electricity will be nuclear-generated.

But the fuel for Ontario Hydro's CANDU reactors at present represents only 20 percent of Eldorado's production. The other 80 percent is uranium hexafluoride, which goes abroad for enrichment into the fuel used by foreign light-water reactors. The processing of this uranium hexafluoride, Eldorado claims, enables the cost of the CANDU fuel to be kept low, since the preliminary refining stage to uranium trioxide is the same for both fuels.

So the building of a new uranium hexafluoride plant in Port Hope will not only increase valuable export sales for the financially troubled company; it will also help provide the people of Ontario with relatively cheap electrical energy, Eldorado says.

But is this what Canadians need? And what will it do to the people of Port Hope and Port Granby?

To answer the last question first, a new uranium hexafluoride plant will ensure the continuance and growth of the radioactive waste problem in these two little lakeshore towns. There is nowhere to put the low-level wastes now. Even the criteria to regulate a disposal site, supposing one could be found,

have not been formulated.

The only place to dump wastes from the new plant and the thousands of tons still lying poorly fenced and signposted in Port Hope's ravines is in the Lakeshore Site at Port Granby. But as some members of the Ontario Select Committee on Hydro Affairs discovered in October 1980, there are already about 500,000 tons of wastes, and 1,000 curies of radiation in this leaky dump. The wastes lie in unlined trenches with about three feet of soil cover over them. In late 1980 the AECB estimated that there were only three acres of usable space left in the dump, and that this will be used up by current and future operations of Eldorado by the end of 1984. What will happen then?

Both industry and government spokesmen who are faced with this dilemma assure their questioners that it is only temporary. The wastes will be moved, they claim, the problem will be solved. But the radioactivity in these dumps is not temporary. It will last for thousands of years wherever it is put. And in the absence of plans for scouring out the ravines and dumps and moving these massive amounts of contaminated waste, the citizens of Port Hope and Port Granby have to assume that it will remain where it is for many years to come.

Since no one knows how these wastes will be finally disposed of or at what cost, these essential expenses are not being added to the processing costs of Eldorado's product. So, the Canadian taxpayers who must pay for whatever waste-disposal research is going on in the country, and whatever disposal methods there will be, are in effect subsidizing the cost of uranium hexafluoride fuel to American and other foreign buyers. And Port Hoppers are living with the consequences.

As a final twist, the people of Port Hope learned from the Ontario Select Committee on Hydro Affairs hearings that the AECB, having spent nearly \$7 million in a clean-up of their town, could not afford to fence properly or to signpost the ravines where remnants of past Eldorado operations still lie, some still highly radioactive. Old bits of crocks and other material which clean-up crews handle only with tongs were readily accessible—in one case lying, for a while, completely unfenced and unsignposted in wasteland, and in others shielded only by standard 3 1/2- to 4-foot fencing. When the Select Committee asked why 10-foot-high chain-link fencing was not installed around the waste sites, Dr. Roger Eaton—chief of the radioactivity remedial action group of the AECB—said that in his opinion the extra cost (of a few thousand dollars) was not worth the additional security that such a fence would give. It would be as easy to penetrate the more expensive fence as those that had been erected, he believed.

Children pass by these ravines daily. Brewery Pond, where in December 1980 radioactive material emitting an estimated 5 to 10 millirems an hour (which is five to ten times the AECB standard) lay loose on the ground, is a few minutes' walk from the local high school. Other contaminated ravines are within a few yards of residential streets. Yet no special warning was being issued to children, at school or by the police, about the dangers of the material they might find in these ravines.

Investigation into the special dangers of low-level radioactive wastes continues. Some experts such as Dr. David Bates who headed the British Columbia Royal Commission into Uranium Mining and Dr. Gordon Edwards of the Canadian Coalition for Nuclear Responsibility believe that AECB standards are far too lax. Recent figures show, Edwards claims, that people living at the AECB limit would be much more likely than previously estimated to contract lung cancer. Research by Dr. Victor Archer, an acknowledged expert in radon-induced cancer, seems to bear out this claim. What is there to prevent a Port Hope child from innocently picking up a piece of this radioactive material and exposing himself to this health risk?

The only possible excuse for this situation is that the continued economic health of Eldorado, or the benefits of nuclear energy, are so important that they are worth the dangerous health risks with which the people of Port Hope are living. The problems and benefits of nuclear energy have been exhaustively analyzed and fought over. Its proponents say it is clean and will give Canadians the standard of living they seek; its enemies say it is expensive and potentially dangerous. This account of what it has meant to the people of one small town gives a human aspect to the debate.

It has meant jobs, lower taxes, and notoriety. It has meant the loss of its lakeshore and recreational land, currently low real-estate values, and a divided and worried population. It has shown how impotent ordinary citizens and their elected municipal leaders can be in the face of an expanding complex and bureaucratic technology.

The company's proponents argue that most of Port Hope's troubles—the radon gas, the contaminated shoreline at Port Granby, the thousands of tons of low-level radioactive wastes that remain in the town—have nothing to do with the nuclear age. Technically they are right: the worst wastes are a legacy from the time when the company processed radium, not uranium. But the company's failure to clean up these wastes when they were known to be damaging the environment of the community, and its continued reliance on the leaky lakeshore dump at Port Granby, lower its credibility. Now its present failure to submit to standard environmental practices—by planning a buffer zone around the proposed new uranium hexafluoride plant and by taking part in public environmental hearings—shows its apparent determination to ride roughshod over the community that has supported it.

Eldorado spokesmen argue that there is no need for these measures. There have already been detailed hearings on the uranium hexafluoride plant in the area, they say, and new methods of controlling the potentially dangerous hydrogen fluoride emissions from it make a buffer zone unnecessary. The calcium fluoride wastes from the new plant will still be dumped at Port Granby, they admit, but this dump will be properly controlled; moreover, the company is working on ways to recycle these wastes in other industrial processes, notably in the processing of steel.

Port Hoppers may be forgiven their skepticism. So many times in the past they and their neighbours in the countryside have been reassured or bought off, only to find that the contaminated waste that they complained about was just as damaging as they feared, or worse. The regularity with which the old stories of polluted farmland, poisoned cattle, and broken fences come up is not because these people live in the past or enjoy dredging up bad memories. It is a sign of the uncertainty they feel about the future. "We complained then, we told you about our troubles and you assured us it was going to be all right," they are saying. "Then look what happened. Will it all happen again? How can we trust your assurances?"

Anyone who haunts the Ottawa offices of Eldorado Nuclear or the Atomic Energy Control Board soon becomes familiar with one particular poster that employees of both these establishments seem to like. It is in pseudo-Edwardian style, complete with stylized curlicues and an elegant profile with a drooping moustache. A pointing finger warns: "This room is equipped with Edison Electric Light. Do not attempt to light with a match. Simply turn the key..."

The analogy to nuclear power is glib and doubtless amusing to many of the people in the office. And Port Hoppers are no more anxious than they to go back to candles and oil lamps or milking by hand. But the issues for them are much more personal.

They have watched toxic and radioactive waste pile up in their town and countryside and have been told it is not harmful. They have had their houses dug up, a school closed, their recreation areas fenced off because of that waste—and been told there is nothing to worry about. They have seen land values stagnate. They have seen wilderness and agricultural land disappearing into company ownership. They have feared that if they protested the company might leave town. They know of community pressure against citizens who planned to speak out against the company and of business lost by others who did. Above all, some of them now wonder, what will happen in the future?

AFTERWORD

On May 28, 1981, the Atomic Energy Control Board withheld site approval of Eldorado's planned new uranium hexafluoride plant in Port Hope until the company stopped higher-than-normal uranium emissions from its present plant. Concentrations of uranium ten to fifty times higher than normal had been released over the town during the first four months of the year but they were not reported by the company to the AECB until May 1st. Eldorado first believed they had been caused by a faulty dust-collecting system. Three weeks after this had been repaired, however, emissions were still high.

AECB staff said that back-to-normal emissions, a continuous—instead of monthly—monitoring of the plant stacks, and tighter reporting mechanisms between the company and the board were among the conditions that would need to be met before the AECB considered another site application.