

# Rich to Riches and the Toxic Debris

## Protesters in own land

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employee accommodations constructed, all under the name of "exploration".

For these reasons the inquiry was boycotted by community and environmental groups throughout Saskatchewan.

When the Key Lake Inquiry opened in La Ronge, a group of more than 50 people marched down Main Street demanding recognition of native rights and an end to uranium mining. The group of protesters was part of a "Caravan for Survival" that travelled from Regina to Saskatoon and Prince Albert, to publicize their concern over human rights violations by the government and uranium companies. To "record" the event, in Prince Albert, "camera men" equipped with long telephoto lenses were stationed on the roofs of buildings as was a video crew on the street.

La Ronge, situated about half way up the province is the gateway point for northern uranium developments. Due to the uranium boom, the population of the town has doubled to about 3,500.

Not everyone is happy in La Ronge, however.

Early this spring a molotov cocktail was thrown through the front office window of Uranerz Canada Ltd., a West German owned uranium exploration and mining company. The cocktail did not ignite but Uranerz reacted by spending over \$10,000 on installing bullet proof glass.

Uranerz owns 50 per cent of the Rabbit Lake mine and one-third of the Key Lake mine.

oxidization of pyrite contained in mill wastes, combined with the addition of large quantities of sulfuric acid in the milling process. A particular problem with acidic wastes is that high acidity increases the solubility of radium, uranium, thorium, and other heavy metals.

Groundwater contamination is also a problem, though until recently it has not been recognized by regulatory authorities. Water quality is often judged by surface water monitoring alone. This ignores the ground water seepage problem. Contamination of groundwater has been taking place for almost 30 years, as common practice since the beginning of mining in the early 1950's according to the Atomic Energy Control Board has been to simply dump wastes directly on the surface and into lakes and streams.

Uranium mine and mill wastes degrade water quality to such a degree that aquatic communities are completely eradicated in the immediate vicinity of a mine.

As distance increases from the source of contamination, the effect on plants is no longer so obvious, however, radioactivity and heavy metals can travel through a complexity of biological pathways and build up to high concentrations.

Radioactivity in the environment eventually finds its way up the food chain to animals, and this, one must remember, includes people.

This area of study is almost completely unexplored in the Canadian context.

Nevertheless, an example of a biological

pathway to people that has been confirmed through scientific study is one involving the lichen-to-reindeer-to human chain.

Finnish scientists from the University of Helsinki, found that people consuming reindeer that ate contaminated lichen ended up with 8 times the normal level of radioactivity in their blood. Lichens accumulate greater amounts of trace elements than other plants because their slow growth increases their exposure time to environmental contaminants.

Research in Russia by A. Il'enko found the effect on small mammals living in areas with high uranium and radium concentrations is greater incidence of sterility. It was also found that gamma radiation reduced bird populations, by reducing the number of hatching eggs. Generally though, research is limited to bioaccumulation of radioactivity in the aquatic environment, and does not examine the impact of that bioaccumulation.

A study on the accumulation of radioisotopes in plants and fish was recently conducted by Eldorado Nuclear at their Dubyna mine, situated 12 km. NE of Uranium City. Results of this work clearly showed that levels of radioactivity in plants and fish were thousands of times greater than levels in the surrounding water, and that the degree of uptake is element and species specific.

For example, of the three aquatic plants studied, milfoil concentrated uranium the greatest (at 14,000 times) while waterlily concentrated greater amounts of radium (at 11,000 times), and sedge the greatest amount of lead-210 (at 13,000 times).

Radioactivity accumulated by both Northern Pike and Lake Trout is concentrated more in the bone (up to 11,000 times) than in the flesh (up to 6,500 times) and therefore several parts of such fish must be examined to determine such accumulations.

The degree of concentration though, is species specific. Lake Trout were found to have greater levels of uranium, thorium, and lead-210 for example, but Northern Pike had the greatest level of radium.

The effects of radioactivity on some species of fish are known, though a great deal of research has not been done. In a sample of fish taken by Eldorado Nuclear Ltd. downstream from the Beaverfoot mines, examination showed 25% of the Lake Chub caught to have eye deformities. Some of the fish had one or both pupils deformed.

Eldorado Nuclear's studies did not examine the effects of radioactivity at higher points in the food chain.

Perhaps this type of research is warranted since a number of cow moose have been found carrying a two-headed fetus near Northern Saskatchewan uranium mines. Some may say this is merely coincidence, but it is not coincidence that the main food of moose, aquatic plants, are highly contaminated with radioactivity — as confirmed by the Dubyna Lake samples noted above.

### NO SOLUTION IN SIGHT TO WASTE PROBLEM

If present expansion plans take place, the annual production of solid wastes will more than double by 1990. In their current search for a longterm solution to contamination by wastes, government and industry are considering "encapsulation" on the surface or underground, both of which have serious drawbacks.

Surface isolation schemes hold the risk of being exposed to erosion and weathering. Underground isolation has the advantage of avoiding catastrophic pollution on the surface though there is no guarantee that such pollution will not occur underground.

Even barring the possibility of a catastrophe, due to the difficulty in

eliminating seepage, the underground site itself still has to be isolated from human use forever.

The waste isolation problem can be regarded as "solved", only when longterm contamination of an area is accepted.

Seepage-proof, waste isolation proposals are based on the theory that seepage in and out of a waste area can be eliminated by covering the top and bottom with an extremely low permeability material, thus preventing contamination of surface and groundwater.

Even though waste "encapsulation" designs do exist, in the Canadian context there is a significant barrier to their implementation. In both the Ontario and Saskatchewan uranium mining areas, large volumes of low permeability material simply do not exist.

What is more, seepage-proof designs remain in the realm of unproven theory. It is well accepted among hydro-geologists that seepage cannot be eliminated over the short term let alone the long term. Needless to say, there is a high degree of uncertainty with regard to the future of uranium mine wastes.

In short, it can be stated that the current form of uranium — dependent, northern development in Saskatchewan is based on the "distant cow principle" — "the southerners get the milk and the northerners get the shit."

In the case of uranium mining, the shit will be around for a long time, and there's more to come.

## Uranium exported to Soviet Union

The uranium industry, or the "front-end" of the nuclear fuel chain, is of key importance in the debate over the pros and cons of nuclear power. The reason for this is that uranium is the raw material used to fuel the nuclear industry.

Almost all uranium mined is used for either production of nuclear weapons or fuel for nuclear reactors, and negligible amounts are used for medical and industrial purposes. The exact proportions of these different uses is unknown because military consumption is not made public.

However, it is known that Canadian uranium from the Port Radium, NWT mine, was used, in part, to fuel the Hiroshima and the Nagasaki bombs, and that Canadian uranium is being used by the French to fuel their regular nuclear weapons tests in the South Pacific.

Over 90 per cent of Canadian uranium is exported. This means that less than 10 per cent is used for the production of Canadian-consumed electricity.

Most of the uranium is mined by American, British, French and West German companies. Canadian uranium is sold to the following countries: Belgium, Finland, Switzerland, Italy, Japan, South Korea, Spain, Sweden, the United Kingdom, the United States and West Germany.

Further, according to J.W. Beare, Director of the Safeguards and Nuclear Materials Branch of the AECB, uranium has been sent to the Soviet Union for enrichment (a further step in the processing for consumption by nuclear reactors). For example, in 1979 about 1000 tonnes of uranium owned by the Canadian crown corporation Eldorado Nuclear Ltd. and the West German government-owned corporation Uranerz Canada Ltd. was exported to the Soviet Union.

