

# The Health of Uranium Miners: Two Studies help paint a picture

One of the 1993 recommendations of the Joint Federal-Provincial Panel on Uranium Mining in Northern Saskatchewan was to conduct a study to find out if the health of current miners is affected by their work in uranium mines.

A previous study directed by Dr. G.R. Howe in 1986 found that miners working from the 1930s to 1980 at Eldorado's Beaverlodge mine near Uranium City, as well as at the Port Radium mine in the NWT from 1932 to 1960, were more likely to contract lung cancer as a result of their work.

The results of two new health studies, initiated by the governments of Saskatchewan and Canada along with Cameco and AREVA management and worker representatives, were recently released.

The first was an update of the earlier Eldorado study; the second looked at the feasibility of conducting a new health study of today's uranium miners.

## Today's exposures lower

Radon exposures in modern miners are between 100 and 1000 times lower than those at, say, Port Radium. Radon exposures in the Beaverlodge mine in the 1970s and 1980s better reflect modern mines, although radon exposures were still higher than today.

## Confounding factors

The studies looked at lung cancers, the cancer type most commonly caused by breathing in radon gas. However, other causes of lung cancer must also be considered. Lung cancer varies with age, sex, smoking habits and radon levels in homes.

Health studies of smokers in the general population show smoking is responsible for 80% of lung cancer cases and 30% of all other cancer deaths. Radon comes from the earth, and the air in most homes contains some level of radon gas. Most modern uranium miners receive a radiation exposure from radon in their homes similar to that from their workplace.

## The Eldorado study

The first new study, led by the Canadian Nuclear Safety Commission (CNSC) and again involving Dr. Howe, updated the historic data on Eldorado miners.

Besides verifying records, the update used national death records to look for miners' causes of death since 1980, providing 20 more years of information since the first study. The update also used national cancer records to look at 30 years of new cancer information on these miners.

The study looked at records of 17,660 employees who started working for Eldorado between 1930 and 1981.

Employees' job histories and radiation exposures were collected up until 1999.

There were 5,332 (30%) deaths between 1950 and 1999, and 2,355 (19%) cases of cancer between 1969 and 1999.

There were 618 lung cancer deaths in the study update among men compared to only 122 in the original study.

This is important since we can learn more about radon by studying these new lung cancers. This update makes us more certain of the health risks from radon gas than ever before!

It should be noted that 75% of the workers were still alive at the end of 1999 and many men (40%) were still 65 years of age or younger. This is important since these men could still be working at a modern mine today.

Lung cancer was the only disease which consistently showed higher rates among miners than among the general population. This is mostly due to breathing in radioactive radon gas while underground.

In the early days of mining, there was no ventilation or protective equipment, and no dosimeters, so miners had very high radon exposures.

Other causes of death that were relatively high for the miners included alcohol-related deaths and external causes such as homicides, suicides and accidents. Lifestyle habits and the remote northern environment may explain these deaths.

For other causes of death, including heart disease, the miners of the day were as healthy as the general population.

The analysis found a very strong increase in the miners' risk of lung cancer with increasing radon exposure. This is important to note. Today's miners' workplace risk of lung cancer is very low because radon exposures are now very low.

However, miners should always try to lower their radon exposures.

There was no evidence that radon exposure increased the risk of getting any other diseases or other cancers. The analysis also found gamma ray exposure, another type of radiation, had no effect on the risk of dying from lung cancer or any other disease.

Although no data was available on smoking rates, an earlier study of Beaverlodge miners found that miners' smoking habits were not related to their radon exposures. This meant the radon and lung cancer relationship could be studied alone, without also studying smoking. Errors in measuring exposure estimates could not be taken into account, but much work was done to verify records so exposures are as accurate as possible.

## Study of modern miners

The second study, completed in 2003 by SENES Consulting of Toronto, focused on miners working in modern uranium mines from 1975 onwards. The purpose was to determine whether it is scientifically possible to determine the number of excess lung cancers from the relatively low radon exposures in modern mines.

The study considered current levels of employment and radon exposures, assumed they would continue at the same levels, and calculated the expected number of excess cancers until 2030.

The study also took into account current radon levels in Saskatchewan homes, and current smoking habits of uranium miners.

SENES calculated that about 24,000 workers will have spent time working at uranium mines by 2030. During this period, 141 miners could be expected to contract a lung cancer, primarily from smoking. Only one additional miner could be expected to get lung cancer from exposure to radon in the workplace.

The conclusion: that it would be practically impossible to correct accurately for the effects of smoking and radon in the home, and that the ability of any study to detect an excess risk of lung cancer from working in today's uranium mines would be so low the results would be meaningless.

Therefore, a full study was deemed not feasible.