

## Native infant death rate too high

by Debbie Jones

Social and economic strife contributes to a native infant death rate three to five times higher in the Northwest Territories than anywhere else in Canada, says Dr. Don W. Spady of the pediatrics department at the University of Alberta.

Co-author of a study into northern infant morbidity and mortality rates, Spady says the study was first undertaken in 1973 to investigate the causes and remedies of the unreasonably high death rate among northern children. "There was a concern that health care was not adequate," he says.

He has now concluded that "the health facilities of people living in the Territories are very good," but that the distance between communities and hospitals, malnutrition, parental neglect, inadequate housing and alcohol are some of the factors to blame for the higher rates.

"The important thing was that the infantile rate was higher with the natives than the white children" he says. "When cultures change, people suffer — especially the children. Ordinarily the parents teach the children the way of life. But when the parents haven't adapted yet, they have no way to teach their children. That is why I think these people are sicker."

The soon-to-be-published study was carried out jointly by

the University of Alberta and the federal Department of Health and Welfare.

A total of 1191 infants were studied from the time of pregnancy to the first year of life. Thirteen of the babies were still-born, 16 died within the first week and there were 33 more deaths before the children reached the age of one year. Three main cultural groups were studied, including 449 Inuit, 269 Indians and 361 whites.

The death rate of the white infants was approximately that of other Canadians in general. The white children's parents were more steadily employed, had much higher incomes and better food and housing. Meanwhile, "the general health of the native infant is less satisfactory than that of the white," says Spade.

If funding comes through as hoped, Spade will continue the study when the children are of school age. He says he will focus on the native children, and is optimistic about a comprehensive, complete analysis because Most of the native children will remain in their communities, in contrast to the whites who are more transient.

"I think it's an important study," he says. "We really have a fantastic opportunity here. It's probably the most complete study of infant health among Canadian native infants."



B. Keith/UPI

These exhibits are part of the Zoogeography show on display at the Provincial Museum until March 18.

## Explore this system

The Queen Elizabeth Planetarium has opened a new show "Explorations: A New View of the Solar System." The program traces the history of planetary knowledge, and looks at each planet through the eyes of Earth's robot explorers. Some of

the latest scenes of Jupiter and Saturn are included in the presentation.

Show time is 8:00 p.m. Tuesday to Friday evenings and at 3:00 p.m. and 8:00 p.m. on Saturday and Sunday.



## relative perspectives

by W. Reid Glenn

In the last article, one saw that the CANDU reactor is a slow breeder which is much less strained than the fast breeders advanced by other countries. The CANDU system has also been shown to be easier to maintain, cool and control than other breeder reactors. To understand nuclear core boiling it is necessary to know a bit about physics.

Heat, produced by radioactive decay, is removed from the core by conduction from the fuel bundles, across the fuel cladding materials, into the heat transport fluid. This heat is used subsequently outside the core to run a conventional open steam power cycle. The quantity of heat produced in a volume of the reactor's core is solely limited by the rate at which heat can be removed from the core's surface area. The boiling heat transfer mechanism will now be examined in detail to explain the safety problems involved.

The phenomenon of boiling can be best understood by considering a heated plate completely immersed in a cooler liquid. Since the fluid in contact with the plate is cooler, heat will flow by conduction from the high temperature plate to the surrounding liquid. Now buoyancy forces begin to act. As the liquid surrounding the plate

is heated, it expands and becomes marginally less dense than the surrounding cooler fluid. The heated fluid rises from the plate to be replaced by cooler liquid and convection cells are set up which move heat away from the plate.

Since the temperature gradient is low between the fluid and the heating surface, the rate of heat transfer is also low. As this difference between the plate temperature and the average fluid is increased, boiling begins. Boiling is initiated at isolated nucleation sites which usually are small pores or other imperfections on the otherwise smooth surface. The heat conducted from the plate's surface increases the fluid temperature in addition to changing the phase of some of the liquid to a gas.

The heat of vapourization is many times greater than the heat capacity of the fluid to the rate of heat transferred from a surface supporting boiling is vastly greater than one operating only by convection heating. As the bubbles of the vapour rise from the surface, cool liquid rushes in to replace the void and the great relative density differences between the vapour and liquid also serves to promote a high rate of heat transfer. Boiling heat transfer is a well known and universally applied technique but does have several drawbacks.

As the temperature difference between the liquid and the plate increases, more of the surface is covered by vapour bubbles and these can prevent cool liquid from reaching the surface. At the same point, depending on environmental conditions, the plate will be completely covered by a vapour film and a further increase in temperature difference will only cause a loss of heat transfer rate. This is referred to as the departure from nucleate boiling (DNB) point.

In order for more heat transfer to be effected across this vapour film, the heating surface's temperature must be increased by several hundred to several thousand of degrees. At such high temperatures, radiative heat transfer comes into play. However, because the surface temperature is so much higher, most metals begin to melt. For this reason, the DNB point is usually synonymous with the burnout point.

In nuclear reactors, if DNB is exceeded, the results are catastrophic as we have seen in the Three Mile Island incident. The next series of articles will deal with the Three Mile Island incident.



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The Students' Union requires staff for the General Election on Friday, February 8th. Help us out and earn \$4.00/hour at the same time. For further information, please contact the SU Returning Office (Room 271, SUB) or the Receptionist, SU Executive Offices (Room 259, SUB).