

MANY PROBLEMS ASSOCIATED WITH NUCLEAR REACTORS ON THE NORTH SASKATCHEWAN RIVER

By Dr. Bill Adamson, a retired member of the faculty of the University of Saskatchewan and a member of the Inter-Church Uranium Committee Educational Cooperative.

Duncan Hawthorne of Bruce Power is proposing to build two nuclear reactors in Saskatchewan. They would employ 1000 people full time for 60 years and bring \$240 million annually to the provincial government. However, we do well to remember the saying, "The Devil is in the details"!

Details of Construction Costs

In a splurge of spending in the 1970's, Ontario Power Generation built 20 nuclear reactors and ran up a debt of \$38 billion dollars. It used a new form of accounting called "stranded debt," in the amount of \$20 billion dollars. Each month, every household in Ontario is now charged an extra fee on their electrical bill for "debt retirement," and the debt is still far from being paid for. (1) Nuclear power costs twice as much as wind power, 14 cents a kilowatt hour versus 7 cents a kilowatt hour. The reactors will cost \$8 billion to \$10 billion each. (2) That is a lot of money.

Details of Reactor Model

We have a choice of two models to pick from, perhaps a third from Westinghouse. One is from AECL called ARC-1000, or the Advanced Candu Reactor. It is still on the drawing boards. One has never yet been built or tested operationally. However, Saskatchewan citizens would not mind being guinea pigs to give it a try. A second choice is the model from AREVA, a third generation EPR, or Evolutionary Power Reactor. Three are currently under construction—one in Taishan, China; one in Flamanville in Normandy, France; and one in Oikiluto, Finland. The latter was estimated to cost 3 billion Euros (\$3,838,200,000 US dollars), and is already over its initial budget by 1.3 billion Euros (\$1,660,000,000 US dollars), and is three years behind schedule. But we like to have a choice! (3)

Details of Financing

Hawthorne suggests a new reactor might be built and solely owned by Bruce Power. Or, it might enter into partnership with SaskPower. Or, it might enter into a partnership with SaskPower and the Government of Saskatchewan. (4) After all, Saskatchewan has recently been awarded an AA+ credit rating by Standard and Poors of New York, and Saskatchewan could float a sizeable loan. (5) Just think! A \$10 billion dollar debt floated by 1 million people, would only result in a mere per capita debt of \$10,000 for every man, woman, and child during the 5 or 10 years needed for constructing the reactors, and before they become operational. We need to remember that nuclear reactors have never been economical and self-supporting, but always propped up and sustained by government subsidies. Beginning with the Manhattan Project, in the secrecy of

wartime, and continuing till the present day, the Canadian government has subsidized the nuclear industry to the tune of approximately \$18 billion dollars. (6)

Details of Water Supply

If a nuclear reactor were to be situated on the North Saskatchewan River there would be a problem of water usage. The average annual volume in the North Saskatchewan is approximately 6,623,000,000 cubic metres per year. (7)

The City of Edmonton has an average annual withdrawal of or 144,758,000 cubic metres. The City of North Battleford has an average annual withdrawal of 2,930,000 cubic metres of water.

The Pembina Institute reports that 9 Upgraders proposed for the Tar Sands during the next 10 years, will require ten times the water withdrawal of the City of Edmonton, or some 60,623,000,000 cubic metres per year. (8)

Nuclear reactors need a lot of water for cooling purposes. A dam or a holding pond would need to be constructed. The water would be reused and recycled, with some loss for pumping, evaporation, and steam loss. However, for the first 24-hour start-up, the two 1000 MW reactors will need 5,529,600 cubic metres of water. That is quite lot of water! (9)

Last year, in the extreme heat of summer, nuclear reactors in France had to be shut down because the increase of temperature in the water of the streams and rivers was proving deadly for fish and marine creatures. Meanwhile, the melting and receding glaciers in the eastern Rocky Mountains will mean a reduction in the water flow of the river.

However, the City of Prince Albert is also downstream and draws an average annual amount of 6,279,778 cubic metres for its citizens, who will be hoping that the river will not be reduced to a trickle by the time it reaches their city. (10)

Details of Decommissioning

Decommissioning of old and worn out reactors is a complex process, involving robotic means to dissect the radioactive machinery and bury it deep in the earth. Nuclear companies set aside modest funds for decommissioning, but generally not nearly enough to cover escalating costs. Such items are rarely included in the per kilowatt costs of electricity. The decommissioning cost for the Windscale reactor in Britain, which experienced a meltdown, has cost some \$170 million US dollars thus far, and several remaining reactors are estimated in the future to cost Britain \$132 billion US dollars. (11)

Details of Export

We could perhaps make a profit by exporting electricity to the Alberta tar sands, and by selling it to the USA grid. However, it will be our miners with a 30% extra chance of cancer in 20 years time; the millions of tonnes of radioactive tailings to poison our water systems with arsenic, radium, and thorium; and the swimming pools full of burnt uranium fuel pellets with their 200 deadly chemicals lasting thousands of years! We will receive money for the electricity but will inherit a Pandora's Box of deadly poisons as well. "The Devil is in the details." The citizens of Saskatchewan need to consider these details very, very carefully.

Dr. Bill Adamson

304-1735 McKercher Dr., Saskatoon. SK., S7H 5N6

(306) 374-1417

REFERENCES—Many Problems Associated With Nuclear Reactors

- (1) CBC's **THE FIFTH ESTATE** "The Gospel of Green." Nov. 12/08
- (2) **Saskatoon Star Phoenix** Dec. 2/08, p.C3, Paul Hanley, "Nuclear power costly, no friend of environment."
- Earth Policy Organization** Lester Brown, "The Flawed Economics of Nuclear Power," Oct. 30, 2008. www.earthpolicy.org/Updates/2008/Update78_data.htm
- (3) **The Guardian** "New-generation Finnish nuclear reactor hit by fourth delay," Oct. 18/08. www.guardian.co.uk/environment/2008/oct/18/nuclearpower/print
- (4) **Saskatoon Star Phoenix**, Nov. 28, 2008, p. A8, "Nuclear: Bruce Power to begin consultations.
- (5) **Saskatoon Star Phoenix**, Nov. 28, 2008, p. C4, "Sask. credit rating gets boost."
- (6) **Sierra Club Canada**, "Canadian Nuclear Subsidies: Fifty Years of Futile Funding," by Dave H. Martin, Campaign for Nuclear Phaseout, Executive Summary, p. iii. www.sierraclub.ca/national
- (7) E-mail message from Curtis Hallborg, "**North Saskatchewan Water Supply and Use Data**," Saskatchewan Watershed Authority, Moose Jaw, SK, Dec. 17, 2008. www.curtis.hallborg@swa.com
- (8) "**The Heavy Footprint of Upgraders**," www.oilsandswatch.org http://pubs.pembina.org/reports/Upgrader_Alley-F5
- (9) R. W. Nordquist, "**CONSIDERATIONS FOR SITING A NUCLEAR POWERED GENERATING STATION IN SASKATCHEWAN**," Saskatchewan Power Corporation, April 4, 1975, p.3. Also, e-mail message from Olwen Glover, Senior Communications Advisor, Pickering Nuclear Public Affairs. olwen.gover@opg.com
- (10) E-mail message from Curtis Hallborg, Saskatchewan Watershed Authority, January 05, 2009. www.curtis.hallborg@swa
- (11) **The Guardian**, Jan. 30, 2008. A Report by the National Audit Office www.guardian.co.uk