Desalination's Huge Potential

The greatest potential for solving the whole world's water problems, is through creation of much more fresh water by desalinating seawater. The failure of Soviet water management in Central Asia, was not so much due to its grand scale, but rather to the failure to bring sufficient water into the most arid region on Earth, both to save the Aral Sea and to turn the steppes and deserts green.

Bringing river water from Siberia would be one great help; another, is desalinating brackish water in Central Asia, including its abundant groundwater reserves.

Hal B.H. Cooper, a civil engineer and consultant on many infrastructure projects in North America, says, "I believe that there are many saline aquifers which exist throughout the world which could be utiliized if it were possible to implement the LaRouche water and energy desalination policy, with nuclear power plants and desalination together. . . . We should be making extensive use of the desalination of brackish and impure waters, so they can be used for municipal, industrial, and agricultural purposes."

Professor Micklin reported in 1988 that in Central Asia, "ground water could make a larger contribution to regional water supplies. Subsurface storage is huge, but little used. However, much of the reserve lies at great depth or is heavily mineralized. Up to 17 cu km per year of ground water could be consumed in the Aral Sea basin without adversely affecting river flow." Kyrgyzstan alone has aquifers which carry 13 cu km of water a year.

Only small-scale desalination projects exist, such as one set up by the United Nations Children's Fund (UNICEF) to produce drinking water on the Amu Darya River in Dashoguz province, Turkmenistan.

Both China and India, with huge populations and urgent water management problems, are working on combined nuclear power and desalination projects. Some 11 seawater desalination plants using nuclear energy are already in operation internationally. The nations of Southwest Asia produce about 60% of current desalinated seawater, but they use abundant petroleum supplies as the heat source for the process. This would be far too expensive for petroleum-importing nations. In Central Asia, Kazakstan has petroleum resources, which could be put to use for desalination projects on the Aral Sea and in the lower reaches of the Syr Darya.

But this, while useful in the short term, will not meet the needs of the future. Regions of such broad expanses as Central Asia, and nations of such high population as China and India, must develop nuclear energy as the only clean, safe, and "non-geopolitical" energy resource. Petroleum must be transported, often over long distances, and is currently hostage to geopolitical economic and political operations. Nuclear plants are local, under a nation's sovereign control, and uniquely produce enough energy for *large-scale* desalination.

In December 2003, India's President Abdul Kalam, a noted scientist, told an Indian Nuclear Society conference

at the Indira Gandhi Centre for Atomic Research at Kalpakkam, that desalination of seawater is the best solution to the world water crisis. Using the "multistage flash" desalination process requires enormous quantities of energy, and only nuclear power can supply that. "It is essential to set up desalination plants next to nuclear plants to reuse the waste energy effectively," Kalam said.

China's Programs

China also is developing nuclear desalination. The China Society of Nuclear Science, and the Beijing Institute of Nuclear Engineers directed by Prof. Li Zhaoheng, are developing projects which could produce an annual output of 300 million-1 billion tons of water. Only nuclear power is cheap and efficient enough for this scale of desalination. China has also developed new, more efficient distillation techniques. "Three decades worth of effort has ranked China among the world's few countries capable of seawater desalination," Prof. Hui Shaotang, director of the Tianjin Institute of Seawater Desalination and Comprehensive Utilization told a 2002 conference. "Water diversion can only alter the geological layout of water resources. It's not able to enhance the total amount available." Desalinated water from large-scale, nuclear-powered projects would cost about 25%—eventually even more—below what diverted water—at 20 yuan a ton—will cost.

China is now "first" in the world, with a nuclear technology which could be of enormous benefit in Central Asia for desalination. This is the modular high temperature gas-cooled nuclear reactor (MHTGR, or HTR for short). A prototype of the reactor has already been built at China's leading science and technology institution, the Institute of Nuclear Energy Technology (INET) of Qinghua University, northwest of Beijing. This reactor is more efficient than conventional nuclear technology; is relatively simple and inherently safe; and can be built in small units, which are perfect for flexible application—for heating, industrial use, electricity generation. Because they could be produced on standardized "assembly-lines," HTR production costs can be kept low. Germany first developed the technology, but China is the only nation to have built one.—*Mary Burdman*

Seven nations already have operating desalination units powered by nuclear energy, needed for any large-scale production of fresh water, especially from brackish inland and groundwater. This nuclear desalination plant is at Kalpakkam in India.