

Cutting back on uranium enrichment

The Department of Energy (DOE) is getting out the mothballs for two uranium enrichment plants. One plant, which dates back to World War II, will go "on standby," while another, only partly completed and representing the latest generation of enrichment technology, will be abandoned. Last week, DOE also decided to concentrate its future research and development effort on a laser technique for enriching uranium.

"Our strategy is aimed at achieving a competitive price structure and developing the world's most advanced uranium enrichment technology," says Secretary of Energy John S. Herrington.

These decisions were prompted by a sharp decline in the worldwide market for enriched uranium. Not only are fewer nuclear power plants being built, but stronger competition from European suppliers using newer, more energy-efficient technologies is also cutting into the U.S. share of the international market (SN: 1/28/84, p. 59). A decade ago, the United States was the sole supplier in the noncommunist world.

Currently, three U.S. plants, all more than 30 years old, produce enriched uranium using a "gaseous diffusion" process. In this process, uranium hexafluoride gas passes through a series of filters. Molecules containing the lighter isotope uranium-235 diffuse slightly more quickly than those containing U-238. However, these gaseous diffusion plants are inefficient and are now running at well below capacity. By shutting down its plant in Oak Ridge, Tenn., DOE expects to save about \$50 million a year.

After spending about \$2.6 billion, DOE is also stopping work on its giant "gas centrifuge enrichment plant" near Portsmouth, Ohio (SN: 8/7/82, p. 86). In this technology, tall, cylindrical centrifuges spin uranium hexafluoride gas, separating the different uranium isotope-containing molecules like cream from milk.

With 1,170 centrifuges already installed in the first of two processing buildings, the gas centrifuge plant is partly finished. Earlier this year, Goodyear Atomic Corp., which runs the plant for DOE, began testing the centrifuges and produced the first enriched samples. However, completing the plant could cost an additional \$5 billion. According to DOE studies, such a plant would not be economical without a more advanced type of centrifuge.

But now DOE has decided to devote its entire uranium enrichment research effort to "atomic vapor laser isotope separation" (AVLIS), with no funding for work on the advanced gas centrifuge. In the laser enrichment process, an intense, finely tuned laser beam focused on a stream of atomic uranium vapor forces the ejection of elec-

trons from U-235 atoms but not from U-238 atoms. The ionized atoms are then collected (SN: 5/15/82, p. 327).

AVLIS survived a very intensive peer review, says James I. Davis, who heads the project at the Lawrence Livermore (Calif.) National Laboratory. "It was the nearest thing to a technical court that we have," he says.

"AVLIS is the way of the future, the uranium enrichment technology of the 21st century," says Herrington. "It has the technical and economic potential for better performance than the [advanced gas centrifuge]."

Nevertheless, Rep. Marilyn Lloyd (D-Tenn.) says DOE should continue to fund the advanced gas centrifuge program as a backup, although at a considerably reduced level. Later this month, Lloyd's congressional subcommittee will consider this and other questions related to DOE's uranium enrichment program.

Davis says that a large-scale, prototype laser enrichment system may be in operation by 1988. "There's no question that the process will perform," he says. "It's a question of how well it'll perform."

"We're pretty optimistic right now that we'll be able to proceed," adds Davis, "if there's enough funding." So far, a little less than \$400 million has been spent on the AVLIS program. —I. Peterson

Eye surgery unpredictable

The long-term effects of radial keratotomy, a surgical treatment for nearsightedness, may be less stable than previously thought, according to a study in the June ARCHIVES OF OPHTHALMOLOGY. The results are "disconcerting," says the journal's editor, Perry S. Binder.

Previous studies have found that the operation gives most people 20/40 vision or better — good enough to drive without glasses (SN: 11/17/84, p. 312). And several reports have indicated that eyesight stabilizes permanently within a year of the operation.

However, the new study, by Michael R. Deitz of Bethany Medical Center in Kansas City, Kan., and Donald R. Sanders of the University of Illinois in Chicago, shows that most of the eyes operated on in 55 patients continued to change three to four years after the operation, becoming more farsighted or more nearsighted. However, only about one-third of the changes were significant, and, because many patients did not yet have normal vision after one year, 42 percent of the changes actually improved vision.

Binder cautions that because better surgical techniques have come into use since Deitz and Sanders began their study, the results may not apply to current surgical methods. But, he writes, the short-term success of a new kind of surgery clearly does not guarantee its long-term safety and efficacy. □

Cyclamate: A reappraisal

Cyclamate, an artificial sweetener that has been banned in the United States since 1970 due to suspicions that it causes cancer, may speed up cancer development in the presence of other, carcinogenic substances—but it does not by itself start the process, a National Research Council committee announced this week.

Acting at the request of the U.S. Food and Drug Administration, the committee spent more than a year reviewing all existing studies on cyclamates and cancer. The committee concludes that, in animals and cell cultures at least, cyclamate can act with carcinogenic substances to increase the number of tumors formed or to speed up tumor development. But "there is little likelihood," the committee says, that cyclamate damages the DNA in cell genes, thereby causing cancer. It's not clear, the committee adds, how study results can be interpreted to predict cyclamate's possible health effects on humans.

Cyclamates were banned after researchers in the late 1960s concluded that cyclamate/saccharin mixtures — used mostly to sweeten diet soft drinks — caused cancer in rats; some scientists have argued ever since that saccharin, and not cyclamate, was the carcinogen. But committee head Richard J. Havel of the University of California, San Francisco, School of Medicine told SCIENCE NEWS that the committee's findings should not be used to draw conclusions about the health effects of saccharin, which in 1978 was deemed a weak carcinogen by the National Research Council, an arm of the National Academy of Sciences.

Epidemiologic studies of human consumption of the cyclamate/saccharin mixture concentrated on bladder cancer, the committee says, and did not show a "clear increase in risk in most categories of users." However, the committee calls for more epidemiologic research on the link between cyclamates and this and other types of cancer. Also, animal data indicating that high doses of cyclamate may cause testicle shrinkage should be considered in any overall assessment of cyclamate for widespread use, the committee says. □

TMI-1 restart halted

Early this week, a federal appeals court temporarily barred the operators of the undamaged nuclear reactor, Unit 1, at Three Mile Island from restarting their power plant. On June 27, the court will hear arguments from the four groups seeking a review of the Nuclear Regulatory Commission's earlier decision to allow the restart (SN: 6/8/85, p. 359). GPU Nuclear Corp., which operates TMI-1, says it will continue limited testing for restarting the reactor after the case is settled. □