abroad have been dramatically reduced since DOE gave the go-ahead for the Portsmouth facility, and the anticipated demand for enriched uranium is therefore unlikely to materialize.

The report was requested by Ottinger, and in order to ensure that it would be produced in time to influence the appropriation process, he asked GAO to skip the usual step of having the study's contents reviewed by DOE before publication. DOE officials got their chance to comment at a House appropriations subcommittee hearing on 26 May, however, and they didn't pull any punches. "DOE finds the GAO report misleading, lacking in balance, and in many areas, shallow in its findings and supporting evidence," Shelby Brewer, assistant secretary for nuclear energy, told the committee. If the plant were scrapped, "the United States would price itself out of the enrichment business," Brewer warned.

About $1.2 billion has already been spent on the Portsmouth facility, and the Administration has requested another $669 million in the fiscal year 1983 budget. By the time it is completed in 1994, the plant will have cost $7 billion (in 1983 dollars), according to DOE estimates. Brewer pointed out, however, that revenues from DOE's existing enrichment operations will be sufficient to pay for construction of the new facility.

Congress originally approved construction of a new enrichment plant in 1975, when it was projected that demand for enriched uranium would exceed capacity by the early 1980's. Since then, however, orders for new nuclear plants have dried up, many previously ordered plants have been scrapped, and others have been delayed. In addition, enrichment facilities have been brought into operation in Europe, and the United States is no longer a monopoly supplier of enriched uranium to non-Communist countries.

These developments have resulted in much lower demand for U.S. enriched uranium than anticipated a decade ago. Moreover, the GAO study notes that DOE has recently spent $1.5 billion to expand and upgrade its existing gaseous diffusion plants. It therefore concludes that there will be enough capacity to meet anticipated demand for at least another two decades.

Brewer argues, however, that capacity is not the only criterion. The gaseous diffusion plants are massive consumers of electricity, and thus the price of the enriched uranium they produce is heavily dependent on the price of electricity, which has been climbing rapidly. The gas centrifuge technology consumes far less electricity, and it therefore offers a chance to insulate enriched uranium prices from rising electricity costs. This is particularly important in view of the growing competition from foreign enrichers, he notes. The GAO report says, however, that cost savings over a long period will only materialize if demand for enriched uranium is unexpectedly high. Brewer counters that the demand will not materialize unless the plant is built because customers will go elsewhere.

An additional factor in all of this is the emergence of a new technology that at present looks as though it will enrich uranium even more cheaply than the gas centrifuge. This is the laser separation process. Last month, DOE announced that it has chosen a process developed at the Lawrence Livermore Laboratory for further development, and it is planning to build a pilot facility using this technology at the Oak Ridge National Laboratory (*Science*, 21 May, p. 830). GAO suggests that there should be enough time to develop this technology if demand for enrichment services picks up. DOE says that the technology is not yet proved and cannot be relied upon to bypass the centrifuge plant.

Although these arguments got a good airing before the House appropriations subcommittee last month, the major factor that will figure in the congressional debate over the Portsmouth plant is its high price tag. In a year when Congress is desperately searching for budget cuts, it is a tempting target—especially if there is a chance that the plant is not needed.—***Colin Norman***

The gas centrifuge enrichment plant

The Latest on MX

Last October, President Reagan said that he had narrowed the choices for basing of the MX, a new nuclear missile, to just three: on slow airplanes, in defended silos, or in mountains far below the earth's surface. Pentagon officials say the airplane idea has been rejected, even though a study of it by the Defense Science Board is still underway.

The decision, reached at the White House, represents a victory for the Air Force leadership, which opposed the airplane. Current Pentagon thinking is to put the MX both inside mountains and in densely clustered silos nearby. Each has substantial drawbacks. A panel of the National Academy of Sciences recently concluded that technical aspects of the mountain-basing plan remain highly uncertain. Densely packed silos might only succeed in deferring, not preventing, a successful Soviet attack (see *Science*, 23 April, p. 388, and 30 April, p. 494). University of California physicist Charles Townes, who chaired a panel on MX basing last summer, has been asked to chair a new panel on densely packed silos, under the auspices of the Defense Science Board.

—***R. Jeffrey Smith***