At prodding from Congress, the DOE began to address the issue of how to best provide technology for future competition. In mid-1984, the process was begun with the appointment of a process evaluation panel which was given the task of recommending to the Secretary of Energy which of the two advanced technologies (advanced centrifuges or AVLIS) was to be the replacement for the diffusion operations. There followed a string of debates between teams from each side before the panel, which culminated in the selection of AVLIS as the favored program for the future. The announcement by the Secretary of Energy was that concentration thereafter was to be on the development of AVLIS as the sole advanced enrichment technology and included shutting down as soon as possible the gaseous diffusion plant at Oak Ridge, Tennessee, and the immediate discontinuation of the gas centrifuge plant program at Portsmouth, Ohio, and development work on centrifuge processes.

The advantages of AVLIS over gaseous diffusion and gas centrifuge were seen as:

- Requirement of only a single step to enrich uranium compared with the sequential steps required in gaseous diffusion and gas centrifuge
- Ability to extract nearly all of the U^{235} from the feedstock
- Ability to reprocess the depleted UF_6 resulting from the diffusion operations
- Lower cost plant to construct and operate

DOE supported the development work of AVLIS at LLNL until 1994 when the USEC became an entirely private company. At that time, DOE turned the program over to USEC for continuation. In the first half of 1999, USEC gave up on AVLIS and started to search for a replacement.

Upon the closure of AVLIS, the only remaining laser process on the world stage was (separation of isotopes by laser excitation [SILEX]), a molecular separation process developed by the Australian company Silex Systems Limited. The French had ceased work on their laser program, SILVA, in 2003.

In 1996, USEC secured the rights to evaluate and develop SILEX but relinquished those rights in 2003, having earlier decided to reopen the advanced centrifuge program.

In early 2006, General Electric (GE) announced the signing of an exclusive agreement with Silex Systems Limited to license the technology and develop the next-generation low-enriched uranium manufacturing process in the United States. The transaction will require regulatory controls and government approvals. GE has had meetings with the US Nuclear Regulatory Control (NRC) and the license application was submitted in 2009 and approved by the USNRC in September of 2012. The first phase would be a test loop in GE's existing fuel manufacturing facility in Wilmington, North Carolina.

The Silex fuel technology exclusively licensed to GE in 2006 was later licensed to Global Laser Enrichment (GLE) which is made up of GE, Hitachi, and Cameco. GLE now has an NRC license to construct and operate a laser enrichment plant in Wilmington, North Carolina. Also, GLE and DOE are currently negotiating a commercial contract to establish a uranium tails processing facility based on the Silex process at the closed down gaseous diffusion enrichment plant at Paducah, Kentucky.

11.3.5.2 Laser Separation Processes

The gaseous diffusion and gas centrifuge techniques exploit the small mass differences between U^{235} and U^{238} in the gaseous form of UF_6. AVLIS is based on an entirely different concept. U^{238} and U^{235} isotopes have different electron energies, so that they absorb