

## **SUMMARY**

In order to obtain a license to build and operate a uranium enrichment plant, an applicant must submit an application for approval to the U.S. Nuclear Regulatory Commission (NRC). The contents of the application are specified in the Code of Federal Regulations (CFR) and reflect the requirements set down by Congress in the Atomic Energy Act.

The two main regulations that apply to a uranium enrichment plant are Title 10 of the Code of Federal Regulations, Part 70 (i.e., 10 CFR 70), "Domestic licensing of special nuclear material," and 10 CFR 40, "Domestic licensing of source material." The reason for this is that the material that comes into the plant to be enriched, natural uranium, is classified by the regulations as "source material," and the enriched uranium that leaves the plant is classified by the regulations as "special nuclear material." The two regulations, 10 CFR 70 and 10 CFR 40 also require that an applicant for a uranium enrichment plant submit information concerning the plant's impact on the environment in accordance with the regulations in 10 CFR 51, "Environmental protection regulations for domestic licensing and related regulatory functions." Because an application for a uranium enrichment plant involves national security classified information by its nature, the regulations in 10 CFR 95, "Facility security clearance and safeguarding of national security information and restricted data," are also applicable.

This application was prepared by Louisiana Energy Services (LES) for the proposed National Enrichment Facility (NEF) to be located in southeastern New Mexico, in Lea County, about one-half mile from the Texas border. This application is comprised of a number of documents that address the requirements in the regulations cited above:

- Safety Analysis Report (SAR)
- Environmental Report (ER)
- Fundamental Nuclear Material Control Plan (FNMCP)
- Emergency Plan
- Physical Security Plan
- Safeguards Contingency Plan
- Guard Force Training and Qualification Plan
- Standard Practice Procedures Plan for the Protection of Classified Matter

The following is a summary of the key information and conclusions provided in these documents.

### **Safety Analysis Report (SAR)**

The SAR covers the description of the site, facility, and enrichment process.

- The NEF is based on a highly reliable gas centrifuge process.

- The plant is designed to separate a feed stream containing the naturally occurring proportions of uranium isotopes into a product stream enriched in the uranium-235 (U-235) isotope, and a byproduct stream depleted in the U-235 isotope.
- The process, entirely physical in nature, takes advantage of the tendency of materials of differing density to segregate in the force field produced by a centrifuge.
- The chemical form of the working material in the plant, uranium hexafluoride (UF<sub>6</sub>) does not require chemical transformation at any stage of the process.
- The process proposed in the application will enrich natural UF<sub>6</sub> containing approximately 0.7% U-235 to a UF<sub>6</sub> product containing up to 5% U-235.
- The unit of measurement used in the enrichment process is the "separative work unit" (SWU).
- The NEF in full production will have a capacity of 3 million SWU.

A summary of a detailed analysis of the safety, called the Integrated Safety Analysis (ISA), of the NEF is part of the SAR.

- The ISA approach employs a semi-quantitative risk index method for categorizing accident sequences (due to plant and external hazards) in terms of their likelihood of occurrence and their consequences of concern.
- The risk index method framework identified which accident sequences have consequences that could exceed the limits specified in the regulations and, therefore, require the designation of Items Relied On For Safety (IROFS) and their supporting management measures.
- The identified IROFS have then been included in the design and planned operation of the plant to prevent or mitigate the consequences of the accident sequences to below the limits set by the regulations.
- The results of the ISA presented in the SAR show that the consequences of all accident sequences analyzed are below regulatory limits based on the plant design, the IROFS, and the management measures described in the SAR.

The SAR provides a discussion of the programs that will be implemented at the facility to ensure the safety of the workers and the public.

- The programs covered are radiation protection, nuclear criticality safety, chemical process safety, and fire safety.
- Other administrative topics are also covered in the SAR, including the make-up of the LES limited partnership, comprised of the general partners Urenco, the European uranium enrichment company supplying then centrifuge technology, and Westinghouse.
- Limited partners include the utilities Duke, Entergy, and Exelon. The financial qualifications that the partnership will satisfy in order to obtain NRC approval to construct the \$1.2 billion facility are described
- The corporate, construction, and operating organizations are described and the qualification requirements for key management positions are given.

- The management measures governing the configuration management, maintenance, training, procedures, records, and audit programs are discussed.
- Along with the management measures, the quality assurance program is described. As part of this description, LES details its commitment to conforming, without exception, to the applicable provisions of the standard that the NRC has accepted, the American Society of Mechanical Engineers standard NQA-1-1994 as revised by the 1995 Addenda.

Lastly, the SAR includes a discussion of how the decommissioning of the facility will be funded.

- Specifically, LES will guarantee decommissioning funding, including the disposition of any depleted uranium byproduct on site at the time of decommissioning, by the surety bond method.
- The decommissioning cost estimate is approximately \$825 million (2002 dollars). This estimate is based on the actual experience of decommissioning a similar facility to unrestricted status in Europe, and a combination of U.S. cost estimates and actual European costs for disposing of the depleted byproduct material

### **Environmental Report (ER)**

The ER provides information that is specifically required by the NRC to assist it in meeting its obligations under the National Environmental Policy Act, and second, it demonstrates that the environmental protection measures proposed by LES are adequate to protect the environment and the health and safety of the public.

- The ER meets these requirements by discussing the evaluation of the environmental impacts of the proposed NEF.
- The first part of this evaluation is the explanation of the need for the facility.
- The U.S. Department of Energy and the Department of State have made public statements concerning the importance from a national energy security perspective of establishing additional reliable and economical uranium enrichment capacity in the U.S.
- Operation of the proposed NEF would further the attainment of energy and national security policy objectives.
- The enriched uranium produced by the NEF would constitute a significant addition to current U.S. enrichment capacity, approximately one-fourth of the current U.S. enrichment services demanded by the nuclear power plants that produce 20% of the nation's electricity.
- From a different perspective, the ER shows that the enrichment capacity of the NEF will be needed in the future based on an assessment of a range of realistic scenarios.
- The ER also provides a summary of the evaluation of various potential plant sites and the results showing that the Lea County site scored among the highest of the sites evaluated.

A description of the affected environment and an assessment of the impact on the environment are provided in the ER.

- These cover topics such as transportation and show that the expected truck traffic to and from the operating facility, two to three trucks a day on average, does not have any impact on the existing traffic patterns and road conditions.
- The impact on water resources is shown to be minimal in that expected plant water consumption, about 21 million gallons per year (71 acre-feet/year) is well within the capacity of the sources of water from the Hobbs and Eunice municipal water supply systems.
- Water discharges from the plant will be to on-site evaporative basins; and the basin receiving water potentially contaminated with uranium will be double lined with leak detection.
- The ER provides the annual expected uranic discharges in air and water, less than 10 g and 570 g or less, respectively.
- The ER reports that as a result of surveys, there will be no impact on rare, threatened or endangered species and any impact on archaeological sites will be avoided or mitigated.
- The construction and operation of the NEF will have a beneficial affect on the socioeconomic aspects of the surrounding area, including a total payroll during construction of \$122M and 210 permanent jobs with a payroll of \$10.5M and a direct impact on the community due to local purchases of \$9.5M.
- The results of an analysis of environmental justice aspects on the population around the plant shows that neither minority or low-income groups are disproportionately impacted by locating the NEF in Lea County.

An evaluation of various options for dispositioning the depleted uranium byproduct is presented in the ER, including detailed cost estimates.

- The preferred option, or "plausible strategy" discussed in the ER is the method that LES committed to in its August 6, 2003 letter to the governor of New Mexico, conversion and disposal of the byproduct by a private, commercial company.
- The ER reflects the fact that recent discussions have been held between LES and a firm currently involved in the disposition of byproduct in Europe, Cogema, regarding a conversion facility in the U.S.

- With regard to temporary storage of uranium byproduct cylinders (UBCs), the ER provided a discussion of the methods that will be employed to ensure that the cylinders are surveilled and maintained.

### **Fundamental Nuclear Material Control Plan (FNMCP)**

The FNMCP describes the goals, methods, and requirements of the Material Control and Accounting (MC & A) Program for control, transfer, and accounting of source and special nuclear material during the operation of the NEF.

- The FNMCP will also describe the methods that LES will use to meet the objectives of the MC & A Program implemented at the NEF.

### **Emergency Plan**

The Emergency Plan describes actions that will be taken to protect the public should a highly unlikely accident occur. The Emergency Plan includes the coordination between LES and state and local emergency response agencies, including police and hospitals.

### **Closing**

The Security Plan, Safeguards Contingency Plan, Guard Force Training and Qualification Plan, and the Standard Practice Procedures Plan for the Protection of Classified Matter detail the programs, personnel, and actions that will be put in place to protect the site, the material, and the sensitive equipment and information from threat or diversion.

The development of the complete application involved over 300 people expending about 50 person-years of effort. This group included experts from the U.S. as well as those with many years experience designing, building, and operating similar facilities in Europe. The application contains almost 3000 pages and more than 300 figures in 11 binders.