POLICY ISSUE
(Notation Vote)

November 20, 1997 SECY-97-270

FOR: The Commissioners

FROM: L. Joseph Callan
Executive Director for Operations

SUBJECT: ANNUAL REPORT TO CONGRESS ON THE GASEOUS DIFFUSION PLANTS LOCATED NEAR PADUCAH, KENTUCKY, AND PORTSMOUTH, OHIO

PURPOSE:

This paper seeks Commission approval of the "Annual Report to Congress for the Gaseous Diffusion Plants Located Near Paducah, Kentucky, and Portsmouth, Ohio" (hereafter, "Annual Report" or "report").

BACKGROUND:

The Energy Policy Act of 1992 amended the Atomic Energy Act of 1954 (AEA) by adding a new Title II (Sections 1201-1805), establishing the United States Enrichment Corporation (USEC). The purpose of this corporation was to operate the uranium enrichment facilities located near Portsmouth, Ohio, and Paducah, Kentucky, that are owned and were previously operated by the Department of Energy (DOE). The AEA requires that the Nuclear Regulatory Commission establish safety, safeguards, and security regulations for the uranium enrichment facilities and certify that they are in compliance with those standards. The Office of Nuclear Material Safety and Safeguards Director's initial certification decision was published in the Federal Register on September 19, 1996, and the initial certificates were issued to USEC on November 26, 1996. The certificates became effective on March 3, 1997, and, on this date, NRC assumed regulatory oversight of the facilities from DOE. Section 1701 of the AEA also requires that NRC, in consultation with DOE and the Environmental Protection Agency (EPA), report at least annually to Congress on the status of health, safety, and environmental conditions at the facilities. The "Annual Report" must include a

CONTACT: Andrew Persinko, NMSS/FCSS
(301) 415-6522

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determination of whether the facilities comply with applicable regulations established for the facilities, and all applicable laws. Congress was advised, on November 29, 1996, that the first "Annual Report" would be issued in approximately one year. The Commission was advised of the proposed format and content of the "Annual Report," in SECY-97-187, dated August 13, 1997. In Staff Requirements Memorandum (SRM) 97-187, dated September 18, 1997, the Commission approved, with comment, the format and content contained in that SECY paper.

DISCUSSION:

The staff developed the enclosed "Annual Report" in accordance with the policy and procedure approved by the Commission in SRM 97-187. The report covers the period from March 3, 1997, when NRC assumed regulatory oversight, through September 30, 1997, the end of the fiscal year. This report addresses those areas of the plants that are NRC-regulated; it addresses compliance with NRC regulations and provides a summary of performance at the gaseous diffusion plants.

The AEA requires NRC to consult with DOE and EPA. This consultation was accomplished by providing both DOE and EPA with a preliminary draft of the Annual Report and requesting their comments. Both DOE and EPA provided comments that have been incorporated into the report as appropriate. Both DOE and EPA provided information regarding the non-leased areas of the facilities, which has also been included in the report. DOE also provided a separate draft report dated October 1997 to NRC entitled, "Department of Energy Input to the Nuclear Regulatory Commission's Annual Report to Congress Regarding the Status of Health, Safety, and Environmental Conditions at the Paducah and Portsmouth Gaseous Diffusion Plants for Fiscal Year 1997."

On November 6, 1997, the staff convened an NRC Senior Management Review Board to review the report and plant performance. The conclusion was that, overall, the gaseous diffusion plants' performance was adequate and gradually improving. Currently, there are two enforcement actions pending for activities occurring during the period of this "Annual Report" (March 3, 1997, to September 30, 1997), that are not completely reflected in the "Annual Report." A predecisional enforcement conference is scheduled for December 1, 1997, on the submittal of incomplete Safety Analysis Report modifications, contrary to commitments in the Compliance Plans. A predecisional enforcement conference has been held for a security violation at the Paducah, Kentucky gaseous diffusion plant; however, the final enforcement action has not yet been taken. If either of these enforcement actions is finalized, the transmittal letters to Congress may need to be revised to reflect the resolution, particularly if a civil penalty is issued.

COORDINATION:

The Office of the General Counsel has reviewed this paper and has no legal objection.

RECOMMENDATION:

The staff believes that the attached Annual Report meets the requirement of the AEA and appropriately reflects the status of the gaseous diffusion plants. The staff recommends that the Commission approve the "Annual Report" and provide it to Congress.

L. Joseph Callan
Executive Director
for Operations

Attachments:
1. Annual Report to Congress
   for the Gaseous Diffusion Plants
   Located Near Paducah, Kentucky, and
   Portsmouth, Ohio

2. Congressional Transmittal Letters

Commissioners' comments or consent should be provided directly to the Office of the Secretary by c.o.b. Monday, December 8, 1997.

Commission staff office comments, if any, should be submitted to the Commissioners NLT December 1, 1997, with an information copy to SECY. If the paper is of such a nature that it requires additional review and comment, the Commissioners and the Secretariat should be apprised of when comments may be expected.

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ANNUAL REPORT TO CONGRESS
ON THE
GASEOUS DIFFUSION PLANTS
LOCATED NEAR
PADUCAH, KY AND PORTSMOUTH, OH

NOVEMBER 1997

EXECUTIVE SUMMARY

This annual report is being provided to Congress as required by Section 1701 of the Atomic Energy Act (AEA). This is the first such report to be issued. It covers the period from March 3, 1997, the date when NRC assumed regulatory oversight responsibilities for the gaseous diffusion plants (GDPs), to September 30, 1997. Information reported in this report are as of September 30, 1997, unless otherwise specified. As directed by the AEA, the Department of Energy (DOE) and the Environmental Protection Agency (EPA) have been consulted regarding this report. DOE provided regulatory oversight of both plants before March 3, 1997, and continues to be responsible for regulatory oversight of portions of both plants.

In accordance with the process described in the AEA and NRC regulations, NRC issued Certificates of Compliance to the United States Enrichment Corporation (USEC), for the operation of the GDPs located near Paducah, Kentucky, and Portsmouth, Ohio, on November 26, 1996. After an interim period to allow an orderly transition from DOE oversight to NRC oversight, the certificates of compliance became effective and NRC began regulatory oversight of USEC operations at the plants on March 3, 1997. Through implementation of formal memorandums of understanding (MOUs) and other cooperative NRC/DOE efforts, transition from DOE regulatory oversight of the leased portions of the GDPs to NRC oversight was effected in a safe, efficient, and effective manner.

Since the Nuclear Regulatory Commission (NRC) assumed regulatory oversight in March 1997, the Paducah and Portsmouth GDPs have provided adequate protection of health, safety, and environmental (HS&E) conditions, and have generally operated in compliance with NRC regulatory requirements. Offsite radiological doses, as well as doses to the workers, are very low, and well within regulatory limits. There have been no events, at either site, requiring activation of the emergency response centers, or involving a significant release of radioactive material.

Conditions at the GDPs at Paducah and Portsmouth are generally in compliance with NRC regulations. Exceptions are described in Compliance Plans, provided for by the AEA and approved by NRC, which document binding commitments for actions and schedules to achieve full compliance. Progress has been made in completing issues in the Compliance Plans since the initial certification, thereby bringing the plants closer to full compliance with NRC regulations than they were at the time of initial certification in November 1996. For those instances where, during the normal course of operation, violations of NRC regulations occurred, USEC took prompt actions to reestablish compliance, and developed plans to prevent recurrence.

CONTENTS

Executive Summary i

Chapter 1 Background 1

Chapter 2 Gaseous Diffusion Plant Operations 6

Chapter 3 Status of Compliance Plan Activities 8

Chapter 4 Health, Safety, and Environmental Status 14

Chapter 5 Certification Activities 17

Chapter 6 Inspections 21

Chapter 7 Event Reports 24

Chapter 8 Regulatory Activities 26

Chapter 9 NRC Consu'tation with EPA and DOE 28

Chapter 10 Summary Assessment of Performance 32

Chapter 11 Compliance with Applicable Laws 33

Appendices

A. Abbreviations and Acronyms A-1

B. Compliance Plan Issues B-1

C. Amendments to Certificates of Compliance C-1

D. NRC Inspection Report Summary D-1

CHAPTER 1

BACKGROUND

ENERGY POLICY ACT

In October 1992, Congress enacted the Energy Policy Act (EPAct) of 1992, which amended the Atomic Energy Act of 1954 (AEA), to create the United States Enrichment Corporation (USEC)[1]. Provisions of the AEA direct the U.S. Department of Energy (DOE) to lease the gaseous diffusion plants (GDPs) in Piketon, Ohio, and Paducah, Kentucky, to USEC. These GDPs produce enriched uranium (EU), and the AEA specifies that USEC operate the GDPs efficiently and market EU on a profitable basis. Although the AEA established USEC as a government corporation, the AEA also required that within 2 years after the transition date of July 1, 1993, USEC prepare a plan for transferring ownership of USEC to private investors. In the *Lease Agreement Between The United States Department of Energy and The United States Enrichment Corporation* (Lease) dated July 1, 1993, and in other subsequent agreements, DOE and USEC established the roles and responsibilities for each organization at both GDPs. The AEA also requires NRC, in consultation with DOE and the Environmental Protection Agency (EPA), to report at least annually to Congress on the status of health, safety, and environmental (HS&E) conditions at the gaseous diffusion uranium enrichment facilities. This report is the first annual report. It encompasses the period from March 3, 1997, the date when NRC assumed regulatory responsibility, through September 30, 1997, the end of the fiscal year.

The AEA assigns safety, safeguards, and security regulatory responsibility at the USEC-operated GDPs to NRC. Further, the AEA requires that within 2 years of the date of the passage of the EPAct, NRC establish, by regulation, both: (1) safety, safeguards and security standards for the GDPs; and (2) a certification process to ensure that USEC complies with these standards. This certification process is in lieu of any requirement for a license. Thus, the AEA made NRC regulation of the GDPs conditional on the issuance of new regulations, which were to be promulgated by October 1994. In accordance with these requirements, NRC promulgated Title 10 of the *U.S. Code of Federal Regulations*, Part 76 (10 CFR Part 76), "Certification of Gaseous Diffusion Plants," in September 1994.

The EPAct changes to the AEA made provision for the possibility that USEC might not initially be able to comply with the safety, safeguards, and security standards established by NRC. To address this contingency, the AEA permitted NRC to approve continued USEC operation of the GDPs if NRC approved DOE-prepared plans for bringing the GDPs into compliance with any unsatisfied provisions of NRC regulations. On November 26, 1996, NRC issued Certificates of Compliance certifying USEC's operation of the GDPs in

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[1] A listing of abbreviations and acronyms can be found in Appendix A.

accordance with 10 CFR Part 76 and approved a Compliance Plan for each GDP for achieving compliance with NRC regulations for those areas not in full compliance. After an interim period allowing for USEC to transition to NRC regulation in an orderly manner, NRC began regulatory oversight of USEC operations on March 3, 1997.

NRC/DOE INTERFACE AND RESPONSIBILITIES

The AEA does not require that DOE lease all of the entire GDP sites to USEC. Those facilities necessary for the production of highly enriched uranium (HEU, i.e., uranium that is enriched to 20 percent or more in uranium-235 (U^{235})) were excluded from the Lease. Consequently, DOE retains responsibility for the environmental protection, safety, safeguards and security for those portions of the GDPs that are not leased to USEC and for those portions of the GDPs which are leased to USEC that contain HEU material. DOE regulates the HEU material activities that occur in the leased areas until: all of the HEU material has been down-blended into the Portsmouth GDP low enriched uranium cascade; HEU refeed activities are completed; all cylinders that contain HEU material are cleaned; and the associated areas are transitioned to NRC regulation. These activities are currently projected to be completed in 1998. At that time, all that will remain under DOE regulatory oversight will be areas within the GDP sites not leased to USEC or its successor organization. The AEA further assigns responsibility to DOE for the payment of any costs of decontamination and decommissioning, response actions, or corrective actions that are related to conditions existing before USEC leased the GDPs. With this assignment, DOE retains responsibility for environmental restoration activities and legacy[2] waste management at the GDP sites and for the operation of facilities used for the storage of DOE-owned source and special nuclear material, such as the cylinder storage yards for depleted uranium hexafluoride (DUF_6) generated before July 1993.

Since the AEA required DOE to lease the GDPs to USEC on July 1, 1993, more than a year before the deadline for establishing safety, safeguards, and security regulations by NRC, and more than 3 years before NRC assumed regulatory responsibility, an interim period was created between the lease of the GDPs to USEC, and the establishment of both the NRC safety, safeguards, and security regulations for the GDPs and completion of the certification process for USEC operation of the GDPs. During this interim period, DOE remained responsible for oversight of nuclear safety, safeguards, and security at the GDPs. DOE oversight was exercised through a Regulatory Oversight Agreement between DOE and USEC, designed to facilitate the transition of the GDPs to NRC regulation. During this time, there was a need for close interactions, between NRC and DOE, to effect the transition to NRC regulatory oversight of nuclear safety, safeguards, and security at the GDPs in a safe, efficient, and effective manner. Consequently, NRC and DOE developed several documents,

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[2] The term "legacy" refers to items that are a carryover from the era when DOE managed the facility (e.g., legacy waste and legacy equipment).

discussed below, to establish a mutual understanding of areas of responsibility during the transition. After NRC approved USEC's certification applications on November 26, 1996, DOE agreed to retain regulatory oversight responsibility for the GDPs until March 3, 1997, so that there would be time for an orderly transition from DOE to NRC regulatory oversight.

After enactment of the EPAct changes to the AEA, NRC and DOE cooperated closely to ensure a safe, efficient, and effective transition of regulatory oversight from DOE to NRC. In December 1993, NRC and DOE approved a "Joint Statement of Understanding Between the Nuclear Regulatory Commission and the Department of Energy on Implementing the Energy Policy Act Provisions on the Regulation of Gaseous Diffusion Uranium Enrichment Plants" (59 FR 4729, published on February 1, 1994).

The joint statement provides that NRC:

- Assume and maintain regulatory oversight of both public health and safety and common defense and security for the leased GDP areas, on completion of the first certification process, based on the NRC regulations, and

- Assume and maintain responsibility, in its common defense and security regulatory oversight role, for granting security facility approvals and for establishing an information security program to ensure that restricted data are appropriately classified and protected with respect both to the GDP facilities leased by USEC and to USEC itself.

The joint statement also provides that DOE:

- Continue to exercise regulatory oversight of both public health and safety and common defense and security of the leased facilities at the GDPs until NRC promulgates its regulations, the regulations become effective, and the first certification process based on the NRC regulations is completed;

- Supply to NRC the "Safety Basis and Framework for DOE Oversight of the Gaseous Diffusion Plants";

- Permit NRC to station observers at the GDPs during DOE regulatory oversight of the GDPs;

- Retain responsibility for access authorization programs with respect to the GDP facilities leased by USEC, as well as for USEC itself, while the leased facilities are in operation and as long as necessary thereafter; and

- Retain title to, and possession of, all HEU at Portsmouth, and retain sole responsibility for establishing and maintaining appropriate safety and safeguards and security

controls on such material.

In August 1994, NRC and DOE approved an "Agreement Establishing Guidance for NRC Inspection Activities at the Paducah and Portsmouth Gaseous Diffusion Plants Between Department of Energy Regulatory Oversight Manager and Nuclear Regulatory Commission." This agreement supplemented the joint statement by defining in more detail the role of the NRC observers at the GDPs in the interim period during which DOE exercised public health and safety and common defense and security regulatory oversight of the leased GDPs. In March 1995, NRC and DOE established the "Agreement Defining Security Responsibilities at the Paducah and Portsmouth Gaseous Diffusion Plants Between the Department of Energy's Office of Safeguards and Security and the Nuclear Regulatory Commission." This agreement also supplements the joint statement by defining in greater detail the security roles and responsibilities of DOE and NRC after NRC assumption of regulatory oversight of USEC activities. NRC and DOE approved a memorandum of understanding (MOU), in October 1997, that supplements the 1995 agreement and replaces the 1994 agreement. The MOU delineates the responsibilities of NRC and DOE at the GDPs in areas such as exchange of information and technical staff support, emergency response, modification of the Compliance Plans, referral of identified concerns to the respective agency responsible for the particular concern, and other activities requiring coordination between NRC and DOE.

In addition to these formal agreements, NRC and DOE have cooperated informally. DOE has attended NRC meetings with USEC; NRC has attended the DOE/USEC issues meetings; and NRC and DOE have had frequent discussions about GDP issues.

On July 1, 1993, DOE instituted a program to provide regulatory oversight of the leased areas of the GDPs until such time as NRC assumed regulatory oversight responsibility for these areas. One of the objectives of the DOE Regulatory Oversight (RO) Program during the interim period was to facilitate the transition of leased areas of the GDPs from DOE to NRC regulatory oversight. In support of this objective, DOE provided training to NRC personnel on GDP operations and safety issues. DOE supported the placement of NRC observers at the GDPs during the period when DOE had regulatory oversight for public health and safety and common defense and security for the leased portions of the GDPs. DOE also provided NRC with copies of inspection reports from its RO Program inspections and invited NRC to observe DOE regulatory oversight inspections. DOE invited NRC staff to attend its monthly regulatory affairs meetings with USEC and assisted NRC in its rulemaking and certification process by providing NRC with copies of the safety analyses, operational safety requirements, procedures, and other safety documentation employed during the period that DOE operated Paducah and Portsmouth. DOE also provided NRC with comments on the draft rulemaking package for 10 CFR Part 76, which reflected DOE experience in operating and overseeing the GDPs. The DOE Regulatory Oversight Program for the leased portions of Paducah and for those leased portions of Portsmouth that do not process HEU, terminated when NRC assumed regulatory oversight for the GDPs on March 3, 1997.

To ensure that no USEC commitments to safe and secure operation were lost in the transition of regulatory oversight from DOE to the NRC when NRC assumed regulatory oversight responsibility for the leased portions of the GDPs, NRC received from DOE: (1) a listing of all open regulatory oversight inspection findings; (2) copies of all regulatory oversight inspection reports; (3) summaries of the findings and concerns that were identified, during inspections, for which draft inspection reports were not available; (4) a listing of all open USEC commitments to DOE relating to the Regulatory Oversight Program; and (5) a listing of all open items in the Compliance Plans.

Through these aforementioned formal MOUs and other cooperative NRC/DOE efforts, a seamless transition from DOE oversight of the leased portions of the GDPs to NRC oversight has been effected.

CHAPTER 2

GASEOUS DIFFUSION PLANT OPERATIONS

The principal process regulated by NRC at the GDPs is the production of EU for reactor fuel. The GDPs receive uranium hexafluoride (UF_6); enrich it (i.e., process the material to increase the concentration of fissionable U^{235}), and then ship the enriched UF_6 to other fuel cycle facilities, where it is processed into fuel assemblies for use in nuclear power reactors. In the gaseous diffusion separation process, UF_6 gas passes through a material (barrier) with small pores that are large enough to permit the escape of single molecules, but are too small to permit bulk flow of the gas. The gas that emerges from the pores has a slightly higher concentration of U^{235} atoms than the gas that does not pass through the barrier. This process creates two streams of gas, one with a higher U^{235} concentration (enriched) and one with a lower concentration (depleted). Because the degree of enrichment achieved by the use of a single barrier (i.e., a single diffusion stage) is very small, the process must be repeated many times, employing a cascade of many stages to achieve the required enrichment levels. The outputs of the cascade are EU product and depleted uranium. The depleted uranium is stored at the GDPs, awaiting ultimate disposition.

The main components of a GDP are: large cylindrical vessels called diffusers that contain the barrier; compressors used to compress the gas to the pressures needed to flow through the barrier tubes and from one stage to another; electric motors to drive the compressors; heat exchangers and cooling circuit for removing the heat of compression from the UF_6; piping for the stage and interstage connections; and block and control valves, to adjust the gas flow. In addition to this process stage equipment, GDPs require auxiliary systems such as the UF_6 feed and withdrawal systems, an extensive electrical power distribution system, and cooling towers to dissipate the waste process heat.

The major areas of NRC oversight at the GDPs include: chemical process safety; nuclear criticality safety; plant operations; fire protection; physical protection; security; material control and accounting (MC&A); radiological controls for onsite and offsite personnel; waste management; transportation of radiological materials; maintenance and surveillance; training and emergency preparedness. The NRC is responsible for regulatory oversight of the design, operation, and maintenance of hardware (i.e., structures, systems, and components) relied on for safe operation; operational aspects involving the human element such as training, staffing, and adherence to procedures; and management organization and controls necessary to assure effective management oversight of facility operations. Management organization and controls include: internal reviews and audits; safety review committees; configuration management; records management; event investigation and reporting; and quality assurance programs. The NRC also reviews and approves accident analyses and technical safety requirements (TSRs) developed by USEC. The accident analyses describe potential credible accidents and the facility response to those accidents, to

demonstrate that the facility is capable of responding in a fashion that will not jeopardize public health and safety. The TSRs define the safety envelope and operating parameters within which the facility is required to operate for safe operation. NRC assures safe operational readiness through issuance of a certificate of compliance, after a thorough review of design and operational information, and by field inspections conducted by specialists from both NRC Headquarters and the regional office having responsibility for the sites. In addition, two NRC resident inspectors are located at each GDP site. The resident inspectors perform daily inspections covering a broad range of site activities.

CHAPTER 3

STATUS OF COMPLIANCE PLAN ACTIVITIES

The AEA permits NRC to authorize operation of the GDPs in cases where the plants do not fully comply with NRC regulations, provided that DOE prepares, and NRC approves, a plan (i.e., Compliance Plan) for bringing the plants into compliance. 10 CFR 76.35 states that the application for an initial certification of compliance must include, among other things, a DOE-prepared and -approved plan, for achieving compliance with respect to any areas of noncompliance with NRC's regulations. 10 CFR 76.35 further states the plan must include a description of the areas of noncompliance, a plan of actions and schedules for achieving compliance, and a justification for continued operation with adequate safety, safeguards, and security.

Separate Compliance Plans were prepared for Paducah and Portsmouth, and approved by NRC, on November 26, 1996, as part of the certification activities. The initial USEC certification applications, including the associated Compliance Plans, were submitted in April 1995. NRC rejected these initial certification applications because of incompleteness. NRC did not review the initial Compliance Plans that were submitted as part of the application. The Compliance Plans were subsequently revised to complement the revised certification applications and were resubmitted in November 1995. NRC accepted the revised certification applications and Compliance Plans for review. However, during the course of NRC review, the Compliance Plans were further revised to accommodate USEC application changes and commitments, and NRC comments. The final pre-certification revisions to the Compliance Plans (Revision 3) were submitted to NRC in July and August 1996. The Compliance Plans contain 53 and 46 issues (excluding issues that were deleted) respectively, for Paducah and Portsmouth. Of these, 36 issues are substantially common to both Paducah and Portsmouth. The issues contained in the Plans, along with their status as of September 30, 1997, are listed in Appendix B. Each issue in the Plan, which may consist of several sub-issues, contains a description of the requirement, USEC's commitment to achieve compliance, a description of the non-compliance, a justification for continued operation while the issue is being resolved, and a plan of action to resolve the issue and bring the GDP into compliance, along with completion schedules.

Several types of noncompliances are discussed in the Compliance Plans. These noncompliances can be generally grouped into three types. The first type, minor issues, consists of minor noncompliances that are associated with established programs. Eight minor issues have been identified at Paducah, and 10 minor issues at Portsmouth. The second type of noncompliance, equipment issues, involves the need for upgrades of safety-related equipment to meet NRC requirements. Equipment issues identified in the Compliance Plans total 18 for Paducah and 8 for Portsmouth. The third type of noncompliance, programmatic issues, involves situations in which USEC has not yet fully implemented a program necessary to meet NRC requirements. Programmatic issues identified in the Compliance Plans total 27 for

Paducah and 28 for Portsmouth.

Equipment noncompliances for both Paducah and Portsmouth include the need to upgrade the autoclaves, discussed below, to provide an additional safety margin. These noncompliances also address structural upgrades to the process buildings at Paducah, to provide an appropriate margin of safety against earthquakes. Programmatic noncompliances for both Paducah and Portsmouth include upgrading the GDPs' SARs and procedures to meet NRC requirements and assuring that programs are in place to maintain the procedures consistent with current GDP operations and the authorization basis.

Three significant issues, addressed in the Compliance Plans, which are common to both Paducah and Portsmouth, are discussed in detail below:

- SARs - 10 CFR Part 76 requires that the application for a certificate of compliance include a SAR that presents an assessment of potential accidents and describes the plant site and principal structures, systems, and components of the plant; the equipment and facilities that will be used to protect health and minimize danger to life; and the management contr ls and oversight program employed to protect the public, and worker health and fety. DOE was in the process of updating the SARs for the GDPs when the . ct was passed. These SAR updates were necessary to reflect new information and understanding about initiating events; plant configuration; expected response of structures, systems, and components; and accident analyses. Some TSRs needed to be revised, to agree with the revised SAR. However, it was not possible to complete the revised SARs in time to include them in the applications for NRC certification. Thus, the SARs that were submitted with the certificate application were based, in part, on the 1985 Final Safety Analysis Reports (FSARs) for the two plants and on DOE-approved safety evaluations performed after those FSARs were issued. DOE completed the update of the SARs and transmitted the revised SARs to USEC and NRC on February 14, 1997. On August 18, 1997, USEC submitted some SAR-related information, but was unable to fulfill its SAR commitments as stated in the Compliance Plans. As of September 30, 1997, NRC is reviewing the information submitted by USEC and may require that USEC take additional action with respect to its August 18, 1997 submittal.

- Design Modifications to the Autoclaves - Feed material is received at the GDPs in cylinders that contain 10 to 14 tons of UF_6 in the solid state. To transfer this material to the diffusion cascade, the cylinder must be heated to transform the UF_6 from a solid to a gas. When in a gaseous state, the UF_6 flows from the cylinders to feed headers, which deliver the gaseous feed material to the appropriate assay points in the diffusion cascade. Heating of the cylinders and removal of the UF_6 are performed in an autoclave. An autoclave is essentially a cylindrical vessel with an internal diameter of approximately 6 feet in which the entire UF_6 cylinder is placed and heated. The autoclave vessels and all penetrations out to the isolation valves provide containment

for the remote possibility of a UF_6 release while the UF_6 is being heated and transferred. NRC has determined that autoclave design improvements are needed. These improvements include the ability to test the containment valves, replacing all containment valves that are not fail-safe, and providing adequate operator alarms. Although these design improvements will enhance the assurance of safety, the current autoclave design, in conjunction with compensatory measures imposed by NRC, is sufficient to provide adequate assurance of safe operation until the autoclave upgrades are completed.

- Criticality Safety - 10 CFR Part 76 requires that criticality prevention be included in the TSRs and be addressed via established procedures and/or equipment. Before March 3, 1997, there were operations, at the GDPs, for which nuclear criticality safety evaluations (NCSEs) were incomplete or formal documentation was unavailable and double-contingency or other bases for acceptance had not been documented in an NCSE. Additionally, there were administrative aspects of the nuclear criticality safety program that had not been proceduralized or documented. Actions have been implemented at Paducah and Portsmouth to rectify these noncompliances.

STATUS OF PADUCAH COMPLIANCE PLAN

Of the 53 issues listed in the Paducah Compliance Plan, 34 have been completed (i.e., USEC has informed NRC that it has fulfilled all the individual actions described in a Compliance Plan issue). Of the 34 issues that have been completed, 11 issues were completed between March 3, 1997, when NRC assumed regulatory responsibility, and September 30, 1997, the close of the reporting period. The nine issues, along with a description of the noncompliance and corrective actions, follow:

- Chemical Safety Mechanical Integrity Program - All elements of a mechanical integrity program, as defined in 29 CFR 1910.119, were not implemented for those chemicals described in SAR Section 5.16.13.3. This Compliance Plan item is a commitment to meet an Occupational Safety and Health Administration (OSHA) requirement. USEC completed a mechanical integrity program for maintenance- and inspection-process safety-management requirements, as committed to in the Compliance Plan.

- Administrative Controls on Overtime - The staffing allocations were not sufficient to meet training needs and to comply with NRC working-hour guidelines. USEC supplemented staffing allocations to meet the working-hour guidelines, as committed to in the Compliance Plan.

- DOE Chemical Safety and Third-Party Use of Hazardous Chemicals - When USEC was created, DOE did not have established communication channels to provide USEC with information regarding the use of hazardous chemicals by DOE and third parties present at the site. To correct the situation, all initial process-hazards analyses were

completed and a directive was issued by DOE, as agreed to in the Compliance Plan, that directs DOE and third-party tenants to notify USEC before hazardous chemicals, including UF_6 and uranium tetrafluoride (UF_4), are introduced onto the site.

- Fire Protection Procedures and Hot Work Permit Program - Fire protection procedures, such as those needed to perform welding and burning, fire hazard assessments, and testing and inspection of fire suppression systems, did not contain sufficient technical guidance and process controls to ensure understanding of requirements and implementation by all personnel. Further, the permit program to perform welding, burning, and other hot work did not ensure Fire Services involvement and oversight. USEC completed commitments in the Compliance Plan to revise the procedures and the hot work program.

- Public Warning Sirens and Controls - The emergency planning outdoor-warning sirens did not provide total coverage of the immediate notification area, within a 2-mile radius of the plant, and were not reliable. USEC replaced three existing sirens with a new siren system to improve the reliability and the coverage and also completed an analysis of the number, capabilities, and coverage of the new siren system as committed to in the Compliance Plan.

- Public Address System - In addition to reliability problems, the coverage of the public address system did not assure, because locations existed where the system could not be heard, that all onsite personnel can be notified of immediate protective action recommendations. USEC upgraded the existing public address system to provide more reliable and expanded service to the plant, as committed to in the Compliance Plan.

- High Efficiency Particulate Air (HEPA) Filter Systems Testing - The installed and portable HEPA filter systems had not been evaluated to identify those that are required to control worker exposure or to contain environmental releases. Further, some of the HEPA systems may need to be modified to allow performance of leak testing and inspections. USEC performed the required evaluations and modifications and revised applicable inspection and testing procedures.

- Fire Protection Pre-Fire Plans - The existing pre-fire plans did not reflect all current facility conditions, because of building configuration changes, fire hazards, and fire protection system changes that have occurred over the years. Further, no current analysis existed that identified the combustible fuel loading for various areas of the process buildings. USEC updated the pre-fire plans to reflect the current facility configurations and conditions and conducted analyses to determine the maximum allowable combustible loading within the process buildings.

- High-Volume Ambient Air Samplers - This system continuously collects air samples in the environment that are analyzed, weekly, for radioactivity. The new high-volume air

sampling system has been in operation since August 1995; however, sufficient data to establish baseline radionuclide concentrations at the stations have not been obtained. Therefore, action levels to trigger isotopic analyses for ambient air radionuclide levels had not been established because of the lack of data. USEC has subsequently obtained the data and established the required action levels. USEC has also compared the effective dose equivalent calculated using 1996 release data, with the effective dose equivalent using the 1996 data from the high-volume ambient air samplers.

- Fire Protection Water System Reliability - The high-pressure fire water system pumps are not as reliable as necessary. Further, the automatic fire suppression systems in Building C-315 cannot be assured because the water source is a multipurpose system. USEC refurbished the high-pressure fire water system pumps and reconfigured the fire water supply to Building C-315.

- Environmental Trending Procedures - Some environmental data are not currently trended to identify long-term changes in the environment that may result from plant operations. USEC developed and implemented procedures to trend environmental data as part of the Nuclear Safety Upgrade Project.

A significant safety issue, specific to Paducah, that is currently being resolved, involves seismic upgrading of two main process buildings. During the upgrading of the SAR for Paducah, it was discovered that a significant number of piping attachments could fail, and two of the main process buildings could suffer significant damage if subjected to an earthquake intensity associated with an earthquake at the Paducah site that might be expected to occur more frequently than the frequency associated with the design basis earthquake. DOE was responsible for regulatory oversight of the GDPs at the time this was discovered. DOE required that USEC develop a plan for improving the seismic resistance and imposed process constraints on the operation of the Paducah plant to significantly reduce the risk of release of radioactive and hazardous material (UF_6) in the event of an earthquake. Both NRC and DOE require that safety-related structures be designed to withstand natural phenomena events, including earthquakes. During development of the Paducah Compliance Plan, USEC committed to, and NRC approved, a plan to strengthen the buildings to improve the seismic resistance of the structures and piping attachments. The Paducah Compliance Plan also requires USEC to continue to operate under the process constraints to reduce the risk of UF6 release during an earthquake until the seismic upgrades have been completed. In the Compliance Plan, USEC committed to strengthen the buildings to improve the seismic resistance of the structures and piping attachments by December 31, 1997. Three unreviewed safety questions(USQs) related to the seismic upgrade were identified by USEC and submitted to NRC for approval. In conjunction with the USQ submittals, USEC has requested to extend the date for completing the physical modifications by approximately 18 months. NRC is reviewing the information provided by USEC concerning the USQs as well as the new proposed schedule.

STATUS OF PORTSMOUTH COMPLIANCE PLAN

Of the 46 issues listed in the Portsmouth Compliance Plan, 28 have been completed (i.e., USEC has informed NRC that it has fulfilled all the individual actions described in a Compliance Plan issue). Of the 28 issues that have been completed, four issues were completed between March 3, 1997, when NRC assumed regulatory responsibility, and September 30, 1997, the close of the reporting period. These four issues follow:

- Chemical Safety Mechanical Integrity Program - All elements of a mechanical integrity program, as defined in 29 CFR 1910.119, were not implemented for those chemicals described in SAR Section 5.16.13.3. This Compliance Plan item is a commitment to meet an OSHA requirement. USEC completed a mechanical integrity program for maintenance- and inspection-process safety-management requirements as committed to in the Compliance Plan.

- HEPA Filter Systems Testing - In-place leak testing of all fixed and portable HEPA filter systems/units was not being performed. As committed to in the Compliance Plan, USEC retrofitted some HEPAs and downgraded others where it was determined that the filters were not required to ensure environmental protection or worker safety. Further, USEC developed a database of portable HEPA filtration units and performed in-place leak testing of all portable HEPA filter units.

- Emergency Packets - An emergency plan procedure requires that emergency packets be developed and updated annually. The packets, located in the facilities, contain information about the building, the layout, specific hazards, and other information applicable to the facility. The emergency packets did not accurately reflect the facility conditions since they were not updated to reflect changes in the plant and changes in the requirements. Further, no up-to-date analysis existed that identified the combustible fuel loading for various areas of the process buildings. USEC completed the actions committed to in the Compliance Plan to resolve this issue -- namely, the emergency packets were updated to reflect current facility conditions and an analysis was performed to determine the maximum allowable combustible loadings in each process building.

- UF_6 Leak Detector Sensitivity Testing - Detector testing methods have not been developed that establish a precise correlation between the detectability of "test smoke" and the detectability of UF_6 and its reaction products. To rectify this noncompliance, USEC has developed a program to relate the response of UF_6 leak detectors to manual test methods and to the detection of an actual UF_6 leak.

CHAPTER 4

HEALTH, SAFETY, AND ENVIRONMENTAL STATUS

NRC has responsibility for assuring that the health and safety of the public and the workers at the GDPs are protected from radiological hazards. Section 76.60 requires USEC to comply with applicable sections of 10 CFR Part 20, "Standards for Protection Against Radiation." Safety and health activities regulated by NRC can be grouped into the functional areas of nuclear safety, radiation protection, fire protection, emergency preparedness, and management and oversight. Effective NRC oversight of radioactive effluents and radioactive waste should protect the quality of the environment. HS&E conditions are reflected in radioactive doses received by workers, and radioactive effluents. This chapter contains information relating to the HS&E conditions for the leased areas of the GDPs under NRC regulatory oversight. For a discussion of the HS&E conditions in the non-leased areas under DOE regulatory oversight, see the DOE report entitled "Department of Energy Input to the Nuclear Regulatory Commission's Annual Report to Congress Regarding the Status of Health, Safety, and Environmental Conditions at the Paducah and Portsmouth Gaseous Diffusion Plants," DOE/ORO/2059, October 1997.

Both Paducah and Portsmouth monitor air and water emissions to the environment and maintain environmental dosimeters to monitor gamma radiation levels both onsite and offsite. The most recent data from the environmental dosimeters show that ambient gamma exposure at the site boundaries for both Paducah and Portsmouth are not statistically different from offsite monitoring locations. Radiation from the plants, both direct and from effluents, does not result in any detectable contribution to the total background external gamma radiation at the unrestricted site boundaries. Doses to the nearest offsite individuals from exposure to radioactive effluents are projected to be 0.05 millirem (mrem) at Portsmouth and less than 0.05 mrem at Paducah for the calendar year 1997, based on data measured to date. These values are well below the NRC regulatory limit of 100 mrem/year for members of the public specified in 10 CFR Part 20.

The average occupational radioactive doses at Paducah and Portsmouth are projected to be approximately 4.5 mrem per person at each site for calendar year 1997. The maximum occupational dose received by any worker for the first half of calendar year 1997 is approximately 160 mrem. These values are within the historical ranges for the sites and within the NRC regulatory limit of 5000 mrem/year specified in 10 CFR Part 20 for individuals. There were no instances where 10 CFR Part 20 individual limits were exceeded. There were no planned special exposures at the GDPs, as permitted by NRC regulations, between March and September 1997. There were nine skin contamination incidents at Portsmouth and none at Paducah during the same period.

There are a number of HS&E improvements that have recently been completed or are currently in progress. Some of these improvements are part of USEC's effort to achieve

compliance with NRC regulations and are included in the Compliance Plans; however, some of the HS&E improvements were initiated by USEC and are neither required by NRC nor included in the Compliance Plans. These improvements include the following:

Nuclear Safety:

- Upgrades to the criticality accident alarm system (CAAS) at Paducah.
- Quality reviews of NCSE's and nuclear criticality safety approvals (NCSAs) and field verification of NCSEs and NCSAs.
- Upgrades to the autoclaves, and leakage detection systems.
- Upgrades to HEPA filters at Portsmouth.
- Upgrades to cranes at Paducah.
- Established calibration settings for variables on which safety limits have been set.
- Upgrades to the SARs.

Radiation Protection:

- Upgrades to ventilation units for control of airborne radioactive material.
- Expanded use of continuous air monitors.
- New computer system to maintain internal and external personnel dosimetry exposure data at Paducah.
- Improved training for as-low-as-reasonably-achievable (ALARA) principle.

Emergency Preparedness:

- Developed training for emergency responders.
- Replace existing public warning system with a new siren system at Paducah.
- Upgrade the existing emergency plan at Portsmouth.

Fire Protection:

- Upgraded procedures and training.
- Refurbished electric firewater pumps.
- Verified maximum combustible loading in the process buildings.
- Verified adequacy of the sprinkler system.

Management and Oversight:

- Establish a program to control vendor manuals for safety-related items.
- Establish a Plant Operations Review Committee (PORC), consisting of senior-level personnel, to review plant activities.
- Establish a Plant Performance Review Committee to identify areas for plant improvement and assess progress toward improvement; and also to conduct an annual independent assessment of GDP performance in functional areas.

- Developed an Employee Concerns Program.
- Implemented an Operating Experience Review Program to assess operating experience between plants and from outside the GDPs.
- Employed experienced individuals as coaches for a period of time, to advise plant personnel about the nuclear safety standards expected by NRC.

Environmental:

- Upgraded ambient air monitors at Paducah.

CHAPTER 5

CERTIFICATION ACTIVITIES

INITIAL CERTIFICATION

USEC submitted its initial certificate applications, one each for Paducah and Portsmouth, to NRC on April 18, 1995. After conducting a preliminary review of the applications, NRC concluded that the applications did not adequately address the standards established by NRC for the GDPs and that they did not contain sufficient information for NRC to determine whether the GDPs complied with 10 CFR Part 76. Therefore, NRC rejected the applications on May 5, 1995, and directed USEC to submit revised applications. USEC submitted revised applications on September 15, 1995. Revised Compliance Plans, based on the revised application, were submitted on November 6, 1995. During the course of NRC review, meetings were held with USEC, additional information was requested, and revisions to the applications and Compliance Plans were submitted. The final versions of the applications, along with the revised Compliance Plans, were approved by NRC as part of the initial certification.

As part of the certification process, public meetings were held in Portsmouth and Paducah in late 1995 to solicit public input on the certificate applications. For specific areas not in compliance with NRC regulations, 10 CFR 76.35(b) requires that DOE prepare a plan for achieving compliance. An environmental assessment was performed for the Compliance Plan and the interim period of noncompliance. It concluded with a finding of no significant impact (FONSI). After NRC completed its review, considered public comments, and consulted with the EPA, NRC issued Compliance Evaluation Reports (CERs) for Paducah and Portsmouth on September 13, 1996. NRC concluded, in the CERs, that the applications and Compliance Plans, in combination, fulfill the requirements of 10 CFR Part 76. Subsequently, Certificates of Compliance were issued to USEC on November 26, 1996, and became effective March 3, 1997, allowing operation of the GDPs under NRC regulatory oversight. The initial certificates were issued for a period of approximately 2 years, expiring on December 31, 1998. This timeframe is consistent with Public Law 104-134, the USEC Privatization Act, which amended Section 1701 of the AEA by replacing the requirement for an annual application for a Certificate of Compliance with a requirement for an application to be filed periodically, as determined by the Commission, but at least every 5 years. According to the initial certificates, the next renewal applications are to be filed by April 15, 1998.

The NRC Office of the Inspector General recently conducted a survey of the staff's certification of the GDPs. The Inspector General concluded that:

- NRC's consistency of regulation and its expectation of adherence to operating commitments are creating safer and improved operations at the GDPs; and

- NRC's inspection approach and its inspection staff are highly regarded and are key to NRC's regulatory consistency.

- The following are areas where the transition of oversight for the GDPs can provide valuable lessons that may also be applicable to NRC's possible future regulation of DOE facilities: 1) certification and/or licensing activities; 2) regulatory transition; 3) inspection program; and 4) evaluation and report writing.

AMENDMENTS TO THE CERTIFICATES OF COMPLIANCE

10 CFR 76.45 describes the process for amending the certificates to cover new or modified activities, or to change commitments made in the Compliance Plans. On receipt of an amendment application, NRC determines whether the amendment is significant. If the amendment is determined to be significant (e.g., margin of safety is reduced), then the amendment is published in the Federal Register for public comment, and possibly, subsequent public meetings. For all amendments, regardless of significance, NRC issues its decision to either grant or deny the amendment and publishes the decision in the Federal Register to provide an opportunity for interested parties to review the decision before the amendment is issued.

Subsequent to certifying the GDPs, NRC received 18 amendment requests for Paducah and 13 for Portsmouth through September 30, 1997, to amend the certificate. As of September 30, 1997, of the 18 amendment requests submitted for Paducah, 9 have been issued; 3 have been published in the Federal Register but have not been issued; 5 are under review, and 1 has been withdrawn. As of September 30, 1997, of the 13 amendment requests submitted for Portsmouth, 5 have been issued, and 8 are under review. Some of the requests were submitted in conjunction with the resolution of issues contained in the Compliance Plans. NRC requested that DOE also review those amendments that revise the Compliance Plans so as to assure continued DOE approval of the Compliance Plans. A listing of the amendment requests for Paducah and Portsmouth is provided in Appendix C.

PRIVATIZATION

A major regulatory activity currently underway affecting future certification of the GDPs is the privatization of USEC. On April 26, 1996, the President signed the U.S. Enrichment Corporation Privatization Act (the Act), which directs USEC to implement a privatization plan. USEC developed a privatization plan containing two alternative methods of privatizing: 1) a sale through an initial public offering, or 2) a merger and acquisition. USEC, with the approval of the Secretary of the U.S. Treasury, will select the alternative that best satisfies the requirements of the Act. The private sector entity that purchases the assets of USEC will be responsible for the operations of the two GDPs, and the development of the Atomic Vapor Laser Isotope Separation (AVLIS) process. The Act prohibits the issuance of a certificate of compliance by NRC to that entity if NRC determines that:

- The entity is owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government; or

- Issuance of a certificate of compliance would be inimical to the common defense and security of the United States; or

- Issuance of a certificate of compliance would be inimical to the maintenance of a reliable and economical domestic source of enrichment services.

NRC has not previously been asked to evaluate whether a proposed action is detrimental to the viability of an industry subject to NRC regulation. Information about the intent of the language is contained in a Senate Committee report on an earlier version of the legislation (S. Rpt. No. 104-173 on S. 755, November 17, 1995), which states that the intent of the provision is to "... guard against the possibility of a foreign enrichment company acquiring the Corporation with the intent of operating it in such a manner inconsistent with its maintenance as an ongoing concern."

Before promulgation of the Act, foreign ownership, control, or influence (FOCI) in USEC or its private successor was restricted by the National Industrial Security Program Operating Manual (NISPOM), promulgated pursuant to Executive Order 12829. The NISPOM establishes requirements to safeguard classified information and governs its release to foreign interests by Federal government contractors, licensees, grantees, and certificate holders. The NISPOM provides that any entity requiring access to classified information, as does USEC or any privatized USEC successor, must be determined by the U.S. Government to be free from FOCI that could potentially result in a compromise of classified information. It also sets forth detailed procedures and criteria for making this determination. The NISPOM was concurred in by the Department of Defense, DOE, NRC, and the Central Intelligence Agency.

Any successor to USEC will require access to classified information and thus will be subject to a FOCI determination based on the NISPOM criteria. The NISPOM FOCI requirements have been incorporated into NRC regulations through a final rule (61 FR 40555) that amended 10 CFR Part 95, which contain requirements for access to and protection of classified information. The NISPOM FOCI requirements are more comprehensive and prescriptive than the statutory prohibition of foreign ownership under Section 193 of the AEA, as amended. Therefore, the FOCI information that is elicited, and which is sufficient to make a FOCI determination, should also be sufficient to enable NRC to satisfy its statutory responsibility to ensure that the USEC successor is not owned, controlled, nor dominated by an alien, a foreign company, or a foreign government.

NRC, DOE, and USEC coordinated closely during the development of the privatization process and USEC has incorporated the NISPOM FOCI requirements in its advance public information package for prospective bidders. DOE and NRC have agreed that

DOE will assist NRC in performing the FOCI investigations and NRC will be the cognizant security agency responsible for making the final FOCI determination. All FOCI information received from prospective bidders will be forwarded to both DOE and NRC, for a preliminary determination of whether to allow such bidders access to information regarding USEC operations. The time required to make the final FOCI determination for access to classified information will depend on the number and complexity of bidder information packages received from USEC. The same FOCI information will then be used to make the statutory determination regarding foreign ownership, control, or domination. The statutory determination must be made before certification of the USEC successor or final approval of privatization.

The issuance of the initial USEC certification was based, in part, on a finding of compliance with NRC standards to protect the common defense and security. Subsequent recertification of USEC, or certification of a USEC successor, will be based on the submission of changes to the initial application and a similar review process. This review will include the SAR, the Physical Security Plan, the Security Plan for the Protection of Classified Matter, and the Fundamental Nuclear Material Control Plan. Additional considerations will include NRC's determination on foreign ownership, control or domination; USEC's implementation of the Compliance Plans; accumulated regulatory experience; and NRC resident, regional, and Headquarters inspection reports.

NRC's determination regarding the maintenance of a reliable and economical domestic source of enrichment services will be based on an independent contractor's analysis of the privatized corporation's financial data. The contractor will use standard investment banking financial ratios to estimate a credit rating for the privatized corporation.

NRC is preparing a Standard Review Plan to guide the recertification of the GDPs. Included in the SRP will be a chapter to ensure consistency in, and to formally document, the process that will be used to make the foreign ownership, control or domination, common-defense-and-security, and reliable and economical source-of-domestic enrichment-services determinations required by the statute.

CHAPTER 6

INSPECTIONS

10 CFR Part 76, Subparts F and G; 10 CFR 76.70; 10 CFR 76.72; 10 CFR Part 95; and 10 CFR Part 2 address NRC inspections of the GDPs, violations of NRC regulations, and civil penalties. These regulations give NRC the authority to issue Notices of Violation for violations of the AEA, NRC regulations, or conditions of a certificate, Compliance Plan, or Order. Further, these regulations permit NRC to impose civil penalties for certain violations of NRC regulations.

Violations of NRC regulations are classified into one of four severity levels, with Severity Level I being assigned to violations that are most significant and Severity Level IV being assigned to violations that are least significant. Further, there are other violations of minor safety or environmental significance that are below the level of significance of Severity Level IV violations. These violations, which must meet certain criteria, are not usually the subject of formal enforcement action. To the extent such violations are described in the inspection reports, they are noted as non-cited violations. A group of Severity Level IV violations may be evaluated in the aggregate and assigned a single, increased severity level (Severity Level III) if the violations have the same underlying cause or programmatic deficiencies. More information about the NRC Enforcement Policy is provided in NUREG-1600, "General Statement of Policy and Procedures for NRC Enforcement Actions", and NUREG/BR-0195, Rev. 1, "NRC Enforcement Manual."

NRC performed a total of 28 inspections, totaling approximately 6600 onsite inspection-hours (3300 hours per site), at both Paducah and Portsmouth between March 3, 1997, and September 30, 1997. Sixty five violations were identified as a result of the inspections. Except for one special inspection at Portsmouth, all of the inspections were routine inspections. The majority of the violations were in the areas of criticality safety, security, and procedures, either implementing incorrect procedures or failing to follow procedures. With one exception, all of the violations were Severity Level IV or non-cited violations with no civil penalties. There was one Severity Level III violation at Paducah for multiple instances where USEC failed to properly implement provisions of its security plan and failed to provide complete and accurate information to NRC. Although the actual security consequences were minimal in this case, NRC concluded that collectively, the deficiencies were indicative of a programmatic breakdown of the USEC security program. No civil penalty was assessed because this was the first Severity Level III issued to USEC/Paducah, and because of USEC's prompt and comprehensive corrective action. For all violations identified during inspections, USEC took prompt corrective action to bring the facility back into compliance with NRC regulations. In most cases, USEC also identified long-term improvements as well. References to NRC inspection reports are provided in Appendix D.

INSPECTION SUMMARY FOR PADUCAH

During the period March 3, 1997, through September 30, 1997, NRC Headquarters and regional personnel, including the resident inspectors, conducted 13 routine inspections, totaling approximately 3300 onsite inspection-hours, of plant operations, plant maintenance, plant support, engineering, fire safety, chemical process safety, nuclear criticality safety, MC&A, and security.

The inspections resulted in one Severity Level III, and 29 Severity Level IV violations assessed against USEC. Five non-cited violations were also documented in inspection reports. The one Severity Level III violation, which was of significant regulatory concern, involved a programmatic breakdown of the USEC security program, as discussed above. The Severity Level IV violations were more than minor concerns but none was judged to be of such safety significance as to warrant a more serious severity level. None of the violations warranted a civil penalty. In all cases, corrective actions and plans were promptly taken by USEC to reestablish compliance with NRC regulations. A brief summary of the violations is provided below.

Ten violations involved nuclear criticality safety. In two cases, there were either no NCSAs or the NCSA was not incorporated into the procedure; one violation resulted from operating with a TSR-required CAAS detector inoperable; two violations stemmed from failing to implement compensatory measures when a CAAS failed or was taken out of service; one violation was a result of inadequate post-maintenance functional testing of a criticality alarm; one violation resulted from failure of double contingency; one violation resulted from exceeding an NCSA batch limit; and two violations involved improperly maintaining personnel control. Control was not maintained when, in one case, personnel entered an area where criticality monitors were inoperable, whereas in another case, an area potentially containing fissile material was not roped off. Four violations involved inadequate staffing levels and excessive work hours. Five violations involved using improper procedures or a failure to follow procedures. Two violations involved the fire protection system, where, in one case, fire sprinkler operability was not restored in a timely manner after missing sections of pipe were discovered, and in another case, USEC identified uncorrected discrepancies previously found during walkdowns of the fire protection system. QA violations involved using incorrect security and classification forms, improperly preparing a cylinder for transport, changing operations or making modifications without performing a safeguards or safety determination, not maintaining documents important to safety with the appropriate level of quality and improperly storing quality documents. Other violations involved deficiencies in the training of operators; using unapproved scales for weighing UF_6 cylinders before heating; poor root-cause analysis; failure to report equipment failure within the NRC-specified timeframe; and permitting uncleared individuals access to classified information.

NRC issued a Confirmatory Action Letter (CAL) to USEC in February 1997 with an effective date of March 3, 1997, to confirm actions to be taken at Paducah to compensate and correct a nuclear criticality deficiency identified by the Paducah staff on February 18, 1997, before NRC assumed regulatory oversight. As a result of the deficiency, USEC stopped operations, to maintain safe conditions until corrective actions were completed. DOE issued a CAL on February 21, 1997, confirming the shutdown of operations and requiring that USEC request approval for restart before resuming the activity in question. DOE notified NRC of DOE's action and agreed to provide NRC with information relating to DOE's investigation of the deficiency.

INSPECTION SUMMARY FOR PORTSMOUTH

During the period March 3, 1997, through September 30, 1997, NRC Headquarters and regional personnel, including the resident inspectors, conducted 14 routine inspections, totalling approximately 3300 onsite inspection-hours, of plant operations, plant maintenance, plant support, engineering, fire safety, chemical process safety, nuclear criticality safety, MC&A, and security. In addition, one special inspection was conducted to assess the root cause and safety implications of a loss-of-steam event.

The inspections resulted in 19 Severity Level IV violations assessed against USEC. Eleven non-cited violations were also documented in inspection reports. The Severity Level IV violations were judged to be more than minor concerns, but none of the violations was judged to be of such safety significance as to warrant a more serious severity level. None of the violations warranted a civil penalty. In all cases, USEC took corrective actions to reestablish compliance. A brief summary of the violations is provided below.

Twelve of the violations involved nuclear criticality safety. One violation involved not having an NCSA as required; four violations involved failure to follow NCSA administrative controls; two others involved improperly validated computer code calculations or calculations that did not agree with the SAR; one violation involved improper quality classification of equipment used to meet the double-contingency principle; one violation incorrectly identified the boundaries of the nuclear criticality system; in one case, improper Raschig rings were used; one violation involved a lack of TSRs where double contingency was not met; and one violation was for not specifying nuclear criticality safety requirements for firefighting in one emergency packet. Eight violations resulted from either incorrect procedures or a failure to adhere to procedures. Three violations involved improper implementation of TSRs. In one case, plant operating modes were improperly changed; in another, operators failed to perform pressurization after shutdown within the TSR-specified timeframe; and in the third case, emergency lighting was not provided as required. The remaining violations involved performing ineffective corrective actions; allowing uncleared individuals access to classified information; untimely pursuit of a safety issue involving an improper transportation cylinder valve; exceeding overtime limits; and inadequate staffing.

CHAPTER 7

EVENT REPORTS

Section 76.120 describes the requirements for reporting certain events to NRC. The regulations specify events that must be reported to NRC within three different time limits and describe the contents and schedule for submitting follow-up written reports. USEC is required to report criticalities, loss of special nuclear material, and emergency conditions that have been declared an alert or site area emergency to the NRC operations center within 1 hour after discovery. Events that prevent immediate protective actions necessary to avoid releases or exposures to radiation or radioactive materials that could exceed regulatory limits must be reported to the NRC Operations Center within 4 hours after discovery. The third reporting requirement specifies that certain contamination events, failure of certain TSR safety equipment with no backup equipment available, fires or explosions that damage radioactive material or containers holding radioactive material, and events that require offsite medical treatment of a contaminated person must be reported to the NRC Operations Center within 24 hours. Although not required by 10 CFR Part 76, USEC also reports safety system actuations and notifications made to other State and Federal agencies.

A summary of event reports for events that occurred between March 3, 1997, and September 30, 1997, is provided below.

EVENT NOTIFICATION SUMMARY FOR PADUCAH

There were 64 reported events at Paducah during the period. Of these, USEC retracted 15 after an evaluation showed that they did not meet the reportability criteria. The majority of the 49 events involved nuclear criticality safety and fire protection issues. The 13 nuclear criticality safety events that were reported mostly resulted from instances where the CAAS was inoperable, there was a lack of an NCSA to cover operations, or there were violations of NCSAs. The 16 fire protection events that were reported mostly resulted from configuration deficiencies in the high-pressure fire water sprinkler system. These deficiencies included improperly installed sprinkler heads, obstructed heads, branch piping that was not connected to the main supply header, and areas lacking a sprinkler system where one was required. Five reported events were related to the autoclaves, where an autoclave safety system actuated, or where autoclave subsystems did not perform properly. Four reported events resulted from polychlorinated biphenyls spills or oil leaks to the environment. There were several security reports where classified information was potentially compromised or where there was unauthorized access to a secure area. One event involved defects in cylinder valve packing nuts; and another event was reported when a TSR was suspended. The remaining four events involved miscellaneous equipment being inoperable, because of human error, maintenance, or unknown causes.

If the event notification involved a noncompliance with NRC regulations, prompt

actions were taken to assure that compliance with NRC regulations was reestablished.

EVENT NOTIFICATION SUMMARY FOR PORTSMOUTH

There were 43 reported events at Portsmouth during the period, of which one was retracted. The majority of the events involved the autoclaves, environmental effluents, and security infractions. There were 11 events involving the shutdown of the autoclaves because of high condensate levels or high pressure. Nine events were reported where classified information was potentially compromised. There were nine environmental-related events including failure to meet air and water environmental permit levels, which accounted for eight events, and one event involving a capacitor oil/PCB spill. USEC reports events to NRC when it is required to notify another regulatory body. These nine environmental events were reported to NRC because USEC was required to report the events to another regulatory body. Six events were reported for violations of nuclear criticality safety controls. Two events involved releases of UF_6 and two events involved deactivation of UF_6 detectors. The remaining three events involved improper welding, an inoperable fire water suppression system, and an error discovered in a commonly used structural analysis computer program.

If the event notification involved a noncompliance with NRC regulations, prompt actions were taken to assure that compliance with NRC regulations was reestablished.

CHAPTER 8

REGULATORY ACTIVITIES

RULEMAKING

Since initial certification of the GDPs, USEC has requested NRC approval of several amendments to its certificates. When processing the amendment requests, as described in 10 CFR 76.45, NRC identified several deficiencies in the administrative process for amending the certificates currently embodied in 10 CFR 76.45. Therefore, NRC initiated rulemaking to revise 10 CFR Part 76 to correct certain deficiencies.

Although 10 CFR Part 76 provides for amending the certificate, the process is not clearly defined and the recurring need for timely amendments was not adequately anticipated. Only a very limited number of amendments to the certificate was expected; however, more were received than anticipated. The current 10 CFR Part 76 does not provide a mechanism for making an amendment immediately effective and it is ambiguous as to who can petition the Commission for review. The proposed revisions to 10 CFR Part 76 include providing a process for making an amendment immediately effective and clarifying that any person whose interest may be affected is eligible to file a petition for review of a certificate for amendment. It is expected that the rulemaking will be completed in 1998.

EMERGENCY PREPAREDNESS EXERCISE

On September 12, 1997, a full-scale emergency preparedness exercise was conducted at the Portsmouth GDP. NRC Headquarters, NRC Region III and a site team participated in the exercise. Additionally, the response organizations of DOE in Oak Ridge, Tennessee, the State of Ohio, and the County of Pike participated. DOE and EPA were also represented at the site. The purpose of the exercise was to test the response of the various participants and the effectiveness of the information flow from the Portsmouth Emergency Operations Center. It was concluded that the objectives of the exercise were accomplished and potential improvements to the process were identified. A similar exercise is scheduled at Paducah in the spring of 1998.

AVLIS

The USEC Privatization Act granted USEC the exclusive commercial right to deploy and use AVLIS patents, processes, and technical information owned or controlled by the Federal Government, upon completion of a royalty agreement with DOE. To the extent requested by USEC, and subject to the requirements of the AEA, the President shall transfer title to all of the property owned by the United States or under its control that is useful for the development of AVLIS or alternative technologies for enriching uranium.

AVLIS technology involves processing uranium metal alloy feedstock rather than UF_6 gas, through the use of lasers and separator systems. Based on engineering studies, it is expected that an AVLIS facility will use only about 5 percent of the power used by the GDPs, require less capital investment than a new centrifuge plant, and use 20 to 30 percent less uranium to produce comparable amounts of EU. Currently, AVLIS development, demonstration, and design activities are being conducted at Lawrence Livermore National Laboratory in Livermore, CA; General Electric Company in Wilmington, NC; and Cameco Corporation in Port Hope, Ontario, Canada.

In July 1994, USEC's Board of Directors authorized USEC management to begin taking steps necessary to commercialize the AVLIS technology. In April 1995, USEC entered into an agreement that provided for the transfer of intellectual and physical property pertaining to AVLIS technology from DOE. USEC expects to submit a license application to NRC in December 1998 to obtain an NRC license to construct an AVLIS facility; however, USEC proposed conducting preliminary meetings before that date to discuss technical issues. NRC will participate in these meetings to the extent that NRC resources are available. USEC currently expects to deploy an AVLIS plant in 2004.

The AVLIS project will present some unique and highly complex issues for NRC review. Since this is the first facility to employ laser technology, NRC currently has no documents to guide its review of such a facility. The form of EU will present some unique issues and problems in the areas of: nuclear criticality safety (novel forms of EU consisting of vapor and metal); criticality computer code validation; accident analysis; safeguards; fire; explosions; and toxicity of laser dyes. NRC currently has a project manager working part-time on the AVLIS activities. Thus far, NRC activities concerning AVLIS have consisted of reviewing the AVLIS QA Plan as well as other preliminary meetings with USEC to lay the groundwork for USEC's AVLIS licensing application. NRC resources provide for one full-time equivalent (FTE) until fiscal year (FY) 1999, to initiate preparation of the staff's guidance and to initiate review of the AVLIS preliminary submittals from USEC.

CHAPTER 9

NRC CONSULTATION WITH EPA AND DOE

RESULTS OF DOE CONSULTATION

DOE provided a report entitled "Department of Energy Input to the Nuclear Regulatory Commission's Annual Report to Congress Regarding the Status of Health, Safety, and Environmental Conditions at the Paducah and Portsmouth Gaseous Diffusion Plants," DOE/ORO/2059, October 1997, to assist NRC in preparing the annual report. Information from DOE's report was included in various sections of this report, as appropriate.

The DOE report discusses the background associated with DOE's efforts to promote safety, safeguards, and security during the interim period when DOE had regulatory responsibility for the USEC-operated GDPs. The report discusses the transfer of regulatory oversight to NRC; DOE's regulatory oversight program for the leased facilities until NRC assumed responsibility on March 3, 1997; DOE's activities regarding HEU at Portsmouth; the Compliance Plans developed by DOE; nuclear safety upgrades funded by DOE at Paducah and Portsmouth; the SAR upgrade program; and modifications to the Lease. The report also includes information on the HS&E conditions of the non-leased portions of the plants, which remain under DOE oversight responsibility.

DOE SUMMARY OF PADUCAH

DOE accomplishments and initiatives to enhance and improve HS&E conditions at Paducah between July 1, 1993, and September 30, 1997, include, but are not limited to, the following:

- Approved the implementation plan developed to implement the upgraded SAR;
- Worked approximately 2.5 million hours, with no Lost Workday cases;
- Met all regulatory deliverables regarding environmental compliance, cleanup, waste management, and other areas (approximately 400) on, or ahead of, schedule;
- Painted UF_6 cylinders and began building new concrete cylinder storage yards in response to Defense Nuclear Facilities Safety Board concerns;
- Signed five Records of Decision on environmental cleanup;
- Constructed and began operation of two groundwater treatment/containment systems;
- Successfully demonstrated a proprietary soil remediation technology (LASAGNE), developed by an industry consortium with DOE sponsorship;
- Disposed of 20 million pounds of waste either in DOE landfills or at off-site facilities;
- Constructed a new solid waste contained landfill (completed in FY 1996);
- Completed three Resource Conservation and Recovery Act (RCRA) closures;
- Continued pollution prevention and waste minimization practices, including the use of micropurging techniques in groundwater monitoring, use of steel grit recycling in

association with the cylinder repainting project, use of a generator set-aside fee program, and recycling of paper and aluminum cans.

Environmental releases and discharges from DOE activities during FY 1997 remained within established regulatory limits, with the exception of eight exceedances of its Kentucky Pollutant Discharge Elimination System permit effluent limits. Kentucky Department of Environmental Protection/Kentucky Division of Air Quality issued an NOV on August 28, 1997, for failure to comply with permit conditions that required the recording of pressure drop readings of grit reclaim unit (used in the cylinder painting operation) and failure to promptly report the deviation from permit requirements. Average radiation exposure at Paducah, based on monitoring 420 people, primarily DOE and contractor employees, was 11.2 mrem per person for calendar year (CY) 1996, which is less than 3 percent of the administrative limit.

DOE SUMMARY OF PORTSMOUTH

DOE accomplishments enhancing and DOE initiatives to improve HS&E conditions at Portsmouth between July 1, 1993, and September 30, 1997, include, but are not limited to the following:

- Approved the implementation plan developed to implement the upgraded SAR;
- Worked approximately 1 million hours, with no Lost Workday cases, between July 1, 1993, and September 30, 1997;
- Completed painting of more than 6600 skirted DUF_6 cylinder ends, to prevent corrosion, and completed restacking of 10,000 DUF_6 cylinders, to enhance inspections;
- Completed chemical treatment and buffer monitoring of 200 HEU cells in the X-326 Process Building by March 1996;
- Shipped more than 10 million pounds of mixed, low-level and Toxic Substance Control Act (TSCA) waste off-site over the past 2 years;
- Obtained approval for the final Baseline Ecological Risk Assessment study from the Ohio EPA and U.S. EPA;
- Instituted an aggressive waste minimization program;
- Continued to recycle paper products, aluminum cans, and scrap metal;
- Completed the repackaging of low-level radioactive waste, which resulted in a waste volume reduction of 9300 cubic feet;
- Completed closures of 14 RCRA solid waste management units since FY 1994.

At Portsmouth, the National Pollutant Discharge and Elimination System (NPDES) permit limit at an internal outfall at the wastewater treatment facility was exceeded once during the past fiscal year; however, the violation had no adverse environmental impacts on the treatment facility. Average radiation exposure at Portsmouth, based on monitoring 502 people, primarily DOE and contractor employees, was 1.1 mrem per person for CY 1996,

which is substantially less than the administrative limit.

For both GDPs, DOE has not identified any instances of substantial noncompliance with those laws for which it had oversight responsibility during FY 1997; however, some environmental permit violations have occurred during the past year as discussed in DOE's report (DOE/ORO/2509). In these instances, actions were taken to notify appropriate authorities, identify the cause of the violation, and institute corrective measures.

RESULTS OF EPA CONSULTATION

ENVIRONMENTAL SUMMARY OF PADUCAH

The Paducah GDP is part of EPA Region 4. The environmental regulatory authority over Paducah is both Federal and State (the Commonwealth of Kentucky). EPA has delegated many of its environmental authorities to the Commonwealth of Kentucky such as the Clean Air Act, Clean Water Act, and RCRA. Therefore, most environmental regulatory oversight is by Kentucky.

During the time period from March 3, 1997, to September 30, 1997, Paducah has had the following environmental actions:

- CLEAN AIR ACT: The GDP is considered an "A" (major) source. The facility had two State inspections, which culminated in an NOV (August 7, 1997), issued to DOE, for two violations of activities under DOE regulatory oversight. These violations are: 1) Needs additional air monitoring at the cylinder painting booth (being resolved); 2) The construction of a vitrification process without approval (resolved).

- CLEAN WATER ACT: The GDP is considered a "major source". The facility had three State compliance inspections and all required NPDES discharge monitoring reports submitted. One NOV (May 23, 1997) was issued for oil and grease in discharge in April 1997 (resolved). The NOV was issued to DOE, the owner of the facility.

- RCRA: The GDP is considered a treater, storage, disposal(TSD) facility. The facility had no compliance inspections; however, the State conducted numerous non-financial reviews with no violations.

- COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT: The GDP's activities to clean up waste sites across the plant continued according to agreements and plans of the interested parties - DOE, EPA, and the Commonwealth of Kentucky. A "no-action" Record of Decision at area Group 17 was signed September 29, 1997.

Overall, the GDP appears to have had only minor environmental violations which they quickly resolved by working with regulatory authorities.

ENVIRONMENTAL SUMMARY OF PORTSMOUTH

The Portsmouth GDP is part of EPA Region 5. The environmental regulatory authority over this GDP is both Federal and the State (State of Ohio). The EPA has delegated many of its environmental authorities to the State of Ohio, such as the Clean Water Act and the RCRA. Most environmental regulatory oversight is by Ohio.

During the time period from March 3, 1997, to September 30, 1997, the GDP located in Portsmouth, Ohio, has had the following environmental actions:

- CLEAN AIR ACT: The GDP is also considered an "A" (major) source. Based on the last inspection, the facility appropriately and in a timely manner addressed all minor deficiencies found.

- RCRA: The GDP is a TSD facility. There were no compliance inspections this year.

- COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT: The GDP's activities to clean up waste sites across the plant continued according to agreements and plans of the interested parties - DOE, EPA, and the State of Ohio. A lead regulator agreement was signed in FY 1997 which gives Ohio the lead in day-to-day oversight of clean-up activities at Portsmouth.

- CLEAN WATER ACT: The GDP is considered a "major source". There are no known Clean Water Act compliance problems at the facility at this time.

CHAPTER 10

SUMMARY ASSESSMENT OF PERFORMANCE

The GDP's at Paducah and Portsmouth are more than 40 years old, having been constructed in the 1950's. They were built at a time when design standards and quality assurance standards were significantly different from current requirements; and documentation requirements were less stringent. The age of the facilities, and the requirements in effect when the plants were constructed, have resulted in difficulties in maintaining the physical condition of the facilities and some poor documentation of design and safety bases. These shortcomings have challenged USEC's performance during the period; however, both the material condition of the plant, and design and safety basis documentation, are being upgraded.

Since NRC assumed regulatory oversight in March 1997, performance at Paducah and Portsmouth is acceptable, and improving. Improving trends at both sites were evident in the self-identification of problems; in improving understanding of the facility TSRs; in the material condition of the plants, exhibited by a decreased maintenance backlog at one site, improved material condition of the fire protection systems, and fewer contaminated areas within the plants; and in conservative decision-making with regard to safety. Offsite radiological doses, as well as doses to the workers, are very low, and well within NRC regulatory limits. There have been no events, at either site, requiring activation of the emergency response centers.

Although the operational performance of the Paducah and Portsmouth GDPs is acceptable, continued improvements are warranted. Further improvements are necessary, by the certificate holder, in understanding: the required level of performance and operational rigor; the NRC's regulatory requirements; the maintenance work control program; and the design bases of the facility, as well as the facility TSRs and their safety bases. An improved understanding of the TSRs, their safety bases, and NRC regulatory requirements would help the certificate holder prepare technically accurate safety analyses, plant change analyses, and operability determinations, and more complete amendment requests. Operational rigor can be improved at both sites in areas such as development and implementation of procedures; performance of surveillance activities; implementation of corrective actions; and control of classified information.

CHAPTER 11

COMPLIANCE WITH APPLICABLE LAWS

The GDPs at Paducah and Portsmouth are either in full compliance with NRC regulations, or a Compliance Plan exists, as required by NRC regulations, for achieving full compliance. Progress has been made in completing Compliance Plan issues since the initial certification, thus bringing the plants closer to full compliance with NRC regulations than they were at the time of initial certification in November 1996. For those instances where, during the normal course of operation, violations of NRC regulations were identified, USEC took prompt actions to reestablish compliance, and developed plans to prevent recurrence.

USEC is required to comply with all NRC regulations applicable to the GDPs, most specifically 10 CFR Part 76. Other NRC regulations, or portions thereof, that apply include 10 CFR Part 19, "Notices, Instructions, and Reports to Workers: Inspection and Investigations"; 10 CFR Part 20, "Standards for Protection Against Radiation"; 10 CFR Part 21, "Reporting of Defects and Noncompliance"; 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material"; 10 CFR Part 71, "Packaging and Transportation of Radioactive Material"; 10 CFR Part 73, "Physical Protection of Plants and Materials"; 10 CFR Part 74, "Material Control and Accounting of Special Nuclear Material"; and 10 CFR Part 95, "Security Facility Approval and Safeguarding of National Security Information and Restricted Data."

As part of the initial certification, NRC performed a review to determine whether the operations at the GDPs comply with NRC regulations. The results of this review were described in CERs, one each for Paducah and Portsmouth, which were issued by NRC on September 13, 1996. In those reports, NRC concluded that there is reasonable assurance that the plants will continue to be operated such that public health and safety will be adequately protected. NRC further concluded that the application fulfills the requirements of 10 CFR Part 76. Although specific instances existed where compliance with NRC regulations was not achieved, 10 CFR 76.35(b) permits operation outside NRC regulations provided that DOE prepares a Compliance Plan, for achieving compliance with NRC regulations, that includes, among other things, a justification for continued operation, in the interim period of non-compliance, with adequate safety, safeguards, and security. The Compliance Plans for Paducah and Portsmouth fulfill this requirement and were approved as part of the initial certification. Since initial certification in November 1996, 19 Compliance Plan issues have been completed at Paducah and 15 at Portsmouth. Although not complete, work has progressed on all of the remaining issues in the Compliance Plans, thus bringing these plants closer to full compliance with NRC regulations than at the time of initial certification.

Between March 3, 1997, and September 30, 1997, there have been 35 violations of NRC regulations, TSRs, or Compliance Plan commitments at Paducah and 30 at Portsmouth.

Some of these violations were self-identified by USEC, whereas others were identified by NRC inspectors performing routine inspections. The majority of the violations were in the areas of nuclear criticality safety, security, and procedural deficiencies -- either inadequate procedures or failing to follow procedures. For those instances where noncompliances with NRC regulations were identified, plant management took prompt corrective actions to bring the plant back into compliance. In many cases, plant management also identified long-term actions to prevent recurrence.

APPENDIX A

ABBREVIATIONS AND ACRONYMS

AEA	Atomic Energy Act
AVLIS	atomic vapor laser isotope separation
CAAS	criticality accident alarm system
CAL	confirmatory action letter
CER	compliance evaluation report
CFR	U.S. Code of Federal Regulations
CY	calendar year
DOE	U.S. Department of Energy
DUF_6	depleted uranium hexafluoride
EPA	U.S. Environmental Protection Agency
EPAct	Energy Policy Act of 1992
EU	enriched uranium
FOCI	foreign ownership, control or influence
FONSI	finding of no significant impact
FR	Federal Register
FSAR	final safety analysis report
FY	fiscal year
GDP	gaseous diffusion plant
HEPA	high efficiency particulate air
HEU	highly enriched uranium
HS&E	health, safety, and environment
MC&A	material control and accounting
mrem	millirem; a measure of radiological dose
MOU	memorandum of understanding
NCSA	nuclear criticality safety analysis
NCSE	nuclear criticality safety evaluation
NCV	non-cited violation
NISPOM	National Industrial Security Operating Manual
NOV	notice of violation
NPDES	national pollutant discharge elimination system
NRC	U.S. Nuclear Regulatory Commission
OSHA	Occupational Safety and Health Administration
PORC	plant operational review committee
RCRA	Resource Conservation and Recovery Act
QA	quality assurance
SAR	safety analysis report

TSCA	Toxic Substances Control Act
TSD	treater, storage, disposal
TSR	technical safety requirement
U^{235}	uranium-235
UF_4	uranium tetrafluoride
UF_6	uranium hexafluoride
USQ	unreviewed safety question
USEC	United States Enrichment Corporation

APPENDIX B

COMPLIANCE PLAN ISSUES

ISSUES COMMON TO BOTH PADUCAH AND PORTSMOUTH

Issues	Status[1]	
	Paducah	Portsmouth
Transition from DOE Regulations to NRC Regulations	Complete	Complete
Update the Application Safety Analysis Report	8/17/97[2]	8/17/97
Autoclave Upgrades	10/31/97	2/1/01
Nuclear Criticality Safety Approval Documents	Complete	Complete
Nuclear Criticality Safety Approval Implementation	Complete	Complete
Exceptions for Criticality Accident Alarm System	7/1/98	7/1/98
Radiation Protection Procedures	Complete	Complete
Posting of Radioactive Materials	11/30/97	12/31/98
NVLAP Certification	Complete	Complete
Fire Protection Procedures/Hot Work Permit Program	*Complete	12/31/97
Packaging and Transportation	Complete	Complete
Management Controls	12/31/97	12/31/97
Safety Committees	Complete	Complete
Plant Changes and Configuration Management	12/31/97	12/31/97
Maintenance Program	6/30/98	6/30/98
Operations Program	12/31/97	12/31/97
Systems Approach to Training	6/30/98	6/30/98
Event Investigations and Reporting Program	Complete	Complete
Records Management and Document Control Program	6/30/98	12/31/98

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[1] (a) Complete - U.S. Enrichment Corporation has informed NRC that it has fulfilled all of the individual actions described in a Compliance Plan issue.

(b) * indicates that the issue was completed between March 3, 1997, and September 30, 1997.

(c) Dates provided are completion dates committed to by USEC.

(d) Status as of September 30, 1997.

[2] Partial SARs for Paducah and Portsmouth were submitted on August 18, 1997.

COMPLIANCE PLAN

ISSUES COMMON TO BOTH PADUCAH AND PORTSMOUTH

Issues	Status	
	Paducah	Portsmouth
Procedures Program	12/31/97[3]	12/31/97
Quality Assurance Program Implementation	12/31/97	12/31/97
Emergency Plan Support Documents	Complete	Complete
Quality Control Program for Low-Level Waste Disposal	Complete	Complete
Depleted Uranium Management Plan	12/31/97	Complete
Decommissioning Funding Program	---When Privatized---	
Chemical Safety Mechanical Integrity Program	*Complete	*Complete
HEPA Filter Systems Testing	*Complete	*Complete
Administrative Controls on Overtime	*Complete	Complete
DOE Chemical Safety and Third Party Use of Hazardous Chemicals	*Complete	Complete
Operational/Safety Systems Trip Redundancy	12/31/97	Complete
Codes and Standards	Complete	Complete
UF_6 Leak Detector Sensitivity Testing	7/31/98	*Complete
Criticality Accident Alarms for Nearby Buildings	12/15/98	7/31/98
Materials Control and Accountability Manuals and Procedures	Complete	12/31/97
Receipts Based on Measured Values	Complete	12/31/98
DOE Materials Stored in Leased Space	Complete	Complete

ISSUES SPECIFIC TO PADUCAH

Issues	Status
C-360 Crane Upgrades	Complete
Criticality Accident Alarm System Coverage	Complete
Radioactive Calibration Source Accuracy	Complete
Fire Alarm System Reliability	Complete

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[3] All new or updated procedures should be issued by December 31, 1997, for Paducah and Portsmouth. Procedures that are designated as "in-hand" or that involve liquid uranium hexafluoride handling activities must be reviewed by the Plant Operations Review Committee (PORC) by March 3, 2002, if PORC did not review them as part of the upgrade program.

ISSUES SPECIFIC TO PADUCAH

Issues	Status
Fire Protection Water System Reliability	Complete
Fire Protection Equipment	Complete
Fire Protection Pre-Fire Plans	*Complete
Public Warning Sirens and Controls	*Complete
Public Address System	*Complete
Training for Emergency Response Organization	Complete
Seismic Capability of Buildings C-331 and C-335	12/31/97[4]
Environmental Trending Procedures	Complete
High-Volume Ambient Air Samplers	*Complete
Criticality Accident Alarm System - Horn Audibility	12/15/98
Cascade Cell Trip Function Requirements	Complete
Measurement Systems	Complete
Inventory Program for Uranium Holdup	Complete

ISSUES SPECIFIC TO PORTSMOUTH

Issues	Status
X-705 Evaporator Heat Exchanger Modifications	Complete
X-705 Isolation Valve Testing	Complete
X-705 Microfiltration Influent pH Shutdown System Replacement	Complete
Nuclear Criticality Safety Training for Managers	Complete
Fire Protection Compensatory Measures	Complete
Fire Protection Sprinkler Testing	Complete
Emergency Packets	*Complete
Assessments	Complete
Training for Emergency Preparedness	Complete
Possession of Uranium Enriched to Greater Than 10% U235	1/31/99

[4] USEC submitted an amendment application that would delay installation of the modification; NRC is reviewing the amendment request.

APPENDIX C

AMENDMENTS TO CERTIFICATES OF COMPLIANCE

PADUCAH

Title	Submittal Date	Status[1]	Compl. Plan Issue[2]
Cascade Cell Trip Function	9/30/96	Issued	Issue 48
Autoclave Manual Isolation System	10/31/96	Issued	Issue 3
Autoclave Containment Valves Pressure Decay Testing	12/23/96	Issued	Issue 3
Feed Facility Crane Design Features	2/14/97	Issued	No
Definition of Completion Times	2/28/97	Issued	No
Revision to Fundamental Nuclear Materials Control and Accountability Plan and Compliance Plan Issue	3/4/97	Issued	Issue A.2
MC&A Accountability Scale Usage	3/17/97	Issued	No
Administrative Controls on Overtime	3/31/97	Issued	Issue 42
Fire Protection/Movement Prevention System	3/31/97	Issued	No
Cascade Cell Trip Function	4/14/97	In Progress-decision published in FR	No
Buildings C-331 and C-335, Seismic Upgrades	4/23/97	In Progress	Issue 36

[1] Status as of September 30, 1997.

[2] Amendments that are related to a Compliance Plan issue are either required by the Compliance Plan to resolve the issue or were submitted to modify a commitment in the Compliance Plan.

AMENDMENTS TO CERTIFICATES OF COMPLIANCE

PADUCAH

Nuclear Criticality Safety Program Elements	6/16/97	In Progress-decision published in FR	No
High-Volume Ambient Air Samplers	6/26/97	Withdrawn	Issue 38
Revise Safety Analysis Report Date	7/18/97	In Progress	Issue 2
Autoclave Upgrades / Low Instrument Air Pressure and Extended Downtime	8/11/97	In Progress-decision published in FR	Issue 3
Safety Analysis Report Upgrade Revision	8/18/97	In Progress	Issue 2
Closure of C-360 Autoclave Isolation Valves Following UF_6 Detection	8/29/97	In Progress	No
Product and Tails Withdrawal CAAS	9/15/97	In Progress	No

AMENDMENTS TO CERTIFICATES OF COMPLIANCE

PORTSMOUTH

Title	Submittal Date	Status[3]	Compl. Plan Issue
Withdrawal Stations Standby Operational Mode	11/8/96	Issued	No
Change to Technical Safety Requirements for Administrative Controls on Overtime	12/23/97	Issued	Issue 37
Additional Hypothetical Criticality Case for X-333	2/13/97	In Progress	No
Definition of Completion Times	2/28/97	Issued	No
Air Gap Design Feature	4/28/97	Issued	No
Deletion of Seal Exhaust Pump Overflows in Buildings X-330 and X-333	5/6/97	In Progress	No
Scale Pit Raschig Rings	5/16/97	Issued	No
Autoclave Containment Valve Pressure Decay Testing	6/9/97	In Progress	Issue 3
Nuclear Criticality Safety Program Elements	6/16/97	In Progress	No
Autoclave Upgrades	7/1/97	In Progress	Issue 3
Revise Safety Analysis Report Date	7/18/97	In Progress	Issue 2
Autoclave Smoke Detection System	7/30/97	In Progress	No
Safety Analysis Report Upgrade Revision	8/18/97	In Progress	Issue 2

[3] Status as of September 30, 1997.

APPENDIX D

NRC INSPECTION REPORT SUMMARY
FOR THE PERIOD
MARCH 3, 1997 - SEPTEMBER 30, 1997

PADUCAH

Insp. Report No.	Date of Report	Dates of Inspection	Areas Inspected	Violation
97-203	4/25/97	3/24/97 - 3/27/97	Fire Protection	1 Level IV
97-202	5/15/97	3/24/97 - 4/18/97	Chemical Process Safety	None
97-201	5/16/97	3/17/97 - 3/21/97 3/31/97 - 4/4/97	Nuclear Criticality Safety	2 Level IV
97-204	5/30/97	4/28/97 - 5/2/97	MC&A Safeguards	None
97002	5/30/97	3/3/97 - 4/21/97	Operations, Maintenance Engineering, Plant Support	8 Level IV 1 NCV
97005	6/24/97 9/22/97	5/5/97 - 5/9/97	Security	1 Level III 2 NCV
97003	7/2/97	4/22/97 - 6/2/97	Operations, Maintenance, Engineering, Plant Support	6 Level IV 2 NCV
97004	8/5/97	6/3/97 - 7/14/97	Operations, Maintenance, Engineering, Plant Support	6 Level IV
97-205	8/12/97	7/14/97 - 7/18/97	MC&A Safeguards	None

NRC INSPECTION REPORT SUMMARY
FOR THE PERIOD
MARCH 3, 1997 - SEPTEMBER 30, 1997

PORTSMOUTH

97-206	8/21/97	7/21/97 - 7/25/97	Chemical Safety	None
97-207	9/17/97	8/18/97 - 8/22/97	Fire Protection	None
97007	9/24/97	7/15/97 - 9/12/97	Operations, Maintenance, Engineering, Security, Environmental Protection	5 Level IV 1 Apparent Violation
97009	10/17/97	9/8/97 - 9/12/97	Quality Assurance Program	1 Level IV

NRC INSPECTION REPORT SUMMARY
FOR THE PERIOD
MARCH 3, 1997 - SEPTEMBER 30, 1997

PORTSMOUTH

Insp. Report No.	Date of Report	Dates of Inspection	Areas Inspected	Violation
97-201	4/17/97	3/17/97 - 3/21/97	MC&A Safeguards	None
97002	5/9/97	3/3/97 - 4/6/97	Operations, Maintenance, Engineering, Plant Support	2 Level IV
97-202	5/15/97	4/14/97 - 4/18/97	Fire Safety	None
97-204	6/16/97	5/5/97 - 5/23/97	Chemical Process Safety	None
97003	6/20/97	4/7/97 - 5/18/97	Operations, Maintenance, Engineering, Plant Support	4 Level IV 4 NCV
97-203	6/27/97	4/28/97 - 5/2/97 5/27/97 - 5/30/97	Nuclear Criticality Safety	3 Level IV 2 NCV
97004	7/18/97	5/19/97 - 6/29/97	Operations, Engineering, Plant Support	3 Level IV 2 NCV
97-205	8/7/97	7/7/97 - 7/11/97	MC&A Safeguards	None
97007	9/9/97	7/29/97 - 8/1/97	Loss of Steam Supply Event	None

NRC INSPECTION REPORT SUMMARY
FOR THE PERIOD
MARCH 3, 1997 - SEPTEMBER 30, 1997

PORTSMOUTH

97005	9/10/97	6/30/97 - 8/10/97	Operations, Maintenance, Engineering, Plant Support	2 Level IV 1 NCV
97-207	9/11/97	8/11/97 - 8/15/97	Chemical Process Safety	None
97-206	9/29/97	7/21/97 - 7/25/97	Nuclear Criticality Safety	3 Level IV 2 NCV
97009	10/20/97	9/11/97 - 9/13/97	Emergency Preparedness Exercise	None
97-208	10/14/97	9/15/97 - 9/19/97	Fire Safety	None
97006	10/20/97	9/2/97 - 9/5/97	Security	2 Level IV

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

CHAIRMAN

The Honorable Dan Schaefer, Chairman
Subcommittee on Energy and Power
Committee on Commerce
United States House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

The Energy Policy Act of 1992 modified the Atomic Energy Act to require the U. S. Nuclear Regulatory Commission to prepare an annual report to Congress discussing the status of health, safety, and environmental conditions at the gaseous diffusion plants (GDPs) located near Paducah, Kentucky, and Portsmouth, Ohio. The NRC assumed regulatory oversight of the GDPs from the U. S. Department of Energy on March 3, 1997.

Attached is the first NRC Annual Report to Congress, covering events occurring from March 3, 1997, to September 30, 1997. In addition, the United States Enrichment Corporation (USEC) is pursuing development and licensing of Atomic Vapor Laser Isotope Separation (AVLIS) technology as an alternate method to enrich uranium. NRC has had some preliminary meetings with USEC to lay the groundwork for USEC's AVLIS licensing application. A discussion of AVLIS is included in the Annual Report since the availability of AVLIS technology has the potential to impact gaseous diffusion plant operations.

Sincerely,

Shirley Ann Jackson

Enclosure: Annual Report to Congress
on the Gaseous Diffusion Plants
Located in Paducah, Kentucky and
Portsmouth, Ohio

cc: Representative Ralph Hall

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

CHAIRMAN

The Honorable James M. Inhofe, Chairman
Subcommittee on Clean Air, Wetlands, Private
Property and Nuclear Safety
Committee on Environment and Public Works
United States Senate
Washington, DC 20510

Dear Mr. Chairman:

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Attached is the first NRC Annual Report to Congress, covering events occurring from March 3, 1997, to September 30, 1997. In addition, the United States Enrichment Corporation (USEC) is pursuing development and licensing of Atomic Vapor Laser Isotope Separation (AVLIS) technology as an alternate method to enrich uranium. NRC has had some preliminary meetings with USEC to lay the groundwork for USEC's AVLIS licensing application. A discussion of AVLIS is included in the Annual Report since the availability of AVLIS technology has the potential to impact gaseous diffusion plant operations.

Sincerely,

Shirley Ann Jackson

Enclosure: Annual Report to Congress
on the Gaseous Diffusion Plants
Located in Paducah, Kentucky and
Portsmouth, Ohio

cc: Representative Senator Bob Graham

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

CHAIRMAN

The Honorable Frank Murkowski, Chairman
Committee on Energy
United States Senate
Washington, DC 20510

Dear Mr. Chairman:

The Energy Policy Act of 1992 modified the Atomic Energy Act to require the U. S. Nuclear Regulatory Commission to prepare an annual report to Congress discussing the status of health, safety, and environmental conditions at the gaseous diffusion plants (GDPs) located near Paducah, Kentucky, and Portsmouth, Ohio. The NRC assumed regulatory oversight of the GDPs from the U. S. Department of Energy on March 3, 1997.

Attached is the first NRC Annual Report to Congress, covering events occurring from March 3, 1997, to September 30, 1997. In addition, the United States Enrichment Corporation (USEC) is pursuing development and licensing of Atomic Vapor Laser Isotope Separation (AVLIS) technology as an alternate method to enrich uranium. NRC has had some preliminary meetings with USEC to lay the groundwork for USEC's AVLIS licensing application. A discussion of AVLIS is included in the Annual Report since the availability of AVLIS technology has the potential to impact gaseous diffusion plant operations.

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on the Gaseous Diffusion Plants
Located in Paducah, Kentucky and
Portsmouth, Ohio

cc: Senator Dale Bumpers

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

CHAIRMAN

The Honorable Pete V. Domenici, Chairman
Subcommittee on Energy and Water Development
Committee on Appropriations
United States Senate
Washington, DC 20510

Dear Mr. Chairman:

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cc: Senator Harry Reid

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

CHAIRMAN

The Honorable Joseph M. McDade, Chairman
Subcommittee on Energy and Water Development
Committee on Appropriations
United States House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

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cc: Representative Vic Fazio