October 11, 2006

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
USEC Inc.	)	Docket No. 70-7004
	)	
(American Centrifuge Plant)	)	ASLBP No. 05-838-01-ML
	)	

NRC STAFF'S PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW IN THE MANDATORY HEARING

I. INTRODUCTION

1.1 These findings and rulings address the application filed by USEC Inc. ("USEC" or "the Applicant") for a license, under 10 C.F.R. Parts 30, 40, and 70 to possess and use byproduct, source, and special nuclear material (SNM) in a gas centrifuge uranium enrichment facility. These findings address the mandatory hearing required by the Atomic Energy Act. 42 U.S.C. § 2239(g). For the reasons stated below, the Board makes the following findings of facts and conclusions of law.

II. PROCEDURAL BACKGROUND

2.1 On August 23, 2004, USEC filed an application to construct and operate a gas centrifuge uranium enrichment facility, to be known as the American Centrifuge Plant ("ACP"), in Piketon, Ohio. The NRC staff ("Staff") published a "Notice of Receipt of Application for a License; Notice of Availability of Applicant's Environmental Report; Notice of Consideration of Issuance of License; and Notice of Hearing and Commission Order" ("Notice of Hearing") in the *Federal Register* on October 18, 2004. 69 Fed. Reg. 61411 (Oct. 18, 2004).

2.2 As set forth in the Notice of Hearing, the Commission directed the Atomic Safety and Licensing Board ("Board") to conduct a hearing in accordance with 10 C.F.R. Part 2 and to

make certain findings required by 10 C.F.R. § 2.104(b), discussed further below. 69 Fed. Reg. at 61411-12. The Commission also indicated that, if petitions to intervene were filed, the Commission would determine the issue of standing and refer petitions from individuals or groups with the requisite standing for a determination on the admissibility of the petitioners' proffered contentions. *Id.* at 61412.

2.3 Two petitions to intervene were filed in the proceeding; one by Portsmouth/Piketon Residents for Environmental Safety and Security ("PRESS") and a second by Geoffrey Sea. The Commission determined that both PRESS and Mr. Sea had standing to intervene, and referred the question of the admissibility of PRESS's proposed contentions to the Board. *USEC Inc.* (ACP), CLI-05-11, 61 NRC 309, 310 (2005).

2.4 On May 17, 2005, after the petitions to intervene from PRESS and Mr. Sea were referred by the Commission, this Board was established to rule on petitions for hearing and for leave to intervene, and to preside over the adjudicatory proceeding to be held in connection with the USEC application pursuant to 10 C.F.R. § 2.104(b). "Establishment of Atomic Safety and Licensing Board," May 17, 2005. The Board ultimately found that neither PRESS nor Mr. Sea had proffered an admissible contention. *USEC Inc.* (ACP), LBP-05-28, 62 NRC 585 (2005); *aff'd ACP*, CLI-06-09, 63 NRC 451 (2006) (Sea Contentions); *aff'd USEC Inc.* (ACP), CLI-06-10, 63 NRC 433 (2006) (PRESS Contentions).

2.5 This Board requested documents related to the Staff's review of the License Application ("Application"). Order (Request for Documents and Briefings), April 19, 2006; Memorandum and Order (Ruling on Motion for Modification and Clarification), May 31, 2006. The Board requested, and the Staff and USEC provided, copies of the Application, including the Emergency Plan (EP), Integrated Safety Analysis (ISA) calculations previously submitted to the Staff, the Physical Security Plan, the Fundamental Nuclear Material Control Plan, and the Environmental Report (ER); the ISA Summary; the Staff's final Environmental Impact Statement

(FEIS), NUREG-1834, “Environmental Impact Statement for the Proposed American Centrifuge Plant in Piketon, Ohio,” Final Report (2006); the Staff’s Safety Evaluation Report (SER), NUREG-1851, “Safety Evaluation Report for the American Centrifuge Plant in Piketon, Ohio” (2006); Staff Requests for Additional Information (RAIs) and USEC Responses; and information related to presentations to the Advisory Committee on Nuclear Waste (ACNW) related to the license application.

2.6 This Board also requested that the Staff, after completing the SER and FEIS and submitting them to the Board, provide proposed findings of fact and conclusions of law based upon the Staff’s review, as outlined in the SER and FEIS.

2.7 The SER and FEIS and the proposed findings represent the Staff’s conclusions based on its review of the Application and associated documents from the Applicant. Following the issuance of the Board’s final initial decision and the grant of the license (assuming the Agency decision is to issue a license), construction of the facility may begin. In accordance with 10 C.F.R. § 70.72(d)(2), the Applicant (then Licensee) will submit to the Staff annual updates to the ISA Summary during construction along with a brief summary of any changes to the facility design made during the year. In addition, the Applicant has committed to provide to the Staff an update to the ISA Summary at least 180-days prior to the planned introduction of special nuclear material into the ACP facility. The Staff will review these submissions as well as any license amendment requests that may be submitted. Although the Applicant (then Licensee) can start construction following issuance of the license, it may not begin operation of the enrichment facility until after it successfully completes a second step. Prior to operation, the Staff must verify through inspection that the facility has been constructed in accordance with the requirements of the license pursuant to 10 C.F.R. § 70.32(k). Only after this step is successfully completed will the ACP be permitted to begin operations. SER at xvii.

III. LEGAL STANDARDS AND REGULATORY GUIDANCE

A. Regulatory Requirements

3.1 For license applications for uranium enrichment facilities, the NRC must hold a hearing whether or not the issuance of the application is contested. Atomic Energy Act Section 189a, 42 U.S.C. § 2239(g); *see also* 10 C.F.R. §§ 70.23a and 70.31(e) (requiring a hearing for uranium enrichment facility licenses). These types of hearings are known as "uncontested" or "mandatory" hearings. This is in contrast to a "contested" hearing, which will take place if "(1) there is a controversy between the NRC Staff and the Applicant concerning the issuance of a license or any of the terms thereof, or (2) a petition for leave to intervene in opposition to the application has been granted or is pending before the Commission." 10 C.F.R. § 2.4. If a license application for a type of facility subject to the mandatory hearing requirement is contested, the hearing will be bifurcated into contested and uncontested portions on an issue-by-issue basis. *Exelon Generation Company, LLC* (Early Site Permit for Clinton ESP Site), CLI-05-17, 62 NRC 5, 34 (2005).

3.2 For contested hearings, 10 C.F.R. § 2.104(b)(1) requires the Board to consider:

> (i) Whether in accordance with the provisions of § 50.35(a) of [10 C.F.R., regarding the issuance of construction permits for nuclear power reactors]:
>
> > (a) The Applicant has described the proposed design of the facility, including, but not limited to, the principal architectural and engineering criteria for the design, and has identified the major features or components incorporated therein for the protection of the health and safety of the public;
> >
> > (b) Such further technical or design information as may be required to complete the safety analysis, and which can reasonably be left for later consideration will be supplied in the final safety analysis report;
> >
> > (c) Safety features or components, if any, which require research and development, have been described by the Applicant and the Applicant has identified, and there will be conducted, a research and development program reasonably designed to resolve any

> safety questions associated with such features or components; and
>
> (d) On the basis of the foregoing, there is reasonable assurance that (1) such safety questions will be satisfactorily resolved at or before the latest date stated in the application for completion of the proposed facility; and (2) taking into consideration the site criteria contained in Part 100 of this chapter, the proposed facility can be constructed and operated at the proposed location without undue risk to the health and safety of the public;
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> (ii) Whether the Applicant is technically qualified to design and construct the proposed facility;
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> (iii) Whether the Applicant is financially qualified to design and construct the proposed facility;
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> (iv) Whether the issuance of a permit for the construction of the facility will be inimical to the common defense and security or to the health and safety of the public;
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> (v) If the application is for a construction permit for a nuclear power reactor, a testing facility, a fuel reprocessing plant, or other facility whose construction or operation has been determined by the Commission to have a significant impact on the environment, whether, in accordance with the requirements of Subpart A of Part 51 of this chapter, the construction permit should be issued as proposed.

3.3 For hearings on uncontested applications (or on uncontested portions of otherwise contested applications), the Board, pursuant to 10 C.F.R. § 2.104(b)(2), must consider the following:

> (i) Without conducting a *de novo* evaluation of the application, whether the application and the record of the proceeding contain sufficient information, and the review of the application by the Commission's staff has been adequate to support affirmative findings on (b)(1)(i) through (iii) specified in [10 C.F.R. § 2.104] and a negative finding on (b)(1)(iv) specified in [§ 2.104] proposed to be made and the issuance of the construction permit proposed by the . . . Director of Nuclear Material Safeguards and Safety . . . and
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> (ii) If the application is for a construction permit for a nuclear reactor, a testing facility, a fuel processing plant, a uranium enrichment facility, or other facility whose construction or operation has been determined by the Commission to have a

> significant impact on the environment, whether the review conducted by the Commission pursuant to the National Environmental Policy Act (NEPA) has been adequate.

3.4 In addition, pursuant to 10 C.F.R. § 51.105(a), the Board must make the following determinations regarding NEPA issues:

> (1) Determine whether the requirements of section 102(2)(A), (C) and (E) of NEPA and the regulations in [10 C.F.R. Part 51, Subpart A] have been met;
>
> (2) Independently consider the final balance among conflicting factors contained in the record of the proceeding with a view to determining the appropriate action to be taken; and
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> (3) Determine, after weighing the environmental, economic, technical, and other benefits against environmental and other costs, and considering reasonable alternatives [to the proposed action], whether the construction permit . . . should be issued, denied, or appropriately conditioned to protect environmental values.

3.5 On July 28, 2005, the Commission issued a Memorandum and Order responding to six questions certified by the ASLB Panel concerning the NRC's statutory duty to conduct a mandatory (or uncontested) hearing for certain license applications. *Clinton ESP,* CLI-05-17, 62 NRC 5. Among the questions raised was whether in uncontested hearings the Board should conduct a *de novo* review of the license application or whether the Board should instead determine only whether the Staff's review of the application was sufficient. The Commission determined that a *de novo* review is not necessary for mandatory hearings. Rather, "when considering safety and environmental matters not subject to the adversarial process – so-called 'uncontested' issues – the boards should decide simply whether the safety and environmental record is 'sufficient' to support license issuance. In other words, the boards should inquire whether the NRC staff performed an adequate review and made findings with reasonable support in logic and fact." *Id.* at 34. With respect to NEPA considerations, the Commission stated that "licensing boards must reach their own independent determination on uncontested

NEPA 'baseline' questions–*i.e.*, whether the NEPA process 'has been complied with,' what is the appropriate 'final balance among conflicting factors,' and whether the construction permit should be issued, denied or appropriately conditioned.'" *Id.* at 45.

B. NRC Guidance

3.6 The Staff has developed generic guidance for reviewing applications for licenses for fuel cycle facilities, including enrichment and fuel fabrication facilities, in NUREG-1520, "Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility" (2002) (NUREG-1520). The Staff also uses additional applicable guidance for some particular areas of review, including, for example, additional guidance documents applicable to material control and accounting and physical security at fuel cycle facilities: NUREG-1757, "Consolidated NMSS Decommissioning Guidance" (2003); NUREG-1065, "Acceptable Standard Format and Content for the Fundamental Nuclear Material Control (FNMC) Plan Required for Low-Enriched Uranium Facilites" (1995); and Regulatory Guide 5.59, "Standard Format and Content for a Licensee Physical Security Plan for the Protection of Special Nuclear Material of Moderate to Low Strategic Significance" (1983).

IV. FINDINGS OF FACT

A. SER, Chapter 1, "General Information"

4.1 Chapter 1 of the SER describes the Staff's review of the information in the Application related to the facility and process descriptions. SER at 1-1. 10 C.F.R. § 30.33, 10 C.F.R. § 40.32, and 10 C.F.R. § 70.22 require each license application to include information on the proposed activities to be conducted at the site and the equipment and facilities to be used by the Applicant to protect health and minimize danger to the public. In addition, pursuant to 10 C.F.R. § 70.65, each application must include a general description of the facility that emphasizes areas that could affect safety. In conducting its review of the facility and process description, the Staff followed the guidance in Chapter 1 of NUREG-1520, which is applicable to

the USEC facility in its entirety. *Id.*

4.2 The facility and process description in an application must conform with 10 C.F.R. § 70.22, "Contents of Applications," and 10 C.F.R. § 70.65(b)(1)-(3), "Additional Content of Applications." NUREG-1520 lists the following acceptance criteria for determining whether an application conforms with these regulatory requirements: (1) The application presents information at a level of detail that is appropriate for general familiarization and understanding of the proposed facility and processes; (2) The application summarizes the facility information contained in the ISA Summary, including descriptions of the overall facility layout on scaled drawings, the site's geographical features and facility structural features and transportation right-of-ways, and the relationship of specific facility features to the major processes that will be ongoing at the facility; (3) The major chemical or mechanical processes involving licensable quantities of SNM are described in summary form, based in part on information in the ISA Summary, and including reference to the building locations of major process components, brief descriptions of process steps, the chemical forms and maximum amounts of SNM in process, and the types, amounts and discharge points of waste materials; and (4) The application presents a summary identification of the raw materials, by-products, wastes, and finished products of the facility. NUREG-1520 at 1-2.

4.3 Because the Staff followed the guidance in Chapter 1 of NUREG-1520, the Staff reviewed the information provided by the Applicant against the acceptance criteria listed above. The review confirmed that the Applicant provided a summary description of the proposed gas centrifuge uranium enrichment plant and processes, a summary of the information contained in the ISA Summary, described the major chemical and mechanical processes involving licensable quantities of SNM, and identified the raw materials, by-products, wastes, and finished products expected at the facility. SER at 1-3 to 1-4. The facility and process description information explained that the ACP is to be located at the U.S. Department of Energy's (DOE) Portsmouth

Gaseous Diffusion Plant (PORTS) reservation in Piketon, Ohio, in refurbished existing buildings, newly constructed facilities, and grounds to be leased from DOE. *Id.* at 1-1.

4.4 Based on its review pursuant to NUREG-1520 of the information provided in the Application, the Staff found that the Applicant met all regulatory requirements and acceptance criteria applicable to Chapter 1 of NUREG-1520. Specifically, the Staff found the Applicant has adequately described: (1) the facility and processes so that the Staff has an overall understanding of the relationships of the facility features; and (2) the function of each feature. SER at 1-3 to 1-4.

4.5 The Applicant's institutional information must comply with 10 C.F.R. § 70.22, "Contents of Applications"; 10 C.F.R. § 70.65(b)(1)-(3), "Additional Contents of Applications"; 10 C.F.R. § 70.33, "Renewal of Licenses"; and 10 C.F.R. Part 95, "Security Facility Approval and Safeguarding of National Security Information and Restricted Data." NUREG–1520 lists acceptance criteria for gauging whether or not an application complies with the applicable regulations. These acceptance criteria are:

> (1) Corporate Identity. The Applicant will furnish its name and address and the address of the facility, along with a full description of the site location. If the application is a corporation or other entity, the names and citizenship of its principal officers are provided, along with any information concerning the control or ownership of the Applicant by any alien, foreign corporation or foreign government. Primary ownership and relationships to other components of the same relationship are explicitly described, as are the presence and operations of any other company on the site to be licensed.
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> (2) Financial Qualifications. A description of financial qualifications demonstrates the Applicant's current and continuing access to the financial resources necessary to engage in the proposed activity in accordance with 10 C.F.R. §§ 70.22(a)(8) and 70.23(a)(5).
>
> (3) Type, Quantity, and Form of Licensed Material. An identification of the elemental name, maximum quantity, and specifications, including the chemical and physical

> form(s), isotopic content and amount of enrichment by weight percent, of the SNM that the Applicant proposes to acquire, deliver, receive, possess, produce, use, transfer, or store.
>
> (4) Authorized Uses. A summary, non-technical narrative description consisted with the Atomic Energy Act of 1954 and more detailed process descriptions submitted as part of the ISA summary is provided for each activity or process in which the Applicant proposes to acquire, deliver, receive, possess, produce, use, transfer, or store SNM.
>
> (5) Special Exemptions or Special Authorizations. Specific requests for exemptions or authorizations of an unusual nature should be listed in this section and justified in the appropriate technical section of the application.
>
> (6) Security of Classified Information. If applicable, the Applicant has requested and received a facility security clearance in accordance with 10 C.F.R. Part 95.

NUREG-1520 at 1-4 to 1-5.

4.6 The Staff reviewed the portions of the Application related to institutional information against the acceptance criteria listed above. SER at 1-4 to 1-18. All areas referred to in the acceptance criteria were described. Based on its review, the Staff found that the Applicant has adequately described and documented the corporate identity, structure, and financial information, and is in compliance with those parts of 10 C.F.R.§ 30.32, 10 C.F.R. § 40.31, 10 C.F.R. § 70.22, and 10 C.F.R. § 70.65 related to institutional information. SER at 1-17. In addition, the Staff found that in accordance with 10 C.F.R. § 30.32, 10 C.F.R. § 40.31, and 10 C.F.R. § 70.22(a)(2) and (4), the Applicant has adequately described the types, forms, and quantities and proposed purpose and authorized uses of licensed materials to be permitted at the facility. *Id.* The Applicant provided information on seven exemption requests and one special authorization request related to radiation protection, criticality monitoring alarms, event reporting, liability insurance, and decommissioning funding that meet the requirements of 10 C.F.R. § 40.14 and 10 C.F.R. § 70.17. SER at 1-11 to 1-14.

The Applicant has also adequately described information related to Foreign Ownership, Control or Influence (FOCI), 10 C.F.R. § 40.38, and 10 C.F.R. § 70.40, and its plans to secure classified matter for a facility clearance under 10 C.F.R. Part 95. *Id.* at 1-5, 1-14 to 1-16. The Staff concluded that the Applicant has met the requirements and acceptance criteria in Section 1.2.4.3 of NUREG-1520, however, the Staff did impose several license conditions, as described below. *Id.*

4.7 The Staff reviewed the Applicant's financial qualifications and, based on the Applicant's status as a pre-existing, publicly held global energy company with total assets over $2 billion, found that the Applicant appears to be financially qualified to build and operate the proposed ACP. In addition, to ensure the Applicant meets the financial qualifications requirements for construction and operation of the facility, the Staff conditioned its approval of the application on the imposition of the following license conditions:

> *Construction of each incremental phase of the ACP shall not commence before funding for that increment is available or committed. Of this funding, USEC Inc. must have in place before constructing such increment, commitments for one or more of the following: equity contributions from USEC Inc., affiliates and/or partners, along with lending and/or lease arrangements that solely or cumulatively are sufficient to ensure funding for the particular increment's construction costs. USEC Inc. shall make available for NRC inspection documentation of both the budgeted costs for such phase and the source of funds available or committed to pay those costs.*
>
> *Operation of the ACP shall not commence until USEC Inc. has in place either: (1) long term contracts lasting five years or more that provide sufficient funding for the estimated cost of operating the facility for the five year period; (2) documentation of the availability of one or more alternative sources of funds that provide sufficient funding for the estimated cost of operating the facility for five years; or (3) some combination of (1) and (2).*

SER at 1-16.

4.8 The Staff reviewed the information provided by the Applicant on liability insurance and found that the information meets the requirements of 10 C.F.R. § 140.13b. However, because full liability insurance coverage will not be provided until prior to receipt of

licensed material, the Staff conditioned its approval of the application on the imposition of the license condition provided in Section 1.2.3.3.3 of the SER:

> *USEC Inc. shall provide to the Commission, at least 120 days prior to the planned date for obtaining licensed material, documentation of any liability insurance required to be obtained by USEC Inc. under its lease with DOE for the ACP by that time or, alternatively, the status of USEC Inc.'s efforts to obtain any such liability insurance. During the time that USEC Inc. is engaged in efforts to obtain liability insurance, USEC Inc. shall provide the Commission with status reports regarding those efforts. The status reports shall be submitted at a frequency of at least once every six months following issuance of a license. USEC Inc. shall notify the Commission within 30 days upon receiving notification of denial or approval of commercial liability insurance for the ACP. If commercial liability insurance is required to be obtained under its lease with DOE, within 60 days of receiving notification of approval of commercial liability insurance, USEC Inc. shall provide proof of liability insurance coverage and a justification, for Commission review and approval, if USEC Inc. is proposing to provide less than $300 million of liability insurance coverage.*

SER at 1-17.

4.9 The Staff reviewed the Applicant's request to possess uranium enriched in ^{235}U up to 10 wt%. If a license is issued in 2007 and operations subsequently begin at the ACP, the Applicant is not anticipated initially to produce uranium above 5 wt% in ^{235}U during the next several years since no demand for uranium above 5 wt% ^{235}U is anticipated. However, if the need for the ACP to generate uranium at enrichments between 5 and 10 wt% ^{235}U is created, then to allow NRC to confirm that no adverse safety or regulatory implications would result inside or outside the ACP (such as during transportation), the Staff conditioned its approval of the application on the imposition of the following license condition:

> *USEC Inc. shall provide a minimum 60-day notice to the NRC prior to initial customer product withdrawal of licensed material exceeding 5 wt. percent ^{235}U enrichment. This notice shall identify the necessary equipment and operational changes to support customer product shipment for these assays.*

SER at 1-17.

4.10 The Staff reviewed the Applicant's "Security Plan for the Protection of Classified Matter" and found it to satisfy the requirements of 10 C.F.R. Part 95. Because a specific facility

for use and storage of classified matter had not been identified other than as provided under DOE authority, the Staff conditioned its approval of the application on the imposition of the following license condition:

> *The licensee shall not use, process, store, reproduce, transmit, handle, or allow access to classified matter except provided by applicable personnel and facility clearances as required under 10 CFR Part 95.*

SER at 1-17.

4.11 Information related to the site description must comply with 10 C.F.R. § 70.22, "Contents of Applications." NUREG–1520 lists acceptance criteria for gauging whether or not an application provides sufficient information in the site description. These are whether the Application: (1) briefly describes site geography, including the facility's location relative to prominent natural and man-made features and the site boundary and controlled area; (2) provides population information based on the most current available census data to show population distribution as a function of distance from the facility; (3) addresses appropriate meteorologic data, including a summary of design-basis values for accident analysis of maximum snow or ice load, probable maximum precipitation, and severe weather conditions that are applicable to the site; (4) includes a summary description of the hydrology and geology for the area, cites the design-basis flood event for which the facility may safely be shut down, and provides earthquake accelerations for the site associated with a 250-year and 500-year earthquake; and (5) is consistent with the more detailed information presented within the ISA Summary, the ER, and the EP. NUREG-1520 at 1-7 to 1-8.

4.12 The Staff reviewed the site description information provided by the Applicant against the acceptance criteria listed above. The Applicant provided complete information related to each of the acceptance criteria. SER at 1-18 to 1-35.

4.13 Based on its review pursuant to NUREG-1520, the Staff found that the Applicant has adequately described and summarized general information pertaining to: (1) the site

geography, including its location relative to prominent natural and man-made features such as mountains, rivers, airports, population centers, schools, and commercial and manufacturing facilities; (2) population information on the basis of the most current available census data to show population distribution as a function of distance from the facility; (3) meteorology, hydrology, and geology for the site; and (4) applicable design basis events. SER at 1-35. The Staff reviewer verified that the site description is consistent with the information used as a basis for the ER, the EP, and ISA Summary; and that it demonstrates compliance with regulatory requirements in 10 C.F.R. § 30.33, 10 C.F.R. § 40.32, 10 C.F.R. § 70.22, and 10 C.F.R. § 70.65(b)(1). *Id.*

B. SER, Chapter 2, "Organization and Administration

4.14 Chapter 2 of the SER describes the Staff's review of information in the Application related to descriptions of the Applicant's proposed organization and administration, including management policies that provide reasonable assurance that the licensee plans, implements, and controls site activities in a manner that ensures the safety of workers and the public and adequately protects the environment. 10 C.F.R. §§ 70.22 and 70.23 pertain to the establishment of a management system and administrative procedures. The Staff's review of the information in the Application for compliance with sections 70.22 and 70.23 was guided by Chapter 2 of NUREG-1520, "Organization and Administration." The information in Chapter 2 of NUREG-1520 applicable to new facilities is applicable to the ACP in its entirety. SER at 2-1.

4.15 Chapter 2 of NUREG-1520 includes acceptance criteria used by the Staff to determine whether the Application complies with 10 C.F.R. §§ 70.22, 70.23, and 70.62(d). NUREG-1520 at 2-2. These acceptance criteria include whether: (1) an applicant has identified and functionally described the specific organizational groups that are responsible for managing the design, construction, and operation of the facility and has included organizational charts; (2) clear, unambiguous management controls and communications exist among the organizational

units that are responsible for managing the design and construction of the facility; (3) the personnel responsible for managing the design, construction, and operation of the facility have substantive breadth and level of experience and are appropriately available, and their qualifications, responsibilities, and authorities are clearly defined; and (4) an applicant has described specific plans to commission the facility's startup and operation. *Id.*

4.16 Guided by the acceptance criteria above, the Staff reviewed the information in the Application to determine compliance with 10 C.F.R. §§ 70.22, 70.23, and 70.62(d). The review indicated that the Applicant provided all required information. Specifically, the Application describes the organization for the proposed ACP, as well as the proposed organizational responsibilities and qualifications for the facility. SER at 2-2 to 2-8. The Application also describes management controls to ensure that the equipment, facilities and procedures, staff, and programs at the proposed ACP provide for the protection of the environment, and for the common defense and security. SER at 2-8 to 2-9. Finally, the review showed that the Applicant has described its plans and the management controls for pre-operational testing and initial start-up of the ACP covering the transition from the refurbishment/construction phase to the operations phase. SER at 2-9 to 2-11.

4.17 Based on its review of the Application, the Staff found that the Applicant had described the following organizational and administrative elements: (1) clear responsibilities and associated resources for the design, construction, and operation of the facility; and (2) its plans for managing and operating the project. SER at 2-11. The Staff concluded that the Applicant's plans and commitments provide reasonable assurance that an acceptable organization, administrative policies, and sufficient competent resources have been or will be established in such a manner as will allow for the safe operation of the facility. *Id.*

4.18 Based on the above, we find that the Staff has a reasonable basis for its conclusions, and that the record is sufficient with respect to proposed facility's organizational

and administrative elements to support license issuance.

C. SER Chapter 3, "Integrated Safety Analysis (ISA) and ISA Summary

4.19 Chapter 3 of the SER describes the Staff's review of the Applicant's Integrated Safety Analysis (ISA) and ISA Summary. The review was undertaken to determine whether the Application addresses appropriate hazards and baseline design criteria, whether the Application designates acceptable items relied on for safety (IROFS), whether the Application, with IROFS, meets performance requirements, and whether the programmatic commitments to maintain the ISA and ISA Summary are acceptable. The Staff's review considered whether the Application meets the regulatory requirements specified in 10 C.F.R. Part 70, Subpart H, in particular the requirements of 10 C.F.R. §§ 70.61, 70.62, 70.64, and 70.65.

4.20 The Staff's review of both the safety program and ISA commitments and the ISA Summary and ISA documentation was guided by the acceptance criteria in Chapter 3 of NUREG-1520, which is applicable, with three exceptions, to the review described in Chapter 3 of the SER in its entirety. SER at 3-3. The first exception is Section 3.4.3.2(4)(c), which includes acceptance criteria for criticality monitoring, a topic addressed in Chapter 5 of the SER. Second, Section 3.4.3.2(5)(b)(i-ix), regarding process hazard analysis methods to be used by an applicant not following NUREG-1513, "Integrated Safety Analysis Guidance Document" (2001), is not applicable because the Applicant has used methods described in NUREG-1513. Third, portions of Section 3.4.3.2(9) regarding qualitative methods of defining and evaluating likelihood are not applicable because the Applicant has used a quantitative method. *Id.*; NUREG-1520 at 3-24 to 3-27.

4.21 The Staff's review of the information in the Application regarding the Safety Program and ISA Commitments was guided by Section 3.4.3.1 of NUREG-1520. The Staff reviewed the Safety Program and ISA Commitments in order to determine whether the three key elements of the safety program identified in 10 C.F.R. § 70.62(a), process safety

information, the ISA, and management measures, demonstrate regulatory compliance. The Staff also conducted its review to confirm that records will be established and maintained that will document each discovery of an IROFS or a management measure that has failed or degraded such that the IROFS or the management measure cannot perform its intended safety function. SER at 3-5. With regard to process safety information, the Staff's review found that the Applicant will compile and maintain process information addressing: (1) the hazards of materials used or produced in the process; (2) the description of the technology of the process; (3) equipment used in the process; and (4) assurance that chemicals not related to the licensed material are evaluated as necessary. The Applicant also commits to update process safety information as the design of the proposed ACP is finalized. *Id.* at 3-5 to 3-6. With regard to the ISA commitments, the Staff's review found that the Applicant identifies ISA program commitments that were used to establish the ISA process, including the performance of an ISA for each process that identifies the radiological hazards, chemical hazards that could increase radiological risk, chemical hazards from materials involved in processing licensed material, facility hazards that could increase radiological risk, potential accident sequences, consequences and likelihood of each accident sequence, and IROFS including the assumptions and conditions under which they support compliance with the performance requirements of 10 C.F.R. § 70.61. *Id.* at 3-6 to 3-7. The Applicant also commits to updating the ISA to account for any changes in the facility or its processes. With regard to management measures, the Staff's review found that the Applicant describes management measures that comprise the principal mechanism by which the reliability and availability of each IROFS are ensured. *Id.* at 3-7 to 3-8.

4.22 The Staff reviewed the Applicant's ISA Methodology pursuant to the guidance in Section 3.4.3.2 of NUREG-1520. SER at 3-8. The Staff's review included information in the ISA related to: (1) the identification and evaluation of hazards associated with ACP operation;

(2) the evaluation and definition of receptors for chemical and radiological consequences; (3) a discussion of the method used for evaluating the likelihood of an event; and (4) discussions of the potential chemical, radiological, and environmental consequences of events and hazards. *Id.* at 3-13 to 3-21. The Staff's review showed that the Applicant has used an adequate methodology to identify hazards related to this type of facility and credible events that could exceed the performance requirements of 10 C.F.R. § 70.61. *Id.* at 3-21. The Staff's review also found that the Applicant established appropriate definitions of likelihood and applied those definitions in an acceptable manner to demonstrate that intermediate consequence events are unlikely and that high consequence events are highly unlikely. *Id.*

4.23 Because the ACP is a new facility and, therefore, must comply with 10 C.F.R. § 70.64(a) and (b) in relation to baseline design criteria (BDC) and Defense-in-Depth practices, the Staff conducted an on-site review of the ISA related to the BDC and Defense-in-Depth practices. SER at 3-21. Applicants for new facility licenses must address 10 BDC: (1) quality standards and records; (2) natural phenomena hazards; (3) fire protection; (4) environmental and dynamic effects; (5) chemical protection; (6) emergency capability; (7) utility services; (8) inspection, testing, and maintenance; (9) criticality control; and (10) instrumentation and controls. The Staff reviewed the information on these BDCs and found that the Applicant appropriately addressed each BDC. *Id.* at 3-22 to 3-23. The Staff also reviewed information related to Defense-in-Depth practices. The review found that the facility design and operations are based on defense-in-depth practices, with controls selected with a preference for engineered controls over administrative controls when available. *Id.* at 3-23. Controls that are not credited to demonstrate compliance with 10 C.F.R. § 70.61 were incorporated into the control strategy for a postulated event whenever possible. *Id.* In many cases, these non-credited controls are expected to reduce challenges to IROFS in the case of an initiating event.

4.24 Based on its review, the Staff found that the Applicant's commitments to maintain process safety information and conduct and maintain an ISA are in accordance with the applicable guidance and regulations. The Staff considered the ISA methodology to be complete based on its use of the appropriate accident identification methodology from NUREG-1513. The Staff also found that the Applicant's likelihood and consequence evaluations conform to the applicable guidance in NUREG-1520. Finally, the Staff found that, as required by 10 C.F.R. § 70.64(a)-(b), the Applicant has appropriately addressed the BDC for new facilities and Defense-in-Depth practices for new facilities. SER at 3-24.

4.25 Based on the above, we find that the Staff has a reasonable basis for its conclusions, and that the record is sufficient with respect to proposed facility's ISA and ISA Summary to support license issuance.

D. SER Chapter 4, "Radiation Protection"

4.26 Chapter 4 of the SER describes the Staff's review of information related to the Applicant's radiation protection (RP) program. The purpose of the Staff's review is to determine whether the RP program is adequate to protect the radiological health and safety of the workers and to comply with the applicable regulatory requirements. The Staff's review of the adequacy of the Applicant's RP program is guided by Chapter 4 of NUREG-1520, which is applicable to the proposed ACP in its entirety.

4.27 The Applicant's RP program must address the occupational RP measures in 10 C.F.R. Parts 19, 20, and 70. Specifically, the Applicant must develop, document, and implement a RP program in accordance with 10 C.F.R. § 20.1101, which requires that:

> (a) Each licensee shall develop, document, and implement a radiation protection program commensurate with the scope and extent of licensed activities and sufficient to ensure compliance with the provisions of [10 C.F.R. Part 20].
>
> (b) The licensee shall use, to the extent practical, procedures and engineering controls based upon sound radiation protection

> principles to achieve occupational doses and doses to members of the public that are as low as reasonably achievable (ALARA).
> (c) The licensee shall periodically (at least annually) review the radiation protection program content and implementation.
>
> (d) To implement the ALARA requirement . . . and notwithstanding the requirements in § 20.1301 . . . a constraint on air emissions of radioactive material to the environment, excluding Radon-222 and its daughters, shall be established by licensees . . . such that the individual member of the public likely to receive the highest dose will not be expected to receive a total effective dose equivalent in excess of 10 mrem (0.1 mSv) per year from these emissions. If a licensee subject to this requirement exceeds this dose constraint, the licensee shall report the exceedance as provided in § 20.2203 and promptly take appropriate corrective action to ensure against recurrence.

4.28 Acceptance criteria used by the Staff in determining whether the Applicant's RP program provides adequate protection are listed in Chapter 4 of NUREG-1520. NUREG-1520 at 4-2 to 4-12. These acceptance criteria are applicable in their entirety. SER at 4-2.

4.29 Acceptance criteria related to RP program implementation guide the Staff in determining whether the Applicant has complied with 10 C.F.R. Part 20, subpart B, "Radiation Protection Programs." NUREG-1520 at 4-2. Under these criteria, an applicant's RP program is acceptable if an applicant provides data and information in its application that meets each of the following commitments to: (1) design and implement an RP program that meets the regulatory requirements of 10 C.F.R. Part 20, subpart B; (2) outline the RP program structure and define the responsibilities of key program personnel; (3) staff the RP program with suitably trained people, provide sufficient resources, and implement the program; (4) commit to the independence of the RP function from the facility's operations; and (5) review, at least annually, the content and implementation of the RP program as required by 10 C.F.R. § 20.1101(c). *Id.*

4.30 Guided by the acceptance criteria listed above, the Staff reviewed the information in the Application related to RP program implementation. SER at 4-3. The Staff's review found that the Application outlines the RP program structure and has defined the responsibilities of

key personnel, including the RP Manager (RPM), who will be responsible for providing guidance and direction for establishment and implementation of the program and will have direct access to the Director of the ACP and USEC's Vice President for the ACP. Direct access to the Director and the Vice President will also ensure that the RP program will be independent of operations. The Health Physics Group reports to the RPM and will be staffed with trained individuals to provide oversight and control of the technical aspects of the program elements that affect RP. The Staff's review also confirmed that the Applicant will review the RP program content and implementation annually, and the RPM will be responsible for drafting an annual report based on the review.

4.31 The Applicant's ALARA program must conform to 10 C.F.R. § 20.1101, described above, by maintaining occupational exposures and environmental releases as far below regulatory limits as is reasonably achievable. Chapter 4 of NUREG-1520 lists acceptance criteria that guide the Staff in determining whether or not the Applicant's ALARA program is acceptable. Under these criteria, the program is acceptable if the Applicant makes and provides data and information related to the following commitments to: (1) establish a comprehensive, effective, and written ALARA program; (2) prepare policies and procedures to ensure occupational radiation exposures are maintained ALARA and that such exposures are consistent with applicable regulations; (3) outline specific program goals, establish a program organization, and have written implementation procedures; (4) establish an ALARA Committee or equivalent organization to ensure that the occupational dose limits of 10 C.F.R. Part 20 are not exceeded under normal operations; (5) use the program as a mechanism to facilitate interaction between RP and operations personnel; and (6) regularly review and revise the program goals and objectives and incorporate changes that could reduce radiation exposure at a reasonable cost. NUREG-1520 at 4-3 to 4-4.

4.32 The Staff reviewed the information in the Application related to the ALARA program. SER at 4-3 to 4-5. The review found that the Applicant has committed to a comprehensive, effective, and written ALARA program. The information in the Application describes the goals, organization, and structure of the ALARA program, as well as the Applicant's commitments to prepare policies and procedures for implementing the facility design and operations, and ensuring that occupational exposures will be maintained ALARA. The Application contains information on the ALARA Committee to be established by the Applicant, which will have sufficient staff, resources, and clear responsibilities to ensure that the occupational radiation exposure dose limits specified in 10 C.F.R. Part 20 are not exceeded under normal operations. The ALARA Committee will include staff from both operations and radiation safety management, assuring that the ALARA program will be a mechanism to facility interaction between RP and Operations. Finally, the Staff's review found that the Applicant has committed to regularly review and revise the ALARA program goals and objectives based on new technologies and operating experience.

4.33 Information related to the organization and qualifications of the Applicant's RP staff must comply with 10 C.F.R. § 70.22, "Contents of Applications." Acceptance criteria in NUREG-1520 related to the organization and qualifications of the RP staff state that the Applicant's program is acceptable if the application provides data and information that meet each of the following commitments to: (1) appoint suitably trained RP personnel and identify their authority and responsibilities; (2) establish clear organizational relationships among the individual positions responsible for the RP program and other line managers; (3) appoint a suitably trained RP program director; (4) assign responsibility to the RP program staff for implementation of the RP program functions; and (5) describe the minimum training requirements and qualifications for the RP staff. NUREG-1520 at 4-4 to 4-5.

4.34 The Staff reviewed the information in the Application related to RP program organization and personnel qualifications against the acceptance criteria above. SER at 4-5 to 4-6. The review found that the Applicant has identified appropriate qualifications for the RPM and RP staff and has identified their authority and responsibilities, specifically, the Application identifies the appropriate education level and technical experience for the RPM. The Application also enumerates training and qualifications for the health physics (HP) technicians who are responsible for implementing RP program functions. The Application establishes clear organizational relationships for the RP program and other line managers; the RPM reports to the Director, ACP and Vice President, American Centrifuge, for radiological control matters, and reports to the Production Support Manager, which provides independence from operations.

4.35 Regulatory requirements applicable to RP procedures are presented in 10 C.F.R. § 70.22(a)(8), which requires that applications contain "proposed procedures to protect health and minimize danger to life or property." In order to determine compliance with § 70.22(a)(8), the Staff reviewed the information provided in the application related to RP procedures against the acceptance criteria listed in NUREG-1520. NUREG-1520 at 4-5. Under these criteria, an application is acceptable if it includes information and data that meet each of the following commitments to: (1) prepare written, approved procedures to carry out activities related to the RP program; (2) specify how the procedures will be prepared, authorized, approved, and distributed; and (3) specify written, approved radiation work permits for activities involving licensed material that are not covered by the RP procedures. *Id.*

4.36 The Staff reviewed the proposed procedures in the Application against the acceptance criteria above. SER at 4-6. The Applicant has committed to prepare written procedures and radiation work permits in accordance with the acceptance criteria. The Staff's review showed that: qualified HP personnel will prepare written RP procedures to carry out activities related to the RP program; the Applicant specified how the RP procedures will be

prepared, authorized, approved, and distributed; and the Applicant will use approved Radiation Work Permits (RWP) for activities involving licensed material that are not covered by written RP procedures.

4.37 The Applicant's commitments to employee training are governed by 10 C.F.R. §§ 19.12, "Instructions to workers" and 20.2110, "Form of records." The Staff reviews compliance with these regulations against acceptance criteria which state that the application is acceptable if it includes data and information that commits to: (1) design and implement an employee RP training program that complies with the requirements of 10 C.F.R. Parts 19 and 20; (2) provide training, to all personnel and visitors entering restricted areas, that is commensurate with the health risk to which they may be exposed, or to provide trained escorts; (3) provide a level of training based on the potential radiological health risks associated with that employee's work responsibilities; (4) incorporate, in the RP training program, the provisions in 10 C.F.R. § 19.12 and topics such as correct handling of radioactive materials, minimization of exposures to radiation, access and egress controls and escort procedures, radiation safety principles, policies, and procedures, monitoring for internal and external exposures, monitoring instruments, contamination control, ALARA and exposure limits, radiation hazards and health risks, and emergency response; (5) review the RP training programs and conduct refresher training at least every 3 years; and (6) evaluate the effectiveness and adequacy of the training program curriculum and instructors. NUREG-1520 at 4-6 to 4-7.

4.38 In Chapter 4 of the SER, the Staff reviewed the Applicant's training commitments against the acceptance criteria listed above. SER at 4-6 to 4-7. The review showed that the Applicant's RP training program will conform to the acceptance criteria. In particular, the Applicant has incorporated the provisions of 10 C.F.R. §§ 19.11 and 19.12 into the RP training program. All other data and information necessary to meet the acceptance criteria is present.

4.39 The Applicant's ventilation and respiratory protection programs must conform to

10 C.F.R. Part 20, Subpart H, "Respiratory Protection and Controls to Restrict Internal Exposure in Restricted Areas." Subpart H includes regulations pertaining to the use of process or other engineering controls to control the concentration of radioactive material in the air; the use of other controls, such as control of access, limitation of exposure times, or use of respiratory protection equipment, to limit workers' intakes of radioactive materials; the use of individual respiratory protection equipment to limit the intake of radioactive material; restrictions on the use of respiratory protection equipment; and application for use of higher assigned protection factors. The Staff gauges compliance with Part 20, Subpart H against acceptance criteria that state that an application is acceptable if information and data are presented in relation to ventilation and respiratory protection programs that meet commitments detailed in NUREG-1520. NUREG-1520 at 4-8.

4.40 The Staff reviewed the Application's ventilation and respiratory protection programs against the acceptance criteria outlined in NUREG-1520 and discussed above. SER at 4-7 to 4-10. The Applicant commits to follow relevant ASME standards, with some corrections and clarifications, reviewed by the Staff. The Staff's review showed that the Applicant has established ventilation and respiratory protection programs in accordance with the acceptance criteria and satisfies the regulatory requirements of Part 20, Subpart H. *Id.*

4.41 An application must provide information related to radiation surveys and monitoring programs, as required by 10 C.F.R. Part 20, Subpart F, "Surveys and Monitoring," Subpart C "Occupational Dose Limits," Subpart L, "Records," and Subpart M, "Reports." The Staff's review of the Application for compliance with these regulations is guided by the related acceptance criteria listed in Chapter 4 of NUREG-1520. NUREG-1520 at 4-10.

4.42 The Staff reviewed the Application with respect to radiation surveys and monitoring programs against the acceptance criteria in NUREG-1520. SER at 4-10 to 4-14. The review showed that the Applicant has established radiation survey and monitoring

programs in accordance with the acceptance criteria. The Application includes the necessary programs that comply with all applicable regulatory guidance documents.

4.43 The Applicant also committed to additional program commitments in accordance with 10 C.F.R. Part 20, Subpart L, “Records” and Subpart M, “Reports,” in addition to 10 C.F.R. §§ 70.61, “Performance Requirements,” and 70.74, “Additional Reporting Requirements.” Acceptance criteria for the Staff’s review of additional program requirements are listed in NUREG-1520. Specifically, the application is acceptable if it contains data and information that meet commits to: (1) maintain records of the RP program, radiation survey results, and results of its corrective action program; (2) establish a program to report to the NRC, within the time specified in 10 C.F.R. §§ 20.2202 and 70.74, any event that results in an occupational exposure to radiation exceeding the dose limits in 10 C.F.R. Part 20; (3) submit to the NRC an annual report, as required by 10 C.F.R. § 20.2206(b); and (4) refer to its corrective action program occupational exposures that exceed the dose limits in 10 C.F.R. Part 20, Appendix B, or are required to be reported per 10 C.F.R. § 70.74, and report the results to the NRC. NUREG-1520 at 4-12.

4.44 The Staff reviewed the additional program requirements outlined in the Application against the acceptance criteria outlined above. SER at 4-14 to 4-16. The Applicant will maintain RP program records and has committed to procedures to retain its records and to make reports and notifications of RP issues. The Applicant has also committed to submitting personnel monitoring information to the NRC’s Radiation Exposure Information Reporting System (REIRS) based on the personnel exposure database. Therefore, the Staff’s review found that the Applicant’s additional program commitments meet the acceptance criteria.

4.45 The Applicant has requested an exemption from 10 C.F.R. § 20.1904, which requires that each container of licensed material bear a durable, clearly visible label such that the radionuclide(s) present, the quantity of radioactivity, radiation levels, kinds of materials,

mass, and enrichment be identified. SER at 4-15. The Applicant states that it will be impractical to label each and every container in restricted areas, and will have one sign posted stating that every container may contain radioactive material in these areas. The Applicant will perform a survey when containers will be removed from contaminated or potentially contaminated areas to prevent spread of contamination. The Applicant also requested that the UF_6 feed, product, and depleted uranium cylinders not be labeled because they will be readily identifiable due to their size and unique construction. The Applicant also states that UF_6 cylinders will be constantly attended by qualified radiological workers during movement. The Staff reviewed the exemption request and proposed alternatives, and found that the request is authorized by law and will not be an undue hazard to life or property. *Id.* at 4-16.

4.46 The Applicant has also requested that in lieu of the requirements of 10 C.F.R. § 20.1601(a), each High Radiation Area will be conspicuously posted "Caution, High Radiation Area," and entrance into the area will be controlled by an RWP. SER at 4-16. The Applicant will also implement physical and administrative controls to prevent inadvertent or unauthorized access to High and Very High Radiation Areas. Upon reviewing the Applicant's request, the Staff found the Applicant's use of conspicuously posted signs with the Applicant's RWP program an acceptable alternative. *Id.*

4.47 As a result of the Staff's review of the Applicant's RP program, the Staff made the following findings. The Staff found that the Applicant has established and will maintain an acceptable RP program that includes: (1) an effective documented program to ensure that occupational radiological exposures are ALARA; (2) an organization with adequate qualification requirements for RP personnel; (3) approved written RP procedures; (4) RP training for all personnel who have access to restricted areas; (5) a program to control airborne concentrations of radioactive material with engineering controls and respiratory protection; (6) a radiation survey and monitoring program; and (7) other programs to maintain records, report to the NRC

in accordance with Parts 20 and 70, and correct for upsets at the facility. Therefore, the Applicant's RP program meets the requirements of Parts 19, 20, and 70, and conformance to the license application will ensure safe operation. SER at 4-16.

4.48 Based on the above, we find that the Staff has a reasonable basis for its conclusions, and that the record is sufficient with respect to the Applicant's RP program to support license issuance.

E. SER Chapter 5, "Nuclear Criticality Safety"

4.49 Chapter 5 of the SER documents the Staff's review of the nuclear criticality safety (NCS) program described in the Application to determine whether the Applicant's NCS program is adequate to support safe design, construction, and operation of the facility, as required by 10 C.F.R. Part 70. The Staff also reviewed the ISA and ISA Summary to determine whether the ISA program is acceptable for NCS.

4.50 The NCS program must meet the requirements of 10 C.F.R. §§ 70.22 and 70.65, which, respectively, specify the general and additional content of a license application, as well as the requirements of 10 C.F.R. §§ 70.24, 70.52, 70.61, 70.62, 70.64, 70.65, and 70.72, and 10 C.F.R. Part 70, Appendix A. For NCS purposes, the ISA and ISA Summary must meet requirements of 10 C.F.R. §§ 70.62 and 70.65, which specify: (1) the requirements for establishing and maintaining a safety program; (2) the requirements for conducting and maintaining an ISA; and (3) requirements for the contents of an ISA Summary for NCS. In order to determine regulatory compliance, the Staff reviewed the Application's NCS information against the acceptance criteria in Sections 5.4.3.1 through 5.4.3.4 of NUREG-1520 and the ISA against the acceptance criteria in Sections 3.4.3.1 and 3.4.3.2 of NUREG-1520.

4.51 Throughout its review, the Staff's determination of the acceptability of the Applicant's statements was informed by a consideration of the low risk of the majority of ACP operations. SER at 5-2. This is based on: (1) heavy reliance on passive geometry and limited

mass in the majority of processes (except product withdrawal and uranium hexafluoride (UF_6) cylinder handling and storage); (2) heavy reliance on the integrity of passive equipment to ensure moderator control in most of the remaining, support processes; (3) limited handling of liquid UF_6 (i.e., limited to autoclaves and associated piping in the sampling, transfer, and blending facility), and no solution processing (responsible for the majority of historical criticality accidents) at the facility; and (4) processes being limited to less than 10 wt% ^{235}U (and product initially limited to less than 5wt% ^{235}U). Although there are parts of the facility that involve large quantities of enriched uranium in unfavorable geometry (e.g., product withdrawal and cylinder storage), these factors permitted a graded approach in the Staff's review of safety in the facility overall. *Id.*

4.52 The Staff reviewed the management of the NCS program against the acceptance criteria in Section 5.4.3.1 of NUREG-1520. SER at 5-2 to 5-3. The review confirmed that the Applicant has adequately described the NCS program elements that will meet major regulatory requirements. The Staff also reviewed information on NCS program objectives, including the portion of the Application enumerating the main duties to be performed by the NCS program. The review confirmed that these duties comply with the guidance in NUREG-1520 and specifically include establishment of safe parameters and program procedures.

4.53 The Staff reviewed information in the Application related to the organization and administration of the NCS program, including the responsibilities of key NCS personnel and the qualifications of NCS staff, against the acceptance criteria in Section 5.4.3.2 of NUREG-1520. SER at 5-3 to 5-4. The Staff's review found that the list of duties for key NCS personnel (the NCS Manager, Qualified NCS Engineers, and Senior NCS Engineers) is consistent with the applicable guidance and adequately outlines the program structure and defines the responsibilities and authorities of key personnel. The Applicant also lists the minimal education and experience requirements for key personnel. Upon review, the Staff found that these

requirements are acceptable and appropriate for the duties of these provisions. The Staff also determined that, because the Applicant has included the actual organizational and staff qualification requirements in the Application, the Applicant need not include the commitments described in Sections 5.4.3.2(6) and 5.4.3.2(8) of NUREG-1520.

4.54 Section 5.3 of the Application describes management measures related to NCS. The Staff reviewed this information against the acceptance criteria in Section 5.4.3.3 of NUREG-1520. SER at 5-4 to 5-7. The Application states that operations to which NCS pertains will be governed by written procedures or work packages, and that NCS Evaluation (NCSE) controls that specify operator actions are incorporated into the procedures. The Application also contains requirements for posting and labeling of NCS administrative controls, and the Staff's review found that the planned procedures outlined in the Application will ensure that postings of NCS limits will be effectively employed. SER at 5-5. The Application addresses the configuration management program as applied to NCS, including defining the boundary of components necessary to ensure reliability and availability of NCS controls, and describes the change control process for changes that may affect NCS. Pursuant to the Application, "Changes that could establish new fissile material operations or affect established fissile material operations are reviewed by NCS" program personnel. The Staff found that this practice should ensure that no changes that could impact the criticality safety basis of the facility are made without proper NCS review, and that this approach represents an acceptable alternative to the approach outlined in NUREG-1520. The Application also describes the operation surveillance and assessment measures intended to ensure continued compliance with NCS controls and NCS program requirements, including walk-throughs, self-assessments, and internal audits of operations and the NCS organization.

4.55 Section 5.4 of the Application describes the methodologies and technical practices for the proposed ACP. The Staff reviewed this information against the acceptance

criteria in Section 5.4.3.4 of NUREG-1520, which states that an application is acceptable if it states that: (1) NCS controlled parameters will be appropriately applied; and (2) NCS limits on IROFS will be appropriately determined. The information reviewed by the Staff includes adherence to ANSI/ANS Standards, process evaluation and approval, non-fissile material operations, design philosophy and review, criticality alarm system coverage, a description of the portable CAAS system, a description of technical practices in the Application, requirements for the use of criticality control based on described criticality safety parameters, and calculation method used to demonstrate subcriticality. The Staff's review found that the information and commitments in the Application are consistent with the acceptance criteria. SER at 5-7 to 5-23.

4.56 The Application also contains references to various industry codes and standards, including certain ANSI/ANS-8 Series standards applicable to NCS. Many of these standards have been endorsed in Regulatory Guide 3.71, "Nuclear Criticality Safety Standards for Fuels and Material Facilities" (2005), which are also listed in the acceptance criteria of Section 5.4.2 of NUREG-1520. The Applicant stated that it would comply with the standards related to NCS, with some exceptions. The Staff reviewed these exceptions and found them acceptable. SER at 5-24 to 5-25. The Applicant also stated that it did not rely on other standards listed in Section 5.4.2 of NUREG-1520. The Staff reviewed this portion of the Application and found that a specific reference to these standards is not necessary because the Applicant has committed to alternative acceptable standard or the standards are not applicable to the processes to be carried out at the ACP. SER at 5-25 to 5-27.

4.57 The Applicant also requested an exemption from the criticality monitoring requirements of 10 C.F.R. § 70.24 for the UF_6 cylinder storage yards. 10 C.F.R. § 70.24(a) requires installation of a criticality detection and alarm system in each area in which greater than 700 g ^{235}U is handled, used, or stored. The Applicant's exemption request is similar to a request previously granted for the cylinder storage yards in the gaseous diffusion plants.

SER at 5-27. The Staff reviewed the request and found that given the unlikelihood of having a large cylinder breach, because of the stringent requirements on cylinder integrity and the historical failure data for UF_6 cylinders, the long periods of time needed for sufficient water to accumulate in the cylinder, and the prohibition on storing cylinders enriched to >5wt% ^{235}U outdoors, the Staff has reasonable assurance that occurrence of criticality in a cylinder with material enriched between 5 and 10wt% ^{235}U is extremely unlikely. Therefore, an exemption to 10 C.F.R. § 70.24(a) for the cylinder storage yards is warranted. SER at 5-29.

4.58 Chapter 5 of the Application also describes how the Applicant addresses the BDC requirement in 10 C.F.R. § 70.64(a), which requires that the design provide for criticality control including adherence to the double contingency principle. The Applicant's NCS program describes generally the measures that provide for criticality control, and the ISA Summary describes in greater detail the specific features of the design that provide for criticality control for specific criticality accident sequences. The Staff reviewed this information and found that the Applicant has met the BDC requirement regarding criticality control. SER at 5-31.

4.59 Based on its review of the NCS program information for the proposed ACP, the Staff concluded that the information submitted in Chapter 5 of the Application described an NCS program for the ACP that meets the applicable requirements of 10 C.F.R. Part 70 and is in accordance with the acceptance criteria of Chapter 5 of NUREG-1520 or an acceptable alternative approach. The Staff also concluded that the information submitted in support of the requested exemption from 10 C.F.R. § 70.24 was sufficient to demonstrate that such an exemption for the UF_6 cylinder yards is authorized by law, will not endanger life or property or the common defense and security, and will otherwise be in the public interest, as required by 10 C.F.R. § 70.17(a). Based on its review, the Staff concluded that construction and operation of the proposed ACP will provide for reasonable assurance of safety and the adequate protection of public health and safety from the consequences of a criticality accident.

SER at 5-31 to 5-32.

4.60 Based on the above, we find that the Staff has a reasonable basis for its conclusions, and that the record is sufficient with respect to the programmatic review in relation to NCS to support license issuance.

F. SER Chapter 6, “Chemical Process Safety”

4.61 Chapter 6 of the SER describes the Staff’s review of information in the Application related to chemical process safety. Under 10 C.F.R. §§ 70.22 and 70.65, “Contents of Applications” and “Additional Content of Applications,” respectively, an applicant must include information on chemical process safety at the proposed facility. This information must comply with 10 C.F.R. §§ 70.61, 70. 62, and 70.64. 10 C.F.R. § 70.61 sets out the performance requirements for facilities, with respect to limiting the risks of credible high-consequence events, credible intermediate-consequence events, low-consequence events, and nuclear criticality accidents under normal and credible abnormal conditions. 10 C.F.R. § 70.62(a) requires that each licensee or applicant: (1) establish and maintain a safety program that demonstrates compliance with the performance requirements of § 70.61, (2) establish and maintain records that demonstrate compliance with § 70.62(b)-(d); and (3) maintain records available for inspection by the NRC that document each discovery that an IROFS or management measure has failed to perform its function or degraded so that the performance requirements of § 70.61 are not satisfied. 10 C.F.R §70.62(b) requires the Applicant to maintain process safety information, including information pertaining to the hazards of the materials used or produced in the process, the technology of the process, and the equipment in the process, to enable the performance and maintenance of an ISA, which is required to be conducted according to the guidelines of § 70.62(c). 10 C.F.R. § 70.62(d) requires the Applicant to establish management measures to ensure compliance with § 70.61. 10 C.F.R. § 70.64 establishes baseline design criteria for new facilities and requires that the facility and system design and facility layout be

based on defense-in-depth practices.

4.62 The Staff's review of the Application for compliance with the above criteria is guided by Chapter 6 of NUREG-1520, which provides the applicable acceptance criteria. NUREG-1520 at 6-3 to 6-7. Chapter 6 of NUREG-1520 is applicable to the proposed ACP in its entirety. Additional guidance is provided by NUREG-1601, "Chemical Process Safety at Fuel Cycle Facilities" (1997), and NUREG-1513. SER at 6-1.

4.63 The Staff's review considered the following areas: (1) chemical process description; (2) chemical accident sequences; (3) chemical accident consequences; (4) chemical process IROFS; (5) management measures; (6) emergency management; and (7) baseline design criteria and defense-in-depth requirements. The Staff's review encompassed the Application and the ISA summary, as well as the Applicant's responses to RAIs and ISA documents reviewed during on-site visits. SER at 6-1 to 6-2.

4.64 The Staff evaluated the chemical process safety information in the Application and concluded that the Applicant has described and assessed accident consequences that can result from the handling, storage, or processing of licensed materials that can potentially have significant chemical consequences and effects. The Staff also found that the Applicant prepared a hazard analysis that identifies and evaluates those chemical process hazards and potential accidents and established safety controls providing reasonable assurance of safe facility operation. The Staff's review confirmed that, to ensure that the performance requirements in 10 C.F.R. Part 70 are met, the Applicant has stated that controls are maintained available and reliable to perform their safety-related functions when needed. The Staff reviewed a representative sample of the safety controls and the Applicant's approach for managing chemical process safety and found them acceptable. SER at 6-16.

4.65 Based on its review, the Staff concluded that the Applicant's approach for managing chemical process safety and chemical process safety controls meet the requirements

of 10 C.F.R. Part 70 and provides reasonable assurance that the public health and safety, and the environment, will be protected. SER at 6-16.

4.66 Based on the above, we find that the Staff has a reasonable basis for its conclusions, and that the record is sufficient with respect to chemical process safety to support license issuance.

G. SER Chapter 7, "Fire Safety"

4.67 Chapter 7 of the SER describes the Staff's review of the information in the Application related to fire safety. 10 C.F.R. §70.62(a) requires licensees to develop a safety program that will reasonably protect the health and safety of the public and the environment. The safety program should provide reasonable protection against fire and explosive hazards associated with processing, handling, and storing licensed materials during normal operations, anticipated operational occurrences, and credible accidents. The fire safety program should conform to the requirements for general and additional contents of the application in 10 C.F.R. §§ 70.22 and 70.65, as well as providing reasonable assurance with the requirements of 10 C.F.R. §§ 70.61, 70.62, and 70.64, as discussed in more detail above.

4.68 The fire safety program is reviewed for regulatory compliance against the acceptance criteria listed in Chapter 7 of NUREG-1520, which is applicable to the proposed ACP in its entirety. NUREG-1520 at 7-2 to 7-5. This includes criteria for measuring the adequacy of: fire safety management measures, the Applicant's fire hazards analysis, the proposed facility's fire safety design, information related to process fire safety, and the Applicant's fire protection and emergency response plan.

4.69 The Staff reviewed the Fire Safety Program and the ACP to determine applicability and level of compliance with National Fire Protection Association (NFPA) 801 and applicable daughter standards. SER at 7-2. Some ACP buildings/facilities do not meet NFPA

801 and applicable daughter standards because they were built or established under earlier versions or different codes and standards applicable at the time of construction and installation. The standards applicable to these ACP buildings/facilities will be documented during the baseline configuration assessment effort as described in Section 11.1 of the Application. Table 7-1 of the Application lists the fire codes and standards considered by the Applicant to be applicable to facility, and any exceptions to the applicable codes taken by the Applicant. Upon reviewing the standards and exceptions, the Staff found the use of these standards to be in compliance with the guidance in NUREG-1520 in regard to nationally recognized codes and standards which may be used to measure reasonable assurance of fire safety. *Id.* at 7-4.

4.70 The Staff reviewed the information in the Application regarding fire safety management measures against the acceptance criteria in NUREG-1520 section 7.4.3.1. SER at 7-4 to 7-7. The review showed that The Applicant has committed to implement configuration management, maintenance, training, procedures, audits and assessments, incident reporting and investigations, and record management that will ensure that fire protection IROFS are available and reliable. The Applicant has also identified the Fire Safety Manager as the individual responsible for the fire safety program and the Plant Safety Review Committee as the group responsible for reviewing fire safety at the ACP. The Staff also reviewed the Applicant's fire safety management measures which include fire prevention; inspection, testing, and maintenance of fire protection systems; emergency response organization qualifications, drills, and training; and pre-fire plans, and found that the fire safety management measures are documented in sufficient detail to identify their relationship to, and functions for normal operations; anticipated (off-normal) events; and accident safety.

4.71 The Staff reviewed the information in the Application regarding fire hazards analysis against the acceptance criteria in NUREG-1520 section 7.4.3.2. SER at 7-7 to 7-8. The Staff's review found that applicant has conducted risk analyses in accordance with NFPA

801, “Standards for Fire Protection for Facilities Handling Radioactive Material.” The FHAs identified credible fire scenarios that bound the fire risk. The ISA used these scenarios and identified fire protection IROFS. Procedures are in place (through training and pre-fire plans) to allow the fire department efficient access to process areas during fire emergencies.

4.72 The Staff reviewed the information in the Application regarding facility design in relation to fire protection against the acceptance criteria in NUREG-1520 section 7.4.3.3. SER at 7-8 to 7-10. The Staff’s review found that the Applicant has addressed building construction, fire area determination, electrical installation, life safety, drainage, and lightening protection adequately in the application. A description of ventilation characteristics as they relate to fire protection and fire hazards will be provided in the fire hazards analyses. The information in the Application adequately addresses criticality safety, environmental concerns, and physical security to the extent applicable to the ACP and meets the baseline design criteria through compliance with accepted consensus standards. The review also found that the Application documents the fire safety considerations used in the general design of the facilities containing licensed material or facilities that impose an exposure threat to radiological facilities. The Staff’s review found that the Applicant has demonstrated that appropriate fire safety considerations were incorporated in the design of its facilities. The Staff also found that the Applicant has also demonstrated that the facility has appropriate active-engineered fire protection systems.

4.73 The Staff also reviewed the information in the Application related to process fire safety. SER at 7-10. This review is discussed below in the section of these findings discussing Appendix D, “Fire Safety,” of the SER.

4.74 The Staff reviewed information in the Application related to fire safety and emergency response against the acceptance criteria in Section 7.4.3.5 of NUREG-1520. SER at 7-11. The review found that the Application documents the fire protection systems and

fire emergency response organizations which are to be available for the facility. The Application indicates that manual fire suppression capability will be provided by a continuously manned, professional fire service department on or adjacent to the DOE reservation. The fire service department personnel will be trained to meet or exceed state requirements for fire fighting. Therefore, the Staff found that the Applicant has demonstrated the availability of an adequate fire response organization.

4.75 Based on the above review, the Staff concluded that the Applicant's submittals provide sufficient information in accordance with requirements of 10 C.F.R. § 30.33, 10 C.F.R. § 40.32, 10 C.F.R. § 70.22, and 10 C.F.R. § 70.65 regarding potential fire hazards, consequences, and required controls for the proposed ACP processes. SER at 7-11. The Staff determined that the Applicant demonstrated compliance with the performance requirements of 10 C.F.R. § 70.61 for fire protection related to postulated accident scenarios. The design proposed by the Applicant also satisfies the requirements of 10 C.F.R. § 70.64(a) Baseline Design Criterion (3) "Fire Protection" as well as 10 C.F.R. § 70.64 (b), defense in depth. *Id.*

4.76 Based on the above, we find that the Staff has a reasonable basis for its conclusions, and that the record is sufficient with respect to the Applicant's fire safety program to support license issuance.

H. SER Chapter 8, "Emergency Planning"

4.77 Chapter 8 of the SER documents the Staff's review of the Applicant's emergency plan (EP). The Applicant was required to submit an EP for the proposed ACP under 10 C.F.R. §§ 30.32(i)(1)(ii), 40.31(j)(1)(ii), and 70.22(i)(1)(ii). The EP must contain the following information: (1) a brief description of the facility and the surrounding area; (2) an identification of each type of radioactive materials accident for which protective actions may be needed; (3) a classification system for classifying accidents as alerts or site area emergencies; (4) an

identification of the means of detecting each type of accident in a timely manner; (5) a brief description of the means and equipment for mitigating each type of accident; (6) a brief description of the methods and equipment to assess releases of radioactive materials; (7) a brief description of the responsibilities of licensee personnel should an accident occur and responsibilities for developing, maintaining, and updating the plan; (8) a commitment to and brief description of offsite notification plans; (9) a brief description of the types of information to be given to offsite response organizations and the NRC; (10) a brief description of the frequency, performance objectives, and plans for employee emergency training; (11) a brief description of the means of restoring the facility to a safe condition after an accident; (12) provisions for conducting quarterly communication checks with offsite response organizations and biennial onsite emergency exercise; and (13) a certification that the Applicant has met its responsibilities under the Emergency Planning and Community Right-to-Know Act of 1986. 10 C.F.R. § 70.22(i)(3); *see also* 10 C.F.R. §§ 30.32(i)(3) and 40.31(j)(3).
10 C.F.R. §70.64(a)(6) also requires applicants to address the control of licensed material, evacuation of personnel, and the availability of emergency facilities for the design of new facilities.

4.78 In order to determine whether the Applicant's EP complies with the above regulatory requirements, the EP is evaluated against acceptance criteria in Chapter 8 of NUREG-1520. NUREG-1520 at 8-2 to 8-13. The acceptance criteria related to the evaluation of an EP submitted by an applicant are applicable to the proposed ACP. SER at 8-1. The Staff reviewed the Applicant's EP against these acceptance criteria.

4.79 The Staff reviewed the EP's facility description against the acceptance criteria in section 8.4.3.1 of NUREG-1520. SER at 8-2 to 8-3. The Staff found that the EP contained both a general area map and detailed maps and drawings of the site which show onsite and near offsite structures, building numbers, and labels; roads and parking lots onsite and main roads

near the site; site boundaries showing fences and gates; major features; and appropriate bodies of water. The EP also includes information on stack heights, typical stack flow rates, and efficiencies of any emission-control devices. The Staff's review showed that Appendix A of the EP contains a general description of licensed and other major activities conducted at the facility, and type, form, and quantities of radioactive and other hazardous materials that are normally onsite by location and hazardous characteristics that are important to emergency management. Finally, the Staff's review verified that the Applicant has certified that it has met all responsibilities under the Emergency Planning and Community Right to Know Act of 1986, Title III, Public Law 99-499, in accordance with 10 C.F.R.§ 70.22(i)(3)(xiii).

4.80 The Staff reviewed the information in the EP regarding onsite and offsite emergency facilities against the acceptance criteria in section 8.4.3.1.2 of NUREG-1520, finding that the EP lists and describes the onsite and offsite facilities that could be relied on in an emergency. SER at 8-3 to 8-5. The EP includes a description of onsite and offsite facilities by location and purpose, as well as a description of emergency monitoring equipment that will be available for personnel and area monitoring and for assessing releases of radioactive material or hazardous chemicals to the environment. The Applicant has described the onsite and offsite services that support emergency response operation, including decontamination facilities, medical treatment facilities, first aid personnel, fire fighters, law enforcement assistance, and ambulance services. The Staff review confirmed that the EP contains all necessary commitments, including commitments to have facilities of adequate size with a stated purpose and appropriately located; adequate backup facilities required by the EP and supporting documents that are available and ready for use; appropriate equipment and supplies necessary to support emergency response activities that are accessible during accident conditions; emergency equipment that will be inventoried, tested, and serviced on a periodic basis to ensure accountability and reliability; sufficient reliable primary and backup communications

channels that are available to accommodate emergency needs; offsite emergency resources and services that are identified and ready to ensure their timely mobilization and use; operational engineering information, such as current as-built drawing and procedures, that are readily available in the emergency facilities; sufficient equipment for personnel protection and monitoring; and systems in place to alert onsite and offsite personnel in case of an emergency.

4.81 Section 2.0 of the EP describes the potential accidents identified in the ISA for which protective actions may be needed. The Staff reviewed this information against the acceptance criteria in section 8.4.3.1.3 of NUREG-1520. SER at 8-5. The Staff's review found that the EP describes the following: (1) the process and physical location(s) where the accidents could occur; (2) complicating factors and possible onsite and offsite consequences, including releases of non-radioactive hazardous chemicals incident to the processing of licensed material that could impact emergency response efforts; (3) the accident sequence that has the potential for the greatest radiological and/or toxic chemical impact; and (4) ISA event numbers where projections of doses and toxic substance concentrations as a function of distance and time for various meteorological stability classes may be obtained.

4.82 Pursuant to 10 C.F.R. § 70.22(i)(3)(iii), Section 3 of the EP describes the system used to classify an emergency as either an Alert or a Site Area Emergency (SAE), defines each classification level, and establishes Emergency Action Levels (EALs) to determine if an event meets the criteria of an Alert or SAE. The Staff reviewed this information against the acceptance criteria in section 8.4.3.1.4 of NUREG-1520, and found that the EP: classifies accidents as Alert or Site Area Emergency; identifies the classification expected for each accident type; specifies EALs, at which an alert or site area emergency will be declared and are based on the EPA's Protective Action Guidelines (EPA, 1992); and designates the personnel positions and alternates for accident classification during normal operations and back shifts. SER at 8-6.

4.83 Section 2.2 of the EP discusses the methods and systems used for detecting accidents for both radioactive materials and toxic chemical releases at the site, the means for alerting the operating staff, and the procedures to direct the operating staff's response during anticipated accidents. The Staff reviewed the information in the EP related to detection of accidents against the acceptance criteria in Section 8.4.3.1.5 of NUREG-1520, found that the EP identifies the means of detecting the accident; the means of detecting any release of radioactive material or hazardous chemicals incident to the processing of licensed materials; the means of alerting the operating staff; and the anticipated response of the operating staff. SER at 8-6 to 8-7.

4.84 Sections 5.3 and 5.4 of the EP discuss the methods and protective actions used to mitigate consequences of potential accidents to both onsite and offsite personnel and identifies the personnel responsible for recommending offsite protective actions to local officials, while Section 7.6 of the EP discusses the maintenance and inventory of emergency equipment, instrumentation, and supplies. The Staff reviewed the Applicant's mitigation of consequences against the acceptance criteria in Section 8.4.3.1.6 of NUREG-1520, and found that the EP describes measures and equipment to be used for safe shutdown and mitigating the consequences to workers onsite and offsite, as well as to the public offsite for each accident. SER at 8-7.

4.85 In Section 5.2 of the EP, the Applicant describes the methods that will be used to assess releases both onsite and offsite during an event. This section also describes the information to be communicated to offsite officials during offsite releases, including projected plume direction, movement, and dispersion, which will be calculated using the Area Locations of Hazardous Atmospheres (ALOHA) computer program. The Staff reviewed the Applicant's assessment of releases against the acceptance criteria in Section 8.4.3.1.7 of NUREG-1520 and found that the EP describes procedures for assessing the release of radioactive material or

hazardous chemicals incident to the processing of licensed material, including procedures for estimating or measuring the release rate or source term; use of a valid computer codes used to project does or concentration of material; details of onsite and offsite sampling and monitoring to be used, and; method for assessing collateral damage to the facility. SER at 8-8. In addition, the Staff's review concluded that there is no need to provide procedures for validating codes used to assess releases of radioactive material or hazardous chemicals since the Applicant is using the well known and accepted ALOHA code. *Id.*

4.86 Section 4.0 of the EP discusses the responsibilities of the Emergency Response Organization (ERO) and provides a brief description of each ERO position. Responsibilities of the ERO include event categorization; notification; protective action recommendations; management and decision making; control of onsite emergency activities; consequence assessment; emergency public information; activation and coordination of onsite response resources, security, communications, and administrative support; coordination and liaison with offsite support and response organizations; and downgrade and/or terminate emergencies. The EP also confirms that letters of agreement have been entered into with local offsite agencies including services for medical assistance, fire control, law enforcement, and ambulance services. The Staff reviewed the descriptions of the Applicant's responsibilities in the EP against the acceptance criteria in Section 8.4.3.1.8 and found that the EP: (1) describes the organizational structure and chain of command; (2) contains a commitment that staffing and resources will be sufficient to accomplish all assigned tasks; (3) describes responsibilities and authority for each management, supervisory, and professional position; (4) describes the interfaces with supporting groups, both onsite and offsite; (5) contains a commitment to having mutual cooperation agreements with local agencies, such as fire, police, ambulance/rescue, and medical units; (6) contains a commitment to having plant management measures that will audit and assess emergency preparedness to ensure site readiness to handle emergencies and

to identify and correct problems; (7) describes the onsite emergency response organization that will provide effective command and control of the site during the assessment, mitigation, and recovery phases of an accident; (8) describes the emergency public information system that will provide advance and ongoing information to the media and public on subjects that would be discussed during an emergency, such as radiation hazards, chemical hazards, site operation, and site EPs; and (9) describes the schedule of emergency preparedness procedure development will provide for availability of procedures to support startup and operation of new processes/facilities onsite. SER at 8-8 to 8-10.

4.87 Section 3.0 of the EP discusses the use of EALs to determine the classification of accidents, as well as the notification procedures and messages based on the classifications. Section 4.3 of the EP discusses the procedures for requesting offsite assistance (such as medical support, fire support, law enforcement assistance, or support through local, state, and federal government agencies) when needed. Sections 5.6 and 5.7 of the EP discuss medical transportation and treatment of contaminated injured workers. The Staff reviewed the information on notification and coordination against the acceptance criteria in NUREG-1520 Section 8.4.3.1.9 and found that the EP provides reasonable assurance that: emergency events will be classified on the basis of the EP; notification procedures will minimize distraction of shift site personnel and will include concise, preformatted messages and follow-up messages to offsite authorities; information on the nature and magnitude of the hazard will be made available to appropriate emergency response personnel; radiological and chemical source terms will be available to appropriate onsite and offsite personnel; when available, offsite field monitoring data will be used in the protective action recommendation process; protective action guidelines will be available and used by appropriate personnel in a timely manner; the emergency public information program will ensure timely dissemination of understandable information; systems will be in place, to alert, notify, and mobilize onsite and offsite response personnel in case of an

emergency; and procedures will be in place to notify and coordinate with responsible parties when some personnel, equipment, and facility components are not available. The Staff also found that the EP describes how and by whom the following actions will be promptly and effectively taken: the decision to declare an alert or site area emergency; activation of the onsite emergency response organization during all shifts; prompt notification of offsite response authorities that an alert or site area emergency has been declared; notification to the NRC operations center; a decision regarding what onsite protective actions to initiate; a decision regarding what offsite protective actions to recommend; a decision to request support form offsite organizations; and a decision to terminate the emergency or enter recovery mode. SER at 8-10 to 8-11.

4.88 Section 3.3 of the EP provides a description of the information to be communicated to offsite response organizations and the NRC during emergency notifications. The information communicated includes plant status conditions, radiological and other hazardous materials release data, recommendations for protective actions for offsite response organizations, and other applicable emergency information. In the event of an SAE or other events which may generate significant interest from the media, a Joint Public Information Center will be activated to provide timely information to the media and the public. The Staff reviewed the EP's description of the information to be communicated during an emergency against the acceptance criteria in NUREG-1520, Section 8.4.3.1.10 and found that the EP includes a standard reporting checklist to facilitate timely notification; the types of information to be provided concerning facility status, radioactive releases or hazardous chemicals and protective action recommendations; a commitment to have preplanned protective action recommendations to be made to each appropriate offsite organization; the offsite officials to be notified, as a function of the classification of the event; and the recommended actions to be implemented by offsite organizations for each accident treated in the EP. SER at 8-11 to 8-12.

4.89 Section 7.2 of the EP describes the types of training that general plant personnel, emergency response organization and support personnel, other Department of Energy (DOE) reservation personnel, and offsite emergency support organizations receive and describe the topics and general content of the biennial training programs used for training the licensee's onsite and offsite emergency response personnel. The Staff reviewed descriptions of the Applicant's training program against the acceptance criteria in NUREG-1520, Section 8.4.3.1.11 and found that the EP describes the frequency, performance objectives, and plans for the training that the Applicant will provide workers on how to respond to an emergency, including: (1) the topics and general content of training programs; (2) the administration of the training program, including responsibility for training, the positions to be trained, the schedules of training, the frequency of retraining, use of team training, and the estimated number of hours of initial training and retraining; (3) the training to be provided on the use of protective equipment; (4) the training program for onsite personnel who are not members of the emergency response staff; and (5) special instructions and orientation tours provided to non-applicant responders such as fire, police, medical emergency personnel. SER at 8-12 to 8-13.

4.90 Section 5.3.2 of the EP discusses the safe shutdown of process equipment or systems or isolation of operating systems, if necessary, due to emergency conditions. Section 9.0 of the EP describes the means of restoring the facility to a safe condition after an accident. The Staff reviewed the described safe shutdown process against the acceptance criteria in NUREG-1520 Section 8.4.3.1.12 and found that the EP describes: the methods and responsibilities for assessing the damage to and the status of the of the facility; the procedures for determining the actions necessary to reduce any ongoing releases of materials and prevent further incidents; the provisions for promptly beginning restoration actions; and key positions in the recovery organization. SER at 8-13 to 8-14.

4.91 Section 7.3 of the EP describes the provisions in place to conduct quarterly

communications checks and biennial exercises to develop, maintain, and test the response capabilities of emergency personnel, facilities, equipment, procedures, and training. An exercise scenario manual, which will be varied annually, will be prepared for each drill and exercise, and no scenario information will be provided to participants prior to the exercise. As discussed in Section 7.4 of the EP, formal critiques will be conducted after each drill and exercise, and items that have safety significance, indicate a regulatory violation, or reflect serious deficiencies in plan content or implementation will be identified and documented using the Corrective Action Program. The Applicant will conduct quarterly communications checks with offsite response organizations. The Staff reviewed the Applicant's exercises and drills against the acceptance criteria in NUREG-1520 Section 8.4.3.1.13 and found that the EP contains commitments to conduct exercises and drills in a manner that demonstrates the capability of the organization to plan and perform an effective response to an emergency. The EP demonstrates that: (1) task-related knowledge will be demonstrated through periodic participation by all qualified individuals for each position in the emergency response organization; (2) drill performance will be assessed against specific scenario objectives, using postulated accidents, that adequately test personnel, equipment, and resources; (3) effective player, controller, evaluator, and observer pre-drill briefings will be conducted; (4) scenario data and exercise messages will be provided by the controllers in a manner that will not interfere with the drill performance; (5) trained evaluators will be used to identify and record participant performance, scenario, strengths and deficiencies, and equipment problems; (6) prestaging of equipment and personnel will be minimized to realistically test the activation and staffing of emergency facilities; (7) critiques will be conducted in a timely manner; (8) emergency drills will demonstrate that resources are effectively used to control the site, mitigate further damage, control radiological releases, perform required onsite activities under simulated radiation/airborne and other emergency conditions, accurately assess the facility's status during an accident, and initiate recovery; (9) emergency drills demonstrate

personnel protection measures, including controlling and minimizing hazards to individuals during fires, medical emergencies, mitigation activities, search and rescue, and other similar events; (10) the emergency drills demonstrate that onsite communications effectively support emergency response activities; (11) emergency drills demonstrate that the emergency public information organization disseminates accurate, reliable, timely, and understandable information; (11) provisions are made for conducting quarterly communications checks with offsite response organizations; and (12) offsite organizations will be invited to participate in the biennial onsite exercise. SER at 8-15.

4.92 Section 7 of the EP describes the responsibilities for developing, maintaining, and updating the EP. The Staff reviewed the information in Section 7 of the EP against the acceptance criteria in NUREG-1520 Section 8.4.3.1.14 and found that the EP describes the means for ensuring that revisions to the EP and the procedures used to implement the EP will be adequately prepared, kept up to date, and distributed to all affected parties, including the NRC. SER at 8-15 to 8-16. The Staff also found that the EP describes the provision for approving the implementing emergency procedures, making and distributing changes to the procedures, and ensuring that each person responsible for an emergency response function has immediate access to a current copy of emergency procedures.

4.93 Based on the reviews above, the Staff found that the Applicant has established an EP for responding to the radiological hazards resulting from a release of radioactive material or hazardous chemicals incident to the processing of licensed material in accordance with 10 C.F.R. §§ 30.32(i), 40.31(j), and 70.22(i). The Staff determined that the EP is adequate to demonstrate compliance with the regulations in that: (1) the facility is properly configured to limit releases of radioactive materials in case of an accident; (2) a capability exists for measuring and assessing the significance of accidental releases of radioactive materials; (3) appropriate emergency equipment and procedures will be provided onsite, to protect workers against

radiation and other chemical hazards that might be encountered after an accident; (4) a system has been established to notify Federal, State, and local Government agencies and to recommend appropriate protective actions to protect members of the public; and (5) necessary recovery actions will be established to return the facility to a safe condition after an accident. SER at 8-16.

4.94 Based on the above, we find that the Staff has a reasonable basis for its conclusions, and that the record is sufficient with respect to the Applicant's EP to support license issuance.

I. SER Chapter 9, "Environmental Protection" and the Final Environmental Impact Statement

4.95 Chapter 9 of the SER documents the Staff's review of the Applicant's environmental protection plan contained in the Application and submitted pursuant to 10 C.F.R. Parts 20 and 51 and §§ 30.33, 41.32(k), 40.32(e), 70.22(a)(7), 70.59, and 70.65(b). As required by NEPA, and pursuant to 10 C.F.R. Part 51, the Staff also prepared an FEIS, evaluating the Applicant's Environmental Report (ER). Findings related to the environmental protection plan reviewed in Chapter 9 of the SER are presented below, followed by findings related to the FEIS.

4.96 In order to determine whether the Applicant's environmental protection measures outlined in its environmental protection plan meet the regulatory criteria, the Staff reviewed the Application against the acceptance criteria in Section 9.4.3.2 of NUREG-1520. Other acceptance criteria in Chapter 9 of NUREG-1520 relate to documents developed pursuant to NEPA, such as an FEIS, and are not applicable to the environmental protection plan. Areas of the Environmental Protection Plan reviewed include Radiation Safety, effluent and environmental controls and monitoring, and the Integrated Safety Analysis.

4.97 10 C.F.R. § 20.1101 requires each licensee or applicant to implement an RP

program, including establishing constraints on airborne emissions of radioactive material in the environment. The Staff reviewed the Applicant's RP program against the acceptance criteria in Section 9.4.3.2.1 of NUREG-1520, which states that an RP program is acceptable if: (1) ALARA goals are set at a modest fraction of the dose limit for members of the public, if the Applicant proposes to demonstrate compliance with 10 C.F.R. § 20.1301, through a calculation of the total effective dose equivalent (TEDE) to the individual likely to receive the highest dose; (2) the Applicant describes and commits to use effluent controls to maintain public doses ALARA; (3) the Applicant commits to annual review of the content and implementation of the RP program, which includes the ALARA effluent control program; and (4) the Application describes how, in accordance with 10 C.F.R. § 20.1406, the facility's design procedures for operation will minimize, to the extent practicable, contamination of the facility and the environment, and generation of radioactive waste. The Staff's review of the Applicant's radiation safety program found that: (1) the Applicant's approach to ALARA goals for air and liquid effluent control is sufficiently detailed to demonstrate that the Applicant is in compliance with regulatory dose limits found in 10 C.F.R. § 20.1301, that the air and liquid dose constraints are within the guidance found in Section 9.4.3.2.1(1) of NUREG-1520, and that the Applicant's ALARA program for controlling gaseous and liquid effluents is within the guidance found in NRC Regulatory Guide 8.37, "ALARA Levels for Effluents from Materials Facilities" (1993); (2) the Applicant's approach to air and liquid effluent controls is consistent with the applicable guidance and is, therefore, acceptable to the Staff; (3) the Applicant has committed to a program of annual ALARA reviews and consequent reports to management that conforms to the applicable guidance in NUREG-1520 and, therefore, is acceptable to the Staff; and (4) the Applicant has committed to a waste minimization program that complies with the requirements of 10 C.F.R. § 20.1406 and is consistent with the applicable guidance in NUREG-1520. SER at 9-3 to 9-7. The Staff also reviewed the Applicant's system for solid and liquid radioactive waste packaging,

labeling, storage, treatment, shipment, and disposal, and found that it meets 10 C.F.R. Parts 71, 61, and 20, Subpart K, and will also meet applicable state, U.S. Department of Transportation, and EPA requirements. *Id.*

4.98 The Staff reviewed the Applicant's program for effluent and environmental monitoring against the acceptance criteria in Section 9.4.3.2.2 of NUREG-1520, which includes requirements for air effluent monitoring, liquid effluent monitoring, and environmental monitoring. SER at 9-8 to 9-11. The Applicant's proposed monitoring program for air and liquid effluents was reviewed by the Staff and found to be adequate to ensure that release of radioactive material would remain below the regulatory limits in 10 C.F.R. Part 20. The Staff's review included the elements set forth in NUREG-1520, including a description of the quality assurance program for laboratory quality control. The Staff also reviewed the Applicant's environmental monitoring program, and found that it is consistent with the applicable guidance in NUREG-1520, and found that the Applicant's environmental monitoring program and its proposal to use effluent monitoring and modeling to demonstrate compliance with the regulations of 10 C.F.R. Parts 20 and 70 is acceptable.

4.99 Based on the above review, the Staff found that the Applicant's environmental protection program is adequate to protect the environment and the health and safety of the public. SER at 9-12.

4.100 The Staff published its FEIS in April, 2006. The FEIS was prepared in order to comply with the National Environmental Policy Act (NEPA) and the NRC's implementing regulations, 10 C.F.R. Part 51, which require the federal government to assess the potential environmental impacts of its proposed actions. The FEIS is the primary document evaluating and examining the Applicant's ER.

4.101 The Staff examined both the proposed action and the purpose and need for the proposed action, as explained by the Applicant in the ER. The proposed action considered in

the FEIS was for the NRC to issue a license that would authorize The Applicant to possess and use special nuclear material, source material, and byproduct material at the ACP, a gas centrifuge uranium enrichment facility to be constructed operated, and decommissioned on the DOE reservation near Piketon, Ohio. FEIS at 1-1 to 1-2. The need for the facility is to satisfy the overall need for an additional reliable and economical domestic source of enriched uranium, to replace existing aging facilities, and, specifically, to satisfy (1) the need for enriched uranium to fulfill electricity requirements; (2) the need for domestic supplies of enriched uranium for national energy security; and (3) the need for upgraded uranium enrichment technology in the U.S. due to aging current facilities. FEIS at 1-3. The Staff found that the proposed ACP would fulfill each of these needs.

4.102 The FEIS also evaluated several potential alternatives to the proposed action, including the no-action alternative, which the Staff determined would result in enriched uranium needs continuing to be met with existing foreign and domestic enrichment suppliers. FEIS 2-35. The Staff considered the following alternatives to fulfill domestic enrichment needs: (1) construct and operate the ACP at the Paducah Gaseous Diffusion Plant in Paducah, Kentucky; (2) construct and operate the ACP at alternative locations at the DOE reservation in Piketon, Ohio; (3) down blend highly enriched uranium instead of constructing a domestic uranium enrichment plant; (4) re-activate the Gaseous Diffusion Plant at the DOE reservation in Piketon; and (5) purchase low-enriched uranium from foreign sources. FEIS at 2-36 to 2-45. These alternatives were eliminated from further consideration in the FEIS because they either did not offer any environmental advantage over the proposed action, or did not meet the need for a reliable, economical source of domestic uranium enrichment. The Staff also considered alternative technologies such as the electromagnetic isotope separation process, liquid thermal diffusion, atomic vapor laser isotope separation, and the separation of isotopes by laser excitation. FEIS at 2-45 to 2-48. These technologies, however, were eliminated from further consideration

because there are either not economically viable or remain at the research development scale.

4.103 The Staff evaluated the potential environmental impacts from the proposed action. Overall, the environmental impact from the proposed action is small. FEIS at 4-100. The Staff found that the impact of the proposed facility would be small in terms of land use, historic and cultural resources, visual and scenic resources, geology and soils, water resources, ecological resources, environmental justice, noise, radiological impacts from routine transportation and transportation accidents, decontamination and decommissioning, public and occupational health and safety, and waste management. Small to moderate impacts are possible in the areas of air quality, non-radiological impacts from routine transportation, and non-radiological impacts from transportation accidents. FEIS at 4-116 and 4-118. The Staff evaluated the potential mitigation measures proposed by the Applicant and identified an additional potential mitigation measure for the impact of construction on air quality. FEIS at 5-1 to 5-4. The Staff also reviewed the proposed environmental measurement and monitoring programs. FEIS at 6-1 to 6-12.

4.104 The Staff reviewed the costs and benefits of the proposed action. Direct costs would result from the life-cycle stages of the facility: site preparation and construction, centrifuge manufacturing and assembly, operations, disposal of tails, and decontamination and decommissioning. Indirect costs reviewed include environmental impacts expected to be caused by the proposed action, which, as stated above were found to be generally small but occasionally moderate. FEIS at 7-1. The primary benefit of the proposed action is the production of 3.5 million to 7 million separative work units (SWU) of enriched uranium over the operational life of the facility, at approximately 20 percent of the operating costs per SWU of a gaseous diffusion plant. This production would augment the domestic supply of enriched uranium and would meet the purpose and need of the facility as discussed above. The Staff also determined that the proposed action would result in a positive socioeconomic impact on the

region around the facility. FEIS at 7-4. Overall, the Staff estimated that the costs of the proposed action are small in comparison to the benefits for the proposed action. FEIS at 7-5.

4.105 The Staff compared the proposed action to the no-action alternative and found that the impacts of both actions would be similar. However, the no action alternative would include a missed socio-economic opportunity for the region surrounding the proposed facility and would result in continued high operating costs associated with gaseous diffusion technology. FEIS at 7-10.

4.106 Based on the information described above, we find that the Staff has a reasonable basis for its conclusions, and that the record is sufficient with respect to the environmental protection plan and the FEIS to support license issuance.

J. SER Chapter 10, "Decommissioning"

4.107 Chapter 10 of the SER addresses the Applicant's decommissioning plan for the purpose of determining whether there is reasonable assurance that the ACP will be decommissioned safely. The Staff reviewed the plan to determine compliance with the regulatory requirements concerning decommissioning funding and financial assurance at 10 C.F.R. §§30.35, 40.36, 70.22, 70.25 and the requirements relating to the decommissioning of sites at 10 C.F.R. §§20.1401-1406, 30.36, 40.42, 70.38. *Id.* The relevant portions of NUREG-1520 references NUREG-1727, "NMSS Decommissioning Standard Review Plan" (2000). The acceptance criteria from NUREG-1520 are applicable to the proposed ACP. However, because depleted uranium deconversion services are not currently available in the United States, depleted uranium generated in the operation of the ACP facility is considered as a potential decommissioning obligation in the decommissioning funding plan. In addition, the Applicant requested an exemption to the decommissioning funding requirements to allow it to incrementally fund its financial assurance instrument as depleted uranium is generated. The Staff also determined that, because the incremental funding approach proposed by the

Applicant will provide funding for all the Applicant's decommissioning obligations at any point in time, the approach will not endanger life or property or the common defense and security.

4.108 While a detailed decommissioning plan will be provided at the time of decommissioning in accordance with and 10 C.F.R. § 30.36(g), 10 C.F.R. § 40.42(g), and 10 C.F.R. § 70.38(g), the Staff reviewed the decommissioning overview in the Application. SER at 10-7 to 10-8. The Staff's review addressed the following areas: (1) general decommissioning program intended to release the facility for unrestricted use; (2) features to minimize worker exposure and waste volumes; (3) planned decommissioning steps; (4) management and organization during decommissioning; (5) application of health and safety requirements; (6) management of radioactive and hazardous wastes; (7) security and nuclear material control; (8) proposed recordkeeping program to meet the requirements in 10 C.F.R. § 30.35(g), 10 C.F.R. § 40.36(f), and 10 C.F.R. § 70.25(g); and (9) decommissioning processes that identify the facilities to be used for decontamination activities, describes the decontamination procedures that will be prepared, and the expected decontamination results. The Staff's review found that the overview is consitent with the guidance in Section 10.1 of NUREG-1520. *Id.*

4.109 The Staff reviewed the Applicant's decommissioning cost estimate against the acceptance criteria in NUREG-1757 in order to determine whether the cost estimate meets the requirements of 10 C.F.R. § 70.25(e). The Staff's review showed that: (1) the cost estimate is based on documented and reasonable assumptions; (2) the cost estimates for individual facility activities and components are reasonable and, to the extent possible, consistent with NRC cost estimation reference documents; (3) the cost estimate reflects decommissioning under appropriate facility conditions; (4) the cost estimate includes costs for labor, equipment and supplies, overhead and contractor profit, sampling, and miscellaneous expenses; (5) the cost estimate includes costs for all major decommissioning activities, including planning and

preparation; decontamination or dismantling facility components; packaging, shipping, and disposal of wastes; restoration of facility grounds; and the final radiation survey; (6) the computations are correct; (7) no credit is taken for salvage value; (8) the decommissioning cost estimate includes an adequate contingency factor of 25 percent; (9) the decommissioning cost estimate provides a description of how it will be adjusted periodically over the life of the facility; and (10) the depleted uranium disposition cost estimate is based in information from DOE, which is statutorily required to recover costs from a uranium enrichment facility licensee if the licensee chooses to utilize a DOE disposition path for depleted uranium generated at the facility. SER at 10-12. Based on its review, the Staff found the decommissioning cost estimate to be in a reasonable range and that the cost estimate is consistent with the acceptance criteria in NUREG-1757 and therefore fulfills the requirements of 10 C.F.R. § 70.25(e). *Id.*

4.110 The Applicant stated that it will use a surety bond method to provide reasonable assurance of decommissioning funding as required by 10 C.F.R. § 70.25(f)(2). The Staff reviewed the surety bond method to be adopted by the Applicant and concluded that it will provide a guarantee that decommissioning costs will be paid in the event the Applicant is unable to meet its decommissioning obligations at the time of decommissioning. SER at 10-12. The surety bond will be structured consistent with applicable NRC requirements and in accordance with NRC regulatory guidance contained in NUREG-1757. However, because final executed copies of the financial assurance mechanism will not be provided to NRC until prior to receipt of licensed material, the NRC staff conditioned its approval of the application on the imposition of the following license condition:

> The licensee shall provide final copies of the proposed financial assurance instruments to NRC for review at least six months prior to the planned date for obtaining licensed material, and provide to NRC final executed copies of the reviewed financial assurance instruments prior to the receipt of licensed material. The amount of the financial assurance instrument shall be updated to current year dollars and include any applicable changes to the decommissioning cost estimate. The decommissioning cost estimate shall include an update to USEC's

> Analysis of Depleted Uranium Disposal Costs for the ACP. To develop this update, USEC shall coordinate with DOE to determine necessary changes to the DOE contractor's depleted uranium cost estimate utilized as input to the USEC specific analysis.

SER at 10-13. In accordance with 10 C.F.R. § 30.35(e), 10 C.F.R. § 40.36(d), and 10 C.F.R. § 70.25(e), the Applicant will update the decommissioning cost estimate for the facility and the associated funding levels over the life of the facility. In addition, the Applicant requested an exemption from the 10 C.F.R. § 40.36 and 10 C.F.R. § 70.25 decommissioning funding requirements to allow incremental funding for decommissioning based on the expected number of centrifuges to be built and installed and on the expected amount of depleted uranium tails to be generated annually in a forward-looking manner. The Staff evaluated the exemption request and determined that the exemption is authorized by law and will not endanger life or property or the common defense and security and is otherwise in the public interest. SER at 10-14. The Staff will review the initial cost estimate and the expected financial instrument before the Applicant takes possession of licensed material. The Staff will also review all subsequent annual revisions to the cost estimate and financial instruments. The Staff conditioned its approval of the application on the imposition of the following license condition related to the submittal of decommissioning funding plan updates:

> The initial and subsequent updated DFP cost estimates, up to the time of full capacity operations, and revised funding instruments shall be provided annually and shall provide full funding for decontamination and decommissioning of the full-size facility, except
>
> (1) The cost estimate for decontamination and removal of the centrifuges shall be provided on an annual forward-looking basis based on planned incremental enrichment capacity increases; and
>
> (2) The cost estimate for depleted uranium byproduct generation shall be provided on a projected annual forward-looking basis. The decommissioning cost estimate shall include an update to USEC's Analysis of Depleted Uranium Disposal Costs for the ACP. To develop this update, USEC shall coordinate with DOE to determine necessary changes to the DOE contractor's depleted uranium cost estimate utilized as input to the USEC specific analysis.

> Once full capacity operation is achieved, the licensee shall provide cost estimates for depleted uranium byproduct generation on an annual forward-looking basis and cost estimates for decontamination and decommissioning the remainder of the facility at intervals not to exceed 3 years, consistent with the requirements of 10 CFR 40.36(d) and 10 CFR 70.25(e).
>
> The DFP cost estimates shall be provided to NRC for review, and subsequently, after resolution of any NRC comments, final executed copies of the financial assurance instruments shall be provided to NRC.

SER at 10-14 to 10-15.

4.111 Based on the review above, and the license conditions imposed by the Staff, the Staff has determined that the Applicant has considered site-specific decommissioning activities that may be needed in the future. In addition, the Applicant's plan for decommissioning, including financial assurance for decommissioning, complies with the NRC's regulatory requirements in 10 C.F.R. Parts 20, 30, 40, and 70 as identified in Chapter 10 of the SER; provides sufficient funding to ensure decommissioning and decontamination of the facility, even if the Applicant should be unable to meet its financial obligations; and provides for updating the decommissioning cost estimate for the ACP and the associated funding levels over the life of the facility. Therefore, the Staff finds that the Applicant's plan for decommissioning activities provides reasonable assurance of protecting the health and safety of workers, the public, and the environment. SER at 10-15.

4.112 Based on the above, we find that the Staff has a reasonable basis for its conclusions, and that the record is sufficient with respect to decommissioning to support license issuance.

K. SER Chapter 11, "Management Measures"

4.113 Chapter 11 of the SER documents the Staff's review of information in the Application related to management measures. The Applicant must provide information to ensure that the management measures applied to items relied on for safety (IROFS), as documented in the Integrated Safety Analysis (ISA) Summary, provide assurance, consistent

with the performance requirements of 10 C.F.R. § 70.61, that the IROFS will be available and reliable 10 C.F.R. § 70.4 states that “management measures” include configuration management, maintenance, training and qualifications, procedures, audits and assessments, incident investigations, records management, and other quality assurance elements. Each applicant or licensee must keep records of IROFS failures in accordance with 10 C.F.R. § 70.62(a)(3), and also must establish management measures to ensure compliance with the performance requirements of § 70.61. 10 C.F.R. § 70.62(a)(3) and (d). Other applicable regulatory requirements are: 10 C.F.R. § 19.2, “Instructions to Workers”; 10 C.F.R. §70.22(a)(8), the requirement for procedures that protect health and minimize danger to life; 10 C.F.R. § 70.72, the requirements for facility change processes; and 10 C.F.R. § 70.74(a) and (b), the requirement for incident investigation and reporting.

4.114 When reviewing the Application to determine compliance with the above regulatory requirements, the Staff was guided by the acceptance criteria listed in Chapter 11 of NUREG-1520. Chapter 11 of NUREG-1520 is applicable to the Application in its entirety. SER at 11-2. Thus, the Staff reviewed the management measures against the acceptance criteria listed in NUREG-1520.

4.115 The Applicant’s configuration management (CM) program is described in Section 11.1 of the Application. The goal of the CM program is to assure that the ACP has accurate, current documentation that matches the plant’s physical and functional configuration and complies with applicable requirements in order to ensure that changes from the plant baseline configuration are identified and controlled to help ensure safety through consistency among the plant design and operational requirements, the physical configuration and the plant documentation. The Staff reviewed the CM program against the acceptance criteria in NUREG-1520 Section 11.4.3. SER at 11-2.

4.116 The Staff’s review encompassed the aspects of the CM policy described in the

Application, including: (1) identification and documentation of IROFS; (2) organizational descriptions of duties and responsibilities; and (3) administrative controls, procedures, and policies to implement and document activities that maintain the facility's configuration. The Staff's review found that the Applicant has provided a sufficient description of the overall CM policy and functions which meets the applicable acceptance criteria. SER at 11-2 to 11-4.

4.117 The Staff also reviewed the "Design Requirements" portion of the CM program, which states that design requirements will be developed for IROFS or other systems or components required to support the ISA and meet the baseline design criteria (BDC) as defined in 10 C.F.R. § 70.64. The baseline configuration of the facility will consist of approved Design Criteria Documents and ISA Summary, Design Basis Documents, System Requirements Documents, and the as-built drawings and specifications and will be approved by the Engineering Manager. All changes to these documents will be controlled. The Staff reviewed the Design Requirements information against the applicable acceptance criteria, and found that the information meets the guidance in Section 11.4.3.1(2) of NUREG-1520. SER at 11-4.

4.118 The Staff reviewed the "Document Control" portion of the CM program against the guidance in Section 11.4.3.1(3) of NUREG-1520. As described in the Application, the document control program is designed to assure that procedures are generated, reviewed, approved, and distributed in a controlled manner. The Staff's review found that the Applicant's plans for document control meet the applicable acceptance criteria. SER at 11-4.

4.119 The "Change Control" portion of the CM program was reviewed against the guidance in Section 11.4.3.1(4) of NUREG-1520. As described in the Application, change controls are implemented to ensure that changes to the plant, structures, systems, processes, equipment, components, computer programs, and activities of personnel, will be implemented in accordance with 10 C.F.R. § 70.72; and also outlines the procedure used by the licensee to evaluate and review changes prior to releasing the changes into operations. The Staff's review

of the change control process information found that the process has been adequately described and meets the applicable guidance and acceptance criteria. SER at 11-5.

4.120 Section 11.1.5 of the Application states that the CM Assessment Program includes both initial and periodic document and system walk-down assessments, with an initial assessment performed during the Applicant's readiness review of the ACP. Deficiencies or recommendations noted during the assessments will be documented and addressed in accordance with the Corrective Action Program. The Staff reviewed the CM Assessment Program, and found that it meets the acceptance criteria in Section 11.4.3.1(5) of NUREG-1520. SER at 11-5 to 11-6.

4.121 The description in the Application of the "Design Verification" portion of the Application states that the Applicant will lease for use in the ACP portions of structures that were already built by DOE for the Gas Centrifuge Enrichment Process. Therefore, to verify that the design and construction of the existing structures meet the ACP design requirements, the Applicant will use a verification process that will include an assessment of the structures to compare the configuration with original drawings, construction specifications, and procedures. The Staff reviewed the description of the Design Verification Program against the acceptance criteria in Section 11.4.3.1(6) of NUREG-1520 and found it acceptable. SER at 11-6.

4.122 The Staff reviewed the Applicant's maintenance programs against the acceptance criteria at Section 11.4.3.2 of NUREG-1520. The review found that maintenance programs related to preventive and corrective maintenance will be established to provide a level of inspection, calibration, repair, replacement, and testing to ensure each IROFS will be available and reliable to perform its intended function. Policies, procedures, and programs will address personnel qualifications and training, design/work control, corrective and preventive maintenance, surveillance and monitoring, post-maintenance testing, control of measuring and test equipment, and equipment/work history. The Maintenance Manager will be responsible for

the overall coordination and management of the organization. The maintenance program will also include surveillance and monitoring performed at specified intervals to verify the proper operation of IROFS and to measure the degree to which IROFS meet performance requirements, as well as functional testing to ensure safe turnover, testing, and start-up of the centrifuge machines, equipment, and support systems. The Staff's review determined that the Application includes an adequate description of the Maintenance Program that meets the applicable acceptance criteria. SER at 11-6 to 11-9.

4.123 Section 11.3 of the Application discusses training and qualification programs that will ensure that those personnel who perform activities relied on for safety have the applicable knowledge and skills necessary to design, operate, and maintain the plant in a safe manner that will protect public and worker safety, safeguard licensed material, and protect the environment. The Application includes descriptions of the organization and management of the training function; the process to analyze and identify functional areas requiring training; position training requirements; the process used to develop the basis for training; the organization of instruction, including lesson plans and other training guides; evaluation of trainee accomplishments; how on the job training will be conducted; the process for evaluating training effectiveness; personnel qualification requirements; and provisions for continuing assurance that training complies with regulatory requirements and national standards. The Staff evaluated the information related to training against the acceptance criteria in Section 11.4.3.3. of NUREG-1520, and found that the information meets the guidance. SER at 11-10 to 11-13.

4.124 Section 11.4 of the Application describes procedure development and implementation. The Application addresses how operating procedures, maintenance procedures, and administrative procedures will be developed and describes the main elements covered by each type of procedure. The Application also describes the process for modifying and disseminating procedures as well as for verifying the effectiveness of changed procedures.

The Staff reviewed the information regarding procedure development and implementation against the acceptance criteria in Section 11.4.3.4 of NUREG-1520 and found the information to be acceptable. SER at 11-13 to 11-16.

4.125 Section 11.5 of the Application describes the implementation of a system of audits and assessments used to ensure that the health, safety, and environmental programs, as described in the Application will be adequately and effectively implemented. The system will be designed to ensure comprehensive program oversight at least every three years for all ACP activities and functions. The system will be composed of audits and assessments. The Staff reviewed this information against the acceptance criteria in Section 11.4.3.5 of NUREG-1520, and found that the information provided gives reasonable assurance that audits and assessments will be adequately performed and documented and, therefore, is acceptable. SER at 11-16 to 11-18.

4.126 Section 11.6 of the Application describes the incident investigation process for the identification, reporting, and investigation of abnormal events in accordance with 10 C.F.R. §§ 70.50 and 70.74. The Applicant will establish procedures to assure that abnormal events and conditions will be promptly reported to appropriate personnel, assessed, and, when required, reported to the NRC. The Staff evaluated the description of the incident investigation process against the guidance in Section 11.4.3.6 of NUREG-1520 and found it to be acceptable. SER at 11-18 to 11-19.

4.127 Section 11.7.3.1 of the Application describes the Applicant's Records Management and Document Control (RMDC) program, which will assure that appropriate records of IROFS will be maintained in accordance with the baseline design criteria of 10 C.F.R. § 70.64(a) and the defense-in-depth requirements of 10 C.F.R. § 70.64(b). The Application explains the responsibilities of the Engineering Manager, the individual responsible for the RMDC program. Records will be maintained according to requirements that will vary

according to the nature of the plant and the hazards and risks posed by it. The Staff reviewed the description of the RMDC program against the guidance in Section 11.4.3.7 of NUREG-1520, and found that it is acceptable. SER at 11-19 to 11-20.

4.128 The Staff reviewed the Applicant's Quality Assurance Program Description (QAPD), which describes elements related to the design, fabrication, refurbishment, modification, testing, operation, and maintenance of the ACP in order to meet the requirements of 10 C.F.R. § 70.64(a)(1). Elements reviewed were: (1) the organization of the QAPD, including the organizational structure, functional responsibilities, and areas of responsibility and authority for all organizations performing activities relied on for safety; (2) the Quality Assurance Program, which includes the elements that will be applied to the design, fabrication, testing, operation, procurement, inspection, maintenance, and modifications of IROFS and activities affecting those IROFS to assure that they will be available and reliable to perform their safety functions when needed; (3) the description of the design control process and procedures that include design inputs, process, analyses, verification, interfaces, changes, and design documentation and records; (4) the description of the control of the procurement process, procurement documents, and procured material, components, and services; (5) a commitment that activities affecting the availability and/or reliability of IROFS will be prescribed by and performed in accordance with documented instructions, procedures, and drawings of a type appropriate for the circumstances; (6) the description of the document control QA element, which governs the preparation, issuance, modification, and control of documents that specify quality requirements or prescribe activities affecting the availability or reliability of IROFS to provide assurance that the appropriate documents will be in use; (7) a commitment that the procurement of items and services will be controlled to assure conformance with specified requirements; (8) a description of IROFS that will be identified and controlled, as necessary, from initial receipt and fabrication of the items up to and including installation and use to provide

assurance that only correct and acceptable items will be used or installed; (9) a description of the control of processes affecting quality of items and services; (10) a description of the inspections element of the QAPD; (11) a description of the tests that will be performed in order to verify conformance to specified requirements, to demonstrate satisfactory performance, or to collect data; (12) a description of the controls to provide reasonable assurance that tools, gauges, instruments, and other measuring and testing devices will be properly identified, controlled, calibrated, and adjusted at specified intervals to maintain performance within required limits; (13) a description of the measures to handle, store, and ship material and equipment in accordance with design and procurement requirements to protect against damage, deterioration, or loss; (14) a commitment to establish procedures to ensure that the status of inspection and test activities will be either marked or labeled on the item or in documentation traceable to the item; (15) a commitment to control items and related activities that do not conform to specified requirements to prevent inadvertent installation or use; (16) a commitment to identify and promptly correct conditions adverse to quality; (17) a description of the QA records system; (18) a description of the planning and scheduling of internal and external audits that verify compliance with the Quality Assurance Program and to determine its effectiveness; and (19) a statement that QAPD changes may be initiated by events such as reorganizations, revised activities, lessons learned, changes to applicable regulations, and process changes. Based on its review, the Staff determined that the information described in the Application meets the applicable guidance and is acceptable. SER at 11-20 to 11-31.

4.129 Based on the above, the Staff found that the Applicant's description of the overall CM program appropriately covered CM policy, design requirements, document control, change control, assessments, and design verification, and, therefore, the CM program is acceptable. The review also concluded that the maintenance functions as described in the Application meet the requirements of Part 70, and provide assurance of protecting the health and safety of

workers, the public, and the environment. The Staff's review concluded that implementation of the Applicant's training program, as described in the Application, will result in personnel who are qualified and competent to design, construct, start up, operate, maintain, modify, and decommission the facility safely, and, therefore, the plan for personnel training and qualification meets the requirements of Part 70. The Staff found that the strategic plan for procedure development will meet the requirements of Part 70 because the information in the Application describes a suitably detailed process for the development, approval, and implementation of procedures which appropriately covers IROFS, as well as other items important to protecting the health and safety of workers, the public, and the environment. Based on its review, the Staff found that the Applicant's plan for audits and assessments meets the requirements of Part 70 and provides assurance of protection of the health and safety of workers, the public, and the environment. With respect to incident investigations, the Staff concluded, based on its review, that the Applicant's description of the incident investigation process complies with applicable NRC regulations and provides assurance of protection of the health and safety of workers, the public, and the environment. Based on its evaluation, the Staff also found that the Applicant's description and implementation processes for records management are acceptable. Finally, the Staff concluded, based on its review, that the Applicant has adequately described the application of other QA elements applied to IROFS, management measures, and other safety-related items and, therefore, meets the requirements of 10 C.F.R. §70.62(d) and other applicable regulations, and provides the assurance of protection of worker and public health and safety and protection of the environment. SER at 11-31 to 11-36.

4.130 Based on the above, we find that the Staff has a reasonable basis for its conclusions, and that the record is sufficient with respect to management measures to support license issuance.

L. SER Appendix A, "Integrated Safety Analysis (ISA) and ISA Summary"

4.131 Appendix A of the SER contains the Staff's review of the Applicant's Integrated Safety Analysis (ISA) and ISA Summary, which is also reviewed in SER Chapter 3, discussed above. Appendix A contains information that has been has been marked as "Export Controlled Information" by the Applicant and that has been designated by the NRC as "Official Use Only-DOE/NOFORN," while the information reviewed in Chapter 3 is publicly available. SER at A-1.

4.132 The ISA and ISA Summary content must comply with the requirements of 10 C.F.R. §§ 70.62, 70.64, and 70.65(b). The regulations in 10 C.F.R. § 70.62, require an applicant to establish and maintain a safety program that demonstrates compliance with the performance requirements of 10 C.F.R. § 70.61. The safety program is required to contain: (1) process safety information; (2) an integrated safety analysis (ISA) which evaluates compliance with performance requirements; and (3) management measures. Pursuant to 10 C.F.R. § 70.65(a) the Application also must include a description of the safety program, and an applicant is required to submit an ISA summary containing: (1) general description of the site; (2) a general description of the facility; (3) a description of each process analyzed in the ISA in sufficient detail to understand the theory of operation and, for each process, the hazards identified in the ISA and a general description of the types of accident sequences; (4) information that demonstrates compliance with the performance requirements of 10 C.F.R. § 70.61; (5) a description of the team, qualifications, and the methods used to perform the ISA; (6) a list briefly describing each IROFS in sufficient detail to understand their functions in relation to the performance requirements of 10 C.F.R. § 70.61; (7) a description of the proposed quantitative standards used to assess consequences to an individual from acute chemical exposure to licensed material or chemicals produced from licensed material; (8) a descriptive list that identifies all IROFS that are the sole item preventing or mitigating an accident sequence that exceeded the performance requirements of 10 C.F.R. § 70.61; and (9) a description of the definitions of unlikely, highly unlikely, and credible, as used in the evaluations

in the ISA.

4.133 The Staff reviewed the ISA and ISA Summary against the acceptance criteria in Chapter 3 of NUREG-1520. SER at A-3. These sections are applicable to the proposed ACP with three exceptions. The first exception is 3.4.3.2(4)(c) which addresses criticality monitoring because criticality monitoring is addressed in Chapter 5 of the SER. The second exception is Section 3.4.3.2(5)b(i-ix) regarding process hazard analysis methods. This section provides conditions which should be met for hazard analysis methods used by the Applicant if the methods are not described in NUREG-1513. Because the methods used by the Applicant (preliminary hazards analysis method and the what if/checklist method) are described in NUREG-1513, these conditions in Section 3.4.3.2(5)b(i-ix) do not have to be addressed. The third exception is various subparts in Section 3.4.3.2(9) regarding qualitative methods of defining and evaluating likelihood, because the Applicant uses a quantitative method. *Id.*; NUREG-1520 at 3-24 to 3-27 (establishing separate acceptance criteria for qualitative and quantitative methods).

4.134 Based on its review, the Staff concluded that the Applicant provided an acceptable ISA Summary for the proposed facility that will meet the applicable 10 C.F.R. Part 70 requirements as listed above. The ISA Summary used the What-If/Checklist procedure to determine credible accident sequences. The ISA Summary provides estimates of the likelihood and consequences of each accident sequence, and provides sufficient information to determine whether adequate engineering or administrative controls are identified for each accident sequence. The ISA Summary describes items relied on for safety, management measures, likelihoods and consequences for higher-risk accident sequences, and acceptable methods for achieving the performance requirements in 10 C.F.R. Part 70, Subpart H, “Additional Requirements for Certain Licensees Authorized to Possess a Critical Mass of Special Nuclear Material.” SER at A-36 to A-37.

4.135 Based on the above, we find that the Staff has a reasonable basis for its conclusions, and that the record is sufficient with respect to the ISA and ISA Summary to support license issuance.

M. SER Appendix B, "Accident Analysis for the Proposed ACP"

4.136 Appendix B of the SER documents the Staff's independent evaluation of the consequences of a set of potential accident sequences identified in the Applicant's ISA Summary. Appendix B contains information that has been marked as "Export Controlled Information" by the Applicant, and is designated by the NRC as "Official Use Only-DOE/NOFORN."

4.137 Pursuant to 10 C.F.R. Part 70, Subpart H, each applicant must limit the risks of credible accidents that can result in significant adverse impacts to workers, the public, and the environment and evaluate, in an ISA, its compliance with certain performance requirements. The Applicant submitted the ISA Summary and made the ISA available for an on-site review by the Staff, and the Staff independently evaluated the consequences of a potential set of accidents identified in the ISA that are representative of the types of accidents that are possible at the proposed ACP.

4.138 The Staff used analytical methods based on NRC guidance for nuclear facility accident analysis to conduct the consequence assessments. SER at B-1. The accidents evaluated involve the release of uranium hexafluoride (UF_6) liquid and/or gas from process systems, components, and containers, which can result in adverse chemical and radiological impacts to the workers, public, and environment. The Staff also evaluated a criticality accident generically. The Staff selected six potential accident sequences for detailed evaluation: (1) explosion of wrecked centrifuge(s) following backfill with air; (2) process building construction fire; (3) cold trap shell structure or associated piping failure; (4) breach of over-pressurized liquid cylinder; (5) breach of piping during liquid UF_6 transfer; and (6) generic

inadvertent nuclear criticality. SER at B-1 to B-2. These sequences are intended to encompass the range of credible accident sequences, varying in severity from high to low consequence events, and including accidents initiated by operator error and equipment failure. The most significant consequences are associated with the release of UF_6 and nuclear criticality. The proposed ACP design reduces the risk (likelihood) of the accident by identifying IROFS, and defense-in-depth features. The Staff independently verified the accident analysis by performing confirmatory hand calculations and computer simulations. SER at B-20.

4.139 Based on its independent verifications, the Staff concluded that through the combination of plant design, passive and active engineered IROFS, administrative IROFS, and defense-in-depth features, the proposed ACP will pose an acceptably low safety risk to workers, public, and the environment. SER at B-20. As a result, the Staff determined that the Applicant meets the requirements to operate the proposed facility under 10 C.F.R. Part 70.

4.140 Based on the above, we find that the Staff has a reasonable basis for its conclusions, and that the record is sufficient with respect to the accident analysis for the proposed ACP to support license issuance.

N. SER Appendix C, "Nuclear Criticality Safety"

4.141 To determine whether the Applicant's nuclear criticality safety (NCS) program is adequate to support safe design, construction, and operation of the facility, as required by 10 C.F.R. Part 70, the Staff independently evaluated the Applicant's criticality code validation report and margin of subcriticality, information related to NCS in the ISA and EP, criticality related accident scenarios, and criticality related IROFS. SER at C-2. The Staff's review is documented in Appendix C of the SER. The Staff's review determined whether the ISA and ISA Summary meet the regulatory requirements specified in 10 C.F.R. Part 70, Subpart H, and, specifically, determining whether: (1) the ISA program is acceptable for NCS; (2) the ISA has been acceptably performed and will be maintained for NCS; and (3) the ISA Summary contains

necessary information, such that the NCS accident sequences are “highly unlikely.” The evaluation in Appendix C contains information that has been marked as “Export Controlled Information” by the Applicant, and is designated by the Staff as “Official Use Only-DOE/NOFORN.”

4.142 Guidance for the Staff’s review is contained in Chapter 5 of NUREG-1520. The acceptance criteria are outlined in Sections 5.4.3.1, 5.4.3.2, 5.4.3.3, and 5.4.3.4 of NUREG-1520. This includes the use of NRC NCS Regulatory Guide 3.71. The acceptance criteria used for the NCS review of the Applicant’s ISA program and ISA Summary are outlined in Sections 3.4.3.1 and 3.4.3.2 of NUREG-1520. SER at C-2.

4.143 The Staff’s evaluation was informed by a consideration of the low risk of the majority of ACP operations. This is based on: (1) heavy reliance on passive geometry and limited mass in the majority of processes (except product withdrawal and uranium hexafluoride (UF_6) cylinder handling and storage); (2) heavy reliance on the integrity of passive equipment to ensure moderator control in most of the remaining, support processes; (3) limited handling of liquid UF_6 (i.e., limited to autoclaves and associated piping in the sampling, transfer, and blending facility), and no solution processing (responsible for the majority of historical criticality accidents) at the facility; and (4) processes being limited to less than 10 wt% ^{235}U (and product initially limited to less than 5wt% ^{235}U). While there are parts of the facility that involve large quantities of enriched uranium in unfavorable geometry (e.g., product withdrawal and cylinder storage), the above factors permitted a graded approach in the Staff’s review of safety in the facility overall. SER at C-2.

4.144 The Staff’s evaluation presented in Appendix C of the SER addresses the criticality code validation report and margin of subcriticality, NCS in the ISA, NCS in the EP, criticality related accident scenarios, and criticality related IROFS. SER at C-2. With regard to the validation report and margin of subcriticality, the Staff concluded that the Applicant’s

validation document was sufficient to demonstrate that facility criticality calculations will meet the subcriticality requirement of 10 C.F.R. § 70.61(d), and is also in accordance with the acceptance criteria in Chapter 5 of NUREG-1520. The validation process ensures that only properly validated codes are used for criticality calculations and will have appropriate margin.

4.145 Based on its review of the Applicant's ISA methodology described in Chapter 3 of the Application, the Staff concluded that the methodology provides an acceptable framework for ensuring adequate protection against criticality accidents. The Staff will evaluate the final implementation of this methodology during the inspection required under 10 C.F.R. § 70.32(k).

4.146 With regard to the information in the ISA Summary itself, the Staff concluded that the Applicant has identified credible hazards, accident sequences, and IROFS for the level of the available design information. The Staff's review confirmed that the Applicant has committed to using an appropriate methodology in accordance with the requirements of 10 C.F.R. § 70.72 for evaluating changes to the facility and determining whether they would create additional accident sequences or require any additional IROFS. Based on these findings, the Staff concludes that there is reasonable assurance that the final design will be acceptable and will ensure that all credible criticality accidents highly unlikely.

4.147 Based on its review of the NCS information submitted in the EP, the Staff concluded that the Applicant has submitted sufficient information to ensure public health and safety following the highly unlikely occurrence of a criticality accident. Based on the review, the Staff concludes that construction and operation of the proposed ACP will provide for reasonable assurance of safety and the adequate protection of public health and safety from the consequences of a criticality accident.

4.148 Based on the above, we find that the Staff has a reasonable basis for its conclusions, and that the record is sufficient with respect to NCS for the proposed ACP to support license issuance.

O. SER Appendix D, “Fire Safety”

4.149 Appendix D of the SER describes the Staff’s independent evaluation of the consequences of a set of potential fire and explosion related accident sequences identified in the Applicant’s ISA Summary. Appendix D contains information that has been marked as “Export Controlled Information” by the Applicant, and is designated by the Staff as “Official Use Only-DOE/NOFORN.”

4.150 The Staff’s fire safety review was focused on ensuring compliance with 10 C.F.R. §§ 70.61, 70.62, and 70.64. To complete its review, the Staff used guidance contained in Chapter 7 of NUREG-1520, which is applicable to the proposed ACP in its entirety. To complete the evaluation described in Appendix D, the Staff specifically relied on guidance in Sections 7.4.3.1 through 7.4.3.5 of NUREG-1520. SER at D-1.

4.151 The Staff’s fire safety review encompassed process fire hazards and special hazards, including: (1) uranium hexafluoride (UF_6); (2) hydrogen fluoride; (3) centrifuge machines and components; (4) storage, handling, and movement of UF_6; and (5) combustible material hazards. SER at D-1 to D-4. During its evaluation, the Staff reviewed a selected set of fire related accident sequences: (1) fire and/or explosion events in the UF_6 cylinder storage area or yards; (2) fire and/or explosion events in the feed area; (3) fire and/or explosion events in the process buildings; (4) fire and/or explosion events in the product and tails withdrawal building; (5) fire and/or explosion events in the recycle/assembly facility, centrifuge testing and training facility, and interplant transfer corridor; (6) fire and/or explosion events in the sampling and transfer area; and (7) fire and/or explosion events in on-site transportation activities and in the feed and product shipping and receiving building. SER at D-4 to D-10. A list of IROFS related to fire safety is presented in Appendix D. SER at Table D-1. The proposed ACP design reduces the risk (likelihood) of the accident by identifying IROFS and defense-in-depth features.

4.152 Based on its review, the Staff concluded that it has reasonable assurance that

the Applicant has identified and evaluated all credible fire-related accident scenarios for the proposed centrifuge process. In addition, the Staff concluded that through the combination of plant design, passive and active engineered IROFS, administrative IROFS, and defense-in-depth features, fire related accidents at the proposed ACP will pose an acceptably low safety risk to workers, public, and the environment. As a result, the Staff determined that the Applicant meets the requirements to operate the proposed facility under 10 C.F.R. Part 70. SER at D-13.

4.153 Based on the above, we find that the Staff has a reasonable basis for its conclusions, and that the record is sufficient with respect to fire safety for the proposed ACP to support license issuance.

P. SER Appendix E, "Electrical System and Instrumentation and Control"

4.154 Appendix E of the SER describes the Staff's independent evaluation of the Applicant's facility design in order to determine whether the Application provides an electrical system and instrumentation and controls (I&C) for the ACP that meets the regulatory requirements specified in 10 C.F.R. Part 70, Subpart H. Appendix E contains information that has been marked as "Export Controlled Information" by the Applicant, and is designated by the Staff as "Official Use Only-DOE/NOFORN."

4.155 The electrical design and I&C systems must meet the applicable requirements of 10 C.F.R. §§ 70.22, 70.61, 70.62, 70.64, and 70.65. While conducting its evaluation for regulatory compliance, the Staff used guidance in Chapter 3 of NUREG-1520, specifically Sections 3.4.3.2(4)(d) and 3.4.3.2(6) as applicable to the review of baseline design criteria contained in 10 C.F.R. 70.64(a) and the description of each IROFS, respectively. In addition, the Staff used the National Electric Code, applicable Institute for Electrical and Electronics Engineering (IEEE) standards, and various NRC guidance. SER at E-1.

4.156 For the electrical system the Staff reviewed the design for adequacy as an essential utility for support of operation of IROFS. This review included continuous operation of

the electrical system as required by 10 C.F.R. § 70.64(a)(7) and adequate protection of all portions of IROFS including, mechanical, electrical, I&C, and structural components, from environmental conditions and dynamic effects as required by 10 C.F.R. § 70.64(a)(4). The Staff reviewed the description of instrumentation and controls credited as IROFS for adequate reliability. This included reviewing the design for inclusion of instrumentation and control systems to monitor the behavior of IROFS as required by 10 C.F.R. § 70.64(a)(10). SER at E-1 to E-14.

4.157 Based on its evaluation, the Staff concluded that the electrical system represents an acceptable alternative approach to the acceptance criteria contained in Sections 3.4.3.2(4)(d) and 3.4.3.2(6) of NUREG-1520 and the requirements of 10 C.F.R. § 70.61 and 10 C.F.R. § 70.64(a)(4) and (7) based on the discussion of the electrical system and the Applicant's commitments to nationally recognized industry standards. SER at E-14.

4.158 The Staff also concluded that the instrumentation and controls also represent an acceptable alternative approach to the acceptance criteria contained in Section 3.4.3.2(4)(d) and 3.4.3.2(6) and the requirements of 10 C.F.R. § 70.61 and 10 C.F.R. § 70.64(a)(10) based on the information available at the time of review and commitments to nationally recognized industry standards. As a result, the Staff determined that the Applicant meets the requirements to operate the proposed facility under 10 C.F.R. Part 70. SER at E-14.

4.159 However, in Section 1.4 of the Application, the Applicant states that the current design of the facility does not include any IROFS that use software, firmware, microcode, PLCs, and/or any digital device, including hardware devices that implement data communication protocols. Given that this statement is based on preliminary design information and the possibility that the Applicant may choose to implement design changes, the Staff conditioned its approval of the application on the imposition of the following license condition to ensure that the final design is adequate and acceptable to the Staff:

Currently, there are no IROFS that have been specified as using software, firmware, microcode, PLCs, and/or any digital device, including hardware devices which implement data communication protocols (such as fieldbus devices and Local Area Network controllers), etc. Should the design of any IROFS be changed to include any of the preceding features, the licensee shall obtain Commission approval prior to implementing the change(s). The licensee's design change(s) shall comply with accepted best practices in software and hardware engineering, including software quality assurance controls as discussed in the Quality Assurance Program Description (USEC, 2006c) throughout the development process and the applicable guidance of the following industry standards and regulatory guides:

- *American Society of Mechanical Engineers (ASME) NQA-1, Part II, subpart Part 2.7, "Quality Assurance Requirements of Computer Software for Nuclear Facility Applications," as revised by NQA-1a Addenda of NQA-1 and ASME NQA-1, Part 1, Supplement 11S-2, "Supplementary Requirements for Computer Program Testing" (ANSI/ASME, 1994).*

- *Regulatory Guide 1.168, "Verification, Validation, Reviews, and Audits for Digital Software Used in Safety Systems of Nuclear Power Plants," Revision 1, February 2004 (NRC, 2004).*

- *Regulatory Guide 1.169, "Configuration Management Plans for Digital Computer Software Used in Safety Systems of Nuclear Power Plants," September 1997 (NRC, 1997a).*

- *Regulatory Guide 1.170, "Software Test Documentation for Digital Computer Software Used in Safety Systems of Nuclear Power Plants," September 1997 (NRC, 1997b).*

- *Regulatory Guide 1.172, "Software Requirements Specifications for Digital Computer Software Used in Safety Systems of Nuclear Power Plants," September 1997 (NRC, 1997c).*

- *Regulatory Guide 1.173, "Developing Software Life Cycle Processes for Digital Computer Software Used in Safety Systems of Nuclear Power Plants," September 1997 (NRC, 1997d).*

SER at E-14 to E-15.

4.160 Based on the above, we find that the Staff had a reasonable basis for its conclusions, and that the record is sufficient with respect to the electrical system and instrumentation and control for the proposed ACP to support license issuance.

Q. SER Appendix F, "Structural and Geotechnical Design"

4.161 In Appendix F of the SER, the Staff documented its review of the structural and geotechnical design of the proposed facility and its independent evaluation of the protection of building structures against natural phenomena in the Applicant's ISA Summary. Appendix F contains information that has been marked as "Export Controlled Information" by the Applicant, and is designated by the Staff as "Official Use Only-DOE/NOFORN."

4.162 The regulatory basis for the structural design review are the general and additional contents of an application, as required by 10 C.F.R. §§ 30.33, 40.32, 70.22, and 70.65. In addition, the structural design review should focus on providing reasonable assurance of compliance with 10 C.F.R. §§ 70.61, 70.62, and 70.64. In order to determine regulatory compliance, the Staff evaluated the structural and geotechnical design against the applicable acceptance criteria in Chapters 1 and 3 of NUREG-1520: Sections 1.3.4.3(3), 1.3.4.3(4), 3.4.3.2(1) through 3.4.3.2(4), and 3.4.3.2(9). SER at F-1.

4.163 The Staff's review included the building designs, general design criteria, loading conditions, and applicable American Society of Civil Engineers standards. Specifically, the Staff reviewed the codes and standards to be used for the design and construction of the proposed ACP. The evaluation also encompassed the information presented in the general design criteria and master specifications for design, fabrication, and erection of structural steel for the X–3001 Process Building regarding the codes and standards for the design of civil structures and the general design criteria for the proposed ACP. The Staff also reviewed the information presented in the ISA Summary and the design calculations and analysis documents. The review found that the ACP design reduces the risk (likelihood) of the accident by identifying items relied on for safety (IROFS), and defense-in-depth features.

4.164 Based on its review, the Staff concluded that through the combination of plant design, passive and active engineered IROFS, administrative IROFS, and defense-in-depth features, adequate protection of building structures against natural phenomena will pose an

acceptably low safety risk to workers, public, and the environment. As a result, the Staff determined that the Applicant meets the requirements to operate the proposed facility under 10 C.F.R. Part 70. SER at F-10 to F-11.

4.165 Based on the above, we find that the Staff has a reasonable basis for its conclusions, and that the record is sufficient with respect to structural and geotechnical design for the proposed ACP to support license issuance.

R. SER Appendix G, "Human Factors"

4.166 Appendix G of the SER describes the Staff's evaluation of the human factors section in the ISA Summary. Human factors engineering, specifically the design and implementation of human-system interfaces (HSI) (e.g., alarms, controls, displays), is an important consideration in the selection of IROFS and in reducing the safety challenges to IROFS. Appendix G contains information that has been marked as "Export Controlled Information" by the Applicant, and is designated by the NRC as "Official Use Only-DOE/NOFORN."

4.167 10 C.F.R. § 70.64(b) requires basing the facility and system design and facility layout on defense-in-depth practices, including human factors engineering. The Staff reviewed the Application for regulatory compliance based on guidance in Chapter 18.0, "Human Factors Engineering," of NUREG-800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants" (1996), NUREG-0711, "Human Factors Engineering Program Review Model," (2004), and NUREG-0700, "Human-System Interface Design Review Guideline" (2002). SER at G-1. The Staff reviews license applications by verifying that acceptable human factors engineering practices and guidance are incorporated into the facility's design basis and subsequent modifications to the design basis. SER at G-6.

4.168 The Staff reviewed human factors related accident sequences. The review evaluated whether the Application provides a process for designing and implementing HSI for

the ACP that will provide reasonable assurance that the health and safety of the facility's workers and the public will not be endangered. SER at G-1. This included reviewing the HSI, general design criteria, and applicable IEEE standards. SER at G-1 to G-4. The Staff also reviewed IROFS related to human factors, and any potential effects on IROFS from modular construction at the facility. SER at G-4 to G-6.

4.169 Based on its review, the Staff found that the information provided in the Application and the ISA Summary is consistent with current NRC human factors engineering design guidance and the nationally recognized industry standards discussed above. The Staff also found that the Applicant has complied with the defense-in-depth requirements found in 10 C.F.R. § 70.64(b). The Staff concluded that the Applicant's process for designing and implementing HSI (e.g., alarms, controls, displays) for the ACP provides reasonable assurance that the health and safety of the facility's workers and the public will not be endangered. SER at G-6.

4.170 Based on the above, we find that the Staff has a reasonable basis for its conclusions, and that the record is sufficient with respect to human factors information for the proposed ACP to support license issuance.

S. SER Appendix H, "Material Control and Accounting"

4.171 The Staff's review of the Applicant's nuclear material control and accounting (MC&A) program, outlined in the Applicant's Fundamental Nuclear Material Control Plan (FNMCP), is documented in Appendix H of the SER. Appendix H contains information that has been marked as "Proprietary Information" by the Applicant, pursuant to 10 C.F.R. § 2.390.

4.172 The Applicant's MC&A program must comply with the regulatory requirements specified in 10 C.F.R. Part 74, including provisions for reports and regulatory inspections. The Staff evaluated the MC&A program against guidance in NUREG/CR-5734, "Recommendations

to the NRC on Acceptable Standard Format and Content for the Fundamental Nuclear Material Control (FNMC) Plan Required for Low-Enriched Uranium Enrichment Facilities" (1991), Regulatory Guide 5.67, "Material Control and Accounting Requirements for Uranium Enrichment Facilities Authorized to Produce Special Nuclear Material of Low Strategic Significance" (1993), NUREG/BR-0096, "Instructions and Guidance for Completing Physical Inventory Summary Reports" (1992), NUREG/BR-0006, "Instructions for Completing Nuclear Material Transaction Reports" (2003), and NUREG/BR-0007, "Instructions for the Preparation and Distribution of Material Status Reports" (2003). SER at H-1.

4.173 The Staff reviewed and evaluated information provided by the Applicant in the FNMCP for the proposed MC&A program. The Staff's evaluation included: performance objectives, MC&A organization, measurements, the Measurement Control Program, statistics, the Physical Inventory Program, the Item Control Program, the Material Receipt and Shipment Program, the Assessment Program, the Unauthorized Production/Enrichment Prevention Program, resolving indications of missing uranium or unauthorized production or enrichment, investigation assistance information, and the Record Keeping Program. SER at H-1 to H-2.

4.174 Based on its review, the Staff concluded that the Applicant provided an acceptable FNMCP for the proposed facility that will meet the applicable 10 C.F.R. Part 74 requirements. The FNMCP describes acceptable methods for achieving the performance objectives in 10 C.F.R. § 74.33(a) and the system capabilities of 10 C.F.R. § 74.33(c). As a result, the Staff determined that the Applicant meets the requirements in the area of MC&A to operate the proposed facility under Part 74. SER at H-5.

4.175 Based on the above, we find that the Staff has a reasonable basis for its conclusions, and that the record is sufficient with respect to material control and accounting for the proposed ACP to support license issuance.

T. SER Appendix I, "Physical Protection"

4.176 The Staff's review of the Applicant's Physical Security Plan (PSP) for the protection of Special Nuclear Materials (SNM) of Low Strategic Significance (LSS) is documented in Appendix I of the SER. Appendix I contains information that has been marked as "Proprietary Information" by the Applicant, pursuant to 10 C.F.R. § 2.390.

4.177 The regulatory requirements for physical protection of SNM-LSS are specified in 10 C.F.R. §§ 70.22, 73.67, and 73.71. In addition, in February 2003, the NRC issued Orders to all Category III fuel cycle licensed facilities requiring the implementation of Additional Security Measures (ASM) at each site that stores or processes SNM-LSS. If licensed, the proposed ACP would be a Category III fuel cycle licensed facility. By their nature, security orders are subject to modification depending on changes in the threat environment. After issuance of the license, the Staff will evaluate the threat environment and the NRC will issue appropriate security orders, if necessary. It is noted that the DOE reservation on which the ACP is proposed to be located also contains the Portsmouth Gaseous Diffusion Plant (PORTS) for which the NRC had issued Orders on June 17, 2002. The NRC determined the implementation of the Interim Compensatory Measures at PORTS to be adequate as documented in 70-7002/2003-002. In establishing any needed ASMs for the ACP, the NRC will take into consideration any PORTS ASMs that may also be applicable to the ACP. SER at I-1.

4.178 The guidance applicable to the Staff's review of the physical protection program described in the PSP is contained in Part II, "Special Nuclear Material of Low Strategic Significance," of Regulatory Guide 5.59. SER at I-1 to I-2.

4.179 The Applicant has stated in the PSP that they will implement specific policies, methods, and procedures in order to comply with the requirements in 10 C.F.R. § 73.67 pertaining to fixed sites. The Staff reviewed the General Design Criteria and the following aspects of the PSP: barriers; access control; detection and assessment; response to unauthorized penetrations or activities; reporting of safeguards events; and documentation.

SER at I-2.

4.180 Based on its review, the Staff concluded that the methods and procedures outlined in the PSP satisfy the performance objectives, systems capabilities, and reporting requirements specified in 10 C.F.R. §§ 73.67 and 73.71 and is in accordance with the applicable review guidelines. Thus, the PSP for the ACP is acceptable and meets regulatory requirements for physical protection of SNM-LSS. SER at I-5.

4.181 Based on the above, we find that the Staff has a reasonable basis for its conclusions, and that the record is sufficient with respect to physical protection for the proposed ACP to support license issuance.

U. SER Appendix J, "Physical Security of the Transportation of Special Nuclear Material of Low Strategic Significance"

4.182 Appendix J of the SER describes the Staff's review of the Applicant's "Physical Security Plan for the Transportation of Special Nuclear Material of Low Strategic Significance" ("Transportation Security Plan" or "TSP"). Appendix J contains information that has been marked as "Proprietary Information" by the Applicant, pursuant to 10 C.F.R. § 2.390.

4.183 10 C.F.R. §§ 73.67(c), 73.67(g)(1) - (5), 73.71, 73.73, 73.74, and 74.15 specify the regulatory requirements for physical protection of SNM-LSS in transit. The Staff reviewed the Applicant's TSP to determine whether it complies with the regulatory requirements. SER at J-1.

4.184 The Staff reviewed the TSP, the portion of the Applicant's physical protection plan relating to the transportation of SNM-LSS shipments to and from the ACP. The Staff's review included the following aspects of the TSP: general performance objective, material transportation requirements, receiver requirements for transportation, in-transit physical protection requirements, export requirements, import requirements, and document retention requirements. SER at J-1.

4.185 Based on its review of the TSP, the Staff found that the approaches and procedures outlined in the Transportation Security Plan satisfy the performance objectives, system capabilities, and event and advance notification requirements specified in 10 C.F.R. §§ 73.67(a), 73.67(c), 73.67(g)(1)-(5), 73.71, 73.73, 73.74, and 74.15. Therefore, the Staff has concluded that the TSP for the proposed ACP is acceptable and meets the regulatory requirements for physical protection of SNM-LSS in transit. SER at J-5.

4.186 Based on the above, we find that the Staff has a reasonable basis for its conclusions, and that the record is sufficient with respect to physical security of the transportation of special nuclear material of low strategic significance to support license issuance.

V. CONCLUSIONS OF LAW

5.1 Based on the foregoing, the Board finds that the Application and the record in the above-captioned proceeding contain sufficient information, and the Staff's review of the Application is adequate, to support findings in accordance with 10 C.F.R. §§ 2.104(b)(1)(i)-(iv) and (b)(2)(i) that: (1) the Applicant has sufficiently described the proposed facility, processes, technical and design information, safety features and components, and Applicant commitments; (2) the Applicant is technically qualified to design and construct the proposed ACP; (3) the Applicant is financially qualified to design and construct the proposed ACP; and (4) the issuance of a permit for the construction of the proposed ACP will not be inimical to the common defense and security or to the health and safety of the public.

5.2 Based on the information with regard to the Staff's environmental review of the proposed ACP presented above, the Board finds that the Staff's review of the Application pursuant to NEPA has been adequate, in accordance with 10 C.F.R. § 2.104(b)(2)(ii). In addition, the Board finds that the requirements of section 102(2)(A), (C) and (E) of NEPA and the applicable regulations in 10 C.F.R. Part 51, Subpart A have been met.

5.3 Based on an independent review of the final balance of environmental considerations and the reasonable alternatives to the proposed ACP, the Board finds that protection of the environment does not require denial or conditioning of the license.

Respectfully submitted,

/RA/

Margaret J. Bupp
Counsel for the NRC Staff

Dated at Rockville, Maryland
this 11th day of October, 2006

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
USEC, Inc.	)	Docket No. 70-7004
	)	
(American Centrifuge Plant)	)	
	)	

NOTICE OF WITHDRAWAL

Notice is hereby given that, effective October 11, 2006, I will withdraw my appearance in the captioned matter. All mail and service lists in this proceeding should be amended to delete my name after this date.

Respectfully submitted,

/RA/

Lisa B. Clark
Counsel for the NRC Staff

Dated at Rockville, Maryland
this 11th day of October, 2006

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
USEC, Inc.	)	Docket No. 70-7004
	)	
(American Centrifuge Plant)	)	ASLBP No. 05-838-01-ML
	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of "NRC STAFF'S PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW IN THE MANDATORY HEARING" and the "NOTICE OF WITHDRAWAL" of Lisa B. Clark in the above-captioned proceeding has been served on the following by deposit in the United States mail; through deposit in the Nuclear Regulatory Commission's internal system as indicated by an asterisk (*), or by electronic mail as indicated by a double asterisk (**) on this 11th day of October, 2006.

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