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May 26, 2006
AET 06-0063

Mr. Jack R. Strosnider
Director, Office of Nuclear Material Safety and Safeguards
Attention: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

American Centrifuge Plant
Docket Number 70-7004
Submittal of Planned Changes to the License Application for the American Centrifuge Plant (TAC Nos. L32306, L32307, and L32308)

Dear Mr. Strosnider:

Pursuant to a request from the U.S. Nuclear Regulatory Commission (NRC) staff on May 22, 2006, USEC Inc. hereby submits planned changes to the License Application related to the topic of Nuclear Criticality Safety for the American Centrifuge Plant as Enclosure 1 of this letter. Enclosure 2 of this letter submits a revised response related to Request for Additional Information question NC-27. The planned changes for the License Application will be finalized and submitted to the NRC in the next revision of the license application.

If you have any questions regarding this matter, please contact Peter J. Miner at (301) 564-3470.

Sincerely,

Steven A. Toelle
Director, Regulatory Affairs

cc: S. Echols, NRC HQ
B. Smith, NRC HQ
C. Tripp, NRC HQ

Enclosures: As Stated

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Enclosure 1 of AET 06-0063

Planned Changes for the License Application for the American Centrifuge Plant

- ANSI/ANS-8.1-1998, *Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactor*

  USEC satisfies the guidance of this standard with the following exceptions/clarification:

  > Section 4.1.6 - Operations are reviewed annually; however, personnel in the operating group who are knowledgeable of the NCS requirements for their operations perform this review. Personnel who are knowledgeable in NCS and are independent of operations (e.g., Engineering) provide assistance in these annual reviews. Personnel who are knowledgeable in NCS and are independent of operations (e.g., Engineering) review operations annually.

  For references to this standard, see Sections 5.4.1, 5.4.2, 5.4.5.1, and 5.4.5.2 of this license application.

- ANSI/ANS-8.3-1997, *Criticality Accident Alarm System*

  USEC satisfies the provision of this standard as modified by Regulatory Guide 3.71 with the following exceptions/clarifications:

  > Section 1.2.5 – The primary radiation alarm system is the Criticality Accident Alarm System designed to detect a nuclear criticality and provide audible and visual alarms that will alert personnel to evacuate the immediate area. ACP primary facilities that handle ^{235}U in quantities greater than 700g have Criticality Accident Alarm System coverage except the UF_6 cylinder storage yards.

  For reference to this standard, see Section 5.4.4 of this license application.

- ANSI/ANS-8.19-1996, *Administrative Practices for Nuclear Criticality Safety*

  USEC satisfies the provisions of this standard with the following exceptions/clarification:

  > Section 7.8 - Operations are reviewed annually; however, personnel in the operating group who are knowledgeable of the NCS requirements for their operations perform this review. Personnel who are knowledgeable in NCS and are independent of operations (e.g., Engineering) provide assistance in these annual reviews. Personnel who are knowledgeable in NCS and are independent of operations (e.g., Engineering) review operations biannually (every two years).

  For references to this standard, see Sections 5.4.1 and 11.3.1.9 of this license application.

- ANSI/ANS-8.20-1991, *American National Standard for Nuclear Criticality Safety Training*

  USEC satisfies the provisions of this standard.

1.4.7 Nuclear Regulatory Commission Guidance

- Regulatory Guide 1.59, Revision 2, *Design Basis Floods for Nuclear Power Plants*

  USEC satisfies the provisions of this Regulatory Guide (RG) to the extent applicable to a Part 70 licensee.

  For references to this standard, see Sections 1.3.4.3 and 1.3.4.3.2 of this license application.

- Regulatory Guide 3.67, Revision 0, *Standard Format and Content for Emergency Plans for Fuel Cycle and Materials Facilities*

  USEC utilized the provisions of this RG as guidance for DOE reservation Emergency Plan.

  For references to this RG, see Sections 8.1 and 8.2 of this license application.

- Regulatory Guide 3.71, Revision 0, *Nuclear Criticality Safety Standards for Fuels and Material Facilities*

  This RG endorses ANSI/ANS-8 standards. USEC commits to ANSI/ANS-8.1-1983, ANSI/ANS-8.3-1997, ANSI/ANS-8.19-1996, and ANSI/ANS-8.20-1991 as described above.

  For the reference to this RG, see Section 5.5 of this license application.

- Regulatory Guide 8.13, Revision 2, *Instructions Concerning Prenatal Radiation Exposure*

  USEC satisfies the provisions of this RG.

  For the reference to this RG, see Section 4.1.1 of this license application.

- Regulatory Guide 8.25, Revision 1, *Air Sampling in the Workplace*

  USEC satisfies the provisions contained in Sections 1, 2, 5, and 6 of this RG.

  For the reference to this RG, see Section 4.7.5 of this license application.

- Regulatory Guide 8.34, *Monitoring Criteria and Methods to Calculate Occupational Radiation Doses*

  USEC satisfies the provisions contained in Section 7 of this RG.

  For the reference to this RG, see Section 4.7.3 of this license application.

within specified values. If two controls are implemented for one parameter, the violations or failure scenarios addressed by the controls will be independent. Application of this principle ensures that no single credible event can result in an accidental criticality or that the occurrence of events necessary to result in a criticality is not credible.

The NCSE will document the basis for the conclusion that a change in a process or parameter is "unlikely." The basis may be an engineered feature, administrative control, the natural or credible course of events, or any combination of these or other means necessary to ensure the change is unlikely to occur. The parameters or conditions relied on and the limits must be specified and justified in the NCSE and controlled. Management measures described in Chapter 11.0 of this license application and other safety programs are sometimes used to help ensure a change in a process or parameter is "unlikely." For example, the Radiation Safety Program and/or the Fundamental Nuclear Material Control Plan may be credited with providing controls on fissile material handling; the Fire Safety Program may be credited with providing controls on combustible material loading and/or hot work activities in fissile material processing/storage areas; the Procedures Program may be credited with ensuring compliance with procedures; etc.

Where the natural or credible course of events is relied upon in whole or in part to prevent a process condition change, no specific additional controls will be necessary to maintain them. The factors that influence the process are described in sufficient detail in the NCSE as items related to NCS and programmatically controlled. For items that are established, maintained, and implemented by non-NCS programs, credit for availability and reliability is established as described in Section 11.1 of this license application without the need for additional NCS controls. For situations where the NCS-credited controls do not provide adequate assurance of availability or reliability (i.e., situations where non-NCS programmatic and physical plant changes could adversely affect the intended criticality safety function of the items relied upon for criticality safety), specific NCS controls are established, maintained, and implemented to ensure criticality safety.

The NCS evaluation process involves a review of the proposed operation and procedures or work instructions, discussions with the subject matter experts to determine the credible process upsets which need to be considered, development of the controls necessary to meet the double contingency principle, and identification of the assumptions and equipment (i.e., physical controls) needed to ensure criticality safety.

Engineering judgment of both the analyst and the technical reviewer is used to ascertain independence of events and their likelihood or credibility. The basis for this judgment is documented in the NCSEs. Depending on the complexity of the operation, analytical methods such as Fault Tree and Event Tree Analyses may be used in the evaluation process to examine potential accident scenarios. When needed to support the analytical method, qualitative or quantitative estimates of event frequency are developed to support the determination of the likelihood of an event.

Once the NCSE is completed, a technical review of the evaluation is performed and documented. The technical review of an NCS evaluation is performed by a Senior NCS Engineer or is a NCS Engineer completing the technical review under the guidance of a Senior NCS Engineer.

The NCSE documents the NCS requirements for the operation. The NCS requirements include the process conditions that must be maintained to meet the double contingency principle or preserve the documented basis for criticality safety and restrict the modes of operation to those that have been analyzed in the NCSE. The requirements to be included in operating procedures and/or work instructions, and postings are identified.

The NCSE approval process first involves the acceptance of the NCSE by the technical reviewer. A review is then performed by the NCS Manager to ensure consistency with other NCSEs and other potentially conflicting requirements or regulations. After approval by the NCS Manager, a review is performed in accordance with 10 CFR 70.72 as described in Section 11.1.4 of this license application to determine whether prior NRC approval of the NCSE is required. PSRC approval is required for initial NCSE approval and for changes that impact the ISA Summary. After initial approval, if NRC approval is not required and the change does not impact the ISA Summary, the NCSE is reviewed by the responsible organization manager. Editorial changes require only the approval of the NCS Manager. Editorial changes are defined as changes that do not change the technical basis of the NCSE. Once approved, the NCS controls, limits, evaluation assumptions, and safety items are verified to be fully implemented in the field. The operations organization and NCS personnel perform this verification process. The documentation of this verification process is maintained as a quality record along with the NCSE.

Management of the operating organization is responsible for implementing, through training and procedures or work instructions, the conditions delineated in the NCSE. Operational aids such as postings, labels, boundaries for fissile material operations, and fissile material movement guidelines are provided as specified in the NCSE. The manager/supervisor ensures postings and labels are prepared and verify that they are properly installed as required by the NCSE. The procedures and/or work instructions are prepared or modified to incorporate the NCSE requirements. Managers/supervisors are responsible for ensuring the employees understand the procedures and/or work instructions and understand the NCS requirements before the work begins.

Each completed NCSE is issued as a controlled document. Completed NCSEs are archived and retrievable as permanent quality records in accordance with the RMDC requirements described in Section 11.7 of this license application. The NCSE process provides assurance that operations will remain subcritical under both normal and credible abnormal conditions.

Emergencies arising from unforeseen circumstances can present the need for immediate action. If NCS expertise or guidance is needed immediately to avert the potential for a criticality accident, direction will be provided orally or in writing. Such direction can include a stop work order or other appropriate instructions. Documentation will be prepared within 48 hours after the emergency condition has been stabilized.

New operations must comply with the double contingency principle.

5.4.2.1 Non-Fissile Material Operations

Some operations involve situations in which the uranium has an enrichment of less than 1 wt. percent ^{235}U or an inventory of less than 100 g ^{235}U. These operations are termed "non-fissile material operations" and are performed without the need for NCS double contingency controls. The determination of which operations are fissile versus which operations are non-fissile may be contained within a NCSE or as a separate document. When the determination is outside a NCSE, the determination need not be performed by a qualified NCS Engineer. The determination of an operation being non-fissile must include normal and credible abnormal upset conditions to ensure the enrichment and/or inventory are maintained below 1 wt. percent ^{235}U or below 100 g ^{235}U. Controls are sometimes applied to a non-fissile material operation to ensure it does not inadvertently involve fissile material. These controls can be either engineered or administrative and will be incorporated into applicable operating procedures or work instructions when it is determined they are needed to maintain the non-fissile material operation below either 100 g ^{235}U or 1 wt. percent ^{235}U. This determination is made by the responsible line manager.

5.4.3 Design Philosophy and Review

Through the CM Program, designs of new fissile material equipment and processes must be approved by NCS before implementation. Where practical, the use of engineered controls on mass, geometry, moderation, volume, concentration, interaction, or neutron absorption will be used as the preferred approach over the use of administrative controls. Advantage will be taken of the nuclear and physical characteristics of process equipment and materials, provided control is exercised to maintain them if they may credibly degrade such that control of the parameter is jeopardized.

The preferred design approach includes two goals. The first is to design equipment such that NCS is independent of the amount of internal moderation or fissile concentrations, the degree of interspersed moderation between units, or the thickness of reflectors. The second is to minimize the possibility of accumulating fissile material in inaccessible locations and, where practical, to use favorable geometry for those inaccessible locations. Passive design controls are preferred to active design controls. The adherence to this approach is determined during the preparation and technical review of the NCSE performed to support the equipment design. This preferred design approach is implemented as described in NCS procedures.

Fissile material equipment designs and modifications are reviewed to ensure that engineered controls are used for NCS to the extent practical. Administrative limits and controls will be implemented to satisfy the double contingency principle for those cases where the preferred design approach is not practical.

5.4.4 Criticality Accident Alarm System Coverage

A criticality accident alarm system (CAAS) that complies with 10 CFR 70.24 and ANS/ANSI-8.3-1997 is provided to alert personnel if a criticality accident occurs. The system utilizes an audible and/or visual signal to alert personnel in the area to evacuate to reduce radiation exposure resulting from the incident.

5.4.4.1 Portable CAAS

In the event a fissile material operation requiring CAAS coverage is performed beyond the detection range of established CAAS instrumentation, a portable unit may be used. The portable unit has the same detection capabilities as the permanently installed units, although those capabilities may be based on gamma radiation. Alarm annunciation, however, is usually limited to the immediate area (confirmed to 65 feet or more) within the audible range of the unit's alarm with an additional telemetric link to the X-3012 ACR and X-1020. This link will transmit the location of the unit, if mobile, and allow the use of the plant PA system to warn personnel within 200 feet of the area of the portable unit to evacuate. A portable unit may only be used on a temporary basis and it may be located indoors, outdoors, or on a vehicle.

5.4.5 Technical Practices

5.4.5.1 Application of Parameters

Moderation

Water is considered to be the most efficient moderator commonly found in the ACP. This is because optimally moderated UO_2F_2/water solutions are more reactive than hydrocarbon oil/UF_4 solutions at worst credible concentrations experienced in vacuum pumps (Reference 13). When moderation is not controlled either optimum moderation or worst credible moderation is assumed as the normal case when performing analyses. When moderation is controlled, credible abnormal process upset conditions determine the worst-case moderated conditions. Generally, moderation control is not maintained by measurement; however, when used, dual independent sampling methods are implemented.

Moderation control is applied to plant equipment containing UF_6. In areas where greater than the safe mass of uranium (as defined below) is handled, processed, or stored and moderation controls are applied, that facility's pre-fire plan (reference Section 7.1.4 of this license application) includes any unique firefighting strategy or tactics that may be needed to limit the use of moderator material. However, even in these areas, the application of the double contingency principle ensures the worst credible loss of moderation control cannot result in a critical configuration without an additional independent and concurrent upset event.

The centrifuge process equipment is comprised of a variety of closed systems designed to process gaseous UF_6. This closed system prevents the introduction of moderation due to wet air in-leakage. Also, because UF_6 reacts chemically with moisture (a moderator) to produce solid uranium-bearing compounds that impedes the proper operation of the process equipment, the UF_6 bearing systems are designed to minimize introduction of moisture.

Interstitial moderation issues are discussed in the *Reflection* section, below.

Density

The density of materials used in a given operation is justified in the NCSE for the operation being considered. If the density must be controlled to maintain compliance with the double contingency principle, it will be documented in the specific NCSE for the operation and it will be measured using instrumentation.

UF_6 in the gaseous phase, at any credible pressures and temperatures existing in the plant equipment, is incapable of supporting a nuclear chain reaction even when intermixed with hydrogenous material (e.g., hydrogen fluoride [HF]). UF_6 in the gaseous phase in plant equipment has low material density.

Heterogeneity

Heterogeneous configurations are considered for those operations that involve small fissile material and moderator regions. Heterogeneous groupings may occur for the handling of small sample containers; however, 10 wt. percent ^{235}U is assumed for samples handled on a safe mass basis. Using the homogeneous safe mass of 10 wt. percent ^{235}U is also safe for heterogeneous 10 wt. percent ^{235}U because, at this enrichment, the homogeneous and heterogeneous minimum critical masses are close in value.

Concentration

Concentration controls are used on a case-by-case basis. When the criticality safety of an operation depends on the concentration of fissile material, the medium is sampled twice, the samples are verified to be properly taken by a second individual, and the two samples are independently analyzed as required by the specific NCSE for the operation involved. The specific controls and details are documented in the NCSE for each operation that relies on concentration controls. No operations exist at the plant where concentration control is applied to an operation involving more than a safe mass of uranium. A container with concentration controlled solution is kept normally closed. Precipitating agents, including freezing, are controlled as necessary to ensure they do not inadvertently increase the concentration.

A typical operating limit is 5 g ^{235}U per liter, regardless of enrichment. A concentration of 11.6 g ^{235}U per liter is considered subcritical at any enrichment, as recognized by ANSI/ANS-8.1. If, under all postulated conditions, the concentration is always less than 11.6 g ^{235}U per liter, the operation is considered subcritical.

Reflection

Normal and credible abnormal reflection is considered when performing NCS evaluations. The possibility of full water reflection is considered when performing analyses. Interstitial moderation is evaluated with either full water reflection or water films with a bounding water density value to simulate sprinkler activation or precipitation combined with full density water blocks to simulate personnel. It is recognized that concrete can be a more efficient reflector than water, and its

Mass

Mass controls are applied on a case-by-case basis depending on the fissile material operation involved. The acceptable mass is determined based on the specific NCSE performed for the operation. The safe mass value depends on many factors including the geometry, the ^{235}U enrichment, composition, etc. Safe mass values may be obtained from established standards or operation specific reactivity calculations. "Safe mass" is defined as being not more than 43.5 percent of minimum critical ($k_{eff} \cong 1.0$) mass for specific system conditions of enrichment, geometry, moderation, reflection, etc. Experimental data is not used as the sole source for safe mass values. Safe mass values are chosen to ensure no single credible upset can result in a critical configuration. When safe mass values are dependent on the geometry, enrichment, composition, or some other parameter, the combination of mass and the other parameter is used as one control to meet the double contingency principle. The safe mass values are communicated to the operating personnel via the operating procedures and/or work packages.

Unless specifically controlled, an item containing enriched uranium is assumed to contain the most ^{235}U credible based on the available volume. When mass is determined through measurement, instrumentation is used.

Enrichment

Uranium-containing material in the ACP with ^{235}U enrichment less than 1 wt. percent is considered incapable of supporting a nuclear chain reaction, but interaction of such materials with materials of higher enrichment is taken into consideration in the specific NCSE for those operations which involve material enriched to greater than 1 wt. percent.

The maximum ^{235}U enrichment of UF_6 in the ACP is 10 wt. percent. Small quantities of greater than 10 wt. percent ^{235}U may be present outside of plant equipment in the form of laboratory samples or standards. Some buildings on the reservation may be used to process and/or store fissile material from both the ACP and Portsmouth Gaseous Diffusion Plant (GDP). Although the GDP has historically processed material at greater than 10 wt. percent ^{235}U, this material is no longer readily available to interact with ACP operations. However, for conservatism, some operations in these common buildings may be analyzed at greater than 10 wt. percent ^{235}U enrichment.

The maximum ^{235}U enrichment for each operation is established by the specific NCSE. The NCSE specifies the maximum acceptable enrichment for each operation. Credible process upset conditions that could alter the ^{235}U enrichment are also considered in the NCSEs. Due to the difficulty in obtaining reliable, real-time enrichment measurements that are both accurate and precise enough to use as a NCS control, enrichment is assumed to be the maximum credible for each operation. When the enrichment of uranium needs to be measured for a NCS control, the measurement is obtained using either installed equipment or based on samples analyzed in a laboratory.

potential presence is considered. Reflection controls are used to limit the potential reactivity of a fissile material operation.

Neutron Absorption

When neutron absorbers are used as NCS controls, the intended distributions and concentrations under both normal and credible abnormal conditions are maintained in accordance with the requirements of the applicable NCSE and ANSI/ANS-8.21-1995. These requirements are: representative sampling of the neutron absorber, sampling at a frequency based on the environment to which the neutron absorber is exposed, analyzing of samples for all material attributes for which credit is taken in the NCSE, and periodic inspections of fixed neutron absorbers to ensure adequate distribution as specified in the NCSE.

A NCS evaluation can take credit for the neutron absorption properties of the materials (1) added specifically for the purpose of absorbing neutrons, and (2) of construction, provided an allowance has been made for manufacturing and dimensional tolerances, corrosion, chemical reactions, neutron spectra, and uncertainties in the neutron cross-sections.

5.4.5.2 Methods of Calculation

Experimental Data

Experimental data are not specific enough to allow evaluation of operations performed in the ACP. The generic nature of the experimental data does not address the variables present in the different operations. However, experimental data are used for validation of the computer code (e.g., KENO V.a) used to perform the calculations needed to support the development of NCSEs. The experimental data used are discussed in the code validation report (Reference 11).

Handbooks

Handbooks are also used in some cases when simple systems are being evaluated. Handbooks used for ACP operations are nationally recognized throughout the NCS industry as high quality analyses that have been confirmed through many years of use or based on experimental data. Most of the operations performed in the ACP are too complicated to be adequately addressed by data in a handbook. When isolated operations are performed with small amounts of fissile material, referencing handbooks is useful to support conclusions in the NCSE. Examples of the handbooks used include, but are not limited to, ARH-600, *Criticality Handbook* and LA-10860-MS, *Critical Dimensions of Systems Containing* ^{235}U, ^{239}Pu, *and* ^{233}U. Other handbooks are held to similar criteria for excellence, industry acceptance, and quality of data to be used at the ACP without further verification calculations.

Because handbooks tend to give minimum critical or maximum subcritical values, use of these values for criticality controls is not appropriate to meet the double contingency principle. Instead, these values are reduced such that subcriticality can be demonstrated under normal and credible abnormal conditions.

When NCS is based on computer code calculations of k_{eff}, controls and limits are established to ensure that the maximum k_{eff} complies with the applicable code validation for the type of system being evaluated. For example, NCS related IROFS developed during initial license application were developed using reactivity calculations performed on personal computers running the Microsoft Windows XP operating system and validated as described in Reference 11. Generally, these calculations were performed with an upper safety limit of 0.955 up to5 percent ^{235}U enrichment; however, specific cases may use a higher or lower limit based on equations from Table 14 of Reference 11. Above 5 percent ^{235}U enrichment, a margin of subcriticality of 0.05 will be applied to calculations performed using the personal computers described above with a resulting upper safety limit of 0.925. Reactivity calculations, performed after initial license application, comply with the code validation for the specific system used to perform the calculation.

Scoping and analysis calculations may be performed utilizing various unvalidated computer codes; however, computer calculations of k_{eff} used as the basis for NCS evaluations are confirmed by, or performed using, configuration-controlled codes and cross-section libraries for which documented validations are performed with at least the same degree of conservatism as that presented in Reference 11 and are in accordance with ANSI/ANS-8.1-1998. Calculations are performed using materials of construction and other parameters consistent with the area of applicability described by the relevant validation report. The area of applicability used by Reference 11 covers enrichments from 2 percent to 30 percent ^{235}U enrichment with moderation levels from an $H/^{235}U$ of 8 to 1,438 with an average energy group of 151.7 to 220 using the 238-group ENDF/B-V cross section library. Moderating materials from Reference 11 include water and paraffin and reflectors range from bare systems to reflection with water, steel, paraffin, polyethylene, concrete, and lead. Other materials included in the area of applicability from Reference 11 are stainless steel, zirconium, aluminum, fluorine, and oxygen.

Extensions to the area of applicability are justified when using techniques described in NUREG/CR-6698. When materials of construction are used that are not represented in the area of applicability, the NCS engineer has several options available to address that situation. First, the specific material can be left out of the model. Second, a different material can be substituted that is within the AOA and provides a similar (or more conservative) amount of neutron moderation, multiplication, or reflection. Third, the material can be included based on a review of its neutron cross sections that conclude no significant impact can occur from that material. Fourth, the material can be included but with an adjustment in its density so that any unknown effect is minimized. Fifth, the material can be included with a reduction to the upper safety limit to account for the additional uncertainty. Lastly, additional benchmark experiments can be added to the validation to specifically include the material. The NRC will be notified in the event an extension to the area of applicability will not adequately encompass the parameters of interest for a specific calculation and a revision to Reference 11 is needed to establish a new area of applicability.

The methodology used in a validation report involves statistical analysis to determine the bias and bias uncertainty for the critical experiments included in the validation. Guidance from NUREG/CR-6698, *Guide for Validation of Nuclear Criticality Safety Calculational Methodology*, is used to perform the validation. The upper safety limit is computed by subtracting the absolute value of the bias, the bias uncertainty, and the minimum margin of subcriticality from unity. Positive bias is not credited. The exact statistical technique used to obtain the bias and bias uncertainty depends on the specific validation report. The techniques used in Reference 11 included the lower tolerance limit or the lower tolerance band for normally distributed data and a non-parametric technique for non-normally distributed data.

The computer codes and cross sections used in performing k_{eff} calculations are maintained in accordance with a configuration control plan. Quarterly, or prior to use, one of the following is performed: a bit-by-bit comparison of the production version of the software (executable modules and data libraries) versus an archived production version; or a comparison of the output from all validation cases versus archived output of all validation cases from the original validation performed when the production version was installed to ensure no changes in the calculated k_{eff} for the validation cases.

Changes to the hardware or software are evaluated in accordance with 10 CFR 70.72 change requirements. Some changes are expected to result in changes to the calculational algorithm and will require a new validation. Such changes include revisions to the software used to calculate reactivity, updates to the cross section libraries, changes to the operating system kernel, changes to the central processing unit, or changes to the motherboard. Other changes are not expected to result in changes to the calculational algorithm and will require only that the validation cases be re-run and compared to the original results. Such changes include increasing the available RAM, changing a hard drive, graphics card, network interface card, or other peripheral. In the Microsoft Windows environment, periodic changes to components of the operating system are common as Microsoft issues updates or patches to the platform. Also, installation and modification of software not used to calculate reactivity will be performed to support day-to-day business needs. These minor changes are not expected to impact any reactivity calculations, but to ensure this, a verification of the validation cases will be performed at least quarterly as described above.

The System Administrator, a NCS engineer, is responsible for controlling access to the software.

Enclosure 2 of AET 06-0063

Revised Request for Additional Information Response for the American Centrifuge Plant

NC-27 Clarify the statement in Section 5.4.5.1 of the license application under "Moderation" that "water is considered to be the most efficient moderator commonly found in the ACP." State that you will evaluate whether moderators more efficient than water (e.g., oil, under certain conditions) are present, on a case-by-case basis, or justify not doing so.

10 CFR 70.61(d) requires that all nuclear processes must be assured to be subcritical under normal and credible abnormal conditions. Calculational methods assuming that water is the most reactive moderator present could yield non-conservative results if other materials present could be more reactive. Evaluating potentially more reactive moderators is necessary to provide assurance that processes will be subcritical under normal and credible abnormal conditions.

USEC Revised Response

The American Centrifuge Plant does not intend to have any fissile material operations that involve hydrocarbon oils and uranium compounds in mixtures or solutions under either normal or abnormal conditions. Some small vacuum pumps used in various instrumentation or sampling operations are likely to contain hydrocarbon oils, but the oil volume in these applications is not expected to be large enough to accumulate more than 100 grams ^{235}U. In addition, reactivity calculations from NCS-CALC-04-001 show that optimally moderated UO_2F_2/water solutions at 10 weight percent ^{235}U enrichment are more reactive than UF_4/oil solutions at maximum credible concentrations obtained from vacuum pumps. Therefore, for planned operating and maintenance related evolutions, water is the most likely available and most efficient moderator available. The License Application, Section 5.4.5.1, subsection entitled "Moderation," has been revised to reflect this response.