Attachment 1
Request for Additional Information (Public)
USEC Inc. American Centrifuge Plant (ACP) License Application
Dated August 23, 2004

Chapter 1 "General Information"

LA-1 As done for X-7725 in Figure 1.1-8 of Appendix B of the license application, provide building layout drawings/floor-plans depicting all process areas where significant quantities of hazardous material will be present including X-3001, X-3002, X-3012, X-3356, X-7746, and X3346. The drawings/maps/floor-plans should indicate the locations of operations involving significant quantities of radioactive material to assist Nuclear Regulatory Commission's (NRC's) licensing reviewers and inspectors in better understanding the process and locations of any associated hazards.

10 CFR 70.22(a)(7) requires submittal of a description of equipment and facilities which will be used by the applicant to protect health and minimize danger to life and property.

LA-2 Provide an official acknowledgment from the Department of Energy (DOE) or some other equivalent indication that DOE will provide sufficient indemnification for the American Centrifuge Plant (ACP) to meet the requirements of 10 CFR 140.13b. Coverage needs to be provided for the time periods involving construction, operation, and decommissioning.

10 CFR 140.13b requires each holder of a uranium enrichment facility license to have and maintain adequate liability insurance. Section 1.2.2, "Financial Qualifications," of the application states that, pursuant to Section 3107 of the United States Enrichment Corporation Privatization Act, the United States Enrichment Corporation is indemnified under Section 170d of the Atomic Energy Act for liability claims and that this indemnification is sufficient to meet the requirements of Section 193(d) of the Atomic Energy Act of 1954, as amended, and 10 CFR 140.13b. However, it is not clear to the NRC staff, based on the wording in Section 3107 of the Privatization Act, that it is applicable to gas centrifuge facilities.

LA-3 Revise the specific possession limit amounts in Table 1.2-1 of the license application to amounts that the plant is anticipated to utilize/generate over its 30-year planned operation at full capacity. For example, the Decommissioning Funding Plan estimates the amount of tails to be generated over the ACP's 30-year planned operation to be about 11,920 metric tons of UF_6. However, Table 1.2-1 lists a much higher amount for source material. Also, it is not clear why an amount as large as that listed for special nuclear material (SNM) is warranted. Provide the bases in your response for requesting the specific amounts listed in Table 1.2-1.

10 CFR 70.22(a)(4) requires submittal of the amount of SNM an applicant proposes to

use and produce.

LA-4 In the second sentence of Section 1.0, add "decommissioning" to the list of items covered by the license application.

10 CFR 70.22(a)(9) requires submittal of a decommissioning funding plan. NUREG-1727, "NMSS Decommissioning Standard Review Plan," defines regulatory guidance and appropriate acceptance criteria for decommissioning funding plans and decommissioning plans.

Chapter 1 (CAAS Exemption)

CA-1 Describe how the basis for your existing criticality accident alarm system (CAAS) exemption request relates to the cylinder storage yards for the ACP. Section 1.2.5 of the license application states that the exemption requested is "similar to the exemption granted for the GDP." The information in Section 1.2.5 of the license application is not sufficient, by itself, to support granting the exemption because it does not reduce the risk significantly below what is required to meet the performance requirements (i.e., "highly unlikely") with the alarms in place.

10 CFR 70.24 states that a CAAS is required for operations containing greater than 700 g of contained ^{235}U. However, 10 CFR 70.17 states that the NRC may "grant such exemptions from the requirements of the regulations in this part as it determines are authorized by law and will not endanger life or property or the common defense and security and are otherwise in the public interest."

CA-2 Explain why part of the justification for excluding CAAS from the cylinder yards is that maintaining and calibrating the CAAS would expose plant personnel to undue risk, when the administrative controls (e.g., cylinder surveillance) would also put plant personnel at risk in the same area. If maintaining and calibrating the CAAS would put workers at an undue net risk (factoring in the risk benefit to having the CAAS), then it would seem that requiring other surveillance in the same area (without the CAAS) would expose workers to an equal or greater risk. This information is needed to ensure that an exemption would not endanger life or property.

10 CFR 70.24 states that a CAAS is required for operations containing greater than 700 g of contained ^{235}U. However, 10 CFR 70.17 states that the NRC may "grant such exemptions from the requirements of the regulations in this part as it determines are authorized by law and will not endanger life or property or the common defense and security and are otherwise in the public interest."

CA-3 Describe how much water would be needed in a cylinder at the maximum assay to result in criticality. State the maximum assay of cylinders in the CAAS-exempt areas. Provide a summary of this analysis. Also, describe how much water would ingress from a 10-,

100-, and 1,000-year rainfall event relative to the minimum amount needed for criticality. This information is needed to ensure that an exemption would not endanger life or property.

10 CFR 70.24 states that a CAAS is required for operations containing greater than 700 g of contained ^{235}U. However, 10 CFR 70.17 states that the NRC may "grant such exemptions from the requirements of the regulations in this part as it determines are authorized by law and will not endanger life or property or the common defense and security and are otherwise in the public interest."

CA-4 Describe the cylinder handling practices that ensure a low likelihood of breaching a solid UF_6 cylinder. This information is needed to ensure that an exemption would not endanger life or property.

10 CFR 70.24 states that a CAAS is required for operations containing greater than 700 g of contained ^{235}U. This information is needed to ensure that an exemption would not endanger life or property. However, 10 CFR 70.17 states that the NRC may "grant such exemptions from the requirements of the regulations in this part as it determines are authorized by law and will not endanger life or property or the common defense and security and are otherwise in the public interest."

CA-5 Justify why the risk of criticality is sufficiently low to permit exclusion of the CAAS from this area, given that the cumulative likelihood of a criticality (i.e., sum of likelihoods for the four accident sequences related to cylinder handling) is just barely highly unlikely (1.2×10^{-5}/yr). This information is needed to ensure that an exemption would not endanger life or property.

10 CFR 70.24 states that a CAAS is required for operations containing greater than 700 g of contained ^{235}U. However, 10 CFR 70.17 states that the NRC may "grant such exemptions from the requirements of the regulations in this part as it determines are authorized by law and will not endanger life or property or the common defense and security and are otherwise in the public interest."

Chapter 9 "Environmental Protection"

EP-1 Regarding the X-7727H corridor, Section 9.2.1.2.1 of the license application provides a worst case bound for airborne uranium concentration in the corridor. Please provide a more realistic estimate (expected value) of the concentration. The addition of a more realistically conservative estimate (a quantitative or qualitative estimate together with the supporting rational for the estimate) likely would demonstrate an even greater margin of safety, thus adding greater confidence that concentrations are insignificant.

Under 10 CFR Part 70, an applicant must provide a license application that shall contain, among other things, a description of equipment and facilities which will be used by the applicant to protect health and minimize danger to life or property and a description of proposed procedures to protect health and to minimize danger to life and property (10 CFR 70.22(a)(7) and (8)). The applicant must also satisfy the regulatory requirements found in 10 CFR Part 20, Subpart D, Radiation Dose Limits for Individual

Members of the Public.

EP-2 The description in Section 9.2.1.2.2 of the license application regarding the facility and equipment lacks specificity when stating that the TWC blowdown will be modified “at some point in the future.”

Provide greater specificity as to what is meant by "at some point in the future," or under what circumstances, the TWC blowdown will likely be modified to bypass the RCW system. A simple extrapolation regarding capacity of the GDP RCW should be sufficient to provide a general time frame for any future changes and thus more accurately address NRC regulations.

10 CFR 70.22(a)(7) requires that the applicant describe equipment and facilities which will be used to protect health and minimize danger to life and property; 10 CFR 70.22(a)(8) requires that the applicant’s procedures protect health and minimize danger to life or property.

EP-3 The current statement in Section 9.2.1.2.2 regarding the "ample" capacity of the GDP RCW to accept TWC effluent and modification of the TWC blowdown appears conclusive and insufficiently supported.

Provide an estimate (quantify) what is meant by "ample" (e.g., current capacity and usage, percentage to be used by TWC effluent). The information requested would provide the documentation for an independent review to support a determination that there is indeed ample capacity. The added information would provide sufficient detail to make the discussion of facilities and equipment in the application more transparent and defensible under 10 CFR 70.22(a)(7).

10 CFR 70.22(a)(7) requires that the applicant describe equipment and facilities which will be used to protect health and minimize danger to life and property; 10 CFR 70.22(a)(8) requires that the applicant’s procedures protect health and minimize danger to life or property.

EP-4 The description of the integrity assurance plan in Section 9.2.1.2.2 of the license application lacks sufficient detail for an independent assessment regarding the integrity of the tanks. The current statement that the integrity assurance plan ensures that the tanks are not leaking as the ACP takes possession of them appears conclusive and insufficiently supported.

Provide a citation to, and briefly describe, the basic elements of the integrity assurance plan that assures the tanks are not leaking as the ACP takes possession of them. Provide a statement as to when the plan will be available. The information requested would provide the documentation for an independent review to support a determination that tanks are not leaking.

10 CFR 70.22(a)(7) requires that the applicant describe equipment and facilities which will be used to protect health and minimize danger to life and property; 10 CFR 70.22(a)(8) requires that the applicant’s procedures protect health and minimize danger

to life or property. The added supporting information regarding procedures would also provide sufficient detail to make the discussion in the application more transparent and defensible under 10 CFR 70.22(a)(8).

EP-5 The current statement in Section 9.2.1.2.2 of the license application that the inspection and maintenance program ensures that no licensed material is released to the storage pads appears conclusive and insufficiently supported.

Provide a reference or citation, and briefly summarize, the procedures in the inspection and maintenance program for the UF_6 cylinders to assure that no licensed material is released to the storage pads. If the program has not been completed, state when it will likely be available. The information requested to clarify procedures would provide the documentation for an independent review to support a determination that no licensed material is released.

10 CFR 70.22(a)(7) requires that the applicant describe equipment and facilities which will be used to protect health and minimize danger to life and property; 10 CFR 70.22(a)(8) requires that the applicant's procedures protect health and minimize danger to life or property. The added supporting information would provide sufficient detail to make the discussion in the application more transparent and defensible under 10 CFR 70.22(a)(8).

EP-6 The description of the procedure for monitoring stormwater runoff in Section 9.2.1.2.2 of the license application indicates that the stormwater runoff drains to holding ponds and is continuously monitored, and that the data from this monitoring is "available" to ACP environmental personnel as assurance that no unanticipated discharge occurred. As written, the mere availability of the data for review, without more, does not appear to contribute to the control of liquid effluents.

Please explain whether the review of this data is part of a written procedure to assure that the data is in fact reviewed.

10 CFR 70.22(a)(7) requires that the applicant describe equipment and facilities which will be used to protect health and minimize danger to life and property; 10 CFR 70.22(a)(8) requires that the applicant's procedures protect health and minimize danger to life or property.

EP-7 In the discussion of waste minimization in Section 9.2.1.4 of the license application, there is a general reference to waste generated being treated to the extent practical before storage or disposal.

Provide a reference or citation to, and briefly describe, such treatment.

10 CFR 70.22(a)(7) requires that the applicant describe equipment and facilities which will be used to protect health and minimize danger to life and property; 10 CFR 70.22(a)(8) requires that the applicant's procedures protect health and minimize danger to life or property. The supporting information would provide added detail to make the discussion in the application more defensible under 10 CFR 70.22(a)(8).

EP-8 The procedure for analyzing the four radionuclides anticipated to be present in liquid effluents described in Section 9.2.2 of the license application refers to providing routine analysis. This statement lacks sufficient specificity.

Define with greater specificity what is meant by the statement that the ACP will "routinely" analyze the four radionuclides anticipated to be present in liquid effluents.

10 CFR 70.22(a)(7) requires that the applicant describe equipment and facilities which will be used to protect health and minimize danger to life and property; 10 CFR 70.22(a)(8) requires that the applicant's procedures protect health and minimize danger to life or property. The supporting information would provide added detail to make the discussion in the application more defensible under10 CFR 70.22(a)(8).

EP-9 The applicant describes a procedure in Section 9.2.2.1.2 of the license application in which it may supplement reservation meteorological data with data from the National Weather Service. In addition, it may also use such data in lieu of reservation meteorological data. However, there is no explanation of the circumstances under which data would be used in lieu of reservation data.

Describe under what circumstances data from the National Weather Service would be used in lieu of reservation meteorological data.

10 CFR 70.22(a)(7) requires that the applicant describe equipment and facilities which will be used to protect health and minimize danger to life and property; 10 CFR 70.22(a)(8) requires that the applicant's procedures protect health and minimize danger to life or property. The supporting information would provide added detail to make the discussion in the application more defensible under 10 CFR 70.22(a)(8).

EP-10 The term "where feasible" in Section 9.2.2.3.1 of the license application describing the procedure for collecting and packaging ACP-generated waste appears vague.

Explain what is meant by collecting and packaging ACP-generated waste "where feasible."

10 CFR 70.22(a)(7) requires that the applicant describe equipment and facilities which will be used to protect health and minimize danger to life and property; 10 CFR 70.22(a)(8) requires that the applicant's procedures protect health and minimize danger to life or property. The supporting information would provide added detail to make the discussion in the application more defensible under 10 CFR70.22(a)(8).

EP-11 No reference is provided in Section 9.2.2.3.2 of the license application for the procedural requirements that will be followed.

Provide a reference or citation to the procedural requirements that will be followed for labeling containers known to have radioactive waste.

10 CFR 70.22(a)(7) requires that the applicant describe equipment and facilities which will be used to protect health and minimize danger to life and property; 10 CFR

70.22(a)(8) requires that the applicant's procedures protect health and minimize danger to life or property. The supporting information would provide added detail to make the discussion in the application more defensible under 10 CFR 70.22(a)(8).

EP-12 The term "appropriate wastes" in Section 9.2.2.3.2 of the license application is vague and needs clarification to support an independent review.

Clarify what is meant by "appropriate wastes."

10 CFR 70.22(a)(7) requires that the applicant describe equipment and facilities which will be used to protect health and minimize danger to life and property; 10 CFR 70.22(a)(8) requires that the applicant's procedures protect health and minimize danger to life or property. The supporting information would provide added detail to make the discussion in the application more defensible under 10 CFR 70.22(a)(8).

EP-13 The description of the procedure for assessing the atmospheric impacts of ACP operations as described in Section 9.2.2.4.1 of the license application appears vague.

Define or provide examples of "other credible effluent information" that would be used to assess atmospheric impacts of ACP operations.

10 CFR 70.22(a)(7) requires that the applicant describe equipment and facilities which will be used to protect health and minimize danger to life and property; 10 CFR 70.22(a)(8) requires that the applicant's procedures protect health and minimize danger to life or property. The supporting information would provide added detail to make the discussion in the application more defensible under 10 CFR 70.22(a)(8).

EP-14 The description of the DOE groundwater monitoring program in Section 9.2.2.4.5 of the license application does not identify the constituents of interest.

Identify the constituents of interest of the DOE groundwater monitoring program if other than technetium. Provide a citation to the DOE program.

10 CFR 70.22(a)(7) requires that the applicant describe equipment and facilities which will be used to protect health and minimize danger to life and property; 10 CFR 70.22(a)(8) requires that the applicant's procedures protect health and minimize danger to life or property. The supporting information would provide added detail to make the discussion in the application more defensible under 10 CFR 70.22(a)(8).

Decommissioning Funding Plan - (DFP)

DF-1 Include the cost of depleted uranium disposal in the total decommissioning cost estimate (DCE) presented in Table C3.18 of the DFP. Table C3.18 of the DFP presents a summary of total decommissioning costs, but does not include the cost of depleted uranium disposition including disposal. Specifically, the summary accounts only for $130 million (including 25% contingency) for decommissioning the facility, but does not include the $729 million (including 10% contingency, but see item DF-3 below) cost of depleted uranium disposition.

10 CFR 70.25(e) requires the DFP to include an estimate of the cost of decommissioning.

Conforming changes are necessary in the decommissioning cost summaries presented in Section 10.10 and Table 10.10-1.

DF-2 Include a certification that financial assurance in the amount of the cost estimate has been provided. The DFP did not contain the required certification. An acceptable form of certification is illustrated in NUREG-1757, Vol. 3, Section A.2.4.

10 CFR 70.25(e) requires the DFP to contain a certification that financial assurance in the amount of the cost estimate has been provided.

DF-3 Incorporate a 25% contingency factor into the disposal cost estimate for depleted uranium tails deposition or provide a more detailed justification as to why 10% is acceptable.

The DCE applies a 25% contingency factor to all decommissioning costs except those associated with tails disposition. A 10% contingency factor is applied to the tails disposition costs. A contingency factor helps ensure coverage for unexpected circumstances that could increase decommissioning costs and such circumstances are equally likely for tails dispositions, as well as decommissioning costs. NUREG-1757, Volume 3, Appendix A, page A-29, states the following:

"Because of the uncertainty in contamination levels, waste disposal costs, and other costs associated with decommissioning, the cost estimate should apply a contingency factor of 25 percent to the sum of all estimated decommissioning costs. The 25 percent contingency factor provides reasonable assurance for unforeseen circumstances that could increase decommissioning costs, and should not be reduced or eliminated simply because foreseeable costs are low."

"NRC's recommendation for the use of a 25 percent contingency factor is consistent with the analysis and guidance contained in NUREG/CR–6477, which applies a 25 percent contingency factor to all estimated costs associated with decommissioning various reference facilities."

10 CFR 70.25 requires the applicant to provide a decommissioning funding plan that contains a cost estimate and a description of the method for assuring funds for decommissioning.

DF-4 Provide additional detail to support the decommissioning cost estimate.

In preparing the DCE, the applicant utilized the tables in NUREG-1757, Appendix A, but modified the suggested content. Specifically, the applicant has not included information about decontamination methods in Table C3.7. However, without additional detail on the decontamination methods, NRC cannot verify if appropriate unit costs and labor rates were used, or if disposal of wastes generated from these decontamination methods was included in the DCE.

In addition, in Tables C3.6 through C3.10, labor hours were provided for the five major tasks: (1) planning and preparation, (2) decontamination and/or dismantling of radioactive facility, (3) restoration of contaminated areas of facility grounds, (4) final radiation survey, and (5) site stabilization and long term surveillance. However, no breakdown of the major tasks to be accomplished under these headings was included. For example, under Table C3.10, total hours are given for site stabilization and long term surveillance, but there is no explanation of what activities are anticipated, nor any justification for how those hour estimates were derived. Consequently, it is difficult to determine if the cost estimate adequately covers all tasks to be undertaken during decommissioning. The DCE should be revised to provide information on decontamination methods, as well as the types of activities likely to be undertaken in the five phases of decommissioning described above.

10 CFR 70.25 requires the applicant to provide a decommissioning funding plan that contains a cost estimate and a description of the method for assuring funds for decommissioning.

DF-5 Revise the worker unit cost schedule to include an appropriate overhead rate on labor costs.

In the worker unit cost schedule in Table D3.12, the applicant does not include any labor overhead rate. Appendix A of NUREG/CR-6477 "Revised Analyses of Decommissioning Reference Non-Fuel-Cycle Facilities," Pacific Northwest National Laboratory, 1998), however, applies overhead rates of 50 to 70% for direct labor, and over 100% for subcontracted labor, based on NRC's decommissioning experience at reference facilities. The following factors, listed for the subcontracted rate, should be considered in determining appropriate overhead rate for an independent third-party contractor: overhead rates applied to direct staff labor are expected to be significantly higher for subcontracting organizations than for the facility operator because of the larger ratio of supervisory and support personnel to direct labor than usually exists in subcontracting organizations; having personnel in the field rather than in the home office also increases the overhead costs, because of travel and living expenses for some of the personnel. In view of these factors, an overhead rate on direct staff labor of 110%, plus 15% profit on labor and overheads, is assumed to be applicable to all subcontractor hours in this reevaluation study. (pages A.2-A.3) To ensure that the cost estimate accurately reflects all labor costs associated with decommissioning, the applicant should modify its worker unit cost schedule to include an appropriate overhead[1] rate on labor.

10 CFR 70.25 requires the applicant to provide a decommissioning funding plan that contains a cost estimate and a description of the method for assuring funds for decommissioning.

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[1] The term "overhead" typically includes costs that are not directly traceable to any particular product produced or project conducted by the firm. Thus, overhead typically includes "period" costs such as insurance, utilities, rent, supplies, property taxes, depreciation, and the costs of any wages, salaries, and benefits incurred as a result of the corporation's officers and "support staff" (e.g., accounting staff, legal staff, janitorial staff, security staff). To spread such costs across multiple products or projects fairly, firms usually calculate an "indirect" overhead rate that is applied to all direct labor hours (i.e., on those labor hours that are directly associated with particular products or projects). Licensees/applicants should provide justification for the overhead rates assumed in the cost estimate.

DF-6 Revise labor costs to include contractor profit and variations in labor rates.

The DCE does not appear to include profit on labor. Appendix A, NUREG-1757, recommends that decommissioning cost estimates assume work will be performed by an independent third party contractor. Appendix A, NUREG-1757, and Appendix A, NUREG/CR-6477, recommend that labor costs associated with all decommissioning tasks and activities include wages and benefits for contractor staff performing decommissioning-related tasks, overhead costs, and contractor profit. The base labor salaries shown in Table D3.12 of the DCE include only two labor categories (i.e., salary and hourly) although the cost estimate makes use of eleven labor groupings. To ensure the adequacy of the cost estimate, the applicant should revise the salaries in the cost estimate to account for the variation in labor rates and the addition of contractor profit.

10 CFR 70.25 requires the applicant to provide a decommissioning funding plan that contains a cost estimate and a description of the method for assuring funds for decommissioning.

DF-7 Include estimates for disposal of waste generated from decommissioning activities in the DCE .

The DCE does not appear to include waste disposal costs for any wastes generated by the decontamination process for the facility components or any wastes generated from restoration of facility grounds. The applicant should revise the cost estimate to include costs for disposal of wastes generated in decontaminating its individual facility components and restoring facility grounds.

10 CFR 70.25 requires the applicant to provide a decommissioning funding plan that contains a cost estimate and a description of the method for assuring funds for decommissioning.

DF-8 Justify the costs of packaging, shipping, and disposal of radioactive wastes in the DCE.

The DCE provides several unit costs for packaging, shipping, and disposal of wastes. Specifically, in Table C3.14, the DCE indicates unit costs of $\$28/ft^3$ for compacted equipment waste disposal, and \$4.47/lb for classified waste disposal. Further, the heading on Table C3.14 implies that labor costs were not included (i.e., Table C3.14 “Packaging, Shipping, and Disposal of Radioactive Wastes (Excluding Labor Costs)”). The cost of labor for packaging, shipping and disposal of waste must be accounted for. The DCE should be revised to include labor costs to package, ship, and dispose of the waste.

Further, because the unit cost for compacted equipment waste does not break out the transportation costs, NRC cannot verify that adequate transportation costs or distances were used. The applicant should revise or justify the disposal unit costs so that these costs can be verified.

Table C3.19 indicates a tails disposal cost of \$3/kg U, with no explanation of where the tails will be processed or how this unit cost was derived. No other costs are included for tails disposal, such as transportation or loading. Because the ultimate disposition of the

tails is not known at this point, it is not clear whether the tails would need to be transported (e.g., the tails might be processed by DOE at its co-located facility). The applicant should justify this unit cost and clarify whether it includes anything beyond the actual waste disposal and/or conversion costs.

10 CFR 70.25 requires the applicant to provide a decommissioning funding plan that contains a cost estimate and a description of the method for assuring funds for decommissioning.

DF-9 Revise or justify estimates for non-labor costs in the DCE.

The DCE does not provide justification for the laboratory costs included in Table C3.16. Specifically, no information is included to indicate the number of samples and locations, or the derivation of the $105/sample unit cost. The applicant should provide a justification of the laboratory costs.

The miscellaneous costs listed in Table C3.17 do not include license fees, insurance, or taxes. The applicant should revise the cost estimate to include these costs.

10 CFR 70.25 requires the applicant to provide a decommissioning funding plan that contains a cost estimate and a description of the method for assuring funds for decommissioning.

DF-10 Provide an unexecuted copy of a broker/agent's power of attorney, as recommended in NUREG-1757, Volume 3, pages 4-24 and A-90. Note that pursuant to 10 CFR 70.25(e), the DFP does not meet regulatory requirements until the originally signed financial instruments have been received by the NRC.

10 CFR 70.25 requires that decommissioning funding plans include a certification that financial assurance has been provided in the amount of the site-specific cost estimate. The applicant supplied an unexecuted copy of a surety bond and standby trust agreement proposed to be used as the mechanism for decommissioning financial assurance. The unexecuted copies of the surety bond and standby trust agreement are consistent with the recommended wording in NUREG-1757, Volume 3, Appendix A.[2] However, the applicant did not submit an unexecuted copy of the broker/agent's power of attorney,[3] as recommended by NUREG-1757, Volume 3, pages 4-24 and A-90. An unexecuted copy of the broker/agent's power of attorney authorizing the broker/agent to issue bonds on behalf of the issuing company will ensure that the surety bond is enforceable. Although a model power of attorney is not included in NUREG-1757, it is a commonly-used legal document.

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[2] NRC recognizes that the amount of the surety bond is contingent upon the cost estimate and assumes that the amount and surety organization will be inserted into the surety bond at the appropriate time in the NRC licensing process.

[3] NRC recognizes that a power of attorney cannot be executed until the surety is chosen and a valid instrument is created; however inclusion of an unexecuted copy in the application package demonstrates the applicant's understanding that the instrument is part of the recommended application package.

10 CFR 70.25 requires the applicant to provide a decommissioning funding plan that contains a cost estimate and a description of the method for assuring funds for decommissioning.

DF-11 Please attest to whether the cost of security is included in the cost estimate or not. If it was not included, revise the cost estimate to include the cost of security. The decommissioning cost estimate does not specify whether the cost estimate included the cost of maintaining the security of the facility and licensed material for the duration of the decommissioning period.

10 CFR 70.25(e) requires the DFP to include an estimate of the cost of decommissioning. Appendix A of NUREG-1757 states that the estimate should adequately cover all decommissioning costs. Part of these costs include providing security for the facility and license material.

Financial Qualifications (Chapter 1.0, Section 1.2.2, and Appendix C, Table C-1, Deployment Costs for American Centrifuge Plant (ACP))

FQ-1 Submit a detailed estimate of the cost to construct and operate the ACP, including the supporting basis for each cost item. The level of detail should generally be consistent with that provided in the decommissioning cost estimate. Further, construction costs should be provided by building/area, and include details such as identification of major construction activities (e.g., site preparation, construction of new building, refurbishment of interior of existing building), size of the area to undergo construction, and type and amount of construction materials to be used. Provide costs for construction materials, principal systems and equipment, engineering, construction labor, and any other major costs associated with each building/area.

The license application (in Section 1.2.2 and Appendix C, Table C-1) provides summary text and tables of the costs to build and operate the ACP, but did not provide the supporting basis for the staff to determine if the cost information reasonably represents the costs to build and operate the ACP facility. To determine the financial qualifications of the applicant, the staff must evaluate the cost estimates to construct and operate the facility.

10 CFR 70.23(a)(5) requires financial qualifications of the applicant “Where the nature of the proposed activities is such as to require consideration by the Commission, that the applicant appears to be financially qualified to engage in the proposed activities in accordance with the regulation in this part."

Chemical Process Safety (NUREG 1520, Chapter 6)

CP-1 Clarify the scope and extent of human factors reviews applied to IROFS and initial conditions. Section 6.2.2.9, page 6-7, “Human Factors,” states that “human factors design responsibility for plant and system design in the ACP is assigned to engineering, with specific technical assistance from Industrial Safety personnel. Human factors reviews address the interface of people with processes and its impact on system operation.”

This information is needed to determine compliance with 10 CFR 70.62(c)(vi) which states that the integrated safety analysis should identify "each item relied on for safety; the characteristics of its preventive, mitigative, or other safety function; and the assumptions under each item is relied on to support compliance with performance requirements of 10 CFR Part 70.61."

CP-2 Describe how human factors reviews are considered within the design control/change process. Section 6.2.2.9, page 6-7, "Human Factors," states that "human factors design responsibility for plant and system design in the ACP is assigned to engineering, with specific technical assistance from Industrial Safety personnel. Human factors reviews address the interface of people with processes and its impact on system operation."

This information is needed to determine compliance with 10 CFR 70.62(b) which states that "each licensee or applicant shall maintain process safety information to enable the performance and maintenance of an integrated safety analysis."

CP-3 Describe the graded approach to quality for performing tests and inspections. Section 6.2.2.3.3, "Preventive Maintenance and Quality Considerations," page 6-5 of the license application, states that the "ACP personnel perform inspection and testing based on the graded approach to quality."

This information is needed to determine compliance with 10 CFR 70.62(a) which states that "the safety program may be graded such that management measures applied are graded commensurate with the reduction of risk attributable to that item."

CP-4 Clarify whether the Material Safety Data Sheet (MSDS) records and any other information about hazardous and toxic materials that is brought on site by contractors are readily accessible. Section 6.2.2.11.1, "Identification and Inventory Control," page 6-8 of the license application, states that "when work is to be performed by contractors, a review of the contractors' Safety and Health Plan is conducted to identify the presence of hazardous and toxic materials to be brought on site by a contractor. The contractor provides MSDSs for these chemicals and the list of chemicals is forwarded to Industrial Hygiene and appropriate supervision."

This information is needed to determine compliance with 10 CFR 70.22(i)(3)(xiii) which states that the applicant must meet its responsibilities under the Emergency Planning and Community Right-to-Know Act of 1986, Title III, if applicable to the applicant's activities at the proposed place of use of special nuclear material.

CP-5 Commit to maintaining MSDSs on-site and sharing these with off-site organizations that may be expected to respond to an emergency. Also, identify the locations from where the MSDSs could readily be retrieved on-site. Page 58 of Section 10.0 in the Emergency Plan, "Compliance with Community Right-to-Know Act," states that "MSDSs are maintained in several areas throughout the DOE reservation."

This information is needed to determine compliance with 10 CFR 70.22(i)(3)(xiii) which states that the applicant must meet its responsibilities under the Emergency Planning and Community Right-to-Know Act of 1986, Title III, if applicable to the applicant's activities at the proposed place of use of special nuclear material.

CP-6 Commit to reporting chemical releases that could cause NRC's regulatory limits to be exceeded.

This information is required to determine compliance with 10 CFR 70.50 which states that the licensee "should notify the NRC as soon as possible...release that could exceed regulatory limits (e.g., toxic gas releases)."

CP-7 Commit to retaining records to ensure compliance with the NRC's chemical process safety requirements. Section 11.7.1.5, "Retention and Disposition," page 11-50 of the license application, states that "record retention times are specified in a retention schedule, developed by the manager of the organization that originates the record, or the designee. The process for disposition of records that have reached the end of their retention lifetime is specified by procedures and conforms to applicable requirements."

The Standard Review Plan (NUREG-1520), Section 6.3(8), mentions that the NRC's review should cover "the applicant's committment to retain records for chemical process safety compliance and reporting commitments for chemical releases."

CP-8 Explain how USEC will provide oversight of contractors' qualification and training programs to ensure that guidance followed by the contractors fulfill the training requirements of the ACP. Also indicate which program/position is responsible for ensuring that this task will be performed adequately. Section 11.2.2, "Personnel Qualification and Training," page 11-13, states that "a member of the ACP organization provides oversight of contractor activities."

This information is required to determine compliance with 10 CFR Part 70.62(d) which states that "each applicant or licensee shall establish management measures to ensure compliance with the performance requirements of 10 CFR part 70.61."

Management Measures (NUREG 1520, Chapter 11)

MM-1 Describe the application of quality assurance (QA) controls to nuclear criticality safety controls.

This information is needed to determine compliance with 10 CFR 70.61(d), which states that "the risk of nuclear criticality accidents must be limited by assuring that under normal and credible abnormal conditions, all nuclear processes are subcritical... preventive controls and measures must be the primary means of protection against nuclear criticality accidents."

MM-2 Confirm that modifications to the process, design, system documentation, and drawing specifications are also evaluated, as appropriate, for potential chemical exposure. Section 11.1.4.1, "Control Change of the Physical Plant," of the license application states that "modifications are also evaluated as appropriate, for potential radiation exposure, nuclear criticality safety (NCS), and worker safety requirements and/or restrictions."

This information is needed to determine compliance with 10 CFR 70.72(a)(6) which

states "...the impacts or modifications to the ISA Summary, or other safety program information...[must be addressed prior to implementing any change]."

MM-3 Confirm that ACP oversight of contractor qualification and training programs for activities that could affect IROFS are commensurate with the Quality Assurance Program (QAP) requirements. Section 11.2.2, "Personnel Qualification and Training," of the license application states that "contractors that work on or are performing activities that could affect IROFS follow the same maintenance guidelines as maintenance personnel. In addition, a member of the ACP organization provides oversight of contractor activities."

This information is needed to determine compliance with 10 CFR 70.62(d), "Management Measures," which states that "management measures shall ensure that ...items relied on for safety ...are maintained, as necessary, to ensure they are available and reliable to perform their safety function when needed...".

MM-4 Clarify whether QL-3 items are considered to be IROFS.

This information is needed to determine compliance with 10 CFR 70.62(d), "Management Measures," which states that "management measures shall ensure that ...items relied on for safety ...are maintained, as necessary, to ensure they are available and reliable to perform their safety function when needed...".

MM-5 Confirm that safe work practices to control processes and operations with radioactive and special nuclear material, IROFS, and/or hazardous chemicals incident to the processing of licensed material are covered by appropriate procedures. Section 11.4.2.1, "Identification," of the license application identifies the minimum tasks that require procedures. Those tasks are limited to IROFS and those management measures supporting IROFS operation, and actions to prevent or mitigate the consequences of accidents described in the ISA Summary.

This information is needed to determine compliance with 10 CFR 70.23(a)(4), which states that the applicant shall "propose procedures to protect health and minimize danger to life or property."

Chapter 5, "Nuclear Criticality Safety"

NC-1 Clarify whether all controls and/or barriers relied on to meet the double contingency principle (DCP) will be classified as IROFS. If not, provide appropriate justification. Clarify the difference between controls and barriers.

10 CFR 70.61(e) requires that each control relied on to meet performance requirements be designated an IROFS. In addition, 10 CFR 70.64(a)(9) requires compliance with the DCP. Section 5.1.1of the license application states that "Controls and/or barriers that are relied on to prevent inadvertent criticalities are designated as items relied on for safety (IROFS) in the Integrated Safety Analysis (ISA)." However, during the on-site licensing review, it became apparent that not all controls relied on to meet the DCP were identified as IROFS in the ISA Summary. This information is needed to determine whether controls relied on to meet the DCP will be sufficiently robust that changes in

process conditions will be “unlikely.”

NC-2 Clarify whether the criteria for fissile material operations ($1wt% ^{235}U and $100g ^{235}U) apply to normal operating conditions only or to credible abnormal conditions as well. If applied to normal conditions only, justify why abnormal conditions can be assured to be subcritical. If applied to abnormal conditions, explain how all abnormal conditions will be identified (given that nuclear criticality safety (NCS) evaluation is not required for non-fissile material operations).

10 CFR 70.61(d) requires that all nuclear processes must be assured to be subcritical under normal and credible abnormal conditions. 10 CFR 70.61(e) requires that each control relied on to meet the performance requirements be designated an IROFS. It is conceivable that processes not meeting the criteria for fissile material operations under normal plant conditions could exceed these criteria under certain upsets; in this case, controls would be needed under 10 CFR 70.61(d) to maintain subcriticality of the upset condition.

NC-3 Describe what “equivalent technical experience” is considered an acceptable substitution for the educational requirements for the NCS manager (see Section 5.2.1 of the license application). Also, clarify whether the four years of ”nuclear experience” means experience in NCS.

10 CFR 70.62(a) requires the applicant to establish and maintain a safety program demonstrating compliance with the performance requirements of 10 CFR 70.61. NUREG-1520, Section 5.4.3.2(6), states that the applicant should commit to describe the experience and qualifications of personnel responsible for NCS. Whereas NCS Engineers and Senior NCS Engineers are required to have a bachelor’s degree in engineering, mathematics, or related science, the NCS Manager is only required to have either a bachelor’s degree or equivalent technical experience, but this equivalent experience is not described. This information is needed to ensure the NCS Manager has sufficient education to perform the necessary duties of this position.

NC-4 Justify why one year as a qualified NCS Engineer is sufficient for qualification as a Senior NCS Engineer, given the duties incumbent on the position.

10 CFR 70.62(a) requires the applicant to establish and maintain a safety program demonstrating compliance with the performance requirements of 10 CFR 70.61. NUREG-1520, Section 5.4.3.2(6), states that the applicant should commit to describe the experience and qualifications of personnel responsible for NCS. The duties of a Senior NCS Engineer involve performing technical reviews and overseeing more junior NCS engineers. However, only one additional year’s experience is stated as being needed to qualify as a Senior NCS Engineer. Historically, three additional years experience have been required at other fuel facilities.

NC-5 State whether USEC commits to follow American National Standards Institute/American Nuclear Society (ANSI/ANS) 8.19-1996 and ANSI/ANS-8.20-1991 as they relate to training, procedures, and audits and assessments. If committing to follow these standards, clarify which provisions of the standards USEC will follow in implementing these management measures.

10 CFR 70.62(a) requires the applicant to establish and maintain a safety program demonstrating compliance with the performance requirements of 10 CFR 70.61. NUREG-1520, Section 5.4, states that "if an applicant intends to conduct activities to which a standard applies and the standard has been endorsed by an NRC Regulatory Guide, then a commitment to comply with all the requirements (i.e., "shalls") is necessary but may not be sufficient to meet the acceptance criteria." NUREG-1520, Section 5.4.3.3, states that the applicant should commit to follow these standards with the aforementioned items.

NC-6 Describe the procedure control and work control processes. Describe any differences between the approval and change control processes for procedures and work packages.

10 CFR 70.62(a) requires the applicant to establish and maintain a safety program demonstrating compliance with the performance requirements of 10 CFR 70.61. NUREG-1520, Section 5.4.3.4.7(2), states that the applicant should commit to perform NCS determinations to evaluate changes to processes, operating procedures, IROFS, and management measures. Section 5.3.1 draws a distinction between procedures and work packages but does not explain this difference. This information is needed to ensure that any process changes (including changes to both procedures and work packages) receive appropriate NCS review.

NC-7 In Section 5.3.2, clarify whether postings and/or labels are required for administrative controls in all operations without an "in-hand" operating procedure.

10 CFR 70.62(a) requires the applicant to establish and maintain a safety program demonstrating compliance with the performance requirements of 10 CFR 70.61. NUREG-1520, Section 5.4.3.2(4), states that the applicant should commit to provide NCS postings in areas, operations, work stations, and storage locations. Section 5.3.2 states that postings and/or labels "may not be required for administrative controls when those limits and controls are included in 'in-hand operating procedures'. " However, it is not clear whether the postings and/or labels are required whenever such "in-hand" procedures do not exist. This information is necessary to ensure that administrative controls relied on for NCS are sufficiently available and reliable to perform their safety functions.

NC-8 Clarify what is meant by an "appropriate size" for the writing on postings and what is meant by "conspicuous locations" for posting placement.

10 CFR 70.62(a) requires the applicant to establish and maintain a safety program demonstrating compliance with the performance requirements of 10 CFR 70.61. NUREG-1520, Section 5.4.3.2(4), states that the applicant should commit to provide NCS postings in areas, operations, work stations, and storage locations. It is necessary that these postings be visible to be effective in ensuring compliance with administrative controls. However, the terms in Section 5.3.2 of the license application are ambiguous.

NC-9 In Section 5.3.3 of the license application, state whether the NCS organization reviews all fissile material operation changes, or only those involving an NCS-related IROFS.

10 CFR 70.62(a) requires the applicant to establish and maintain a safety program demonstrating compliance with the performance requirements of 10 CFR 70.61. NUREG-1520, Section 5.4.3.4.7(2), states that the applicant should commit to perform NCS determinations to evaluate changes to processes, operating procedures, IROFS, and management measures. However, there may be instances in which an NCS-related IROFS is not directly being changed, but the change may adversely affect the capability of the IROFS to perform its safety function (or an item relied on to meet the DCP, if these items are not all IROFS). This information is needed to ensure that IROFS are sufficiently available and reliable to perform their safety functions.

NC-10 Justify why annual walkthroughs of fissile material operations are acceptable (see Section 5.3.4).

10 CFR 70.62(a) requires the applicant to establish and maintain a safety program demonstrating compliance with the performance requirements of 10 CFR 70.61. NUREG-1520, Section 5.4.3.3(3)(b), states that such walkthroughs should review all process areas at least every two weeks. This information is necessary to provide assurance that controls relied on for NCS are in fact present in plant operations.

NC-11 State how often NCS Program audits will be performed.

10 CFR 70.62(a) requires the applicant to establish and maintain a safety program demonstrating compliance with the performance requirements of 10 CFR 70.61. NUREG-1520, Section 5.4.3.3(3)(c) states that NCS audits should be performed at least quarterly. This information is necessary to provide assurance that controls relied on for NCS are in fact present in plant operations.

NC-12 Clarify the meaning of “if necessary” with regard to when a Nuclear Criticality Safety Evaluation (NCSE) is needed.

10 CFR 70.61(d) requires that all nuclear processes must be assured to be subcritical under normal and credible abnormal conditions. NUREG-1520, Section 5.3.1, states that the objectives of an NCS Program include “conducting NCS evaluations to assure that under normal and credible abnormal conditions, all nuclear processes [are] remain subcritical.” Section 5.4.2 of the license application provides three criteria for not performing an NCSE in the sentence prior to this one (request is inadequately detailed, the change is bounded by a current analysis, or the process does not meet the criteria for a fissile material operation). It is unclear whether these cases are to be considered all-inclusive or whether there are other reasons an NCSE may not be needed. This information is needed to ensure that all nuclear processes will be subcritical under normal and credible abnormal conditions.

NC-13 When relying on the natural and credible course of events for criticality control, describe how the natural and credible course of events is maintained, in Section 5.4.2. Also, describe what "other means" may be used than those described.

10 CFR 70.61(d) requires that all nuclear processes must be assured to be subcritical under normal and credible abnormal conditions. 10 CFR 70.61(e) requires that each control relied on to meet the performance requirements be desginated an IROFS. Section 5.4.2 states that controls include engineered features, administrative controls, reliance on the natural and credible course of events, and other means. No information is provided on how the natural and credible course of events will be maintained, or what other means may be used. This information is necessary to ensure that sufficient controls are present to ensure nuclear processes are subcritical under normal and credible abnormal conditions.

NC-14 Describe the process and/or criteria that will be used to ascertain whether a change in process conditions is sufficiently "unlikely" to meet the DCP, in Section 5.4.2.

10 CFR 70.64(a)(9) states that new processes and facilities must comply with the DCP. The DCP states that the changes in process conditions leading to criticality must be "unlikely." Section 5.4.2 states that "The NCSE will document the basis for the conclusion that a change in a process or parameter is "unlikely." However the means of making this determination are not described. This information is needed to ensure that the DCP will be met.

NC-15 Clarify the meaning of the second full paragraph on page 5-9 of the license application. In particular, address the following:

a) Define "items related to NCS" and describe how they are programmatically controlled. State whether they are IROFS and, if not, how plant management measures are applied to them.

b) Clarify how Section 11.1 relates to establishing credit for control availability and reliability. Section 11.1 pertains to configuration management, and it is not apparent how it relates to this topic.

c) Clarify the apparent inconsistency in the last sentence of this paragraph. This sentence states that "where the NCS-credited controls do not provide adequate assurance of availability or reliability...specific NCS controls are established..." It would appear that these would then become "NCS-credited controls," so the meaning of this is unclear.

10 CFR 70.61(d) requires that all nuclear processes must be assured to be subcritical under normal and credible abnormal conditions. 10 CFR 70.61(e) requires that each control relied on to meet the performance requirements be desginated an IROFS. Section 5.4.2 states that controls include engineered features, administrative controls,

reliance on the natural and credible course of events, and other means. However, the details of what will be done when relying on the natural and credible course of events is not clear. This information is needed to ensure that nuclear processes are subcritical under normal and credible abnormal conditions.

NC-16 State whether the NCSE approval process includes review by the Plant Safety Review Committee (PSRC). Section 5.2.1 of the license application states that one of the duties of NCS Engineers is to provide support to the PSRC. However, the process described in Section 5.4.2 (top of page 5-10) of the license application does not discuss this.

10 CFR 70.61(d) requires that all nuclear processes must be assured to be subcritical under normal and credible abnormal conditions. NUREG-1520, Section 5.3.1 states that the objectives of an NCS Program include "conducting NCS evaluations to assure that under normal and credible abnormal conditions, all nuclear processes [are] remain subcritical." The information regarding the process for approving such evaluations is unclear. This information is needed to ensure that nuclear processes are subcritical under normal and credible abnormal conditions.

NC-17 Remove the following statement in Section 5.4.2.1 of the license application: "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 may be incorporated into applicable operating procedures or work instructions at the discretion of the responsible line manager."

10 CFR 70.61(d) requires that all nuclear processes must be assured to be subcritical under normal and credible abnormal conditions. 10 CFR 70.61(e) requires that each control relied on to meet the performance requirements be designated an IROFS. The controls needed to ensure a process remains a non-fissile material operation must be reliable and available to perform their intended safety functions, and subject to the same kinds of management measures as controls in fissile material operations.

NC-18 Revise your commitment to the preferred design philosophy in Section 5.4.3 of the license application (or justify not doing so), to indicate that passive engineered controls are preferred over active engineered controls, and enhanced administrative over simple administrative controls. Revise your commitment to indicate that two-parameter control is preferred over two controls on one parameter.

10 CFR 70.61(d) requires that all processes be shown to be subcritical under normal and credible abnormal conditions. NUREG-1520, Section 5.4.3.4.2(3), states that the applicant's order of preference should be "(a) passive engineered; (b) active engineered; (c) augmented administrative; and (d) simple administrative." Also, NUREG-1520, Section 5.4.3.4.4(7)(a) states that "The first method [two-parameter control] is the preferred approach [over single-parameter control] because of the difficulty of preventing common-mode failure when controlling only one parameter." This information is needed to ensure that controls are chosen so as to ensure that criticality

is made highly unlikely.

NC-19 Clarify whether the justification for taking exception in certain instances to the preferred design philosophy in Section 5.4.3 of the license application will be documented in plant NCSEs.

10 CFR 70.61(d) requires that all processes be shown to be subcritical under normal and credible abnormal conditions. NUREG-1520, Section 5.4.3.4.2(3), states that, in addition to the preferred hierarchy of passive over active and engineered over administrative controls, "when using a control, the choice of the type and manner should be justified." This is necessary to ensure that the preferred design philosophy is adhered to to the greatest extent practicable.

NC-20 Revise the commitment to ANSI/ANS-8.3 to indicate which version of the standard USEC is committing, and that USEC is committing to the standard as modified by Regulatory Guide 3.71.

10 CFR 70.24 states that a CAAS is required for operations containing greater than 700 g of contained ^{235}U. NUREG-1520, Section 5.4, states that "if an applicant intends to conduct activities to which a standard applies and the standard has been endorsed by an NRC Regulatory Guide (R.G.), then a commitment to comply with all the requirements (i.e., "shalls") is necessary but may not be sufficient to meet the acceptance criteria." NUREG-1520, Section 5.4.3.4.3(2), states that the applicant should commit to ANSI/ANS-8.3-1997, as modified by RG 3.71. Section 5.4.4 of the license application contains a commitment to the standard, but does not state to which version of the standard the applicant commits, and does not qualify that it is committing to those portions of the standard that have been endorsed in RG 3.71 (i.e., which are consistent with 10 CFR 70.24).

NC-21 Remove the following statement from Section 5.4.4 of the license application with regard to when a CAAS exemption is appropriate: "Other exceptions to CAAS coverage are documented in NCS evaluations and are based on a conclusion in the NCSE that a criticality accident is non-credible in an area where the fissile material operation is ongoing."

10 CFR 70.24 states that a CAAS is required for operations containing greater than 700 g of contained ^{235}U. However, 10 CFR 70.17 states that the NRC may "grant such exemptions from the requirements of the regulations in this part as it determines are authorized by law and will not endanger life or property or the common defense and security and are otherwise in the public interest." In addition to the specific exemption request for the cylinder storage yards, the above general language is contained in the license application. The statement in Section 5.4.4 appears to imply that review and approval of CAAS exemptions by NRC is not required if the applicant determines that criticality is incredible. This is not consistent with the requirements to 10 CFR Part 70.

NC-22 Provide justification for the criteria for CAAS exemption due to incredibility in Section 5.4.4 of the license application (i.e., less than 700g ^{235}U, less than 50g $^{235}U/m^2$, less than 5g ^{235}U in any 10-liter volume). State whether these criteria are applied only to normal or credible abnormal conditions as well.

10 CFR 70.24 states that a CAAS is required for operations containing greater than 700 g of contained ^{235}U. However, 10 CFR 70.17 states that the NRC may "grant such exemptions from the requirements of the regulations in this part as it determines are authorized by law and will not endanger life or property or the common defense and security and are otherwise in the public interest." In addition to the specific exemption request for the cylinder storage yards, the above general language is contained in the license application. More information is needed for NRC to make a determination that an exemption in these select cases will not endanger life and property.

NC-23 Clarify whether dual criticality alarm coverage will exist in all areas meeting the criteria in 10 CFR 70.24(a) that are not subject to an NRC-approved exemption. In the event that dual coverage is not maintained, clarify whether there are any other compensatory measures that may be used besides those listed in Section 5.4.4, and if so, what they are.

10 CFR 70.24(a)(1) requires that "coverage of all areas [in which CAAS is required] shall be provided by two detectors." Section 5.4.4 states that each area requiring CAAS coverage will have "at least two independent detection units", but also states that "this arrangement allows for one detection unit to be temporarily out of service with fissile operations continuing under the coverage of the other detection unit." Thus, it is not clear whether dual-alarm coverage meeting 10 CFR 70.24(a)(1) will be maintained at all times. In the event coverage is not maintained, Section 5.4.4 states that "plant procedures provide for compensatory actions, which may include...", but does not provide a comprehensive list of what the compensatory measures are. NUREG-1520, Section 5.4.3.4.3(7), states that "the applicant should commit to compensatory measures (e.g., limit access, halt SNM movement) when the CAAS system is not functional." Knowledge of what these compensatory measures are is needed to ensure safety to the workers.

NC-24 Provide the technical basis for limiting the installation of evacuation horns and radiation warning lights to facilities within 200 feet of buildings or facilities requiring CAAS coverage.

10 CFR 70.24 states that a CAAS is required for operations containing greater than 700 g of contained ^{235}U. NUREG-1520, Section 5.4.3.4.3(6), states that the applicant should commit to having a CAAS alarm that is clearly audible in areas that must be evacuated. Knowledge of the distance at which plant personnel are at risk from the consequences of a criticality is necessary to determine the area requiring an audible alarm.

NC-25 Clarify whether the "credible abnormal events" that the CAAS system is required to

survive include natural phenomena or external events, including seismic events, fire, explosion, or corrosive atmosphere.

10 CFR 70.24 states that a CAAS is required for operations containing greater than 700 g of contained ^{235}U. NUREG-1520, Section 5.4.3.4.3(4), states that the CAAS should be designed to remain operational during a seismic shock equivalent to the site-specific design basis earthquake or the equivalent value specified by the Uniform Building Code. NUREG-1520, Section 5.4.3.4.3(5), states that the CAAS should be designed to remain operational during credible events such as a fire, explosion, corrosive atmosphere, and other credible conditions. Such conditions could be coincident with a criticality accident.

NC-26 In Section 5.4.4.1 of the license application, justify use of the plant public address (PA) system to warn plant personnel within 200 feet of a portable CAAS unit in the event of a criticality accident. Describe the range in which the portable unit's alarm will be audible. Explain why the time delay for notifying at-risk personnel using the PA system is acceptable.

10 CFR 70.24(a) requires a "monitoring system meeting the requirements of either paragraph (a)(1) or (a)(2), as appropriate...which will energize clearly audible alarm signals if accidental criticality occurs" for operations containing greater than 700g of contained ^{235}U. The applicant has committed to follow ANSI/ANS-8.3-1997 in this regard. However, use of a portable CAAS in conjunction with a PA system does not meet the requirement that the monitoring system will energize a clearly audible alarm and does not meet all the provisions of the standard. Therefore, this information is needed to ensure that use of a portable CAAS in conjunction with a PA system will be an acceptable alternative, in that plant personnel will be notified in a sufficiently timely manner to protect them from the consequences of a criticality accident.

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.

NC-28 Clarify the commitment to limit the use of moderating material for firefighting in areas where greater-than-safe masses of uranium are handled, processed, or stored, and moderation controls are applied. Clarify whether this means that moderating material for firefighting will be entirely excluded, or the amounts of such materials will be limited

based on analysis in NCSEs.

10 CFR 70.61(d) requires that all processes be shown to be subcritical under normal and credible abnormal conditions. NUREG-1520, Section 5.4.3.4.2(12)(f), states that "when developing firefighting procedures for use in a moderation controlled area, restrictions are placed on the use of moderator material." The statement in Section 5.4.5.1 of the license application that use of moderator materials are "limited" in such cases is ambiguous and clarification is needed.

NC-29 Commit that when moderator control is used and process variables can affect moderation, they will be identified as IROFS, or justify not doing so.

10 CFR 70.61(d) requires that all processes be shown to be subcritical under normal and credible abnormal conditions. NUREG-1520, Section 5.4.3.4.2(12)(b), states that "when process variables can affect the moderation, the process variables are shown in the ISA Summary to be controlled by IROFS." This is needed to ensure moderator controls are available and reliable when needed.

NC-30 State whether USEC commits to ANSI/ANS-8.22-1997 with regard to moderator control, and if so, clarify to which provisions in the standard USEC is committing.

10 CFR 70.61(d) requires that all processes be shown to be subcritical under normal and credible abnormal conditions. NUREG-1520, Section 5.4.3.4.2, states "when using moderation, the applicant commits to ANSI/ANS-8.22-1997."

NC-31 Describe the safety factor that will be used when basing safe geometry dimensions on established standards.

10 CFR 70.61(d) states that processes should be assured to be subcritical "including use of an approved margin of subcriticality for safety." NUREG-1520, Section 5.4.3.4.2(8)(b), states that when using large single units as a single parameter control from experimental data, the applicant should use 90% of the minimum critical cylinder diameter, 85% of the minimum critical slab thickness, and 75% of the minimum critical sphere volume, as margins of safety.

NC-32 Clarify what other management measures than pre-operational verification will be used, as appropriate, when relying on geometry for criticality control. If geometry control can be lost by bulging, corrosion, leakage, or other mechanisms, means should be provided to prevent its loss.

10 CFR 70.61(d) requires that all nuclear processes must be assured to be subcritical under normal and credible abnormal conditions. Section 5.4.5.1 discusses pre-operational verification of geometry controlled items, but does not discuss other management measures that may be needed to ensure subcriticality under certain abnormal conditions.

NC-33 Clarify that when relying on factors such as geometry, enrichment, or composition, in the setting of mass limits, these controls in conjunction with mass will only be credited as one control for meeting the DCP, or justify not doing so. Commit that when these items are not identified as IROFS, all other parameters will be evaluated at their most reactive credible values (e.g., spherical geometry, optimum moderation, most reactive reflection).

10 CFR 70.61(d) requires that all processes be shown to be subcritical under normal and credible abnormal conditions. NUREG-1520, Section 5.4.3.4.1(10)(a), states that "NCS safety limits...and limits on NCS controlled parameters will be established assuming credible optimum conditions... unless specified controls are implemented to control the limit to a certain range of values." Therefore, if mass is relied on alone to ensure subcriticality, all other system parameters are uncontrolled and should be at their most reactive credible values. Section 5.4.5.1 of the license application states, however, that safe mass values are determined in conjunction with other controls. This appears to be contradictory.

NC-34 Describe the safety margin that will be applied to mass limits (a) when double batching is credible, and (b) when double batching is not credible.

10 CFR 70.61(d) states that processes should be assured to be subcritical "including use of an approved margin of subcriticality for safety." NUREG-1520, Section 5.4.3.4.2(7)(d), states that when double batching is possible, the mass should be no more than 45% of the minimum spherical critical mass. NUREG-1520, Section 5.4.3.4.2(7)(e), states that when double batching is not possible, the mass should be no more than 75% of the minimum spherical critical mass.

NC-35 State what means are provided to segregate materials of different enrichment when enrichment is used for criticality control.

10 CFR 70.61(d) requires that all processes be shown to be subcritical under normal and credible abnormal conditions. NUREG-1520, Section 5.4.3.4.2(10)(a), states that a method of segregating different enrichments should be used to ensure they will not be interchanged, or else the most limiting enrichment will be applied to all materials.

NC-36 Justify the use of homogeneous safe mass at up to 10wt% ^{235}U. Demonstrate that the difference between heterogeneous and homogeneous systems at up to 10wt% ^{235}U are sufficiently close, with the chosen margin of subcriticality, that the difference can be ignored.

10 CFR 70.61(d) requires that all processes be shown to be subcritical under normal and credible abnormal conditions. NUREG-1520, Section 5.4.3.4.2, states that heterogeneous effects should be considered, especially for low-enriched systems. Section 5.4.5.1 of the license application states that "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." However, this statement is not justified and it is not apparent what "close in value" means. This information is needed to ensure that processes are subcritical under normal and credible abnormal conditions.

NC-37 Clarify whether the use of concentration control requires dual independent sampling. In particular, clarify whether drawing and analyzing the samples must be done by two different individuals or using different instrumentation.

10 CFR 70.61(d) requires that all processes be shown to be subcritical under normal and credible abnormal conditions. NUREG-1520, Section 5.4.3.4.2(13)(d), states that "When concentration needs to be sampled, dual independent sampling methods are used." Section 5.4.5.1 of the license application states that, when relying on concentration, "the medium is sampled twice, the samples are verified to be properly taken by a second individual, and the two samples are independently analyzed." However, it is not made clear whether the dual sampling and analysis is completely independent, especially during taking of the sample.

NC-38 Commit that when process variables can affect concentration, they are identified as IROFS, or justify not doing so.

10 CFR 70.61(d) requires that all processes be shown to be subcritical under normal and credible abnormal conditions. NUREG-1520, Section 5.4.3.4.2(13)(a), states that "When process variables can affect the concentration, the process variables are shown in the ISA Summary to be controlled by IROFS." This is necessary to ensure that concentration controls are available and reliable to perform their safety functions.

NC-39 Describe whether there is a minimum reflection condition to account for the presence of nearby structural or transient materials (e.g., 1-inch tight fitting reflector). If this is not used, justify why the models are adequately bounding.

10 CFR 70.61(d) requires that all nuclear processes must be assured to be subcritical under normal and credible abnormal conditions. NUREG-1520, Section 5.4.3.4.1(10)(a), states that "NCS safety limits...and limits on NCS controlled parameters will be established assuming credible optimum conditions... unless specified controls are implemented to control the limit to a certain range of values." Since there will always be some materials at some distance from the fissile system, unless specific controls are established to preclude them, criticality calculations must take them into account. This information is needed to ensure that processes are subcritical under normal and credible abnormal conditions.

NC-40 State whether the full range of interstitial moderation is considered in evaluating normal and abnormal conditions.

10 CFR 70.61(d) requires that all nuclear processes must be assured to be subcritical under normal and credible abnormal conditions. NUREG-1520, Section

5.4.3.4.1(10)(a), states that "NCS safety limits...and limits on NCS controlled parameters will be established assuming credible optimum conditions... unless specified controls are implemented to control the limit to a certain range of values." Section 5.4.5.1 states that "the possibility of full water reflection is considered when performing analyses." However, there may be instances (e.g., strongly coupled arrays) in which full flooding is not the most reactive case. In this event, the full range must be considered to ensure that processes are subcritical under normal and credible abnormal conditions.

NC-41 State whether you commit to the use of ANSI/ANS-8.21-1995 in the use of fixed neutron absorbers.

10 CFR 70.61(d) requires that all processes be shown to be subcritical under normal and credible abnormal conditions. NUREG-1520, Section 5.4.3.4.2(15)(a) states that the applicant should commit to ANSI/ANS-8.21-1995.

NC-42 State whether raschig rings and/or soluble absorbers are used in the facility, and if so, whether you commit to ANSI/ANS-8.5-1996.

10 CFR 70.61(d) requires that all processes be shown to be subcritical under normal and credible abnormal conditions. NUREG-1520, Section 5.4, states that "if an applicant intends to conduct activities to which a standard applies and the standard has been endorsed by an NRC Regulatory Guide, then a commitment to comply with all the requirements (i.e., "shalls") is necessary but may not be sufficient to meet the acceptance criteria. RG 3.71 has endorsed ANSI/ANS-8.5-1996 for use of borosilicate glass raschig rings. In addition, soluble absorber controls may be used, but these are not mentioned in the application.

NC-43 Clarify the assertion in Section 5.4.5.2 of the license application that "the generic nature of the experimental data does not address the variables present in the different operations." Explain whether this means that the selected benchmark experiments do not cover the range of parameters (area of applicability) needed for ACP operations.

10 CFR 70.61(d) requires that all nuclear processes must be assured to be subcritical under normal and credible abnormal conditions. NUREG-1520, Section 5.4.3.4.1(7)(c) states that the applicant should commit to "apply the methodology only in the area or areas of applicability or provide justifications for applying the methdology outside the area or areas of applicability." The aforementioned quote could be interpreted as contradicting this.

NC-44 When using handbooks to derive subcritical limits, describe the amount of margin used (e.g., 90% of the minimum critical diameter). Describe how the handbooks are validated for use in setting subcritical limits.

10 CFR 70.61(d) requires that all nuclear processes must be assured to be subcritical under normal and credible abnormal conditions. NUREG-1520, Section 5.4.3.4.1(7),

states that the applicant should validate each methodology used for NCS, including "experimental data, reference books, hand calculations, deterministic computer codes, probabilistic computer codes, consensus standards." This is necessary to ensure that processes are subcritical under normal and credible abnormal conditions.

NC-45 Describe how hand calculations are validated for use in setting subcritical limits.

10 CFR 70.61(d) requires that all nuclear processes must be assured to be subcritical under normal and credible abnormal conditions. NUREG-1520, Section 5.4.3.4.1(7), states that the applicant should validate each methodology used for NCS, including "experimental data, reference books, hand calculations, deterministic computer codes, probabilistic computer codes, consensus standards." This is necessary to ensure that processes are subcritical under normal and credible abnormal conditions.

NC-46 Expand on your statement in Section 5.4.5.1 that "Computer codes are validated using experimental data from benchmark experiments that, ideally, have geometries and material compositions similar to the systems being modeled." Indicate what course of action will be followed when benchmark experiments with geometry and material composition similar to the systems being modeled are not used.

10 CFR 70.61(d) requires that all processes be shown to be subcritical under normal and credible abnormal conditions. NUREG-1520, Section 5.4, states that "if an applicant intends to conduct activities to which a standard applies and the standard has been endorsed by an NRC Regulatory Guide, then a commitment to comply with all the requirements (i.e., "shalls") is necessary but may not be sufficient to meet the acceptance criteria." ANSI/ANS-8.1-1998 applies to validation and includes the requirement to use experiments similar in composition and geometry. NUREG-1520, Section 5.4.3.4.1(7)(g), states that the applicant should use "plant-specific benchmark experiments." Inclusion of the term "ideally" appears to indicate this is not always the case. In the event this is not the case, knowledge of what other methods will be followed is necessary to ensure processes are subcritical under normal and credible abnormal conditions.

NC-47 Justify the use of a minimum margin of subcriticality of 0.02 for ACP operations. Show that this provides adequate assurance of subcriticality.

10 CFR 70.61(d) requires that processes be assured to be subcritical "including the use of an approved margin of subcriticality for safety." This information is required to ensure that a sufficient margin of subcriticality for safety will be used.

NC-48 Provide in the license application a summary description of your validation report for ACP operations (or justify not doing so), for all methods used to determine subcritical limits, including:

a) A summary of the theory of the methodology that is sufficiently detailed and clear

to allow understanding of the methodology.

b) A summary of the area or areas to which the validation report applies.
c) A commitment to apply the methodology only in the area or areas of applicability or provide justification for applying the methodology outside the area or areas of applicability.
d) A commitment to use pertinent computer codes, assumptions, and techniques in the methodology.
e) A commitment to properly perform the mathematical operations in the methodology.
f) A commitment to use data based upon reliable and reproducible experimental measurements.
g) A commitment to use plant-specific benchmark experiments and data derived therefrom to validate the methodology.
h) A commitment to determine the bias, the uncertainty in the bias, the uncertainty in the methodology, the uncertainty in the data, the uncertainty in the benchmark experiments, and the margin of subcriticality for safety, when using the methodology.
i) A commitment to use controlled software and hardware, when using the methodology.
j) A commitment to use a verification process when using the methodology.

10 CFR 70.61(d) requires that all processes be shown to be subcritical under normal and credible abnormal conditions. NUREG-1520, Section 5.4.3.4.1(7)(a)-(j), states that the aforementioned information should be included in the applicant's summary description of its validation report.

NC-49 Explain your statement in Section 5.4.5.2 of the license application that "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..." Clarify whether all calculations used to set subcritical limits are either confirmed by or performed using validated methods (i.e., if not performed using validated methods, is there 100% confirmation using validated methods?).

10 CFR 70.61(d) requires that processes be assured to be subcritical "including the use of an approved margin of subcriticality for safety." NUREG-1520, Section 5.4.3.4.1(3) states that "Methods used to develop NCS limits will be validated..." Knowledge that the limits are based on validated methods is needed to ensure that processes are subcritical under normal and credible abnormal conditions.

NC-50 Clarify to which of the currently NRC-endorsed ANSI/ANS-8 series standards USEC is committing, and to which provisions of those standards it is committing.

10 CFR 70.62(a) requires the applicant to establish and maintain a safety program

demonstrating compliance with the performance requirements of 10 CFR 70.61. NUREG-1520, Section 5.4, states that “if an applicant intends to conduct activities to which a standard applies and the standard has been endorsed by an NRC Regulatory Guide, then a commitment to comply with all the requirements (i.e., “shalls”) is necessary but may not be sufficient to meet the acceptance criteria.” In addition, “Any variations from the requirements of the standard should be identified and justified in the application.” There are a large number of industry standards that are endorsed in RG 3.71, but which are not discussed in the license application.