

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

DOCKETED  
USNRC

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In the Matter of  
U.S. ENRICHMENT CORPORATION  
(Paducah, Kentucky, Gaseous Diffusion Plant)

OFFICE OF SECRETARY  
RULEMAKING AND  
DOCKET NO. 70-7001  
ADJUDICATIONS STAFF

UNITED STATES ENRICHMENT CORPORATION  
PETITION REQUESTING COMMISSION  
REVIEW OF DIRECTOR'S DECISION  
DENYING IN PART  
USEC CERTIFICATE AMENDMENT REQUEST  
REGARDING PADUCAH PLANT SEISMIC UPGRADES

1. Introduction

Pursuant to 10 CFR § 76.64 and the "Notice of Amendment and Denial of Amendment Application to Certificate of Compliance GDP-1 for the U. S. Enrichment Corporation, Paducah Gaseous Diffusion Plant, Paducah, Kentucky" published in the Federal Register on December 16, 1997 (62 Fed. Reg. 65823), the United States Enrichment Corporation (USEC) hereby petitions the U.S. Nuclear Regulatory Commission (NRC or Commission) for review of that portion of the decision of the Director of Nuclear Material Safety and Safeguards (Director) denying USEC's July 31, 1997 application for an amendment to its Certificate of Compliance for the Paducah Gaseous Diffusion Plant (Paducah or PGDP). This Petition is being filed within the fifteen (15) day period after the date of such publication in accordance with the above regulation and Notice. USEC is not petitioning for review of those portions of the Director's decision granting in part USEC's Certificate amendment request. Those portions of the amendment request approved by the Director should

become immediately effective upon the Director's signature in accordance with the NRC's December 16 Notice.

The essence of USEC's request for Commission review is that the Director's denial of the requested amendment will require USEC to move forward promptly on a multi-million dollar seismic upgrade project for the C-331 and C-335 buildings at the PGDP site, despite the fact that new analytical and design information remains before the Staff for review. This new information, some of which the NRC Staff has specifically required USEC to submit, calls into question the need for and effectiveness of the planned seismic upgrades. The existence of the information raises serious questions as to whether the committed modifications to the two buildings are an effective means of managing the overall seismic risk at PGDP. USEC believes that it is premature to proceed further with the seismic upgrades without the completed reviews, and that a relatively modest amount of time (perhaps 3-4 months) would be required for the NRC Staff to complete its review of the relevant documents and reach a final determination whether the planned upgrades are appropriate and necessary. Such a delay will not increase the risk to public health and safety because there is in place an adequate justification for continued operation (JCO) in the absence of the seismic upgrades, and special controls have been implemented to assure that the public health and safety is fully protected while the NRC completes its evaluation.

As discussed below, USEC respectfully requests that the Commission review that part of the Director's decision denying USEC's Certificate amendment application. The Commission should extend the deadline for completion of the seismic modifications until eighteen months after the NRC has completed the reviews and approvals described in USEC's July 31 Certificate amendment

application and determined that the proposed modifications to C-331 and C-335 are appropriate and necessary.

Section II of this Petition discusses the background information relevant to USEC's request. Section III discusses USEC's "interest" and how that interest may be affected by the Director's decision, in accordance with the NRC's December 16 Notice. Section IV discusses USEC's areas of concern regarding the activity which is the subject of the Director's decision and provides the basis for our Petition. Finally, Section V explains why granting the Petition, and the specific relief requested, would not jeopardize public health and safety.

## 2. Background

The NRC issued a Certificate of Compliance (Certificate) to USEC authorizing continued operation of the PGDP plant on November 26, 1996. As part of that Certificate, the NRC also approved a "Plan for Achieving Compliance with NRC Regulations at the Paducah Gaseous Diffusion Plant" (Compliance Plan), and made compliance with the commitments in the Compliance Plan a "condition" of the Certificate.

Issue 36 in the PGDP Compliance Plan is entitled "Seismic Capability of Buildings C-331 and C-335." It states that, as a result of ongoing efforts by the Department of Energy (DOE) to upgrade the preexisting DOE Safety Analysis Report (SAR) for PGDP:

Structural seismic loading capacity analyses . . . have identified that significant plant damage could occur in two of the main cascade buildings, C-331 and C-335, below the [existing] Evaluation Basis Earthquake.

PGDP Compliance Plan (Rev. 3, 7/17/96), Issue 36, p. 2. Based on this determination, the Compliance Plan required USEC to, among other things, complete:

[m]odifications to increase the seismic capability for floor and roof sections in Buildings C-331 and C-335 . . . by December 31, 1997.

PGDP Compliance Plan (Rev. 3, 7/17/96), Issue 36, p. 5. The Compliance Plan also directed USEC:

By December 1, 1997, USEC shall submit for NRC approval an updated seismic risk analysis for the Paducah plant site. The analysis shall:

- Consider all available regional and site-specific data published by the U.S. Geological Survey.
- Provide an estimate of the peak ground acceleration for a seismic event with a 250-year return period. If the estimate is greater than 0.15g, then the return period for a  $\hat{c}$  15g event shall also be estimated.

Any proposed modifications that may result from this analysis shall be subject to a backfit analysis pursuant to 10 CFR 76.76(b).

*Id.* at p. 6.

In a letter dated April 23, 1997, USEC requested an amendment to its Certificate to obtain NRC approval of the resolution of three Unreviewed Safety Questions (USQs) associated with the planned performance of the seismic upgrade work, and to extend the completion date for the seismic modifications until 15 months after approval of the amendment request, including the USQs. GDP 97-0062, April 23, 1997. Before the Director ruled on the above amendment request, USEC

submitted new information raising serious questions about whether the planned modifications would be effective in managing seismic risk at PGDP, and whether the remaining, unexpended costs of the upgrades (approximately \$17M) should be incurred before completion of planned evaluations and analyses. GDP 97-0101, June 30, 1997. Subsequently, USEC submitted a revised amendment request. GDP 97-0136, July 31, 1997. Among the changes requested was that the NRC revise the completion date for the seismic modifications from December 31, 1997 to 18 months after:

- NRC completes its review of the final design of the structural modifications;
- NRC completes its review of the seismic analyses included in USEC's updated SAR (submitted on October 31, 1997); and
- USEC completes an updated seismic risk analysis (which was due and submitted on December 1, 1997).

GDP 97-0136, July 31, 1997 (proposed amendment to Compliance Plan Issue 36, p. 6). USEC committed that “[i]f the current modifications are confirmed by these analyses, USEC will proceed with the modification of Building C-331 and C-335 [and that the] modifications will be installed within 18 months from release of the project.” *Id.* USEC also provided a proposed plan and schedule for development of alternative recommendations if the various analyses “indicate that a different set of modifications . . . should be pursued. . . .” *Id.*

On December 1, 1997, USEC transmitted the Updated Seismic Risk Analysis for PGDP, fulfilling the Compliance Plan requirement that USEC prepare and submit the analysis for NRC review and approval. GDP 97-0201, December 1, 1997. The analysis found that the peak ground acceleration slightly exceeds the value used by DOE (0.165g vs. 0.15g for 250-year earthquake) and

that it would be necessary to assess the impact of this change on the design of the planned structural modifications.

On December 8, 1997, the Director issued a decision granting in part and denying in part USEC's July 31, 1997 Certificate amendment request. While the Director granted an extension of the original December 31, 1997 completion date for the seismic modifications until 18 months after the issuance of the requested amendment, he denied USEC's request that the 18 months run from the time that the Staff completes its review of the final design information, updated SAR seismic analyses, and updated seismic risk analysis identified above. "NRC Staff Compliance Evaluation Report: Application Dated April 23, 1997 As Revised July 31, 1997, Buildings C-331 and C-336 Seismic Upgrades (Compliance Plan Issue 36)," December 8, 1997 (CER). USEC anticipates that a full 18 months will be required to complete the seismic modifications. Thus the Director's decision effectively requires USEC to promptly undertake work on the upgrade project despite the pending NRC Staff review of key documents that question the effectiveness and adequacy of any modifications undertaken at the plant to control seismic risk.

### 3. USEC's Interest

USEC clearly has a significant interest in the matter which is the subject of the Director's decision. USEC holds the NRC Certificate of Compliance authorizing it to operate the PGDP plant. It is responsible for the safe operation of the facility and for compliance with all NRC requirements which are applicable to the plant. This includes, of course, installation of the necessary structural modifications to the C-331 and C-335 buildings in accordance with the commitments in the PGDP

Compliance Plan, as well as the installation of any other structural modifications that may be required at the plant in the future. The Directors' decision will require USEC to immediately undertake the seismic modifications before the NRC has completed its review of important analyses and final design information. USEC would be compelled to make plant modifications, incurring the competing risks identified in the USQs<sup>1</sup>, even though the modifications ultimately may be determined to be inadequate or perhaps even unnecessary. USEC has the responsibility to assure that plant modifications and their associated costs are appropriate and necessary.

#### 4. USEC's Areas of Concern

USEC's areas of concern with the Director's decision and the bases for its request for relief are provided below:

##### A. The Structural Modifications Were Originally Ordered by DOE Based on Incomplete Technical Information

The modifications to the C-331 and C-335 buildings were originally ordered by DOE during the time that it possessed nuclear regulatory oversight authority over the GDPs. In an October 31,

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<sup>1</sup>The USQs indicate that: (1) the increased stiffness of the buildings following the planned modifications may increase the number and probability of seismically induced equipment failures inside the buildings; (2) the process of installing the new structural steel may temporarily make the buildings and contained equipment susceptible to seismically induced failure as the existing frames are altered and/or replaced; and (3) the installation process may temporarily increase the probability of equipment failures due to postulated load handling accidents during construction. CER at pp. 3-7.

1995 Directive for Corrective Action and Compensatory Actions in Buildings C-331 and C-335,

DOE stated:

Extensive analysis of the seismic capacity of the PGDP being performed by the GDP SAR Upgrade Program has provided substantive evidence that an unreviewed safety question exists. Specifically, Buildings C-331 and C-335 suffer loss of confinement and internal structural damage at low seismic demand beginning at 0.05g peak ground acceleration (PGA) with the potential to release more than 9,150 lbs. of  $UF_6$  under analyzed conditions and impact worker safety. This is contrary to the existing authorization basis.

Based on the above information, immediate compensatory actions must be taken to limit potential releases from the buildings to less than 9,150 lbs. and avoid possible injury to workers...

In addition, USEC is hereby directed to develop and initiate action(s) to ensure that the response of the rocker supported floor sections of each building can withstand the expected seismic demand without exceeding the authorization basis (9,150 lbs. of  $UF_6$ ) for PGDP...

The DOE directive grew out of the structural analysis work that was being performed by DOE as part of its site-wide Safety Analysis Report Upgrade (SARUP) effort for the Paducah plant. Those structural analyses showed that structural components in the C-331 and C-335 buildings could fail at earthquake levels below the existing Evaluation Basis Earthquake (EBE). However, DOE's directive to install the modifications was issued before it had performed the SARUP consequence analyses to determine what the impact of such a structural failure might be on workers or the offsite public. Furthermore, DOE had not yet completed all of its planned SARUP structural analyses to fully assess the seismic capacity of the other buildings at the PGDP site.

Prior to assuming regulatory oversight over the GDPs, the NRC requested that the DOE seismic requirements for the C-331 and C-335 buildings be incorporated into the PGDP Compliance Plan, including a requirement to prepare and submit for NRC approval an updated seismic risk analysis for the Paducah plant site. While those analyses now indicate that consequences in excess of the existing SAR are possible, they do not justify installation of the structural modifications being planned because the results of a recent seismic risk analysis conducted by Lawrence Livermore National Laboratory show that the actual health risks are low (see the discussion in Item C.).

B. The Updated Seismic Risk Analysis Which Was Required by NRC Indicates a Higher EBE Than the Modifications are Based Upon

After DOE issued its directive to USEC to install the structural modifications in C-331 and C-335, the NRC requested that DOE review additional, recently available, seismological information for its impact on DOE's seismic analyses (letter, Elizabeth Ten Eyck to Joe W. Parks, February 26, 1996). While DOE reviewed this new information and concluded that it did not affect its seismic hazard analyses (letter, Joe W. Parks to Elizabeth Ten Eyck, March 7, 1996), the NRC Staff subsequently requested that DOE commit to assist USEC in preparing and submitting an updated seismic analysis, which would take into account "all available geological and seismological information" (letter, Elizabeth Ten Eyck to Joe W. Parks, May 1, 1996). Because DOE concluded that "no new studies [are] warranted," it declined the NRC's request (letter, Elizabeth Ten Eyck to Joe W. Parks, May 17, 1996).

As a result of DOE's unwillingness to commit to assist USEC on an updated seismic risk analysis, the NRC required USEC to submit for NRC approval by December 1, 1997 an "updated seismic risk analysis for the Paducah plant site." PGDP Compliance Plan (Rev. 3, 7/17/96), Issue 36, p. 6. USEC submitted the updated seismic analysis on December 1, 1997. That analysis is presently before the NRC Staff for review and approval. The analysis indicates that the peak ground acceleration for a 250-year return period seismic event slightly exceeds the value used by the DOE in performing their site-wide SARUP effort (0.165g v. 0.15g), and that a 0.15g event is estimated to have a return period of 220 years.

It is not clear what EBE value ultimately will be accepted by the NRC in its evaluation of the adequacy of any seismic modifications at PGDP. The currently planned seismic modifications were designed to a 0.15g value. Though they may be sufficient to withstand the higher value identified in the updated seismic risk analysis, that determination has not yet been reached. USEC is presently assessing the impact that these results may have on the structural, piping and equipment analyses supporting the seismic modifications and has committed to the NRC that it will submit a status report on that assessment by February 23, 1998. GDP 97-0201, December 1, 1997. Although the NRC has required USEC to submit the updated seismic risk analysis for review and approval, it has not issued its approval. Consequently, it is conceivable that the NRC may require a level of seismic risk management to be applied to the C-331 and C-335 buildings that will not be met by the planned modifications. By denying USEC's amendment request, the NRC has chosen to mandate that the C-331 and C-335 modifications proceed before a decision is reached on the underlying design criterion -- the EBE. USEC believes that any modifications should await an NRC determination of a final EBE value because the cost of backfitting more stringent requirements to these modifications

after they are begun may significantly exceed the cost of incorporating them into the initial design and could force substantial rework.

C. A Recent Study Shows Actual Health Risks From a Postulated Seismic Event to Be Low

In March, 1997, USEC received a copy of a DOE-sponsored study conducted by Lawrence Livermore National Laboratory (LLNL) reviewing the health risks to site workers and the public from a potential release of uranium hexafluoride (UF<sub>6</sub>) during a seismic event at Paducah. "Paducah Gaseous Diffusion Plant Seismic Risk Study," UCRL-ID-126275 (February 1997). The LLNL study evaluated the impact of the planned structural modifications to C-331 and C-335 on seismic risk<sup>2</sup> and concluded as follows:

The results of the study show that the health risk from earthquake-caused releases of uranium hexafluoride at the PGDP is small, and probably less than risks associated with the transportation of hydrogen fluoride and other similar chemicals used by industry. The probability of more than 30 individuals experiencing health consequences (injuries) from earthquake damage is less than  $4 \times 10^{-4}$ /yr, even if the planned modifications to buildings C-331 and C-335 were not completed. With the planned modifications completed, the probability of more than 30 injuries is reduced to  $2 \times 10^{-4}$ /yr. No fatalities are predicted to occur, even in the most severe earthquakes. Thus, it is concluded that the reduction in seismic risk that will be realized by structurally upgrading buildings C-331 and C-335 is small. These results are primarily due to the fact that the inventory of uranium hexafluoride in C-331 and C-335 is small compared to the total inventory on site, and the population density in the vicinity of the plant is low. Therefore, even though the probability of earthquake damage to buildings C-331 and C-335 is relatively high in their current condition, the health risk is low.

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<sup>2</sup> The LLNL study does not evaluate the risks from other seismically-induced building and equipment failures at the PGDP site.

USEC submitted the LLNL report to the NRC on June 30, 1997 (GDP 97-0101), and requested that the JCO in Compliance Plan Issue 36 be amended to reference the report. In response, the NRC Staff's CER accompanying its denial of USEC's amendment request stated:

The Staff did not review the [LLNL] report, nor was it requested to review the report. The Staff has not relied on this report to reach its conclusions.

CER, p. 8.

In submitting the LLNL report to the NRC, it was USEC's expectation that the NRC would consider the LLNL information in its evaluation of PGDP seismic risk. The LLNL report calls into question the justification for the planned structural modifications. USEC believes that before the modifications are undertaken, NRC should consider the results of the report and determine whether the expenditure of funds to undertake these modifications is appropriate or necessary.

D. NRC Has Not Yet Reviewed or Approved Final Design Information Provided by USEC

On July 31, 1997, USEC transmitted to the NRC final design information for the planned structural modifications, including detailed design drawings. The NRC required that USEC transmit the information pursuant to Compliance Plan Issue 36. In denying USEC's amendment request, the NRC Staff stated:

The Compliance Plan did not require the Staff to perform the other items requested by the licensee [the final design information being one of those items] before installing the modifications.

CER, p. 7. While the Staff correctly notes that the existing Compliance Plan did not require it to review the final design information before requiring USEC to proceed with the actual modifications, unless NRC review results are provided to USEC before this work proceeds, there is a significant risk that the NRC could later require expensive changes. USEC believes that this information should be reviewed before it proceeds with any modifications.

E. The NRC Has Not Yet Reviewed PGDP Building and Equipment Seismic Capacity Information Submitted by USEC as Part of the Required SAR Update Submittal

In the PGDP Compliance Plan, the NRC also mandated that USEC submit an update and revision to the SAR which was included in the original certification application and which formed the basis for the NRC's initial issuance of the PGDP Certificate. PGDP Compliance Plan Issue 2 entitled "Update the Application Safety Analysis Report" recognized that there were discrepancies in the 1985 DOE-prepared SAR (which formed the basis for USEC's SAR submittal to the NRC) including, among other things:

the expected response of SSECs to events may be different than previously assumed (e.g., response to seismic events) and . . . there are assumptions and differences in the accident scenarios and atmospheric dispersion models that could affect the releases and consequences calculated in the 1985 FSAR.

PGDP Compliance Plan (Rev. 3, 7/15/96), Issue 2, p. 2.

As a result, the NRC required that USLC submit updated SAR information including, among other things:

- "Seismic characterization . . . using a 250-year return period earthquake . . ."
- "Hazards analysis . . . including . . . natural phenomena (e.g., seismic events . . .)" and
- "[A]nalysis of structures for seismic capacity [and] equipment seismic capacity evaluations . . ."

Id.

On October 31, 1997, USEC submitted its updated SAR to incorporate information from the DOE SARUP, including data on the seismic capacity of buildings and equipment around the PGDP site. GDP 97-0188, October 31, 1997. The NRC Staff has not yet reviewed this information. The updated SAR information indicates, among other things, that the liquid UF<sub>6</sub> withdrawal areas of the C-310 and C-315 buildings on the PGDP site are also susceptible to seismically induced damage. As discussed in the JCO for Compliance Plan Issue 36 and the updated SAR, the seismic risk in the C-331 and C-335 building failure scenarios is somewhat larger than the seismic risk associated with the potential failures in Buildings C-310 and C-315. However, it is important to note that the failure source term for C-331 and C-335 in the Compliance Plan JCO is based on the UF<sub>6</sub> process inventory when operating at 2200 MW, a substantially larger source term than that which would result from failure at a more typical plant power level -- about one-half to two-thirds of that level. The potential liquid releases from failures in the C-310 and C-315 buildings do not vary with the plant operating level.

The information in the updated SAR and Compliance Plan JCO shows a relatively modest level of risk for the range of seismically-induced building and equipment failures postulated at PGDP. Failures are identified at seismic accelerations as low as 0.05g and at increasing seismic accelerations up to 0.15g -- the range of the EBE. The results presented in the Compliance Plan JCO and updated SAR analyses indicate no fatal consequences to the offsite public and limited consequences to onsite workers. As illustrated in the earlier analysis of the LLNL report, even these onsite consequences constitute a low seismic risk.

The updated SAR information shows that the planned modifications which are the subject of this petition are not by themselves effective in reducing the seismic risk at PGDP since the C-331 and C-335 failures do not dominate seismic risk. As indicated in the updated SAR submittal, further analysis of modifications in C-310 and C-315 is underway. Preliminary estimates indicate it would require at least \$8M to modify the equipment in Buildings C-310 and C-315 to resist the forces of a 0.15g EBE. Thus, a combination of modifications to improve all four buildings would cost more than \$25M. However, the updated SAR analysis reveals that only modest risk reduction would be achievable by a comprehensive set of modifications to harden the plant to resist the EBE.

USEC concludes that the information already submitted to the NRC Staff for review shows that the seismic risk at PGDP, evaluated at the 0.15g EBE, is already acceptably low and that the existing plant physical configuration, programs and controls, provide adequate protection of public health and safety for natural phenomena as required by 10 CFR §76.85. USEC further concludes that the risk reduction benefits of any seismic modifications which may be considered for Buildings C-331, C-335, or other buildings at the PGDP plant are not significant and are not commensurate with their

costs. USEC believes that the updated SAR information submitted to the NRC in accordance with the requirements of the Compliance Plan should be reviewed by the Staff before any seismic modifications proceed.

5. Public Health and Safety Will be Protected During the Requested Delay

The Staff's CER explains the basis for denying USEC's amendment request as follows:

[T]he staff believes that steel installation should begin promptly because of the existing weak structural components. Therefore, the staff . . . recommends denying that the schedule be based on [completion of the reviews and approvals proposed by USEC].

CER, p. 7. Extending the schedule for completion of the modifications in accordance with USEC's request would not jeopardize public health and safety for several reasons.

First, as described above, although structural analyses have shown that portions of the C-331 and C-335 buildings are somewhat more susceptible to damage from the existing EBE than had previously been anticipated, the results of the recent seismic risk analysis performed by LLNL show that the actual risk of harm is low.

Second, in Compliance Plan Issue 36, the NRC has approved a JCO for continuing to operate the C-331 and C-335 buildings (in the absence of the structural modifications) for 18 months beyond the date of issuance of the amendments which were approved in the CER. The Compliance Plan

requires that specific actions be taken, and maintained, to reduce the seismic risk until such time as the modifications are completed. In particular, as required by the Compliance Plan:

- Until the completion of [the] modifications . . . operations in Buildings C-331 and C-335 [are] limited to subatmospheric pressure within the enrichment cascade equipment.
- Operations personnel [have been] instructed on the specific emergency procedures for shutting down the affected enrichment cascade equipment and building ventilation systems following a seismic event.
- Building access [is] limited to only those individuals essential to operations, inspections, or those personnel performing the modifications until they are complete.

The NRC has made a finding that the buildings are safe to continue operating, even without the planned modifications, until approximately June, 1999. USEC believes that the existing JCO is acceptable for the additional period of 3-4 months needed for the Staff to review the new information provided by USEC and determine whether the modifications should proceed.

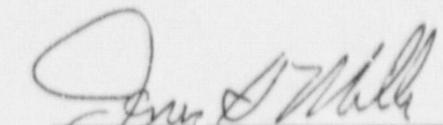
Based on the above, there would be no adverse impact on public health and safety resulting from granting the Petition and extending the date for completion of the seismic modifications in accordance with USEC's amendment request.

## 6. Conclusion

There is a significant amount of important new analytical and design information that has recently been provided to the NRC Staff which calls into question the propriety of proceeding with

the planned structural modifications to PGDP buildings C-331 and C-335. Some of this information was specifically required to be submitted to the NRC as part of its evaluation of seismic issues at the PGDP plant but was not considered as part of the Director's decision. Furthermore, extending the date for USEC's completion of the planned modifications will not jeopardize public health and safety. Accordingly, USEC requests that the Commission review the Director's decision and grant USEC's request to extend the date for completion of the modifications until eighteen months after an NRC determination that the planned modifications are appropriate and necessary based upon review of the final design, the updated SAR seismic analyses, the updated seismic risk analysis, and the LLNL report.

Respectfully Submitted:



James H. Miller  
Vice President, Production

Dated: December 30, 1997