July 28, 2010
GDP 10-0031

Ms. Catherine Haney
Director, Office of Nuclear Material Safety and Safeguards
Attention: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Paducah Gaseous Diffusion Plant (PGDP)
Docket No. 70-7001, Certificate No. GDP-1
Transmittal of Revisions 121 and 122 to Certification Application USEC-01

Dear Ms. Haney:

In accordance with 10 CFR 76, the United States Enrichment Corporation (USEC) hereby submits Revisions 121 and 122 to the USEC-01 certification documents for the Paducah Gaseous Diffusion Plant. These revisions include the following changes:

- Revision 121 incorporates Technical Safety Requirements (TSR) changes that were previously submitted for your review in accordance with 10 CFR 76.45 and approved in your letter dated February 22, 2010 as Amendment 4 to Certificate of Compliance GDP-1. Revision 121 also includes changes to the Safety Analysis Report (SAR) that are associated with the TSR changes. Revision 121 is provided in Enclosure 2. Revision 121 was effective April 23, 2010.

- Revision 122 incorporates TSR changes that were previously submitted for your review in accordance with 10 CFR 76.45 and approved in your letter dated April 14, 2010 as Amendment 5 to Certificate of Compliance GDP-1. Revision 122 also includes changes to the SAR that are associated with the TSR changes. Revision 122 is provided in Enclosure 3. Revision 122 was effective June 14, 2009.

Revision bars are provided in the right-hand margin to identify changes.

USEC Inc.
6903 Rockledge Drive, Bethesda, MD 20817-1818
Telephone 301-564-3200 Fax 301-564-3205 www.usec.com

NMSS01

Should you have any questions regarding this matter, please contact me at 301-564-3250. There are no new commitments contained in this submittal.

Sincerely,

S. A. Toelle

Steven A. Toelle
Director, Regulatory Affairs

Enclosures:
1. Oath and Affirmation
2. USEC-01, Application for United States Nuclear Regulatory Commission Certification, Paducah Gaseous Diffusion Plant, Revision 121.
3. USEC-01, Application for United States Nuclear Regulatory Commission Certification, Paducah Gaseous Diffusion Plant, Revision 122

cc: R. DeVault (DOE) — USEC-01, Copy Number 641 (w/o)
D. Hartland, NRC Region II — USEC-01, Copy Numbers 442, 664
J. Henson, NRC Region II — USEC-01, 2 copies
T. Liu, NRC Project Manager — USEC-01, Copy Number 697
NRC Senior Resident Inspector – PGDP

Enclosure 1
GDP 10-0031

Oath and Affirmation

OATH AND AFFIRMATION

I, Steven A. Toelle, swear and affirm that I am the Director, Regulatory Affairs, of the United States Enrichment Corporation (USEC), that I am authorized by USEC to sign and file with the Nuclear Regulatory Commission Revisions 121 and 122 to the USEC Application for United States Nuclear Regulatory Commission Certification for the Paducah Gaseous Diffusion Plant (USEC-01), as described in USEC Letter GDP 10-0031, that I am familiar with the contents thereof, and that the statements made and matters set forth therein are true and correct to the best of my knowledge, information, and belief.

S. A. Toelle

Steven A. Toelle

On this 28th day of July, 2010, the person signing above personally appeared before me, is known by me to be the person whose name is subscribed to within the instrument, and acknowledged that he executed the same for the purposes therein contained.

In witness hereof I hereunto set my hand and official seal.

ROXINE BEHRENS
Notary Public
Montgomery County
Maryland
My Commission Expires Sep 14, 2011

Roxine Behrens

Roxine Behrens, Notary Public
State of Maryland, Montgomery County
My commission expires September 14, 2011

Enclosure 2 to
GDP 10-0031

USEC-01
Application for the United States
Nuclear Regulatory Commission Certification
Paducah Gaseous Diffusion Plant
Revision 121 (April 23, 2010)

APPLICATION FOR NUCLEAR REGULATORY COMMISSION CERTIFICATION
PADUCAH GASEOUS DIFFUSION PLANT (USEC-01)
REMOVAL/INSERTION INSTRUCTIONS
REVISION 121 – April 23, 2010

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Section 3.7: 3.7-11 / 3.7-12	**Section 3.7:** 3.7-11 / 3.7-12
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3.2 UF_6 FEED FACILITIES

The feed vaporization systems at PGDP are located in the C-337-A Feed Vaporization Facility and the C-333-A Feed Vaporization Facility. Feed material for the PGDP diffusion cascade is manufactured from mined uranium, or partially depleted or enriched UF_6 withdrawn from gaseous diffusion plants.

3.2.1 Description

Feed material at PGDP is in cylinders that contain UF_6 in the solid state. In order to transfer this material to the diffusion cascade, the cylinder must be heated to transform the solid UF_6 to a gaseous state. The UF_6 gas flows from the cylinder through a connecting UF_6 cylinder pigtail to UF_6 feed headers that deliver the gaseous feed material to the appropriate assay points in the diffusion cascade. UF_6 cylinders can be vaporized in the feed facilities for direct withdrawal without enrichment and are handled the same as any other feed cylinder.

The types of activities that take place in the feed facilities are described below.

3.2.1.1 Preheating

Material is not introduced into the enrichment cascade unless assurance is obtained that it meets feed composition and weight specifications. An external inspection is performed on each cylinder to detect any physical damage that may be present. If serious damage is detected, the cylinder is not heated until corrective actions have been completed and verified by a certified inspector.

Feed cylinders are placed in containment-type autoclaves in C-337-A or in C-333-A. If the feed cylinder is a large cylinder (2 ½ ton or larger), the cylinder is placed horizontally in the autoclave with the cylinder valve at the twelve o'clock position. If the feed cylinder is a small cylinder (12B or smaller), the cylinder is placed vertically in the autoclave with the cylinder valve at the top. The cylinder valve is connected to a manifold with a UF_6 cylinder pigtail (see Section 3.2.4 for a discussion of UF_6 cylinder pigtail fabrication and testing). The cylinder valve and UF_6 cylinder pigtail are checked for clarity. If valve clarity is not established, the cylinder will not be heated and is removed from the autoclave. If the cylinder valve and pigtail pass the clarity check, the cylinder pressure is noted and recorded. An indicated pressure less than or equal to 10 psia indicates that the cylinder does not contain significant amounts of impurities and is acceptable for feed. A cylinder pressure of above 10 psia indicates noncondensibles or impurities in the cylinder. With supervisory approval, the cylinder can be cold burped in order to lower the pressure to below 10 psia.

Fill limits for UF_6 cylinders are established to allow adequate room for UF_6 expansion upon heating. For cylinders other than tails cylinders, the limits are calculated based on 250° F maximum UF_6 temperature, certified minimum internal volume for the cylinder model and a minimum cylinder ullage of 5%. If it is discovered that a cylinder exceeds these fill limits, the TSRs may still allow heating the cylinder as long as the required 5% ullage is maintained. Cylinders are designated as Category A if calculations show that at least 5% ullage can be maintained during heating based on the actual cylinder volume (rather than the minimum volume for the cylinder model) and assuming a maximum UF_6 temperature of 235° F. Cylinders are designated as Category B if the required 5% ullage can be maintained based on the actual cylinder volume and a lower temperature value of 230° F assumed for maximum UF_6 temperature. For Category B cylinders, autoclave steam pressure is adjusted to ensure that the assumed maximum UF_6 temperature is not exceeded during cylinder heatup. For cylinders filled

with high purity tails, fill limits for in-plant tails storage and for Category A and B designations are calculated similarly to those described above except that fill limits for in-plant tails storage are based on 235° F maximum UF_6 temperature rather than 250° F and fill limits for heating as Category A or B are based on maintaining 3% ullage during heating rather than 5%. TSRs also allow heating of certain 48OM cylinders which do not have certified volumes, provided that the volume of the cylinder, based on measured dimensions, either exceeds the minimum volume of the cylinder type and the weight of material in the cylinder is less than 26,000 pounds, or the calculated volume with the actual weight of UF_6 in the cylinder meets minimum ullage requirements. Such a cylinder has been verified to contain greater than 7% ullage when heated to 235° F. The additional ullage is provided to compensate for the fact that the actual cylinder volume is based on measured dimensions rather than a certified volume.

Category C cylinders are damaged or overfilled cylinders, which are fed by either the controlled feeding or the cold feeding mode. For the controlled feeding mode, temperature and pressure controls (i.e., a maximum cylinder wall temperature of 142.9°F [61.6°C] and maximum cylinder pressure of 22 psia [152 kPa]) are used such that the UF_6 will remain below the UF_6 triple point even under credible accident conditions. Cylinders must pass the cold pressure check to be fed using the controlled feeding mode. In the cold feeding mode, cylinders are only subjected to the heat provided by the ambient temperature of the building atmosphere. No steam is applied during the cold feeding mode.

3.2.1.2 Heating

Autoclave temperature is controlled by using a cascade control scheme within a feedback loop controller. Information from the autoclave pressure and temperature instruments is used to control the temperature. The steam pressure is limited to a maximum of 8 psig, which corresponds to a saturated steam temperature of 235°F. The temperature may be adjusted to accommodate the type cylinder being heated but will never exceed 235°F. The pressure within a cylinder in an autoclave is an indication of the purity of the contained UF_6 and the rate of pressure increase indicates the clarity of the cylinder valve or UF_6 cylinder pigtail connection. A timed start-up system provides the warning mechanism to protect against a plugged valve or UF_6 cylinder pigtail. If the cylinder pressure fails to reach a set pressure within a specified time frame, the steam supply isolation valves and the thermovent line block valve are closed and alarms are sounded. Cylinders that have been heated and have had the cycle interrupted must be allowed to cool a minimum of three days for a 12B or 2½-ton cylinder or five days for a 10-ton or 14-ton cylinder prior to movement to ensure solidification of the UF_6.

The amount of standing water in the autoclave would be quite high during the initial moments of heating a cylinder since the autoclave control scheme calls for an autoclave temperature of 220°F with a maximum pressure of 4 psig. The thermal inertia of the cold cylinder causes condensate to form on the surface of the cylinder (rarely to the extent that the Water Inventory Control System is actuated, however). At this stage of heating, the actual water inventory is of little, if any, safety concern since the cylinder's contents are at well below atmospheric pressure.

As the cylinder warms, its pressure increases, but the level of standing condensate decreases accordingly since the cylinder no longer requires as much energy input, and thus a lower steam demand is required. At the time when water level is of its highest safety concern (cylinder contents liquefied, mobile and pressurized), the water level is actually at its lowest since the only steam demand necessary is to make up for ambient heat losses.

Table 3.7-1. UF_6 Cylinders

Cylinder Size	Model No.	Cylinder Nos. or Type	Min. Volume (ft^3)
2-1/2 ton	30A	Concave Hd.	25.65[a]
10-ton thick (P)	48A	1-1,000	108.9[a]
10-ton thick (P)	48X	All	108.9[b]
10-ton thick (P)	48A	3,001-3,365	108.9[a]
10-ton thin (T)	48B(T)	5,001-9,230	107.2[a]
14-ton thick (OH)	48F	9,501-9,530	140.0[a]
14-ton thick (OHI)	48F	9,601-9,660	140.0[a]
14-ton thick (Y)	48Y	All	142.7[b]
14-ton thin (O)	48O	10,000-16,601	135[a]
14-ton thin (OM)	48OM	16,602- 18,801 and 100,001-111,820	135[a]
14-ton thin (OM)	48OM	111,821-121,925	139.0[b]
14-ton thin (G)	48G	121,926-149,999 and 160,000 and up	139.0[b]
14-ton thin (Skirted)	48HX	150,001-151,000	140.0[b]
14-ton thin (Skirted)	48H	151,001- 154,144	140.0[b]
14-ton thin wall	48OM Allied	AC-1-AC-400	140.0[a]
2-1/2-ton convex head	30B	All	26.00[b]
2-kg	2S	All	0.026
1-1b	1S	All	0.0053
460-1b	12A	All	2.38
460-lb	12B	All	2.38

a. These volumes are approximate, based on drawing dimensions. Minimum dimensions based on field measurements are used for actual volume calculations if a cylinder is to be heated in accordance with specific TSR limiting conditions.

b. These volumes are certified by the vendor.

Table 3.7-2. USEC Leased UF_6 Cylinder Storage Yards

Yard Designation	Type of Cylinders Stored[a]	Design Capacity[b]
C-745-A	10-ton and 14-ton	4,191
C-745-B	10-ton and 14-ton	8,800
C-745-E	2.5-ton, 10-ton, and 14-ton	1,970
C-745-H	10-ton and 14-ton	750
C-745-Q	14-ton	5,275
C-745-R	10-ton and 14-ton	4,145
C-745-U	10-ton and 14 ton	3,408
C-745-V	14 ton	3,826

a. Major type of cylinders stored in each yard. Several different types may be found.
b. Number of cylinders in the design basis. Actual number may vary.
c. C-745-U yard is only used to store cylinders that do not contain special nuclear material of low strategic significance.

containment of UF_6 throughout the enrichment process including transport, sampling, feeding, filling cylinders with product or tails UF_6 and preventing a release of liquid UF_6.

3.15.6.1.2 Functional Requirements

UF_6 cylinders shall be designed to meet ANSI N14.1 to ensure the capability to accomplish the required safety function.

3.15.6.1.3 System Evaluation

This system is required to minimize the potential for a release of UF_6 to the atmosphere. The safety function is accomplished by retaining its pressure retention boundary during normal operations and upset events, except those events that specifically address a breach of the UF_6 primary system (e.g., cylinder failure [see Section 4.3.2.2.15]).

The design requirements ensure that the cylinder can withstand the pressures/temperatures assumed in the accident analysis provided that the cylinder is filled within the shipping limits. Cylinders are inspected prior to heating and filling to ensure that there is no obvious damage, their weight is within established limits, and (for heating only) the pressures are $\leq$10 psia (69 kPa). Failure to meet any of these parameters could result in a failure of the cylinder integrity during normal heating or filling. A periodic hydrostatic pressure test is also required to allow filling to ensure that the integrity of the cylinder design is maintained. Cylinders manufactured prior to institution of the ANSI N14.1 standard may not meet the design requirements; specifically these cylinders lack a certified volume (water weight). These cylinders are typically designated only for storage of solid UF_6 and may not be heated in a closed autoclave. Certain serial numbers without certified volumes can be safely heated provided the limiting conditions specified in the Technical Specification Requirements are met. The autoclave provides protection should a breach in the cylinder occur during heating. Prior to being refilled, they must have their free volumes verified and be hydrostatically tested. Based on these requirements, the cylinders can accomplish the required safety function.

3.15.6.1.4 System Classification

The UF_6 cylinders are required to perform the following safety functions:

- Prevent a release of UF_6 to the atmosphere during normal operations; and
- Prevent a release of UF_6 to the atmosphere during upset events that do not include a failure of the cylinder.

The following factors were used in determining the system classification of the various UF_6 cylinders in use at the facilities:

- Cylinders approved (i.e., sized) for filling to greater than 500 lb (227 kg) of UF_6 are conservatively assumed to contain a sufficient amount of liquid UF_6 to exceed the off-site EGs for the EBE frequency category if a release were to occur. [A threshold analysis indicated that, in all cases, it takes more than 500 lb (227 kg) to exceed the 30-mg U dose at the site boundary (all cases that exceeded this dose were greater than 1000 lb [454 kg] of UF_6).]

- Cylinders that are not approved (i.e., sized) for holding greater than 500 lb (227 kg) of UF_6 do not have the capacity to contain sufficient material to result in significant off-site health effects.
- Cylinders capable of holding greater than 500 lb (227 kg) of UF_6 but not approved for filling may contain only solid UF_6 unless they are being heated in a closed autoclave.
- Cylinders containing only gaseous/solid UF_6, regardless of size, have the potential to exceed only the on-site EGs if the cylinder does not maintain its integrity.

Therefore, cylinders capable of holding more than 500 lb (227 kg) of UF_6 are classified as Q. Smaller cylinders (capable of holding no more than 500 lb [227 kg] of UF_6) are classified as AQ.

3.15.6.1.5 Boundary

The Q and AQ boundaries for the UF_6 cylinders are defined in Tables 3.15-1 and 3.15-2, respectively.

3.15.6.2 UF6 Cylinder Handling Cranes

The UF_6 cylinder handling cranes consist of those cranes and associated lifting fixtures in the feed, withdrawal, and the toll transfer and sampling facilities that are used to lift UF_6 cylinders. Facility-specific differences are noted where appropriate.

3.15.6.2.1 Safety Function

The UF_6 cylinder handling cranes in withdrawal facilities and the toll transfer and sampling facility are designed for the safe movement of liquid-filled UF_6 cylinders. Therefore, the required safety function of the UF_6 cylinder handling cranes in the withdrawal facilities and the toll transfer and sampling facility is not to fail in a manner that would cause a UF_6 primary system failure (i.e., a dropped liquid-filled cylinder).

The UF_6 cylinder handling cranes in the feed facilities provide for the safe movement of solid-filled UF_6 cylinders or other related loads over autoclaves that could contain liquid-filled UF_6 cylinders and over other feed facility process equipment. No feed facility UF_6 cylinder handling crane shall be allowed to lift liquid UF_6 cylinders at this time. Therefore, the required safety function for feed facility cranes is to not fail in a manner that would cause a UF_6 primary system integrity failure (i.e., rupture a cylinder in the autoclave).

3.15.6.2.2 Functional Requirements

The liquid UF_6 cylinder handling cranes shall be designed in accordance with the following functional requirements to ensure the capability to accomplish the required safety function:

- The cranes shall be designed to withstand the evaluation basis earthquake and not fail in a manner such that the load will be dropped.
- The cranes shall be designed to withstand the evaluation basis wind loading and not fail in a manner such that the load will be dropped.
- The cranes shall be designed for the loads they will handle during operation of these facilities.
- The UF_6 cylinder handling cranes shall be designed so that when controls are released the cranes automatically stop except for small compensatory movements associated with activation of the mechanical braking mechanisms (e.g., evacuation of building).

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SECTION 1.0 USE AND APPLICATION

1.2.5 Cylinder Categories - Cylinders are categorized as follows:

Category	UF_6 Cylinder Requirements
A	Cylinders with certified volumes containing less UF_6 than the maximum fill limit for shipment or less UF_6 than the maximum fill limit for in-plant tails storage (if filled with high purity tails), or cylinders, which if heated to 235°F would have void volumes ≥5% or void volumes ≥3% if filled with high purity tails, according to TSR 2.1.4.6 or 2.2.4.4 or cylinders without certified volumes, but with measured and calculated volumes, containing a quantity of UF_6 which, if heated to 235°F would have void volumes ≥7% according to TSR 2.1.4.7 or 2.2.4.5.
B	Cylinders with certified volumes filled beyond the Category A limits, which if heated to 230°F would have void volumes ≥5% or void volumes ≥3% if filled with high purity tails, according to TSR 2.1.4.6 or 2.2.4.4.
C	Damaged cylinders or cylinders filled beyond the limits of Categories A or B.

1.2.6 Design Features (DF) - Those design attributes of structures, systems, and components that passively prevent or mitigate the consequences of radiological accidents that could cause significant consequences.

1.2.7 Fire Patrol - Required to perform monitoring of an area for fire due to a fire suppression or detection system being impaired/inoperable. This monitoring shall be performed at regular intervals not to exceed the interval specified in the facility-specific TSR. The person performing the fire patrol must be instructed on the following:
(1) specifically what system is inoperable and the area to be patrolled, (2) actions to take upon discovering a fire, and (3) procedures for reporting a fire.

1.2.8 Functional Test - The injection of a simulated or actual signal into the channel as close to the sensor as practicable to verify Operability, including required alarms, interlocks, trip functions, and channel failure trips. The Functional Test may be performed by any series of sequential, overlapping, or total channel steps such that the entire channel is tested.

1.2.9 Immediately - Required action shall be pursued without delay and in a controlled manner.

1.2.10 Limiting Conditions for Operation (LCO) - The lowest functional capability or performance levels of structures, systems, components and their support systems required for normal safe operation of the plant.

1.2.11 Limiting Control Setting (LCS) - Settings for automatic alarm or protective devices related to those variables having significant safety functions.

SECTION 2.1 SPECIFIC TSRs FOR TOLL TRANSFER AND SAMPLING FACILITY (C-360)

2.1.4 GENERAL LIMITING CONDITIONS FOR OPERATION

2.1.4.6 CYLINDER HEATING - CYLINDER ACCOUNTABILITY WEIGHT

LCO 2.1.4.6: Except as allowed by TSR 2.1.4.7, cylinder accountability (net) weight shall be verified to be less than or equal to the "Max. Fill Limit for Shipment" for cylinders other than tails cylinders and "Max. Fill Limit for In-Plant Tails Storage" for tails cylinders stated in TSR Section 2.1, Appendix A prior to heating the cylinder.

APPLICABILITY: Modes: 5

ACTIONS:

Table Withheld Under 10 CFR 2.390

SECTION 2.1 SPECIFIC TSRs FOR TOLL TRANSFER AND SAMPLING FACILITY (C-360)

2.1.4 GENERAL LIMITING CONDITIONS FOR OPERATION

2.1.4.6 CYLINDER HEATING - CYLINDER ACCOUNTABILITY WEIGHT (continued)

SURVEILLANCE REQUIREMENTS:

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BASIS:

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SECTION 2.1 SPECIFIC TSRs FOR TOLL TRANSFER AND SAMPLING FACILITY (C-360)

2.1.4 GENERAL LIMITING CONDITIONS FOR OPERATION

2.1.4.6 CYLINDER HEATING - CYLINDER ACCOUNTABILITY WEIGHT (continued)

BASIS (continued):

Text Withheld Under 10 CFR 2.390

SECTION 2.1 SPECIFIC TSRs FOR TOLL TRANSFER AND SAMPLING FACILITY (C-360)

2.1.4 GENERAL LIMITING CONDITIONS FOR OPERATION

2.1.4.7 CYLINDER HEATING - HEATING LIMITATIONS FOR CERTAIN CYLINDERS WITHOUT CERTIFIED VOLUMES

LCO 2.1.4.7: Heating of the cylinders listed in the table below shall be governed by the limiting conditions specified in the table.

Table Withheld Under 10 CFR 2.390

SECTION 2.1 SPECIFIC TSRs FOR TOLL TRANSFER AND SAMPLING FACILITY (C-360)

2.1.4 GENERAL LIMITING CONDITIONS FOR OPERATION

APPLICABILITY: Modes: 5

ACTIONS:

Table Withheld Under 10 CFR 2.390

SURVEILLANCE REQUIREMENTS: None.

BASIS:

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SECTION 2.1 SPECIFIC TSRs FOR TOLL TRANSFER AND SAMPLING FACILITY (C-360)

2.1.4 GENERAL LIMITING CONDITIONS FOR OPERATION

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SECTION 2.1 SPECIFIC TSRs FOR TOLL TRANSFER AND SAMPLING FACILITY (C-360)

TSR 2.1 Appendix A
Maximum weight limits for UF_6 cylinders.

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SECTION 2.2 SPECIFIC TSRs FOR UF_6 FEED FACILITIES (C-333-A AND C-337-A)

2.2.4 GENERAL LIMITING CONDITIONS FOR OPERATION

2.2.4.4 CYLINDER HEATING - CYLINDER ACCOUNTABILITY WEIGHT

LCO 2.2.4.4: Except as allowed by TSR 2.2.4.5, cylinder accountability (net) weight shall be verified less than or equal to the "Max. Fill Limit for Shipment" for cylinders other than tails cylinders and "Max. Fill Limit for In-Plant Tails Storage" for tails cylinders stated in TSR Section 2.2, Appendix A prior to heating the cylinder.

APPLICABILITY: Modes: 5

ACTIONS:

Table Withheld Under 10 CFR 2.390

SECTION 2.2 SPECIFIC TSRs FOR UF_6 FEED FACILITIES (C-333-A AND C-337-A)

2.2.4 GENERAL LIMITING CONDITIONS FOR OPERATION

2.2.4.4 CYLINDER HEATING - CYLINDER ACCOUNTABILITY WEIGHT (continued)

SURVEILLANCE REQUIREMENTS:

Table Withheld Under 10 CFR 2.390

BASIS:

Text Withheld Under 10 CFR 2.390

SECTION 2.2 SPECIFIC TSRs FOR UF_6 FEED FACILITIES (C-333-A AND C-337-A)

2.2.4 GENERAL LIMITING CONDITIONS FOR OPERATION

2.2.4.5 CYLINDER HEATING - HEATING LIMITATIONS FOR CERTAIN CYLINDERS WITHOUT CERTIFIED VOLUMES

LCO 2.2.4.5: Heating of the cylinders listed in the table below shall be governed by the limiting conditions specified in the table.

Table Withheld Under 10 CFR 2.390

SECTION 2.2 SPECIFIC TSRs FOR UF_6 FEED FACILITIES (C-333-A AND C-337-A)

2.2.4 GENERAL LIMITING CONDITIONS FOR OPERATION

APPLICABILITY: Modes: 5

ACTIONS:

Table Withheld Under 10 CFR 2.390

SURVEILLANCE REQUIREMENTS: None.

BASIS:

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SECTION 2.2 SPECIFIC TSRs FOR UF_6 FEED FACILITIES (C-333-A AND C-337-A)

2.2.4 GENERAL LIMITING CONDITIONS FOR OPERATION

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SECTION 2.2 SPECIFIC TSRs FOR UF_6 FEED FACILITIES (C-333-A AND C-337-A)

TSR 2.2 Appendix A
Maximum weight limits for UF_6 cylinders.

Table Withheld Under 10 CFR 2.390

SECTION 2.3 SPECIFIC TSRs FOR PRODUCT AND TAILS WITHDRAWAL FACILITIES

TSR 2.3 Appendix A
Maximum weight limits for UF_6 cylinders.

Table Withheld Under 10 CFR 2.390

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GDP 10-0031

USEC-01
Application for the United States
Nuclear Regulatory Commission Certification
Paducah Gaseous Diffusion Plant
Revision 122 (June 14, 2010)

APPLICATION FOR NUCLEAR REGULATORY COMMISSION CERTIFICATION
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REMOVAL/INSERTION INSTRUCTIONS
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2.0 American Society of Mechanical Engineers (ASME)

2.1 ASME NQA-1, Quality Assurance Program Requirements for Nuclear Facilities, 1989 Edition

PGDP satisfies the requirements of this standard, including Basic and Supplementary Requirements, with exceptions and clarifications identified in the Quality Assurance Program Description. See also SAR Sections 6.6.13, 6.8.1, and 6.8.2 and Section 7.5 of the Emergency Plan.

2.2 ASME Boiler and Pressure Vessel Code, 1995 Edition

PGDP satisfies the following sections of this code as clarified below:

Section VIII - PGDP satisfies the requirements of Section VIII for the edition in effect at the time of fabrication of the following pressure components and systems: freezer/sublimer, condenser/reboiler, accumulator, autoclave, cell coolant condenser, nitrogen system (relief devices only), air system and dryer, cell coolant pressure relief, CAAS air accumulators, and UF_6 cylinders except that UF_6 cylinders do not have pressure relief devices.

Section IX - PGDP satisfies the requirements of Section IX for the components identified above for Section VIII.

For references to this code, see SAR Sections 3.2.3, 3.2.5.5, 3.3.4.4.1, 3.6.3, 3.6.7.5, and 3.7.1.

3.0 National Fire Protection Association (NFPA)

3.1 NFPA 10, Portable Fire Extinguishers, 1990 Edition

As described in SAR Section 5.4.3, the requirements of this standard were used as guidance only in determining the size, selection, and distribution of portable fire extinguishers. PGDP will satisfy the requirements of this standard for modifications to the plant except as documented and justified by the Authority Having Jurisdiction (AHJ).

For references to this standard, see SAR Sections 5.4.1 and 5.4.3.

3.2 NFPA 13, Sprinkler Systems, 1989 Edition

As described in SAR Section 5.4.1.1, the process buildings meet the definition of Ordinary Hazard Occupancies (Group 2) as stated in this standard and the fire protection system exceeds the required sprinkler discharge density for this type of occupancy. PGDP will satisfy the requirements of this standard for modifications to the plant except as documented and justified by the AHJ.

For references to this standard, see SAR Sections 3.3.5.12, 3.15, 5.4.1, and 5.4.1.1.

3.3 NFPA 15, Water Spray Systems, 1990 Edition

PGDP will satisfy the requirements of this standard for modifications to the plant except as documented and justified by the AHJ.

For references to this standard, see SAR Section 5.4.1.

3.4 NFPA 24, Private Fire Service Mains, 1992 Edition

PGDP will satisfy the requirements of this standard for modifications to the plant except as documented and justified by the AHJ.

For references to this standard, see SAR Section 5.4.1.

3.5 NFPA 25, Inspection, Testing and Maintenance of Water-Based Fire Protection Systems, 1995 Edition

The 90-second response time criteria for the receipt of a sprinkler system flow alarm is consistent with the requirements of this standard. For references to this standard, see SAR Section 5.4.2.

3.6 NFPA 30, Flammable Liquids, 1990 Edition

As described in SAR Section 5.4.1.1, the requirements of this standard are used as guidance only for procedures used to handle flammable liquids. PGDP will satisfy the requirements of this standard for modifications to the plant except as documented and justified by the AHJ.

For references to this standard and year, see SAR Sections 5.4.1 and 5.4.1.1.

3.7 NFPA 72, National Fire Alarm Code, 1996 Edition

The 90-second response time criteria for the receipt of a sprinkler system flow alarm is consistent with the requirements of this standard. For references to this standard, see SAR Section 5.4.2.

3.8 NFPA 101, Life Safety Code, 1991 Edition

PGDP uses the requirements of this standard as guidance only for the review of emergency egress paths.

For references to this standard, see SAR Section 5.4.1.2.

3.9 NFPA 232 (and 232 AM), Standard for the Protection of Records, 1986 Edition

As described in SAR Section 6.10.1.8, there are several acceptable methods for the storage of permanent records. If the NFPA 232 (or 232 AM) method of storage in 2-hour-rated containers is used, any exceptions to this standard will be documented and justified by the AHJ.

Outside of the process buildings there are three areas where liquid UF_6 is routinely handled. These are C-333A, C-337A, and C-360. In each of these buildings cylinders are heated by steam in enclosed autoclaves to liquify UF_6. The autoclaves have some hydraulic controls, but the hydraulic fluid has a flashpoint of greater than 400°F. Combustible loading in these noncombustible buildings is low and the buildings are sprinklered. Other fire hazards are limited to typical industrial equipment.

There are no significant quantities of flammable liquids used in the process. The incidental use of these liquids are primarily for maintenance and support activities and they are handled using procedures that are based on the guidance of NFPA 30.

Hot work operations are normal in the maintenance activities associated with the operation of the process. These operations are covered with a permit system. This includes pre-job inspection, fire watch standby during hotwork, and post-job fire watch to prevent delayed ignition of any combustibles. Fire watches receive training and hands-on fire extinguisher practice.

The cable tunnels connect the switch houses, process buildings, and central control facility. The tunnels at PGDP were evaluated in September, 1966 and again in May, 1970 and were determined to be low risk installations, as described below. No major modifications and changes have occurred in these tunnels since the evaluations were performed. The tunnels are approximately seven feet wide and seven feet high and contain approximately 75 cables mainly for control and communications, though some 440 V AC and 250 V DC circuits do exist. All cables are insulated for 600 volts except for communications cables that are located in a separate low voltage tray. All cables have neoprene or PVC jackets which are considered flame retardant. The vast majority of the cables carry negligible currents and do not produce measurable heat. There are very few cable splices.

Cell control functions are located in the ACR, the LCC and the CCF and are redundant. Therefore, the effect of a loss of cables due to a fire in a cable tunnel would be at most an operational inconvenience. All circuits are protected by fuses or circuit breakers where concern exists for short circuits. All materials of construction used in the tunnels are noncombustible including twelve (six on each side) solid transite cable trays on about one foot spacing. These trays have been maintained clean and free of debris and/or combustibles. Transient combustible loadings are small and limited in magnitude. The only reasonable source of ignition is electrical in origin and its probability is very small.

5.4.1.2 Hazard Evaluation

Fire hazards for major buildings are surveyed annually (listed in Section 5.4.1.1) by fire protection engineering staff and are documented in a building survey. The fire hazard evaluation activity consists of two major parts — the annual building survey and the Chapter 4 accident analysis. The survey is an inspection and analysis with a focus on fire protection. These surveys provide for a formal review and periodic evaluation of the occupancy and the fire protection of a given facility.

The building survey includes a review of the emergency egress paths for the facility. The review of the emergency egress paths is accomplished using the intent of NFPA 101, Life Safety Code as guidance. Process buildings do not comply with the travel distances due to the size of the building. A technical study has indicated that exit arrangements are adequate because of the low occupancy levels, large number of exits, large building volumes, and fixed fire protection in the buildings.

Completing a building survey consists of these elements:

- Identify building construction.
- Define fire areas.
- Evaluate fire cutoffs or barriers.
- Determine exposures to the structure or facility.
- Describe building function including occupancy classification.
- Assess ordinary building hazards such as ventilation and heating systems.
- Discuss processes including any special equipment or special operation.
- Assess special hazards, such as flammable liquid processes, high piled storage, and classified electrical installations.
- Review fire protection and installed detection equipment as well as special features of fire protection in the building.
- Develop a list of issues or recommendations for the facility manager regarding fire protection issues. These are tracked to resolution.
- Review emergency egress paths

Survey elements involving building design, construction, and operation are reviewed annually by the Fire Protection Engineering staff, but are not included in the survey report unless changes have occurred from the baseline survey.

Chapter 4 contains these elements:

- Accident analysis, including major fire scenarios.
- The effect of the fire protection system in controlling the fire scenarios.
- Toxic and radiological hazards from a release regardless of the initiator.

Hazard evaluations performed in this manner have served the site's fire protection program satisfactorily in the past by identifying issues and problems facilitating the continuation of a successful and safe fire protection program.

5.4.1.3 Pre-fire Planning

Pre-fire plans have been developed for major buildings (listed in Section 5.4.1.1). Each pre-fire plan indicates the locations of connections to sprinkler systems, sprinkler control valves, and fire hydrants. Special hazard areas are also identified. These plans are reviewed by Fire Services annually.

5.4.2 Fixed Fire Suppression and Fire Detection Systems

The plant fire alarm system monitors fire alarms in all important buildings and structures (a listing of these is maintained by Fire Services) and provides alarm indication to the C-300 Plant Control Facility, the C-200 Fire and Guard Building, and the C-303 Supervisory Control and Data Acquisition Building. The C-300 facility is manned by Operations personnel around the clock and is one of the fire alarm monitoring locations. If either the C-200 building or C-303 building is used in lieu of C-300, then that fire alarm panel will be continuously monitored, and have the capability to be in contact with the C-300 facility. These alarms include: waterflow alarms from the sprinkler systems; manual pull stations located throughout the site; and other special detection systems such as smoke, heat, and CO_2 discharge. Annual testing of a sprinkler system (see Section 5.4.4) includes the actuation of a water flow alarm by the sprinkler system alarm valve. This alarm valve will only initiate the alarm on sustained water flow due to a time delay. The time delay feature "filters" out flow pulses, which might be caused by short-lived pressure transients in the system, and thus only alarms on a valid water flow. The time delay settings meet the 90-second response criteria consistent with NFPA 25 and 72. All alarms can be received and acknowledged at the primary and both of the backup monitoring locations. This provides for prompt dispatch of emergency response

personnel, as necessary, to investigate and resolve the alarm condition. Alarms caused by non-fire conditions, such as spurious water flow alarms from pressure surges, are reviewed by Fire Services and identified for maintenance as needed. These are trended under the Assessment and Tracking Report system, but are not considered as reportable events as described in Section 6.9. (There is no process-related flammable gas or flammable vapor detection needed, and no alarms of this type are provided.)

Manual pull stations are located throughout the site. These pull stations initiate an alarm indication at the C-300, C-200, and C-303 buildings. Typically this alarm is not announced locally. The process buildings have evacuation alarms that are initiated from a central location.

Fixed automatic fire suppression systems provide the primary means for the detection, control, and suppression of fires at the plant. These systems, primarily sprinkler systems, are installed in most of the buildings on the plant site, including those building areas containing systems designated as Q as defined in Section 3.15. These fixed fire suppression systems are inspected, tested, and maintained on a regular basis (see Section 5.4.4).

A reliable water supply system with water storage, pumps, and underground piping is provided. This is a looped, gridded system to provide for minimum outage potential. Fire pumps and water supplies are separated to provide for maximum reliability. It would require multiple failures to render the fire water system inoperable. This system also has sectional valves to permit isolation in the event of a pipe break and split pumping capacities to provide greater reliability and redundancy.

Details of these systems are contained in Section 3.9.

Emergency response is provided by the on-site Fire Services and the Plant Emergency Squad. Fire alarms are not transmitted off-site to the area fire departments. The site Fire Services currently has mutual aid agreements with other fire departments in the county. These agreements are tested during periodic exercises held by Emergency Management.

5.4.3 Mobile and Portable Equipment

Mobile fire equipment is provided and maintained on-site to support firefighting activities and backup the fixed fire suppression systems. This equipment is manned by Fire Services personnel and includes a minimum of one 1,000-gpm pumper, one truck with HAZMAT, radiological, and rescue equipment, and one ambulance. This equipment is housed indoors and equipped with the necessary hose, nozzles, breathing apparatus, meters, detection equipment, rescue equipment, and other related equipment. Hose carts are also provided for the larger process buildings to facilitate manual fire suppression efforts.

Self-contained breathing apparatus (SCBA) is provided for use by trained personnel in connection with emergency activities including firefighting. Breathing air used in SCBAs meets a minimum quality of Grade D and is checked quarterly.

Portable fire extinguishers are available throughout the plant including the process areas. Primarily, the extinguishers in the process areas are Class ABC dry chemical type and Class BC CO_2 type. Size, spacing and specific type of extinguisher for placement is determined using NFPA 10, Standard for

Portable Fire Extinguishers as the guidance document. These extinguishers are inspected on a monthly basis. Extinguishers used in the balance of the plant consist primarily of dry chemical, CO_2, and pressurized water types.

5.4.4 Testing and Inspection

The inspection and testing of fire protection equipment is performed by or overseen by Operations or Fire Services personnel. The testing and inspection of equipment is completed in accordance with procedures which include test frequencies that have been developed by DOE-Oak Ridge over the past 40 years. The DOE-Oak Ridge program was based on NFPA inspection frequencies modified to the special situations at the site (such as controlled access, specially trained workforce, supervised systems, on-site Fire Services section and engineering staff, and extensive operating experience).

The major elements of the inspection program and their associated frequencies are:

- Every 3 years:

  Trip test the dry pipe sprinkler systems.
  Hydrostatically test fire hoses located/stored in process buildings (unless new hose which will be tested within 5 years of purchase)

- Annually:

  Flow test the fire pumps
  Flow test the wet pipe sprinkler systems
  Inspect and flush the fire hydrants
  Flow test at least one HPFWS hydrant adjacent to each process building to verify acceptable distribution pipe flow
  Test the manual fire alarms (pull stations)
  Test the sprinkler waterflow alarms
  Test supervisory alarm devices or ensure valve seals are installed for control valves in the required flow paths
  Test low air pressure alarms
  Flow test the pumper trucks
  Test SCBA
  Operate sprinkler systems control and sectionalizing valves
  Test special fire alarm indicators, such as heat and smoke detection systems
  Inspect major buildings to evaluate housekeeping, check fire emergency equipment and exit pathways.
  Hydrostatically test fire hoses on pumper trucks.
  Inspect and refold fire hoses located/stored in process buildings.
  Test fire alarm receipt and acknowledgment capability in the C-300, C-200, and C-303 buildings.
  Inspect exterior of fire water storage tank(s)

- Monthly:

  Start test the fire pumps
  Inspect the wet pipe sprinkler systems risers
  Inspect portable fire extinguishers.
  Verify diesel fuel supply to diesel fire pumps
  Verify fire water storage tank and water basin level
  Assure control and sectionalizing valves to required sprinklers are properly aligned

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SECTION 1.0 USE AND APPLICATION

1.2.5 Cylinder Categories - Cylinders are categorized as follows:

Category	UF_6 Cylinder Requirements
A	Cylinders with certified volumes containing less UF_6 than the maximum fill limit for shipment or less UF_6 than the maximum fill limit for in-plant tails storage (if filled with high purity tails), or cylinders, which if heated to 235°F would have void volumes ≥5% or void volumes ≥3% if filled with high purity tails, according to TSR 2.1.4.6 or 2.2.4.4 or cylinders without certified volumes, but with measured and calculated volumes, containing a quantity of UF_6 which, if heated to 235°F would have void volumes ≥7% according to TSR 2.1.4.7 or 2.2.4.5.
B	Cylinders with certified volumes filled beyond the Category A limits, which if heated to 230°F would have void volumes ≥5% or void volumes ≥3% if filled with high purity tails, according to TSR 2.1.4.6 or 2.2.4.4.
C	Damaged cylinders or cylinders filled beyond the limits of Categories A or B.

1.2.6 Design Features (DF) - Those design attributes of structures, systems, and components that passively prevent or mitigate the consequences of radiological accidents that could cause significant consequences.

1.2.7 Fire Patrol - Required to perform monitoring of an area for fire due to a fire suppression system being impaired/inoperable. This monitoring shall be performed at regular intervals not to exceed the interval specified in the facility-specific TSR. The person performing the fire patrol must be instructed on the following:
(1) specifically what system is inoperable and the area to be patrolled, (2) actions to take upon discovering a fire, and (3) procedures for reporting a fire.

1.2.8 Functional Test - The injection of a simulated or actual signal into the channel as close to the sensor as practicable to verify Operability, including required alarms, interlocks, trip functions, and channel failure trips. The Functional Test may be performed by any series of sequential, overlapping, or total channel steps such that the entire channel is tested.

1.2.9 Immediately - Required action shall be pursued without delay and in a controlled manner.

1.2.10 Limiting Conditions for Operation (LCO) - The lowest functional capability or performance levels of structures, systems, components and their support systems required for normal safe operation of the plant.

1.2.11 Limiting Control Setting (LCS) - Settings for automatic alarm or protective devices related to those variables having significant safety functions.

SECTION 2.3 SPECIFIC TSRs FOR PRODUCT AND TAILS WITHDRAWAL FACILITIES

2.3.4 GENERAL LIMITING CONDITIONS FOR OPERATION

2.3.4.8 FIRE PROTECTION SYSTEM - BUILDING SPRINKLER SYSTEM

LCO 2.3.4.8: The automatic fire suppression (sprinkler) systems in process buildings C-310 and C-315 (exclusions: the dry pipe sprinkler system in C-310 and the deluge system for the exterior transformer located adjacent to C-315) shall be operable.

APPLICABILITY: Modes: At all times.

ACTIONS:

Table Withheld Under 10 CFR 2.390

SECTION 2.3 SPECIFIC TSRs FOR PRODUCT AND TAILS WITHDRAWAL FACILITIES

2.3.4 GENERAL LIMITING CONDITIONS FOR OPERATION

2.3.4.8 FIRE PROTECTION SYSTEM - BUILDING SPRINKLER SYSTEM (continued)

SURVEILLANCE REQUIREMENTS:

Table Withheld Under 10 CFR 2.390

SECTION 2.3 SPECIFIC TSRs FOR PRODUCT AND TAILS WITHDRAWAL FACILITIES

2.3.4 GENERAL LIMITING CONDITIONS FOR OPERATION

2.3.4.8 FIRE PROTECTION SYSTEM - BUILDING SPRINKLER SYSTEM (continued)

BASIS:

Text Withheld Under 10 CFR 2.390

SECTION 2.4 SPECIFIC TSRS FOR ENRICHMENT CASCADE FACILITIES

2.4.4 GENERAL LIMITING CONDITIONS FOR OPERATION

2.4.4.5 FIRE PROTECTION SYSTEM - BUILDING SPRINKLER SYSTEM

LCO 2.4.4.5: The automatic fire suppression (sprinkler) systems in process buildings C-331, C-333, C-335 and C-337 (exclusions: the dry-pipe sprinkler systems in C-333-A and C-337-A) shall be operable.

APPLICABILITY: Modes: Cascade 1 through Cascade 3.

ACTIONS:

Table Withheld Under 10 CFR 2.390

SECTION 2.4 SPECIFIC TSRS FOR ENRICHMENT CASCADE FACILITIES

2.4.4 GENERAL LIMITING CONDITIONS FOR OPERATION

2.4.4.5 FIRE PROTECTION SYSTEM - BUILDING SPRINKLER SYSTEM (continued)

SURVEILLANCE REQUIREMENTS:

Table Withheld Under 10 CFR 2.390

BASIS:

Text Withheld Under 10 CFR 2.390

SECTION 2.4 SPECIFIC TSRS FOR ENRICHMENT CASCADE FACILITIES

2.4.4 GENERAL LIMITING CONDITIONS FOR OPERATION

2.4.4.5 FIRE PROTECTION SYSTEM - BUILDING SPRINKLER SYSTEM (continued)

BASIS (continued):

Text Withheld Under 10 CFR 2.390