



United States  
Enrichment Corporation  
**JAMES H. MILLER**  
VICE PRESIDENT, PRODUCTION

United States  
Enrichment Corporation

2 Democracy Center  
6903 Rockledge Drive  
Bethesda, MD 20817

Tel: (301) 564-3200  
Fax: (301) 564-3201

Dir: (301) 564-3309  
Fax: (301) 571-8279

June 13, 1997

Dr. Carl J. Paperiello  
Director, Office of Nuclear Material  
Safety and Safeguards  
Attention: Document Control Desk  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555-0001

SERIAL: GDP 97-0096

**Paducah Gaseous Diffusion Plant (PGDP)**

**Docket No. 70-7001**

**Certificate Amendment Request - Cascade Cell Trip Function Requirements**

Dear Dr. Paperiello:

The purpose of this letter is to provide a response to the NRC's request (TAC No. L32027) for additional information on the Certificate Amendment Request (CAR) dealing with cascade cell trip function requirements. This additional information request was provided to USEC in Reference 1 and identifies additional information required by NRC to allow final action to be taken on our request.

USEC's response to Issues 1, 3-8 of the NRC information request is provided in Enclosure 1 to this letter. The response to Issue 2 will be provided by June 23, 1997. Based on NRC comments provided in Reference 1, USEC has revised the proposed Technical Safety Requirement (TSR) for the Cascade Cell Trip Function. The revised TSR pages are provided as Enclosure 2 to this letter and are replacement pages for those pages previously provided in our Certificate Amendment Request which was submitted to NRC on April 14, 1997 (Reference 2). USEC has reviewed the Enclosure 1 (Detailed Description of Change) and Enclosure 3 (Significance Determination) which were previously transmitted in our April 14, 1997 Certificate Amendment Request (Reference 2) and has determined that the conclusions of these enclosures are still valid. As such, only the enclosed TSR replacement pages (TSR Pages 2.4-41, 2.4-42 and 2.4-43) are provided with this response.

9706230040 970613  
PDR ADOCK 07007001  
C PDR

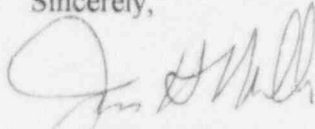
**NRC FILE CENTER COPY**

NF04

Dr. Carl J. Paperiello  
June 13, 1997  
GDP 97-0096 Page 2

This additional information should enable you to complete the review and approval of our Certificate Amendment Request. Any questions related to this subject should be directed to Mr. Mark Smith at (301) 564-3244. Commitments contained in this submittal are identified in Enclosure 3.

Sincerely,



James H. Miller  
Vice President, Production

Enclosures:     1.     Response to Additional Information Request (TAC No. L32003)  
                     2.     Technical Safety Requirement Pages  
                     3.     Commitments Contained in this Submittal

cc:                NRC Region III Office  
                     NRC Resident Inspector - PGDP  
                     NRC Resident Inspector - PORTS  
                     DOE Regulatory Oversight Manager

Dr. Carl J. Paperiello  
June 13, 1997  
GDP 97-0096 Page 3

References

- 1) NRC Letter from Merri Horn to Mr. James H. Miller, "Paducah Certificate Amendment Request - Cascade Cell Trip Function Requirements (TAC L32027)" dated May 23, 1997.
- 2) USEC Letter GDP 97-0047, Mr. James H. Miller to Dr. Carl J. Paperiello, "Paducah Gaseous Diffusion Plant (PGDP)-Docket No. 70-701-Certificate Amendment Request-Cascade Cell Trip Function Requirements" dated April 14, 1997.

**Response to Additional Information  
Request (TAC No. L32003)**

**Issue 1:**

Your letter indicates that the alternative method will be used to demonstrate operability for cells that were shutdown at transition. However, both enclosure 1 and the revised TSR exempt these cells and would allow startup without conducting the alternative test. Please clarify. If this is not your intent to test these cells prior to startup, explain why this is acceptable. Include an indication of the last time the cell was shutdown in a planned manner using the motor stop button or the motor breaker pistol grip.

**Response:**

The note for Surveillance Requirement 2.4.4.12-8 states "Performance of this surveillance is not required for cell restart following an unplanned cell shutdown or for any cell in operation prior to or on the effective date of this TSR until the next planned cell shutdown." The pertinent statement of Enclosure 1 reads, "The applicability of this SR is also revised to clearly specify that it does not apply for cell restart following an unplanned cell shutdown or for any cell in operation prior to the effective date of this TSR." The exemption to which you refer applies only to cells in operation at the time of transition, not to cells which were shutdown at the time of transition. It is USEC's intention to perform the cell trip test on any cell that was out of service at the time of transition.

**Issue 3:**

Include in enclosure 1 a discussion as to why the alternative test is equivalent.

**Response:**

The cell trip surveillance is designed to assure that the motor breaker trip for the cell will activate when the ACR motor stop button or the motor breaker pistol grip is depressed/rotated. When these devices are used with the cell in operation, the motor breaker opens and the motor is de-energized.

For '00' cells, the alternative test is performed as follows:

- (1) The process substation transformer secondary breaker that feeds the circuit supplying power to the motors is open.
- (2) The motor breakers are closed.
- (3) Actuating the motor stop button causes the motor breakers to open.

- (4) This verifies that the ACR trip circuit functions correctly.

For '000' cells, the alternative test is performed as follows:

- (1) The 15 kV Air Circuit Breaker (ACB) disconnects are open.
- (2) The process motor breakers are open.
- (3) The 15 kV ACB is closed.
- (4) Actuating the motor stop button causes the 15 kV ACB to open.
- (5) This verifies that the ACR trip circuit functions correctly.

Since the breakers that have been demonstrated to open during the equivalent functional test (step #3 above for '00' cells and step #4 above for '000' cells) feed the circuit supplying power to the motor, the motor would have been de-energized had it been operating. Therefore the two tests are equivalent since they demonstrate the same functionality (i.e., de-energizing the process motors.)

**Issue 4:**

Revise the TSR to incorporate the changes approved in Amendment 1.

Response:

The proposed TSR has been revised to incorporate the changes approved in Amendment 1.

**Issue 5:**

The definition of planned shutdown is unacceptable as written. The definition implies that any manual method for cell shutdown is acceptable as long as it is covered by a procedure. The TSR specifies a particular method for planned cell shutdowns. The definition should provide some indication of the purpose for the shutdown, such as for preventive maintenance, conduct of surveillances, or operational checks.

Response:

The definition of a planned cell shutdown is provided only to clarify the surveillance frequency language regarding when the test is to be performed. It is not intended to define which methods are, or are not, acceptable surveillance test methods. The proposed TSR Basis Statement states, "only the use of the ACR motor stop button (for the "00" or the "000" cells) or the motor breaker pistol grip at the local cell panel for C-310 cells or equivalent functional test prior to startup satisfies the

surveillance requirement." The definition is independent of the reason for the shutdown because any planned shutdown for any reason would require compliance with SR 2.4.4.12-8.

The definition does not allow the use of any manual method for cell shutdown as being acceptable to meet the surveillance if it is covered by a procedure, but simply states that any manual cell shutdown required by any operating procedure constitutes a planned shutdown (and therefore must be done in accordance with the surveillance requirements.)

Notice that the surveillance requirement does not say "perform a planned cell shutdown." It requires a "functional test." As stated in the TSR basis, "only the use of the ACR motor stop button (for the "00" or the "000" cells) or the motor breaker pistol grip at the local cell panel for C-310 cells or equivalent functional test prior to startup satisfies the surveillance requirement." The frequency (i.e., *when* the test must be performed) is specified to be "each planned cell shutdown." Any time an operating procedure requires a manual cell shutdown, the performance of the functional test is also required by this surveillance. The use of the operating procedures to ascertain when the surveillance is required can be objectively determined as opposed to some other criterion such as "while performing operational checks" which could be subject to various misunderstandings and lead to possible TSR violations. USEC believes that it is desirable to specify that, if the operational procedures require a manual shutdown, then the surveillance requirement is applicable.

Notice also that, for clarity, USEC has defined an unplanned cell shutdown in the basis statement. An unplanned cell shutdown is defined as "any automatic trip of the process motors." This further avoids the possibility of misunderstanding what constitutes a planned cell shutdown by defining explicitly what is not a planned cell shutdown.

#### **Issue 6:**

All planned shutdowns should be conducted using the motor stop button/motor breaker pistol grip. If for some reason (e.g., operator error or down at transition) the cell was shutdown using some other method, the alternative method for demonstrating operability would be acceptable. The TSR surveillance should be revised to reflect this situation.

Response:

USEC agrees that the proposed TSR was unclear on this point and a revision to the proposed TSR is provided in enclosure 2.

#### **Issue 7:**

While your discussion indicates that the safest course in the event of a complete building failure may be to return the cells to service in an expeditious manner, this position appears to be primarily related to operational vice safety needs. Cascade system cooling, UF<sub>6</sub> freeze out and deposition are



primarily operational problems. Also, it is not clear why an operability check for cell trip could not be conducted for unplanned shutdowns involving fewer cells. Your discussion only addressed a large number of cells (e.g., building power failure). Conduct of the alternative operability test prior to restart of cells shutdown in an unplanned manner could count toward the 5 year surveillance frequency so that a cell would not need to shutdown to meet the surveillance requirement. Expand your discussion to address the situation where only a few cells are shutdown in an unplanned manner. How frequently have unplanned shutdowns occurred that affected large number of cells?

Response:

The fact that the return of cells to service is an operational concern, does not negate the fact that there are safety considerations as well. The buildup of solids in the compressors adversely affects the balance of the equipment and increases the probability of metal to metal contact. The buildup of solids in the cascade equipment (in particular the compressors) is an initiating mechanism for the compressor deblade event (SAR 4.3.2.1.7). While a compressor deblade does not typically result in a  $UF_6$  release, a compressor deblade is an initiating event for the  $UF_6$  hot metal reaction event (SAR 4.3.2.5.5). This event could lead to a significant release of  $UF_6$ .

Similar safety concerns apply to the unplanned shutdown of fewer cells as well. The quantity of  $UF_6$  involved is sufficient, were it to freeze-out, to possibly result in a compressor deblade upon restart of the cell.

As noted in the response to issue #2 above, the purpose of the proposed change is to provide an acceptable method to start up cells that were shut down at the time of transition to NRC regulation and therefore can not meet the literal language of SR 2.4.4.12-8 since they were not shut down using the TSR-specified methods.

A summary of major power outages at PGDP is found in Table 4.1.1 of the PGDP Certification Application.

**Issue 8:**

Please provide the assumptions and bases for your assessment that only 0.1% of the battery capability was required to assure the trip system operability.

Response:

The information was based on an engineering calculation of maximum trip coil loading for a Unit of breakers. The calculation was based on the maximum number of cells that could be tripped per unit, a conservative value for tripping current, and conservative trip times. The trip coil loading was then compared to the battery load rating to conclude that the electrical current load demanded of the batteries for the cell trip function was less than 0.1% of the battery capacity.

**Technical Safety Requirement Pages**



## SECTION 2.4 SPECIFIC TSRS FOR ENRICHMENT CASCADE FACILITIES

### 2.4.4 GENERAL LIMITING CONDITIONS FOR OPERATION

#### 2.4.4.12 CASCADE CELL TRIP FUNCTION

**LCO 2.4.4.12** DC control power and air pressure for cell trip of UF<sub>6</sub> stage motors shall be operable.

**APPLICABILITY:** Modes: Cascade 1 and 2 when stage motors are energized.

#### ACTIONS:

Condition	Required Action	Completion Time
A. DC voltage < 210 volts	A.1 Notify Cascade Coordinator of potential need to utilize alternate means of cell shutdown. <u>AND</u> A.2 Restore DC voltage to $\geq$ 210 volts	Immediately  48 hours
B. Required action A. not satisfactorily accomplished.	B.1 Shutdown affected cascade cell(s). <u>AND</u> B.2 Verify cell isolation.	8 hours
C. Air header pressure feeding a group of "000" air circuit breakers is less than the minimum required to actuate those breakers.	C.1 Notify Cascade Coordinator of potential need to utilize alternate means of cell shutdown. <u>AND</u> C.2 Restore air pressure to greater than the minimum required breaker actuation pressure.	Immediately  48 hours
D. Required action C. not satisfactorily accomplished.	D.1 Shutdown affected cascade cell(s). <u>AND</u> D.2 Verify cell isolation.	8 hours
E. Individual battery (cell) parameters (other than voltage) for any connected cell are outside limits established in surveillance requirements.	E.1 Restore the individual battery (cell) parameters to within limits.  TSR 1.6.2.2(d) is not applicable.	90 days

## SECTION 2.4 SPECIFIC TSRS FOR ENRICHMENT CASCADE FACILITIES

### 2.4.4 GENERAL LIMITING CONDITIONS FOR OPERATION

#### 2.4.4.12 CASCADE CELL TRIP FUNCTION (continued)

##### SURVEILLANCE REQUIREMENTS:

Surveillance	Frequency
SR 2.4.4.12-1 Verify DC voltage $\geq$ 210 volts at the battery DC charger.	Daily
SR 2.4.4.12-2 Verify "000" air circuit breaker air header pressure is greater than the minimum required actuation pressure.	Daily
SR 2.4.4.12-3 Inspect battery terminals and racks for evidence of corrosion and for leakage of electrolyte.	Quarterly
SR 2.4.4.12-4 Check that the specific gravity of the pilot cell is $\geq$ 1.180 corrected to 77° F.	Quarterly
SR 2.4.4.12-5 Verify the battery charger output is $> 0$ DC amps	Quarterly
SR 2.4.4.12-6 Visually check the cell electrolyte levels to verify that the level is above the low level indication and no more than 0.25 inches above the high indication line.	Quarterly
SR 2.4.4.12-7 Check that the specific gravity of the cells is $\geq$ 1.180 corrected to 77° F.	Annually
-----NOTE-----	
1. Performance of this surveillance is not required for cell restart following an unplanned cell shutdown or for any cell in operation prior to or on the effective date of this TSR until the next planned cell shutdown.	Either at each planned cell shutdown or prior to restart after each planned cell shutdown.
2. All planned shutdowns should be accomplished using the motor stop button/motor breaker pistol grip. If for some reason (e.g., operator error or down at transition) the cell was shutdown using some other method, the alternative method for demonstrating operability, as defined in the TSR basis, is acceptable.	
SR 2.4.4.12-8 Perform functional test of the ACR "motor stop" button for "00" and "000" cells or of the motor breaker pistol grip at the local cell panel for C-310 cells.	
SR 2.4.4.12-9 Verify expected block valve closure and recycle valve opening for the planned cell isolation and initiate corrective actions for any unexpected valve operation.	Each planned cell isolation.

## SECTION 2.4 SPECIFIC TSRS FOR ENRICHMENT CASCADE FACILITIES

### 2.4.4 GENERAL LIMITING CONDITIONS FOR OPERATION

#### 2.4.4.12 CASCADE CELL TRIP FUNCTION (continued)

##### **BASIS:**

The accident analysis presented in SAR chapter 4 discusses numerous cascade cell-related scenarios (e.g., 4.3.2.1.2, 4.3.2.1.5, 4.3.2.1.6, 4.3.2.2.2, 4.3.2.3.2., and 4.3.2.4.1) in which operating personnel respond to certain process conditions and alarms by de-energizing the process motors ("tripping the cell"), thus bringing the cell below atmospheric pressure. In order to initiate a cell shutdown, the DC control and trip power circuit must be functional.

Two methods can be used to perform the functional test to demonstrate the reliability of the cell trip function. The first, for both the "00" and the "000" cell motors, is at the time of planned shutdown. Use of the ACR cell motor stop button at the time of planned cell shutdown demonstrates cell trip reliability. Note that Planned Cell Shutdown is defined as the process of manually de-energizing the process motors in accordance with approved procedures. However, only the use of the ACR motor stop button (for the "00" or the "000" cells) or the motor breaker pistol grip at the local cell panel for C-310 cells or equivalent functional test prior to startup satisfies the surveillance requirement. Unplanned Cell Shutdown is therefore any automatic trip of the process motors

The second method of testing depends upon the type of cell, "00" or "000", being tested.

The reliability of the cell trip function for "00" cell motors can also be demonstrated using the ACR "motor stop" button with the process substation transformer secondary breaker open and the motor breakers closed. Actuating the ACR push button will open the motor breakers thereby verifying the ACR trip circuit functions correctly.

The reliability of the cell trip function for "000" cell motors can also be demonstrated using the ACR "motor stop" button with the 15kV Air Circuit Breaker (ACB) disconnects open, process motor breakers open, and switch house 15kV ACB closed. Actuating the ACR push button will open the 15 kV ACB thereby verifying the cell trip function.

Planned cell shutdowns must be initiated at the local control panel for C-310 cells because an ACR trip button is not provided for C-310 cells.

The minimum air pressure required to trip the "000" breakers varies with the breaker type. The minimum required breaker actuation pressure for the "000" breaker groups and the bases for those values are identified in SAR Section 3.9.1.3.2.

The alternate means of cell shutdown referred to in required action A.1 are discussed in SAR Table 4.3-2 for the "00" cells and includes alternate means of shutdown from the ACR. For the "000" cells, alternate shutdown is manually accomplished from the switch house if DC power is unavailable; or, from either the switch house, relay house, or C-300, depending on the status of individual breaker air tank pressure.

**Commitments Contained in this Submittal**

1. A response to Issue 2 of NRC Request for Additional Information will be provided by June 23, 1997.