February 5, 1997

Mr. James H. Miller
Vice President, Production
U. S. Enrichment Corporation
2 Democracy Center
6903 Rockledge Drive
Bethesda, MD 20817

SUBJECT: CERTIFICATE AMENDMENT REQUEST - PORTSMOUTH GASEOUS DIFFUSION PLANT WITHDRAWAL STATIONS STANDBY OPERATIONAL MODE (TAC NO. L32006)

Dear Mr. Miller:

Enclosed is a copy of the Compliance Evaluation Report prepared to support the amendment of Certificate of Compliance GDP-2. A copy of the Notice of Amendment, which has been forwarded to the Office of the Federal Register for publication, is also enclosed. This notice provides the opportunity for the public to petition for review of the decision in accordance with 10 CFR Part 76, Subpart C. Final action on your amendment request will not be taken until after the time allowed for requesting review of the Director's Decision is over. If you have any questions regarding this action, I can be reached at (301) 415-8113.

Sincerely,

Original Signed By

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Yawar H. Faraz, Project Manager
Enrichment Section
Special Projects Branch
Division of Fuel Cycle Safety
and Safeguards, NMSS

Docket 70-7002
Certificate GDP-2

Enclosures: 1. Compliance Evaluation Report
2. Notice of Amendment

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

January 31, 1997

DOCKET: 70-7002

CERTIFICATE HOLDER: United States Enrichment Corporation
Portsmouth Gaseous Diffusion Plant
Portsmouth, Ohio

SUBJECT: COMPLIANCE EVALUATION REPORT: APPLICATION DATED NOVEMBER 8, 1996, WITHDRAWAL STATIONS STANDBY OPERATIONAL MODE

BACKGROUND

On November 8, 1996, United States Enrichment Corporation (USEC) submitted a request to revise the Portsmouth Gaseous Diffusion Plant (PORTS) Standby Operational Mode specified in Technical Safety Requirement (TSR) 2.5.1, Withdrawal Station Operational Modes. The amendment changes the TSR Standby Operational Mode definition for the UF_6 Withdrawal Stations by allowing the compression loop vent path to the cascade to be open. It should be noted that venting of the Withdrawal Station compression loop to the cascade is an authorized operational process at PORTS under the regulatory oversight of the Department of Energy. However, accounting for this procedure was inadvertently left out of the Standby Operational Mode definition by USEC from its proposed TSRs contained in the certification application which has been approved by the NRC.

The subject mode definition as described in the USEC certificate application TSR 2.5.1 states:

"IV Standby Withdrawal loop compressors shutdown or operating on recycle, withdrawal loop UF_6 supply suction valve open or closed, vent valve(s) closed. The withdrawal loop may still contain stored UF_6 but station pressure remains below atmospheric."

USEC has proposed to revise the mode definition to state:

"IV Standby Withdrawal loop compressors shutdown or operating on recycle, withdrawal loop UF_6 supply suction valve open or closed, vent valve(s) establishing a vent path from the compression loop to the cascade are open or closed. The withdrawal loop may still contain stored UF_6 but station pressure remains below atmospheric."

The NRC staff review included two separate information requests (RAI's) from Robert C. Pierson to James H. Miller dated November 29 and December 31, 1996. USEC's respective responses to these RAI's were from James H. Miller to Carl J. Paperiello dated December 13, 1996 and January 16, 1997.

DISCUSSION

Three permanently established facilities withdraw uranium in the form of UF_6 from the cascade. These are the Tails Withdrawal Facility located in the northeast corner of the X-330 Process Building; the Extended Range Product (ERP) Withdrawal Station located in the northeast corner of the X-326 Process Building; and the Low Assay Withdrawal (LAW) Station located in the west center of the X-333 Process Building. If the need arises, enriched or depleted UF_6 can be withdrawn at any one facility. For example, the Tails Withdrawal Facility may be used to withdraw enriched uranium (up to 5% assay). Figure 1 shows the UF_6 flow paths at ERP and LAW while Figure 2 shows the UF_6 flow paths at the Tails Withdrawal Facility.

UF_6 is withdrawn from the enrichment cascade into cylinders in liquid form at these three locations. To accomplish this, centrifugal withdrawal compressors (two in series within each compression loop) compress the gas stream to a pressure (30 to 35 psia) and temperature (high enough to maintain UF_6 in vapor phase) above the triple point and then condensers cool and condense the UF_6 vapor. The condenser is vented through a vent return line to the cascade to remove light gases from the top of the condenser and to serve as a control mechanism to regulate the condensing pressure. Accumulators are provided to accumulate liquid UF_6 while cylinder filling is interrupted. Unlike Figure 1 (ERP and LAW), Figure 2 (Tails) identifies the accumulator as the waste drum which is located in the liquid UF_6 portion between the condenser and the UF_6 withdrawal manifold. The compressors are located on the second floor of the process building. The accumulators, associated piping, UF_6 condensers, and valves are located on the mezzanine level between floors. Withdrawal stations (manifolds, cylinder scales and cylinder carts) are located on the ground floor of the process building. All equipment and piping leading from the cascade to the cylinder are "safe geometry" for the allowed enrichment assays.

Because of the very close assay tolerance required when filling a cylinder and the necessity to maintain accurate inventories of "in-process" UF_6, assay monitoring is required for each withdrawal. This is accomplished using a continuous mass-spectrometer. Periodic laboratory analysis is conducted to verify the accuracy of the mass-spectrometer. For the allowed enrichment levels, the withdrawal loop (first stage withdrawal compressor to the withdrawal manifold) is "safe geometry" which means that criticality is not possible even in the presence of a moderator.

Each compression loop at ERP and LAW has a 2-inch line installed from the discharge of the second stage compressor to the vent return header. A 2-inch air-operated valve is installed in this line for the purpose of "manually" or "automatically" relieving high pressure back to the cascade from the loop, when necessary. Only remote "manual" venting is provided for the compression loop at the Tails Withdrawal Facility where the

vent line is installed from the discharge of the first stage compressor to the vent return header. While the withdrawal loop is in a condition known as "station recycle," the vent path from the compression loop to the cascade may be opened to evacuate UF_6 from the compression loop. Under the current TSR Standby Operational mode definition, this compression loop evacuation scheme, which is a DOE authorized activity, would not be allowed, since it requires the vent valve(s) to be closed. Therefore, to continue routine UF_6 withdrawal operations at PORTS, USEC needs to have the Standby Operational Mode definition amended to allow the vent path from the compression loop to the cascade to be open or closed. It should be noted that this amendment does not involve three other vent pathways, i.e., from the condenser, accumulator, and the withdrawal manifold to the vent return header. These pathways will remain closed in the Standby Operational Mode.

Unconfinement of UF_6

The proposed change to TSR 2.5.1 permits evacuating UF_6 from the compression loop in the UF_6 withdrawal station to the cascade, which acts as a low pressure sink, in the Standby Operational Mode. This change will not result in significantly increasing the potential for unconfinement of UF_6 since it only involves venting of UF_6 from one portion of process piping which confines UF_6 in the Withdrawal Station to another portion of process piping which confines UF_6 in the enrichment cascade. In fact, venting the compression loop to the cascade may enhance safety by minimizing the potential for over pressurization of the UF_6 withdrawal loop with subsequent confinement rupture. Confinement of UF_6 within the cascade is primarily provided by maintaining the cell high-side (compressor discharge) gas pressure below 25 psia (TSR 2.2.3.13) and by appropriate quality assurance requirements to process gas piping and equipment (Safety Analysis Report Section 3.8.2.2). Confinement of UF_6 in the Withdrawal Station compression loop is primarily provided by maintaining UF_6 pressure below acceptable levels via the High Pressure Venting (HPV) system and by appropriate quality assurance requirements to process gas piping and equipment (Safety Analysis Report Sections 3.8.1.1.8, 3.8.1.2.8, 3.8.1.3.9, and 3.8.2.2). The HPV, which can be operated in automatic or manual mode at ERP and LAW and only in the manual mode at Tails, relieves to the cascade, any unusual pressure buildup in the Withdrawal Station compression loop.

To avoid enrichment losses, UF_6 is vented from the Withdrawal Station back to the A-suction of a compressor in the cascade that has UF_6 of similar enrichment. All A-suction pressures in lines that would receive the vented UF_6 are subatmospheric. Therefore any confinement failure would likely result in inleakage as opposed to outleakage. In addition, cascade units that would receive vented UF_6 would likely be comprised of relatively smaller sized equipment containing relatively smaller quantities of UF_6 since they would be located near the top and at the bottom of the cascade. Therefore, the proposed change will not result in a significant increase in the potential for UF_6 releases.

Occupational Radiation Exposure

Neither the cascade nor the withdrawal loops result in significant occupational radiation exposures. Some of the reasons are: (1) the occupancy factor is low, (2) distance from the source is generally high, (3) significant shielding is provided by piping and equipment, (4) depleted and low enriched uranium has low specific activities and are also comparatively low gamma radiation emitters, (5) most of the uranium is in gaseous form

(low density), and (6) UF_6 is confined within quality controlled equipment and piping. Therefore, any transfer of confined UF_6 from the withdrawal station to the cascade would not measurably modify individual or cumulative occupational radiation exposures.

Criticality

The staff determined that the only credible criticality accident that this TSR change may affect is the one caused by introducing a large quantity of moderator into an unsafe geometry portion of the cascade containing a large quantity of enriched solid uranium deposits. However, the staff has determined that the likelihood of an accidental criticality in the cascade due to wet-air (moderator) inleakage would not be increased significantly for the following reasons:

a. This amendment involves a valve that is internal to several valves even when the pigtail is not attached to the withdrawal manifold. These valves would be in the closed position. Therefore, several misvalving errors would be required to permit significant wet-air inleakage into the cascade through the compression loop vent valve.

b. To maintain the integrity of the UF_6 pressure boundary, USEC is committed to appropriate quality assurance requirements to process gas piping and equipment (including valves) with diameters of 2 inches or larger.

c. Formation of UO_2F_2 in the cascade due to significant inleakage of wet-air would result in compressor vibration and would reduce barrier permeability thus affecting cascade compressor performance which would be observed in the control rooms via motor load indications. Changes in compressor A-suction pressures would also be detected.

d. Introduction of wet-air into the cascade would be detected on the line recorders that continuously indicate nitrogen and oxygen concentrations.

Based on the primary reasons provided above, the staff has concluded that the proposed TSR change will not significantly raise the probability or consequences of a criticality accident.

Safeguards and Security

The staff has not identified any safeguards or security related implications from the proposed amendment.

ENVIRONMENTAL REVIEW

Issuance of the requested amendment to the Portsmouth Certificate of Compliance (GDP-2), to amend the Withdrawal Stations Standby Operational Mode definition, is subject to the categorical exclusion provided in 10 CFR 51.22(c)(19) and will not have a significant impact on the human environment. Therefore, in accordance with 10 CFR 51.22(b), neither an environmental assessment nor an environmental impact statement is required for the proposed action.

CONCLUSION

Based on the information provided in this CER, the NRC staff approves and grants this amendment. Region III staff have no objection to this proposed action.

Attachment:
1. Figure 1 ERP and LAW UF6 Flow Diagram
2. Figure 2 Tails Withdrawal UF6 Diagram

Principal Contributor(s)

Yawar Faraz

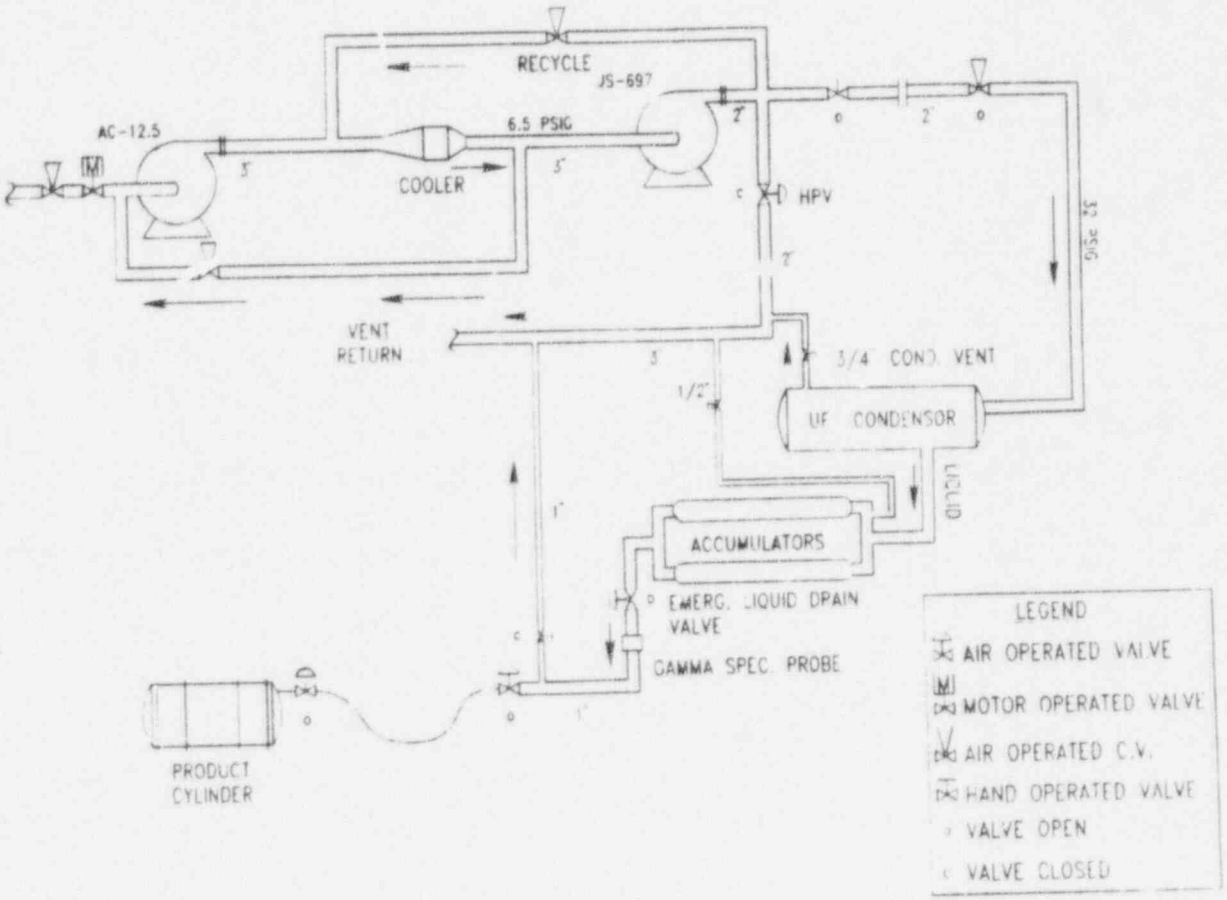

Figure 1 ERP and LAW UF_6 Flow Diagram

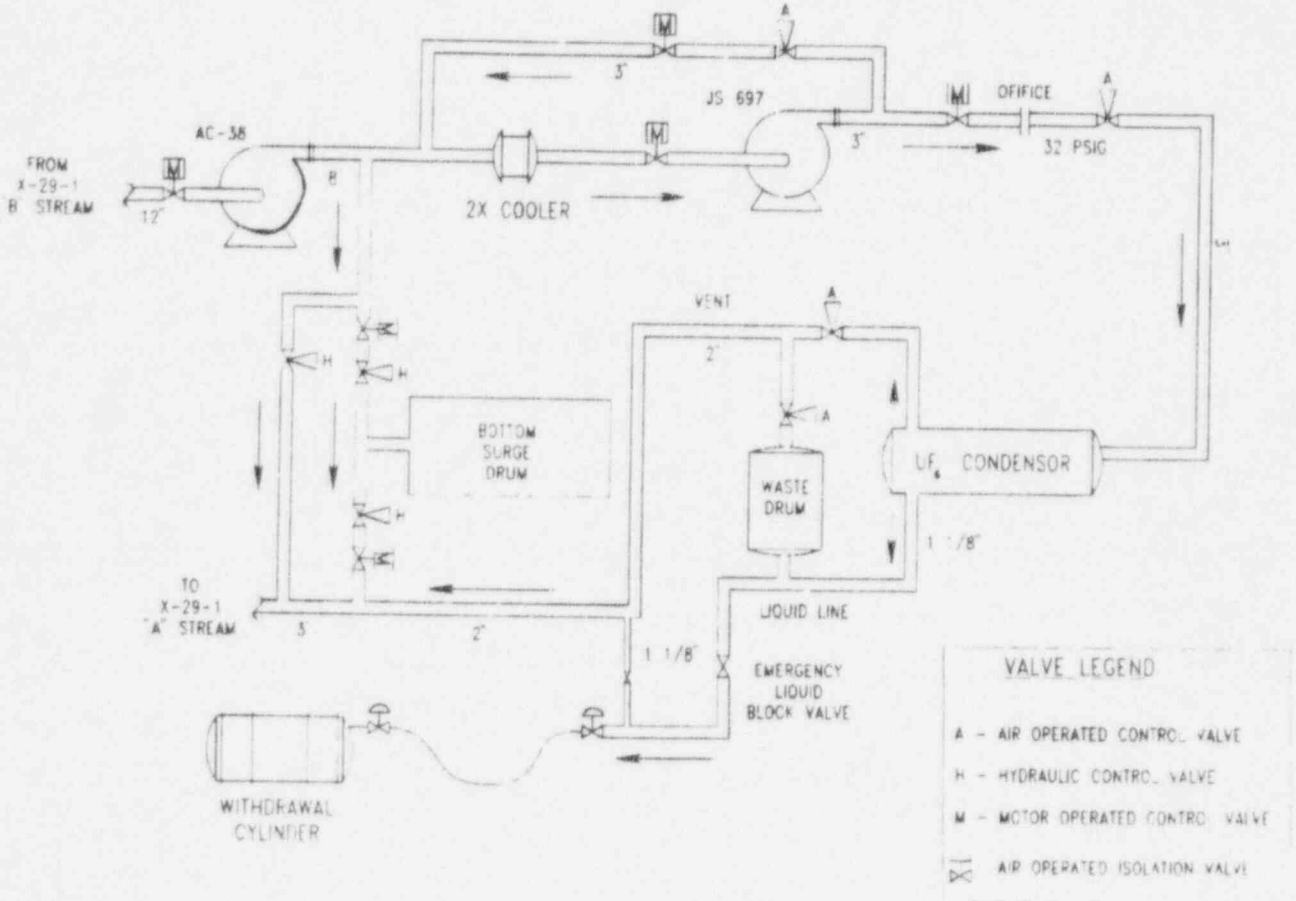

Figure 2 Tails Withdrawal UF_6 Flow Diagram