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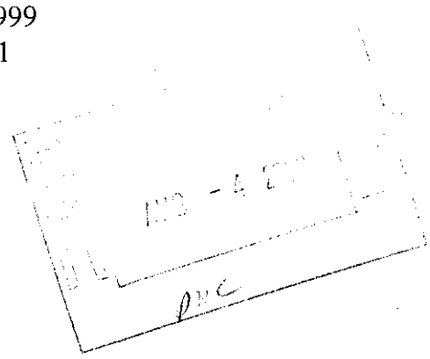
Department of Energy
Portsmouth Site Office
P.O. Box 700
Piketon, Ohio 45661-0700
Phone: 614-897-5010

April 28, 1999
UE-54-9401



Ms. Donna Goodman
Ohio Environmental Protection Agency
2195 Front Street
Logan, Ohio 43138

Dear Ms. Goodman:

DRAFT REVISION TO EXHIBIT B, OHIO ENVIRONMENTAL PROTECTION AGENCY'S (OEPA) DIRECTOR'S FINAL FINDINGS AND ORDERS (DFF&O) FOR LITHIUM AND DEPLETED URANIUM HEXAFLUORIDE (DUF_6)

Enclosed is a draft revision to Exhibit B of the Ohio EPA's DFF&Os which is provided for your review and approval. This revision incorporates numerous changes that are necessary to reflect proposed program changes and improvements since the DFF&Os were journalized on February 24, 1998, and includes the rationale for these changes. This revision also incorporates your recommendations from our February 9, 1999, meeting. The revision includes a strike-out version and a clean version for your records.

If you have any questions or comments, please contact Melda Rafferty of my staff at (740) 897-5521.

Sincerely,

Eugene W. Gillespie
Site Manager
Portsmouth Site Office

Enclosure

cc w/enclosure:
Administrative Records

cc w/o enclosure:
John Shoemaker, Bechtel Jacobs Company LLC-PORTS

Released for Public Review

EXHIBIT B

November 1, 1996

DEPLETED URANIUM HEXAFLUORIDE (DUF_6) MANAGEMENT PLAN

I. **DUF_6 Cylinder Surveillance Program.** The cylinder surveillance program consists of inspections, ultrasonic thickness testing and radiological surveys.

A. **Inspections**. The inspections shall be documented on a checklist which shall include the size, type, number, location, and physical description of all DUF_6 cylinder defect criteria. All accessible areas of all cylinders shall be visually inspected, using the following defect criteria whenever a cylinder is moved or being inspected for the first time. After a baseline inspection utilizing all the criteria below has been performed, the visual inspection to satisfy the quadrennial or annual inspection requirements can be reduced to the criteria marked with an asterisk (*). Double asterisked (**) items indicate that after restacking is completed, that criteria may not apply.

1. **DUF_6 Cylinder Defect Criteria**

a. **General Cylinder Criteria**

* Hole in cylinder
* Visible leakage/contamination on cylinder or ground
** Bulge - protruding one-half inch or more
** Gouge - greater than one-sixteenth inch of metal moved
** Dent - greater than one-sixteenth inch deep
** Bent stiffening ring - cracked weld or separation of ring from body
Severe corrosion - local or extensive pitting and/or scaling that is evident on one third or more of the bottom shell and scaling consisting of layered flakes over one-eighth inch thick and over two inches in diameter

b. **Cylinder Body Contact Point**

Body ground contact
Stiffening ring ground contact
Evidence of water/cylinder contact from poor yard drainage
**Dent caused by lifting lug contact - greater than one-sixteenth inch deep
Evidence of lifting lug contact
** Wood saddle/resting block - cracking, splitting, rotting or sinking
Concrete saddle - cracking, chipping, corrosion or sinking
Debris between saddle and cylinder

c. Valve End of Cylinder

*Evidence of contamination on valve.
** Bent valve body
Bent/separated skirt
Scale in skirt
Skirt in ground contact
Weep hole in skirt plugged
**Valve end not accessible
Packing nut missing/cracked
Port cap missing/cracked
Bent or sheared valve stems
Cracked bent valve protector
Identification (I.D.) plate missing
I.D. plate loose/cracked welds
New name plate attached to skirt/valve/plug

d. Plug End of Cylinder

*Evidence of contamination on plug
**Bent or damaged plug
Bent/separated skirt
Scale in skirt
Skirt in ground contact
Weep hole in skirt plugged
Plug end not accessible

2. Inspection Frequency

a. All DUF_6 cylinders in storage shall be visually inspected at least every four (4) years using the DUF_6 cylinder defect criteria in IA.

b. DUF_6 cylinders stored in areas that exhibit poor drainage conditions (i.e., standing water for a period of forty-eight (48) hours following heavy rainfall) and cylinders with severe corrosion of cylinder surfaces or skirt areas shall be visually inspected annually using the DUF_6 cylinder defect criteria.

c. Valves with evidence of leakage (i.e., buildup of DUF_6 reaction products, discoloration around valve/plug) shall be inspected monthly. This inspection consists of the following:

1) Ensuring the plastic bag is still in place;

2) Checking the bag for clarity or new buildup of DUF_6 reaction products on valve; and

3) Taking a swipe sample from the valve to determine if contamination (alpha, beta, gamma) levels exist.

Note: A swipe sample is where a cloth or wipe is smeared over an area, nominally 100 cm^2 in surface area, to pick up loose surface contamination from the surface of the cylinder. The wipe is then read by the appropriate instrument for contamination level, normally reading out in dpm/100 cm^2 (dpm = disintegrations per minute).

d. Breached DUF_6 cylinders shall be inspected daily until the situation is mitigated. Inspections shall consist of the following:

1) Ensuring that tarps are in place to prevent precipitation from coming in contact with the cylinder and a catch pan placed beneath the cylinder to prevent material from dropping to the pavement.

2) Ensuring that contamination boundaries and transition zones are in place.

Note: A contamination boundary is an area established using a yellow and magenta rope or tape at the perimeter of an area determined by survey to be where no contamination has spread. Transition zones are established for going to and from the contamination zone.

3) Determining Hydrogen Fluoride (HF) content in air.

Note: HF content in the air is determined by hand-held HF detectors using an HF detection tube or equivalent (such as Draeger Model 21/31) which are calibrated instruments to read out in concentration of HF.

4) Collecting DUF_6 reaction products for weighing (accountability).

5) Determining loose surface contamination levels of pad areas adjacent to the breach. See Section 2.C.3.

6) Determining radiation levels at the breach.

Note: Determining radiation levels at the breach shall be accomplished by utilizing calibrated radiation instruments to determine contact readings and general area radiation dose levels in mrem/hr.

e. All DUF_6 cylinders shall be visually inspected immediately before movement unless a pre-move inspection has already been conducted on this cylinder within the past year. The pre-move inspection shall consist of the following:

1) Lifting lug weld (if lug is to be used for lifting the cylinder) - examining for cracked weld, bent lug, elongated lug lifting hole

2) The cylinder in general - examining for deep cracks, gouges, and cuts in shell (ref. I. A.1.)

3) Areas immediately next to saddle contact points - examining for evidence of UF_6 reaction products or severe corrosion

4) Areas of previous lifting lug-to-cylinder contact points - examining for evidence of UF_6 reaction products

f. All UF_6 cylinders shall be visually inspected once it is lifted, unless a post-lift inspection has already been conducted within the past year. This visual inspection of the contact points and all previously inaccessible areas shall be conducted to determine and assess whether there is evidence of UF_6 reaction products, cracks, gouges, cuts, and/or severe corrosion.

g. All UF_6 cylinders shall be visually inspected using the UF_6 cylinder defect criteria (ref. I.A.) immediately after movement of the cylinder.

h. If any of the following defect conditions are noted during any inspections required by this UF_6 Management Plan, recognized industrial applications and practices shall be used to determine the nature and extent of the defect condition and the method of repair or dispositioning of the UF_6 cylinder. Code inspectors shall be used to evaluate the nature and extent of the defect condition. Depending on the condition of the UF_6 cylinder, the code inspectors and appropriate personnel (See V B) shall recommend repairing cracks in welds, patching thinned cylinder wall areas or cold transfer of the contents to a new cylinder prior to movement.

1) Cracks in welds

2) Presence of UF_6 reaction products.

Note: The presence of reaction products represents a potentially unsafe condition and the area must be evacuated immediately and the emergency procedures for a breached cylinder must be followed. (See Section V)

B. Ultrasonic Thickness Testing

1. A statistically based, randomly selected number of cylinders shall be inspected using UT measurement techniques to supplement the corrosion model. A sampling plan will identify where wall thicknesses are measured.

2. Ultrasonic thickness testing of 150 selected cylinders shall be conducted in place every third year, first in calendar year 2001, then 2004, then 2007, etc. Any cylinder measuring less than 180 mil in thickness shall be inspected using UT measurement techniques annually at the <180 mil location.

C. **Radiological Surveys**. A statistically based number of DUF_6 cylinders and the storage yards shall be radiologically surveyed. The scope and frequency of the survey are noted below:

1. A general area survey of the cylinder yards shall be done annually using an approved dose-rate instrument to ensure that no area of the yards exceeds 5 mr/hr.

   Note: A general area survey is accomplished by measuring the dose rate utilizing a calibrated radiation detector held waist high while walking at a steady pace through the cylinder lots recording the three highest radiation levels per row of cylinders and recording all radiation levels that meet or exceed radiation area posting requirements.

2. A statistically based swipe survey of the valve and plug areas for cylinders shall be done annually to determine levels of loose surface contamination (i.e., alpha, beta, and gamma). This survey will include all cylinders that have had contamination in the past plus the statistically identified cylinders.

   Note: See I.A.2.C.3 on page 3 for swipe description.

3. A swipe survey of valves/plugs suspected to be leaking shall be done when identified to determine levels of surface contamination (i.e., alpha, beta, and gamma).

4. A swipe survey of valves/plugs suspected to be leaking shall be done monthly to determine levels of surface contamination (i.e, alpha, beta, and gamma).

   Note: See I.A.2.c. for complete valve inspection description.

5. A general survey of any breached cylinder(s) and areas next to the breached cylinder(s) shall be done daily until the breach is mitigated to assess the level of radiation (i.e., dose in mr/hr).

   Note: See I.A.2.d.6. for more detailed description.

6. A swipe survey of any breached cylinder(s) shall be done daily until the breach is mitigated to determine the level of surface contamination (i.e., alpha, beta, gamma).

   Note: See I.A.2.d. for complete breach inspection description.

II. **DUF_6 Cylinder Maintenance Program:** Corrective maintenance of any defects identified during inspections that threaten the health, safety, and environment during storage of the cylinders will be mitigated. The following defects will be corrected during cylinder storage:

A. Leakage from the valve or plug.

B. Leakage from the body of the cylinder.

III. DUF_6 Cylinder Storage Yard Surveillance and Maintenance Program

A. The storage yards shall be monitored for DUF_6 releases using (1) annual radiological surveys of all yards and annual statistical surveys of cylinders, (2) monthly radiological surveys on valves/plugs suspected to be leaking, and (3) monthly surface water run-off samples for total uranium analysis at the established collection basin for X-745E Yard and depressions on the north, south, and southwest sides of the X-745C Yard. The analytical methods are in-house procedures for alpha, beta and total uranium. The alpha/beta procedure is the same as SW-846, method 9310 except for the calibration standards. The total uranium is an inductively Coupled Plasma/Mass Spectrometry (ICP/MS) procedure capable of detecting down to I ppb Uranium.

B. Soil samples of the surface water runoff areas of the pad shall be sampled if a breached cylinder is discovered. The analytical methods are in-house for alpha, beta and total uranium. The alpha/beta procedure is the same as noted above in A. The total uranium is a fluorometric analytical procedure. Soil sample results and any corrective actions shall be documented. Rate and extent of any contamination found shall be defined and remediated in a manner that controls, minimizes or eliminates to the extent necessary to protect human health and the environment, escape of hazardous decomposition products to the groundwater, surface water or the atmosphere, in accordance with established spill procedures. For a breached DUF_6 cylinder, these procedure shall include the following:

1. Soil showing visible contamination shall be excavated immediately.

2. A statistically valid sampling plan that considers the soil type, properties of the spilled material, area affected, volume of the spill and other factors shall be developed.

3. This sampling plan shall guide the confirmatory sampling and any additional excavation and remediation.

4. Background for soils shall be determined by samples taken in the immediate area adjacent to the release.

5. Excavation of any soil contamination is required as expeditiously as possible and shall continue until the sampling analyses show results less than the mean plus two sigma of the background.

6. Any soil excavated as required by this plan shall be containerized and evaluated according to OAC rule 3745-52-11.

7. Remediation of any ground or surface water contamination resulting from the spill shall be in accordance with the provisions of Section VII of the Ohio Consent Decree and applicable portions of the U.S. EPA Administrative Order of Consent.

8. If a DUF_6 cylinder breaches during the pendency of the Order, the provisions of this Section shall apply until all work required by this Section is completed.

C. Routine maintenance activities for the existing and new storage yards shall consist of: (1) identifying and controlling vegetation, (2) identifying and repairing water retention areas (See I.A.2.b), (3) identifying and replacing or repairing signage (i.e., radiological postings), (4) identifying and replacing damaged barricades, and (5) identifying and repairing defective lighting. Any discrepancies found shall be entered into the MSR system within ten (10) working days.

IV. Design and Construction of New Storage Yards

A. The new storage yards, at a minimum, shall be sloped and constructed of concrete in accordance with General Design Criteria, DOE Order 6430.1*a*. Concrete saddles shall be utilized for cylinder storage.

B. DUF_6 cylinders shall be stored by cylinder type (i.e., fourteen and ten ton). Fourteen and ten ton cylinders shall be stored with aisle spacing of about four feet. Cylinder center-to-center shall measure about sixty inches. Full cylinders shall be stacked no more than two high. See attached drawing.

V. Contingency Plan

A. In the event of an emergency involving the DUF_6 cylinder yards, the Portsmouth Emergency Plan response procedures shall apply and the following actions taken:

1. Evacuate the area immediately.

2. Notify supervision and the Plant Shift Superintendent (PSS) immediately.

B. Appropriate personnel such as code inspectors, health physicists and metallurgists shall be summoned to evaluate the breach after the area is determined by the incident commander to be safe to enter.

C. Notification shall be made to the Ohio EPA.

D. Breaches shall be evaluated on a case-by-case basis and corrective actions taken as appropriate.

VI. Records

A. Procedures and/or checklists shall be used to implement the surveillance and maintenance requirements.

B. All DUF_6 cylinder and cylinder yard surveillance and maintenance activities shall be logged/recorded.

C. Records for activities (i.e., logs and checklists) required by this exhibit shall be maintained at the facility until cylinder disposition.

D. Computerized records may be used in lieu of logs and checklists.

VII. Reporting

A. All records, (i.e., logs and checklists) required by the DUF_6 management plan and requested by Ohio EPA shall be provided. Within 24 hours of discovery, releases from DUF_6 cylinders shall be reported to Ohio EPA verbally detailing all pertinent information known at the time. Within 5 working days of the incident, a written report shall be submitted to the Ohio EPA documenting the details of the release, environmental monitoring that has been completed, corrective actions completed to-date, and any further actions to be taken. Recorded information shall include cylinder yard, section, row, position, breach size, possible causes, amount and location of product released, and nameplate information (e.g. cylinder number, model).

B. Within 30 days of receiving a written request by Ohio EPA, U.S. DOE and Bechtel Jacobs Company LLC shall provide to Ohio EPA a report that documents the surveillance and program improvements activities for the past quarter that were conducted in accordance with the DUF_6 management plan as described in sections I and IX of this outline. Nothing in this paragraph shall limit any statutory or regulatory authority that Ohio EPA may otherwise have to request information from inspection of DUF_6 at PORTS.

VIII. Training

DOE shall train all personnel directly involved in handling and inspection of cylinders, in order to comply with DOE procedures and the DUF_6 Management Plan. Class room instruction and on-the-job training shall be used. Refresher training shall occur for all involved personnel on an annual basis. Training shall be specific to the job performed, and shall include, if applicable, safe operation of cylinder handling equipment, lifting and moving of cylinders, and emergency response procedures. Inspectors shall also be trained on proper inspection procedures, including identification, description, measurement, and recording of all inspection criteria. DOE shall maintain records of training at the facility.

A code inspector shall be trained in the use of precision measuring instruments and various industrial practices/methods and interpretation of data. Code inspectors shall be tested by a certified American Society for Non Destructive Testing (ASNT) examiner. Records of this training shall be retained at the site.

IX. Program Improvements

U.S. DOE shall continue to make improvements to its comprehensive program of managing U.S. DOE's DUF_6 cylinders stored at PORTS. Examples of improvement projects U.S. DOE shall use to evaluate the cylinders are:

A. **Relevant Inspection Data.** The results of the cylinder inspections shall be used to evaluate trends and to develop annual reports.

B. **Ultrasonic Thickness Testing.** This testing shall be conducted to obtain information on existing wall thickness and changes over time.

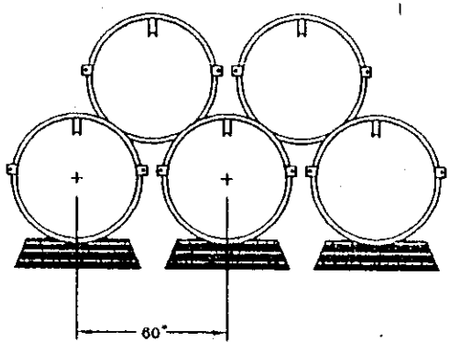
The purpose of the above program improvements is to determine the rate and extent of corrosion of a cylinder wall while in storage. DOE is planning to utilize an independent party to develop a standard for cylinders in storage. This independent interpretation shall be developed using the ASTM standard for pressure vessels in an operational configuration as the baseline. This interpretation along with the above program improvement studies shall be used to determine cylinder wall thickness to be used for long-term storage of cylinders.

X. Other

At U.S. DOE, Bechtel Jacobs Company LLC, or Ohio EPA (parties) request, the parties shall meet annually or as needed to discuss improvements to U.S. DOE's DUF_6 management program.

XI Previously owned USEC cylinders.

Previously owned USEC cylinders are stored in the USEC leased X-745G Cylinder Storage Yard and were transferred to DOE ownership effective July 28, 1998. These cylinders will be inspected for the defect criteria specified in Paragraph 1A. These are relatively new cylinders, so ultrasonic testing will only be performed on an as needed basis (defect areas).

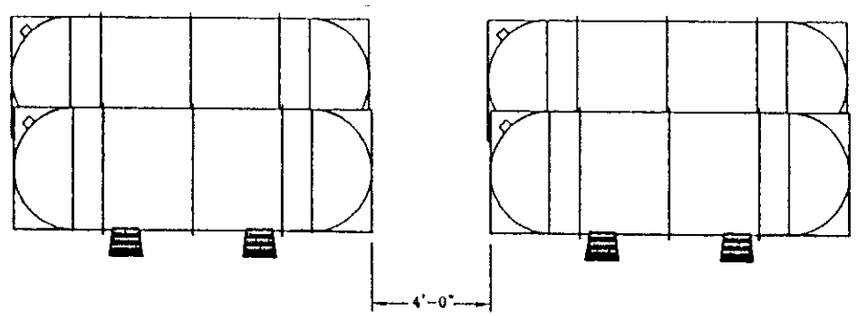


END VIEW

NOTES:

1. 14 AND 10 TON CYLINDERS WILL BE STACKED NO MORE THAN TWO HIGH, AND WILL BE SPACED, ON CONCRETE SADDLES, TO PROVIDE APPROXIMATELY 60 INCHES FROM THE CENTER OF ONE CYLINDER HEAD TO THE CENTER OF THE ADJACENT CYLINDER HEAD.

2. WHEN STACKED IN ROWS, THERE WILL BE APPROXIMATELY 4 FEET OF AISLE SPACE BETWEEN THE ENDS OF CYLINDERS (SKIRTED CYLINDERS SHOWN.) NON SKIRTED CYLINDERS WILL ALSO HAVE APPROXIMATELY 4 FEET OF AISLE SPACE AS MEASURED BETWEEN THE ELLIPTICAL HEADS.



SIDE VIEW

PORTSMOUTH RESTACKING
CONFIGURATION

EXHIBIT B

November 1, 1996

DEPLETED URANIUM HEXAFLUORIDE (DUF_6) MANAGEMENT PLAN

I. **DUF_6 Cylinder Surveillance Program.** The cylinder surveillance program consists of inspections, ultrasonic thickness testing and radiological surveys.

A. **Inspections**. The inspections shall be documented on a checklist which shall include the size, type, number, location, and physical description of all DUF_6 cylinder defect criteria. All accessible areas of all cylinders shall be visually inspected, using the following **DEFECT** criteria **WHENEVER A CYLINDER IS MOVED OR BEING INSPECTED FOR THE FIRST TIME. AFTER A BASELINE INSPECTION UTILIZING ALL THE CRITERIA BELOW HAS BEEN PERFORMED, THE VISUAL INSPECTION TO SATISFY THE QUADRENNIAL OR ANNUAL INSPECTION REQUIREMENTS CAN BE REDUCED TO THE CRITERIA MARKED WITH AN ASTERISK (*). DOUBLE ASTERISKED ITEMS INDICATE THAT AFTER RESTACKING IS COMPLETED, THAT CRITERIA MAY NOT APPLY**:

Rationale: The changes reflected here are commensurate with our earlier discussions. All DOE owned cylinders except for the recently acquired USEC privatization cylinders (2,639) have been restacked, with proper spacing, and have had an entire baseline inspection performed on them. The entire cylinder body has been visually inspected and all noted deficiencies have been properly documented. All cylinder contact points have been visually inspected (cylinder lug-to-cylinder body, cylinder body-to-cradle). Now that this has been accomplished, we would like to be able to reduce the required in-storage inspections to a visual scrutinization of the areas that are prone to leakage. Those areas are around the valves, plugs, severe corrosion areas, and along cylinder welds. This will reduce the time required to perform a visual inspection, preclude redundant redocumentation of previously noted deficiencies (these stay in the historical record), and cut costs. Money saved by this change could then be redirected toward items associated with conversion of the material. All criteria will be checked whenever a cylinder is moved or when a cylinder is inspected for the first time (ie., all cylinders recently acquired from USEC).

1. **DUF_6 Cylinder Defect Criteria**

a. **General Cylinder Criteria**

* Hole in cylinder
* Visible leakage/contamination on cylinder or ground
** Bulge - protruding one-half inch or more
** Gouge - greater than one-sixteenth inch of metal moved
** Dent - greater than one-sixteenth inch deep
** Bent stiffening ring - cracked weld or separation of ring from body
Severe corrosion - local or extensive pitting and/or scaling that is evident on one third or more of the bottom shell and scaling consisting of layered flakes over one-eighth inch thick and over two inches in diameter

b. **Cylinder Body Contact Point**

Body ground contact
Stiffening ring ground contact
Evidence of water/cylinder contact from poor yard drainage
**Dent caused by lifting lug contact - greater than one-sixteenth inch deep
Evidence of lifting lug contact
** Wood saddle/resting block - cracking, splitting, rotting or sinking
Concrete saddle - cracking, chipping, corrosion or sinking
Debris between saddle and cylinder

c. **Valve End of Cylinder**

*Evidence of contamination on valve.
** Bent valve body
Bent/separated skirt
Scale in skirt
Skirt in ground contact
Weep hole in skirt plugged
**Valve end not accessible
Packing nut missing/cracked
Port cap missing/cracked
Bent or sheared valve stems
Cracked bent valve protector
Identification(I.D.) plate missing
I.D. plate loose/cracked welds
New name plate attached to skirt/valve/plug

d. **Plug End of Cylinder**

*Evidence of contamination on plug
**Bent or damaged plug
Bent/separated skirt
Scale in skirt
Skirt in ground contact
Weep hole in skirt plugged
Plug end not accessible

~~**Note: Asterisked criteria indicate that after the restacking is completed that criteria may not apply.**~~

Rationale: Asterisks have been changed somewhat from the current Exhibit B. Single asterisks indicate those items checked if our request is approved. Double asterisked items are those previously marked as not applying after restacking.

2. Inspection Frequency

a. All DUF_6 cylinders in storage shall be visually inspected at least every four (4) years using the DUF_6 cylinder defect criteria **IN IA**.

b. DUF_6 cylinders stored in areas that exhibit poor drainage conditions (i.e., standing water for a period of forty-eight (48) hours following heavy rainfall) and cylinders with severe corrosion of cylinder surfaces or skirt areas shall be visually inspected annually using the DUF_6 cylinder defect criteria.

c. Valves with evidence of leakage (i.e., buildup of DUF_6 reaction products, discoloration around valve/plug) shall be inspected monthly. This inspection consists of the following:

1) Ensuring the plastic bag is still in place;

2) Checking the bag for clarity or new buildup of DUF_6 reaction products on valve; and

3) Taking a swipe sample from the valve to determine if contamination (alpha, beta, gamma) levels exist.

Note: A swipe sample is where a cloth or wipe is smeared over an area, nominally 100 cm^2 in surface area, to pick up loose surface contamination from the surface of the cylinder. The wipe is then read by the appropriate instrument for contamination level, normally reading out in dpm/100 cm^2 (DPM = disintegrations per minute).

d. Breached DUF_6 cylinders shall be inspected daily until the situation is mitigated. Inspections shall consist of the following:

1) Ensuring that tarps are in place to prevent precipitation from coming in contact with the cylinder and a catch pan placed beneath the cylinder to prevent material from dropping to the pavement.

2) Ensuring that contamination boundaries and transition zones are in place.

Note: A contamination boundary is an area established using a yellow and magenta rope or tape at the perimeter of an area determined by survey to be where no contamination has spread. Transition zones are established for going to and from the contamination zone.

3) Determining Hydrogen Fluoride (HF) content in air.

Note: HF content in the air is determined by hand-held HF detectors using an HF detection tube **OR EQUIVALENT** (such

as Draeger Model 21/31) which are calibrated instruments to read out in concentration of HF.

Rationale: This change allows for substitution of detectors with equal or better capabilities.

4) Collecting UF_6 reaction products for weighing (accountability)~~;~~.

5) Determining loose surface contamination levels of pad areas adjacent to the breach. See Section 2.C.3~~; and~~.

6) Determining radiation levels at the breach.

Note: Determining radiation levels at the breach shall be accomplished by utilizing calibrated radiation instruments to determine contact readings and general area radiation dose levels in mrem/hr.

e. All UF_6 cylinders shall be visually inspected immediately before movement **UNLESS A PRE-MOVE INSPECTION HAS ALREADY BEEN CONDUCTED ON THIS CYLINDER WITHIN THE PAST YEAR**. The pre-move inspection shall consist of the following:

Rationale: The statement "unless a pre-move inspection has already been conducted on this cylinder within the past year" should be added to eliminate unnecessary repetitive inspections over short periods of time. Also, handling equipment and techniques have greatly improved.

1) Lifting lug weld (if lug is to be used for lifting the cylinder) - examining for cracked weld, bent lug, elongated lug lifting hole

2) The cylinder in general - examining for deep cracks, gouges, and cuts in shell (ref. I. A.1.)

3) Areas immediately next to saddle contact points - examining for evidence of UF_6 reaction products or severe corrosion

4) Areas of previous lifting lug-to-cylinder contact points - examining for evidence of UF_6 reaction products

f. All UF_6 cylinders shall be visually inspected once it is lifted, **UNLESS A POST-LIFT INSPECTION HAS ALREADY BEEN CONDUCTED WITHIN THE PAST YEAR**. This visual inspection of the contact points and all previously inaccessible areas shall be conducted to determine and assess whether there is evidence of UF_6 reaction products, cracks, gouges, cuts, and/or severe corrosion.

Rationale: Changes in paragraphs I.A.2.e. and I.A.2.f. above reflect our current procedural requirements. This change is requested based upon the completion of restacking, which has fully characterized the DOE cylinders, and the fact that our handling procedures are much improved from the time we started restacking in 1996. Also, whenever a cylinder is moved to its storage location, an entire checklist is completed on the cylinder. Basically, nothing with the cylinder

would change in the course of a 12 month period. This would also eliminate the need for unnecessary repetitive inspections, when the cylinder is set down for short periods before being moved to its final storage location (this occurs when a cylinder has a pre-lift and post-lift inspection performed and is then set down for ultrasonic testing before final restacking).

g. All DUF_6 cylinders shall be visually inspected using the DUF_6 cylinder defect criteria (ref. I.A.) immediately after movement of the cylinder.

h. If any of the following defect conditions are noted during any inspections required by this DUF_6 Management Plan, recognized industrial applications and practices shall be used to determine the nature and extent of the defect condition and the method of repair or dispositioning of the DUF_6 cylinder. Code inspectors shall be used to evaluate the nature and extent of the defect condition. Depending on the condition of the DUF_6 cylinder, the code inspectors and appropriate personnel (See V B) shall recommend repairing cracks in welds, patching thinned cylinder wall areas or cold transfer of the contents to a new cylinder prior to movement.

1) Cracks in welds

~~2) Dents and gouges (ref. I.A.)~~

23) Presence of DUF_6 reaction products.

Rationale: Dents and gouges noted on inspections have not been significant, and would not be a concern except during conversion and they have already been documented.

Note: The presence of reaction products represents a potentially unsafe condition and the area must be evacuated immediately and the emergency procedures for a breached cylinder must be followed. (See Section V)

B. **Ultrasonic Thickness Testing**

1. ~~During DUF_6 cylinder relocation in fiscal years 1996, 1997, and 1998, the wall thickness of 10- and 14- ton mild steel DUF_6 cylinders shall be evaluated using non-destructive techniques, such as ultrasonic thickness (UT) measurements.~~ A statistically based, randomly selected number of cylinders ~~moved during the relocation exercise~~ shall be inspected using UT measurement techniques **TO SUPPLEMENT THE CORROSION MODEL. A SAMPLING PLAN WILL IDENTIFY WHERE WALL THICKNESSES ARE MEASURED.** ~~Initially, this sampling shall consist of a random selection of ten percent of the cylinders moved during fiscal year 1996 (i.e. about 5000 cylinders are to be moved in fiscal year 1996 and thus about 500 cylinders shall be UT measured). This data shall be analyzed and the number of samples UT measured shall be adjusted (e.g., increased, decreased, distribution of sampling changed) based on the results of the analysis of this initial data.~~

~~2.~~ ~~The following locations on the 10-and 14-ton DUF_6 storage cylinders shall be evaluated with hand-held UT probe measurements:~~

~~a. Two measurements at the 12 o'clock position (top of cylinder)~~
~~b. Two measurements at the 3 o'clock position (side of cylinder)~~
~~c. One measurement near the center of the head, valve end~~
~~d. One measurement near the center of the head, plug end~~
~~e. One measurement directly beneath the valve~~
~~f. One measurement directly beneath the plug~~
~~g. On skirted cylinders, five measurements as close as possible to skirt/head interface.~~

2.~~3.~~ ~~After the DUF_6 cylinders have been restacked (FY 1999),~~ ULTRASONIC THICKNESS TESTING OF 150 SELECTED cylinders shall be ~~inspected~~ CONDUCTED IN PLACE ~~(on an annual basis)~~ EVERY THIRD YEAR, ~~using UT measurement techniques~~ FIRST IN CALENDAR YEAR 2001, THEN 2004, THEN 2007, ETC. ANY CYLINDER MEASURING LESS THAN 180 MIL IN THICKNESS SHALL BE INSPECTED USING UT MEASUREMENT TECHNIQUES ANNUALLY AT THE <180 MIL LOCATION. ~~The cylinders that will be evaluated shall be selected at random from the cylinders inspected using UT techniques in FY 96, 97, and 98.~~

Rationale: No measurable change would be seen in one year.

Rationale: The ultrasonic testing of cylinders at PORTS has been more extensive then at Paducah or Oak Ridge. As our performance sheet shows, 601 were completed in 1996)this was greater than the 10% required by the DFF&Os), 250 were completed in 1997 and 150 were completed in 1998. This has given PORTS an excellent view of our cylinders' wall thickness status. The worst case we have seen is 219 mils and only 6 cylinders have shown wall thicknesses below the DOT requirement of 250 mils. Therefore, we are requesting that our ultrasonic testing be done annually only as requested by our Technical Group in Oak Ridge, and that the locations of the testing be dictated by the requirements of the corrosion modeling. Also, instead of going back to retest 150 previously tested cylinders every year, we request to test only the 3 cylinders designated as having excessive corrosion (by visual indication) yearly and then every 3 years, return to previously tested cylinders (150) due to the accuracy of the ultrasonic test of ± 3 mils and the general corrosion rate experienced at PORTS (<1 mil).

C. **Radiological Surveys.** ~~All~~ **A STATISTICALLY BASED NUMBER OF** DUF_6 cylinders and **THE** storage yards shall be radiologically surveyed. The scope and frequency of the survey are noted below:

1. A general area survey of the cylinder yards shall be done annually using an approved dose-rate instrument to ensure that no area of the yards exceeds 5 mr/hr.

Rationale: There are previously owned USEC cylinders stored in the USEC leased X-745C Yard that were transferred to DOE ownership effective July 28, 1998.

Note: A general area survey is accomplished by measuring the dose rate utilizing a calibrated radiation detector held waist high while walking at a steady pace

through the cylinder lots recording the three highest radiation levels per row of cylinders and recording all radiation levels that meet or exceed radiation area posting requirements.

2. A **STATISTICALLY BASED** swipe survey of **THE VALVE AND PLUG** areas ~~**accessible by hand**~~ for ~~**all**~~ cylinders shall be done annually to determine levels of loose surface contamination (i.e., alpha, beta, and gamma). **THIS SURVEY WILL INCLUDE ALL CYLINDERS THAT HAVE HAD CONTAMINATION IN THE PAST PLUS THE STATISTICALLY IDENTIFIED CYLINDERS.**

Rationale: The valve and plug areas are the most likely areas to have loose surface contamination. However, this occurs infrequently enough that statistical sampling is justified. All cylinders have had complete surface area checks during restacking and no contamination has been found on the cylinder bodies.

Note: See ~~above~~ I.A.2.C.3 **on page 3** for swipe description.

3. A swipe survey of valves/plugs suspected to be leaking shall be done when identified to determine levels of surface contamination (i.e., alpha, beta, and gamma).

4. A swipe survey of valves/plugs suspected to be leaking shall be done monthly to determine levels of surface contamination (i.e, alpha, beta, and gamma).

Note: See I.A.2.c. for complete valve inspection description.

5. A general survey of any breached cylinder(s) and areas next to the breached cylinder(s) shall be done daily until the breach is mitigated to assess the level of radiation (i.e., dose in mr/hr).

Note: See I.A.2.d.6. for more detailed description.

6. A swipe survey of any breached cylinder(s) shall be done daily until the breach is mitigated to determine the level of surface contamination (i.e., alpha, beta, gamma).

Note: See I.A.2.d. for complete breach inspection description.

Rationale: We are requesting that the radiological survey of cylinders be reduced <u>from</u> every cylinder, every year over all reachable portions of the cylinder <u>to</u> a statistical number of cylinders at the valve and plug areas only, meeting the requirements of 10 CFR 385 (radiological controls). The statistical numbers is currently not available but is being calculated by a statistician based on our historical records. Rough estimates made show that this number will be somewhere between 30 and 50. In addition to this statistical number, we will do surveys of all cylinders that have shown contamination at any time since 1996. This will make the total surveys to be approximately 160 cylinders per year. The actual number will be provided when calculations are completed.

II. **DUF_6 Cylinder Maintenance Program: ~~shall consist of~~ CORRECTIVE MAINTENANCE OF ANY DEFECTS IDENTIFIED DURING INSPECTIONS THAT THREATEN THE HEALTH,**

SAFETY, AND ENVIRONMENT DURING STORAGE OF THE CYLINDERS WILL BE MITIGATED. THE FOLLOWING DEFECTS WILL BE CORRECTED DURING CYLINDER STORAGE ~~the following~~:

A. LEAKAGE FROM THE VALVE OR PLUG. ~~Renewing the protective coating of cylinders as necessary to avoid excessive corrosion; skirt cleaning; and replacing valve port cap and packing nuts on an as-needed basis. Any discrepancies discovered during this activity requiring maintenance action and during routine inspection of the yards shall be entered into the Maintenance Service Request (MSR) system within ten (10) working days.~~

~~Note: The MSR system is a computerized tracking system for maintenance activities at PORTS. MSRs are submitted by the respective facility custodians for the work at the cylinder yards.~~

B. LEAKAGE FROM THE BODY OF THE CYLINDER. ~~On-going inventory control shall consist of identification tag replacement and accountability of nuclear materials by location. Inventory of nuclear materials is managed through an established computerized database. Any discrepancies discovered during the course of this activity and during routine inspection shall be entered in the MSR system within ten (10) working days.~~

~~C. Cylinder maintenance shall be done in the cylinder storage yards. If breached cylinder contents must be transferred, it shall be done in the cylinder storage yards, the X-344 transfer facility, or a process building, depending on the type of transfer required and condition of the cylinder. Using the information collected in 1.A.1 above, DUF_6 cylinder defect criteria, cylinders shall be analyzed to determine method of repair or dispositioning. All transfers shall be done using established procedures for the appropriate method of transfer (autoclave or cold transfer).~~

Rationale: Knowledge gained from program inspections have indicated that there are currently no significant maintenance concerns requiring immediate attention. A program to renew the protective coating on heavily corroded cylinders has been completed. Ultrasonic testing results have revealed that there are no significant concerns with cylinder wall thickness at this time. Conversion of the DUF6 cylinders will be initiated in the near future, and the cylinder condition will be used to establish the priority for processing.

Rationale: For paragraphs II.A., B., and C., above, this deletes the requirements to put <u>all</u> deficiencies noted on an MSR. These deficiencies are <u>noted</u> and <u>documented</u>, but most are items that have either been corrected by restacking or skirt cleaning and painting. The others are documented for classification and characterization of a cylinder which will be used for prioritization during conversion, but will <u>not</u> be corrected. All deficiencies are in our Cylinder Identification Data System (CIDS).

III. DUF_6 Cylinder Storage Yard Surveillance and Maintenance Program

A. The storage yards shall be monitored for DUF_6 releases using (1) annual radiological surveys of **ALL YARDS AND ANNUAL STATISTICAL SURVEYS OF** ~~**all**~~ cylinders ~~**and yards**~~, (2) monthly radiological surveys on valves/plugs suspected to be leaking, and (3) ~~**existing environmental monitoring programs (i.e., soil sampling, surface water**~~

~~monitoring, and sediment sampling). Once cylinder relocation has been initiated,~~ monthly surface water run-off samples for total uranium analysis ~~shall be collected~~ at the established collection basin for X-745E Yard and ~~a~~ depression**S** on the **NORTH,** south**, AND SOUTHWEST** side**S** of the X-745C Yard. The analytical methods are in-house procedures for alpha, beta and total uranium. The alpha/beta procedure is the same as SW-846, method 9310 except for the calibration standards. The total uranium is an inductively Coupled Plasma/Mass Spectrometry (ICP/MS) procedure capable of detecting down to I ppb Uranium.

Rationale: Paragraph III. A. Reflects our request of statistical radiological surveys addressed in Paragraph I.C.

Rationale: Soil and sediment sampling are not routinely done in the cylinder yards, and there is no specific requirement anywhere else in the DFF&Os. Also, two additional water sample collection points were selected for the X-745C Yard, since drainage off the yard runs in several directions.

B. Soil samples of the surface water runoff areas of the pad shall be sampled if a breached cylinder is discovered. The analytical methods are in-house for alpha, beta and total uranium. The alpha/beta procedure is the same as noted above in A. The total uranium is a fluorometric analytical procedure. Soil sample results and any corrective actions shall be documented. Rate and extent of any contamination found shall be defined and remediated in a manner that controls, minimizes or eliminates to the extent necessary to protect human health and the environment, escape of hazardous decomposition products to the groundwater, surface water or the atmosphere, in accordance with established spill procedures. For a breached DUF_6 cylinder, these procedure shall include the following:

1. Soil showing visible contamination shall be excavated immediately.

2. A statistically valid sampling plan that considers the soil type, properties of the spilled material, area affected, volume of the spill and other factor**S** shall be developed.

Rationale: Should be plural.

3. This sampling plan shall guide the confirmatory sampling and any additional excavation and remediation.

4. Background for soils shall be ~~**in accordance with the Background Sampling Investigation of Soil and Groundwater Report for the Portsmouth Gaseous Diffusion Plant final document dated June 7, 1996 (DOE/OR/11-1323&D3) approved by Ohio EPA April 16, 1996**~~ **DETERMINED BY SAMPLES TAKEN IN THE IMMEDIATE AREA ADJACENT TO THE RELEASE.**

Rationale: The requested change to Paragraph III.B.4. bases any soil clean up would be to the level of background samples taken at areas adjacent to, but unaffected by the release instead of having to meet requirements of background samples taken and calculated outside the security fence. Cleanup to background levels outside the security fence would be required during D&D of the area.

Concern: This has been a problem, since background readings around the cylinder yards are higher than in this report.

5. Excavation of any soil contamination is required as expeditiously as possible and shall continue until the sampling analyses show results less than the mean plus two sigma of the background.

6. Any soil excavated as required by this plan shall be containerized and evaluated according to OAC rule 3745-52-11.

7. Remediation of any ground or surface water contamination resulting from the spill shall be in accordance with the provisions of Section VII of the Ohio Consent Decree and applicable portions of the U.S. EPA Administrative Order of Consent.

8. If a DUF_6 cylinder breaches during the pendency of the Order, the provisions of this Section shall apply until all work required by this Section is completed.

C. Routine maintenance activities for the existing and new storage yards shall consist of: (1) identifying and controlling vegetation, (2) identifying and repairing water retention areas (See I.A.2.b), (3) identifying and replacing or repairing signage (i.e., radiological postings), (4) identifying and replacing damaged barricades, and (5) identifying and repairing defective lighting. Any discrepancies found shall be entered into the MSR system within ten (10) working days.

IV. Design and Construction of New Storage Yards

A. The new storage yards, at a minimum, shall be sloped and constructed of concrete in accordance with General Design Criteria, DOE Order 6430.1*a*. Concrete saddles shall be utilized for cylinder storage.

B. DUF_6 cylinders shall be stored by cylinder type (i.e., fourteen and ten ton). Fourteen and ten ton cylinders shall be stored with aisle spacing of about four feet. Cylinder center-to-center shall measure about sixty inches. Full cylinders shall be stacked **NO MORE THAN** two high. See attached drawing.

Rationale: This change clarifies that there is an option of not having to stack the cylinders.

V. Contingency Plan

A. In the event of an emergency involving the DUF_6 cylinder yards, the Portsmouth Emergency Plan response procedures shall apply and the following actions taken:

1. Evacuate the area immediately.

2. Notify supervision and the Plant Shift Superintendent (PSS) immediately.

B. Appropriate personnel such as code inspectors, health physicists and metallurgists shall be summoned to evaluate the breach after the area is determined by the incident commander to be safe to enter.

C. Notification shall be made to the Ohio EPA.

D. Breaches shall be evaluated on a case-by-case basis and corrective actions taken as appropriate.

VI. Records

A. Procedures and/or checklists shall be used to implement the surveillance and maintenance requirements.

B. All DUF_6 cylinder and cylinder yard surveillance and maintenance activities shall be logged/recorded.

C. Records for activities (i.e., logs and checklists) required by this exhibit shall be maintained at the facility until cylinder disposition.

D. **COMPUTERIZED RECORDS MAY BE USED IN LIEU OF LOGS AND CHECKLISTS.**

VII. Reporting

A. All records, (i.e., logs and checklists) required by the DUF_6 management plan and requested by Ohio EPA shall be provided. Within 24 hours of discovery, releases from DUF_6 cylinders shall be reported to Ohio EPA verbally detailing all pertinent information known at the time. Within 5 working days of the incident, a written report shall be submitted to the Ohio EPA documenting the details of the release, environmental monitoring that has been completed, corrective actions completed to-date, and any further actions to be taken. Recorded information shall include cylinder yard, section, row, position, breach size, possible causes, amount and location of product released, and nameplate information (e.g. cylinder number, model).

B. Within 30 days of receiving a written request by Ohio EPA, U.S. DOE and ~~LMES~~ **BECHTEL JACOBS COMPANY LLC** shall provide to Ohio EPA a report that documents the surveillance and program improvements activities for the past quarter that were conducted in accordance with the DUF_6 management plan as described in sections I and IX of this outline. Nothing in this paragraph shall limit any statutory or regulatory authority that Ohio EPA may otherwise have to request information from inspection of DUF_6 at PORTS.

VIII. Training

DOE shall train all personnel directly involved in handling and inspection of cylinders, in order to comply with DOE procedures and the DUF_6 Management Plan. Class room instruction and on-the-job training shall be used. Refresher training shall occur for all involved personnel on an annual basis. Training shall be specific to the job performed, and shall include, if applicable, safe operation of cylinder handling equipment, lifting and moving of cylinders, and emergency response procedures. Inspectors shall also be trained on proper inspection procedures, including identification, description, measurement, and recording of all inspection criteria. DOE shall maintain records of training at the facility.

Concern: What does "directly involved" actually mean. Based on this paragraph, we consider it to be only those personnel that do the regular inspections, surveys, and actual handling of cylinders. Currently, we train uranium material handlers and their supervisors, Health Physics, and Environmental Compliance personnel. We do not train Safety and Health or Industrial Hygiene personnel, although they do conduct periodic inspections. Should this also include the

craft that positions the concrete saddles, since they do not actually handle or inspect the cylinders? Should DOE or Environmental Compliance inspectors be included, or should they be considered only as "oversight" and be exempt?

A code inspector shall be trained in the use of precision measuring instruments and various industrial practices/methods and interpretation of data. Code inspectors shall be tested by a certified American Society for Non Destructive Testing (ASNT) examiner. Records of this training shall be retained at the site.

IX. Program Improvements

U.S. DOE shall continue to make improvements to its comprehensive program of managing U.S. DOE's DUF_6 cylinders stored at PORTS. Examples of improvement projects U.S. DOE shall use to evaluate the cylinders are:

Concern: This paragraph says that the following are examples of improvement projects DOE "shall use" to evaluate cylinders. Some of these have already been completed. Either they should be deleted as is indicated below, or the wording should be changed in the above paragraph to state DOE "has done or may do"

A. **Relevant Inspection Data.** The results of the cylinder inspections shall be used to evaluate trends and to develop annual reports.

~~B. **Coupon Studies. These studies consists of using different steel types in the cylinder storage yards placed in various locations and angles. The purpose of this study is to measure atmospheric corrosion of metals in accordance with ASTM Standard G-50. The data are to determine whether the metal loss rate stabilizes over time.**~~

Rationale: A final report has been issued after 4 years of testing. Originally, testing was planned for 16 years, but after the initial 4 years, it was determined that further testing would not be necessary.

~~C. **Ambient Condition and Time of Wetness Studies. These studies consist of placing probes on the cylinders. Measurements are taken for surface moisture, surface temperature, relative humidity, and ambient temperature. The purpose of this study is to determine the time of wetness. The data obtained shall be used in conjunction with the corrosion probe data to define conditions that lead to accelerated corrosion and optimize cylinder storage conditions in the future.**~~

Rationale: Some studies have been discontinued because we have gotten all the information we can get from them. This includes the ambient condition, time of wetness, and corrosion probe studies. Final reports have been developed for these areas.

~~D. **Corrosion Probe Studies. Probes are placed in various positions on cylinders and attached to an instrument that applies a small current and compares the difference in resistance across the element each time a measurement is taken. Measurements are taken on a monthly basis to calculate the corrosion rate and metal loss.**~~

Rationale: Some studies have been discontinued because we have gotten all the information we can get from them. This includes the ambient condition, time of wetness, and corrosion probe studies. Final reports have been developed for these areas.

~~E.~~ B. **Ultrasonic Thickness Testing.** This testing shall be conducted to obtain information on existing wall thickness and changes over time.

The purpose of the above program improvements is to determine the rate and extent of corrosion of a cylinder wall while in storage. DOE is planning to utilize an independent party to develop a standard for cylinders in storage. This independent interpretation shall be developed using the ASTM standard for pressure vessels in an operational configuration as the baseline. This interpretation along with the above program improvement studies shall be used to determine cylinder wall thickness to be used for long-term storage of cylinders.

X. **Other**

At U.S. DOE, ~~LMES~~ **BECHTEL JACOBS COMPANY LLC**, or Ohio EPA request (parties), the parties shall meet **ANNUALLY OR AS NEEDED** ~~**in January of each year**~~ to discuss improvements to U.S. DOE's DUF_6 management program.

Concern: There is a need to establish a more timely mechanism to include the Ohio EPA in program improvements impacting the DFF&Os.

XI PREVIOUSLY OWNED USEC CYLINDERS

PREVIOUSLY OWNED USEC CYLINDERS ARE STORED IN THE USEC LEASED X-745G CYLINDER STORAGE YARD AND WERE TRANSFERRED TO DOE OWNERSHIP EFFECTIVE JULY 28, 1998. THESE CYLINDERS WILL BE INSPECTED FOR THE DEFECT CRITERIA SPECIFIED IN PARAGRAPH IA. THESE ARE RELATIVELY NEW CYLINDERS, SO ULTRASONIC TESTING WILL ONLY BE PERFORMED ON AN AS NEEDED BASIS (DEFECT AREAS).

Rationale: These are new (<10 year old) cylinders that have exhibited no significant corrosion.