Enclosure 4
Portsmouth Updated References to May 22, 1996 submittal

ADDENDUM TO POEF-LMUS-10, "Criticality Accident Alarm System Coverage and Exclusions", Revision 3, December, 1998, by J. A. Rapp Jr.

The following addendum to Section 2 of the subject report includes the changes from the latest Lease Change between the DOE and the USEC. None of the facilities added to the Lease require coverage by CAAS. None of the facilities deleted required coverage by CAAS.

FACILITIES ADDED

X-106C	New Fire Training Building
X-230A-41	Ambient Air Monitoring Station A-41 (located offsite at Zahn's Corner)
X-611E	Clearwell and Chlorine Building (at X-611 water treatment facility)
X-747	Clean Scrap Yard
1107DV	Administrative Vehicle Portal

USEC Contractor Trailer Area Approximately 2.8 acres; bounded south by construction road, west by Perimeter Road, north by drainage ditch, and area is directly south of X-6614E

FACILITIES DELETED

X-100L	Environmental Control Trailer
X-106B	Old Fire Training Building
X-630-3	Acid Handling Station

FACILITY NAME/FUNCTION CHANGE

X-3000 Changed from "Electronic Maintenance Building" to "Environmental Compliance Building"

Note: A few editorial changes were made in the updated Lease Agreement to building names or identifying numbers; however, none were substantive with respect to the report evaluation or conclusions

POEF-LMUS-10
Revision 3

LOCKHEED MARTIN

PORTSMOUTH GASEOUS DIFFUSION PLANT

Criticality Accident Alarm System Coverage and Exclusions

December 1998

By

J. A. Rapp, Jr.

LOCKHEED MARTIN UTILITY SERVICES, INC.

PORTSMOUTH GASEOUS DIFFUSION PLANT
P.O. Box 628 Piketon, Ohio 45661

Under Contract USEC-96-C-0001

to the

U.S. ENRICHMENT CORPORATION

LOCKHEED MARTIN UTILITY SERVICES, INC.
UNDER CONTRACT WITH
THE UNITED STATES
ENRICHMENT CORPORATION

DISTRIBUTION

LOCKHEED MARTIN UTILITY SERVICES, INC.

PORTSMOUTH

Bahney,	B.	Lemming,	R.
Belford,	J.	Rapp,	J. (5)
Bolling,	J.	Van Volkinburg,	S
Corzine,	G.	Central Files (2)	
D'Aquila	D.	X-710 Technical Library (2)	
Demeglio,	R.	NRA (5)	
Hone,	M.	USEC (5)	

INTRODUCTION

Federal regulation, 10 CFR 76.89[1], requires criticality monitoring and alarm system coverage for all areas of a facility except approved exclusions. The national standard, ANSI/ANS-8.3[2], also addresses alarm systems. ANSI/ANS-8.3 Section 4.2.1, requires that the need for a criticality monitoring and alarm system shall be evaluated for all activities in individual unrelated areas for which the inventory of fissionable materials involved exceeds 700 grams of ^{235}U.

This report is divided into five sections. Section 1 discusses areas of PORTS that are covered by the Criticality Accident Alarm System (CAAS). Section 2 discusses non-process buildings not covered by a CAAS for which an exclusion is requested. Section 3 discusses an exclusion from CAAS coverage of Hallways for certain materials. Section 4 requests an exclusion from CAAS coverage for cylinder storage yards. Sectron 5 requests an exclusion from CASS coverage for the outside storage pad west of Building XT-847.

Section 1. AREAS COVERED BY CRITICALITY ACCIDENT ALARM SYSTEM

The following buildings/areas are covered by the Criticality Accident Alarm System (CAAS) in accordance with 10 CFR 76.89.

Facility Number	Facility Name and/or Function	Coverage by CAAS	Reference
X-202	Roadways adjacent to Alarmed facilities	yes	3, 4, 5, 6
X-232C1	Tie Line, X-342 to X-330	yes	3
X-232C2	Tie Line, X-330 to X-326	yes	3
X-232C3	Tie Line, X-330 to X-333	yes	3
X-232C4	Tie Line, X-326 to X-770	yes	3
X-232C5	Tie Line, X-343 to X-333	yes	3
X-326	Process Building	yes	7, 8, 9, 10, 20
X-330	Process Building	yes, for the cell floor; one location on the operating floor is covered by a cluster on the cell floor	7, 9, 20
X-333	Process Building	yes, for the cell floor; Adding an additional CAAS cluster to provide coverage on the operating floor	7, 9, 20
X-342A	Feed, Vaporization Fluorine Generation Building	yes	4

Facility Number	Facility Name and/or Function	Coverage by CAAS	Reference
X-343	Feed, Vaporization and Sampling Facility	yes	4
X-344A	UF_6 Sampling Facility	yes	4
X-700	Converter Shop and Cleaning Facility	yes	5, 19
X-705	Decontamination Building	yes	5
X-710	Technical Service Building	yes	6
X-720	Maintenance and Stores Building	yes	5
X-721	Radiation Instrument Calibration Facility (located within Building X-700)	yes	5
X-760	Chemical Engineering Building	yes	6
XT-847	Material Storage Area - north, south, and center warehouse sections	yes, A CAAS cluster is being installed in the south section of XT-847. No fissile material operations will be conducted in the south section until the CAAS system is installed.	21

Section 2. NON-PROCESS BUILDINGS NOT COVERED BY A CAAS FOR WHICH AN EXCLUSION IS REQUESTED

The purpose of this section is to request an exclusion from 10 CFR Part 76.89 for all PORTS buildings/areas that do not contain operations involving uranium enriched to 1 wt% or higher ^{235}U, and 15 grams or more of ^{235}U. LMUS is requesting an exclusion for the buildings/areas listed in the following table. This list was generated using revision 26 (November 6, 1998) of the Application for the Portsmouth Gaseous Diffusion Plant. Historically these buildings/areas have not had uranium operations. Thus, there is no need for a Criticality Accident Alarm System (CAAS) in them. Areas will be added to or deleted from this section per the Lease Agreement between the United States Department of Energy and the United States Enrichment Corporation.

There are two buildings in this list that have greater than 1% uranium enrichment and more than 15 grams uranium. The two buildings are X-744H and X-744L. These two buildings are warehouses that store contaminated equipment. Both buildings have an areal density of less than 50 g $^{235}U/m^2$. Access to both building are controlled ensuring that the areal density of material in these buildings is not exceeded. Since both buildings have an areal density of less than 50 g $^{235}U/m^2$, a CAAS is not required and an exclusion from 10 CFR Part 76.89 is requested for these buildings.

There are two depleted uranium cylinder storage yards listed in this table. They are X-745G and X-745H. These areas are used to store uranium hexifluoride filled cylinders. The uranium in them contains less than 1% ^{235}U. Since uranium with less than 1% ^{235}U can not go critical a CAAS is not required and an exclusion from 10 CFR Part 76.89 is requested for these areas.

Facility Number	Facility Name and/or Function	Requires Coverage by CAAS
X-100	Administration Building	no
X-100B	Air Conditioning Equipment Building	no
X-100L	Environmental Control Trailer	no
X-101	Health Service Center	no
X-102	Cafeteria	no
X-103	Auxiliary Office Building	no
X-104	Guard Headquarters	no
X-104A	Indoor Firing Range	no
X-105	Electronic Maintenance Building	no
X-106	Tactical Response Station	no
X-106B	Fire Training Building	no
X-108A	South Portal and Shelter	no
X-108B	North Portal and Shelter	no
X-108E	Construction Portal	no
X-108J	Pike Avenue Portal	no
X-109A	Personnel Monitoring Building	no
X-109B	Personnel Monitoring Building	no
X-109C	Personnel Monitoring Trailer	no
X-111A	SNM Monitoring Portal (X-326)	no
X-111B	SNM Monitoring Portal (NW X-326)	no
X-112	Data Processing	no
X-114A	Outdoor Firing Range	no

Facility Number	Facility Name and/or Function	Requires Coverage by CAAS
X-120H	Meteorological Tower	no
X-200	Site Prep, Grading, Landscaping	no
X-201	Land and Land Rights	no
X-204	Railroad and Railroad Overpass	no
X-206A	Main Parking Lot (N)	no
X-206B	Main Parking Lot (S)	no
X-206E	Construction Parking	no
X-206H	Pike Avenue Parking Lot	no
X-206J	South Office Parking Lot	no
X-208	Security Fence	no
X-210	Sidewalks	no
X-215A	Electrical Distribution to Process Buildings	no
X-215B	Electrical Distribution to Other Areas	no
X-215C	Exterior Lighting	no
X-215D	Electric Power Tunnel	no
X-220A	Instrumentation Tunnels	no
X-220B1	Process Instrumentation Lines	no
X-220B2	Carrier Communication Systems	no
X-220B3	Water Supply Telemetering Lines	no
X-220C	Superior American Alarm System	no
X-220D1	General Telephone	no
X-220D2	Process Telephone	no

Facility Number	Facility Name and/or Function	Requires Coverage by CAAS
X-220D3	Emergency Telephone System	no
X-220E1	Evacuation Public Address System	no
X-220E2	Process Public Address System	no
X-220E3	Power Public Address System	no
X-220F	Plant Radio System	no
X-220G	Pneumatic Dispatch System	no
X-220H	MuCulloh Alarm System	no
X-220J	Radiation Alarm System	no
X-220K	Cascade Automatic Data Processing System	no
X-220L	Cascade Automatic Data Processing System	no
X-220N	Security Alarm and Surveillance System	no
X-220P	Maintenance Work Authorization and Control System	no
X-220R	Public Warning Siren System	no
X-220S	Power Operations SCADA System	no
X-230	Water Supply Line	no
X-230A	Sanitary and Fire Water Distribution System	no
X-230A-3	Ambient Air Monitoring Station A-3 (South Access Road)	no
X-230-A-6	Ambient Air Monitoring Station A-6 (at Power Pole 6 in Piketon)	no
X-230A-8	Ambient Air Monitoring Station A-8 (at Power Pole 74 Near X-735)	no

Facility Number	Facility Name and/or Function	Requires Coverage by CAAS
X-230-A-9	Ambient Air Monitoring Station A-9 (at Wakefield Mound Road)	no
X-230-A-10	Ambient Air Monitoring Station A-10 (at Don Marquis Substation)	no
X-230-A-12	Ambient Air Monitoring Station A-12 (at McCorkle Road)	no
X-230-A-15	Ambient Air Monitoring Station A-15 (at Loop Road)	no
X-230-A-23	Ambient Air Monitoring Station A-23 (at Taylor Hollow and McCorkle Road)	no
X-230-A-24	Ambient Air Monitoring Station A-24 (at Shyville Road)	no
X-230-A-28	Ambient Air Monitoring Station A-28 (at Camp Creek Road)	no
X-230-A-29	Ambient Air Monitoring Station A-29 (at West Access Road)	no
X-230-A-36	Ambient Air Monitoring Station A-36 (at X-611)	no
X-230-A-37	Ambient Air Monitoring Station A-37 (at Mount Hope Road)	no
X-230-A-40	Ambient Air Monitoring Station A-40 (at X-100 Penthouse)	no
X-230B	Sanitary Sewers	no
X-230C	Storm Water Sewers	no
X-230D	Soften Water Distribution System	no
X-230E	Plant Water System (Makeup to Cooling Towers)	no
X-230F	Raw Water Supply Lines	no

Facility Number	Facility Name and/or Function	Requires Coverage by CAAS
X-230G	RCW System	no
X-230H	Fire Water Distribution System	no
X-230J1	Environmental Monitoring Station	no
X-230J2	South Holding Pond Effluent Monitoring Station	no
X-230J3	West Environmental Monitoring Building	no
X-230J4	Environmental Air Monitoring Station	no
X-230J5	West Environmental Sampling Building	no
X-230J6	Northeast Monitoring Facility	no
X-230J7	East Monitoring Facility	no
X-230J8	Environmental Storage Building	no
X-230J9	North Environmental Sampling Station	no
X-230K	South Holding Pond	no
X-230L	North Holding Pond	no
X-232A	Nitrogen Distribution System	no
X-232B	Dry Air Distribution System	no
X-232D	Steam and Condensate System	no
X-232E	Freon Distribution Lines	no
X-232F	Fluorine Distribution System	no
X-232G	Supports for Distribution Lines	no
X-240A	RCW System (Cathodic Protection)	no
X-300	Plant Control Facility	no

Facility Number	Facility Name and/or Function	Requires Coverage by CAAS
X-300A	Process Monitoring Building	no
X-300B	Plant Control Facility Carport	no
X-300C	Emergency Antenna	no
X-334	Transformer Storage Cleaning Building	no
X-342B	Fluorine Storage Building	no
X-344B	Maintenance Storage Building	no
X-501	Substation	no
X-501A	Substation	no
X-502	Substation	no
X-515	330 KV Tie Line	no
X-530A	Switch Yard	no
X-530B	Switch House	no
X-530C	Test and Repair Facility	no
X-530D	Oil House	no
X-530E	Valve House	no
X-530F	Valve House	no
X-530G	GCEP Oil Pumping Station	no
X-533	Transformer Storage Pad	no
X-533A	Switch Yard	no
X-533B	Switch House	no
X-533C	Test and Repair Facility	no
X-533D	Oil House	no

Facility Number	Facility Name and/or Function	Requires Coverage by CAAS
X-533E	Valve House	no
X-533F	Valve House	no
X-533H	Gas Reclaiming Cart Garage	no
X-540	Telephone Building	no
X-600	Steam Plant	no
X-600A	Coal Pile Yard	no
X-600B	Steam Plant Shop	no
X-600C	Ash Wash Treatment Building	no
XT-801	South Office Building	no
X-605	Sanitary Water Control House	no
X-605A	Sanitary Water Wells	no
X-605H	Booster Pump House and Appurtenance	no
X-605I	Chlorinator Building	no
X-605J	Diesel Generator Building	no
X-608	Raw Water Pump	no
X-608A	Raw Water Wells (1 to 4)	no
X-608B	Raw Water Wells (5 to 15)	no
X-611	Water Treatment Plant and Appurtenances	no
X-611B	Sludge Lagoons	no
X-611C	Filter Building	no
X-611D	Recarbonization Instrument Building	no
X-612	Elevated Water Tank	no

Facility Number	Facility Name and/or Function	Requires Coverage by CAAS
X-614A	Sewage Pumping Station	no
X-614B	Sewage Lift Station	no
X-614D	South Sewage Lift Station	no
X-614P	Northeast Sewage Lift Station	no
X-616	Liquid Effluent Control Facility	no
X-617	South PH Control Facility	no
X-618	North Holding Pond Storage Building	no
X-621	Coal Pile Runoff Treatment Facility	no
X-626-1	Recirculating Water Pump House	no
X-626-2	Cooling Tower	no
X-630-1	Recirculating Water Pump House	no
X-630-2A	Cooling Tower	no
X-630-2B	Cooling Tower	no
X-630-3	Acid Handling Station	no
X-633-1	Recirculating Water Pump House	no
X-633-2A	Cooling Tower	no
X-633-2B	Cooling Tower	no
X-633-2C	Cooling Tower	no
X-633-2D	Cooling Tower	no
X-640-1	Firewater Pump House	no
X-640-2	Elevated Water Tank	no
X-700A	Air Conditioning Equipment Building	no

Facility Number	Facility Name and/or Function	Requires Coverage by CAAS
X-701A	Lime House	no
X-701D	Water Deionization Facility	no
X-705D	Heating Booster Pump Building	no
X-710A	Technical Services Gas Manifold Shed	no
X-710B	Explosion Test Facility	no
X-720A	Maintenance and Stores Building Gas Manifold Shed	no
X-720B	Radio Base Station Building	no
X-720C	Paint and Storage Building	no
X-741	Oil Drum Storage Facility	no
X-742	Gas Cylinder Storage Facility	no
X-743	Lumber Storage Shed	no
X-744B	Salt Storage Building	no
X-744H	Bulk Storage Building	no, this building contains more than 15 grams of uranium, but contains an areal density of less than 50 g/m^2.
X-744J	Bulk Storage Building	no
X-744L	Stores and Maintenance	no, this building contains more than 15 grams of uranium, but contains an areal density of less than 50 g/m^2.

Facility Number	Facility Name and/or Function	Requires Coverage by CAAS
X-744W	Surplus and Salvage Warehouse	no
X-745G	DUF6 Cylinder Storage Yard	no, ^{235}U enrichment less than 1%
X-745H	DU Storage Yard	no, ^{235}U enrichment less than 1%
X-746	Materials Receiving and Inspection Building	no
X-747A	Material Storage Yard	no
X-747B	Material Storage Yard	no
X-747C	Material Storage Yard	no
X-747D	Material Storage Yard	no
X-747E	Material Storage Yard	no
X-747F	Miscellaneous Material Storage Yard	no
X-747J	Decontamination Storage Yard	no
X-748	Truck Scale Facility	no
X-750	Mobile Equipment Maintenance Shop	no
X-750A	Garage Storage Building	no
XT-847	Warehouse - Office Area	no
X-1000	Administration Building	no
X-1007	Fire Station	no
X-1020	Emergency Operations Center (EOC)	no
X-1107A	Administrative Portal	no
X-1107B	Interplant Portal	no
X-1107BP	Admin. Portal	no

Facility Number	Facility Name and/or Function	Requires Coverage by CAAS
X-1107D	Northeast Portal	no
X-2200	Site Preparation, Grading and Landscaping	no
X-2202	Roads (GCEP)	no
X-2204	GCEP Railroads	no
X-2207A	GCEP Administrative Parking Lot	no
X-2207D	Northwest Parking Lot	no
X-2208	Security Fence	no
X-2210	Sidewalks	no
X-2215A	Underground Electrical Distribution to Process Buildings	no
X-2215B	Electrical Distribution to Areas Other than Process Buildings	no
X-2215C	Exterior Light Fixtures	no
X-2220C	Fire and Supervisory Alarm System	no
X-2220D	Telephone System	no
X-2220L	Classified Computer System	no
X-2220N	Security Access Control and Alarm System	no
X-2230A	Sanitary Water Distribution System	no
X-2230B	GCEP Sanitary Sewers	no
X-2230C	Storm Sewers	no
X-2230F	Raw Water Supply Line	no
X-2230G	Recirculating Water System	no
X-2230H	Fire Water Distribution System	no

Facility Number	Facility Name and/or Function	Requires Coverage by CAAS
X-2230J	Liquid Effluent System	no
X-2230T	Recirculation Heating Water System	no
X-2232A	Nitrogen Distribution System	no
X-2232B	Dry Air Distribution System	no
X-2232D	Steam and Condensate System	no
X-2232G	Supports for Distribution Lines	no
X-3000	Electronic Maintenance Building	no
X-5000	GCEP Switch House	no
X-5001	Substation	no
X-5001A	Valve House	no
X-5001B	Oil Pumping Station	no
X-5015	HV Electrical System	no
X-6000	GCEP Cooling Tower Pump House	no
X-6001	Cooling Tower	no
X-6001A	Valve House	no
X-6609	Raw Water Wells	no
X-6613	Sanitary Water Storage Tank	no
X-6614E	Sewage Lift Station	no
X-6614G	Sewage Lift Station	no
X-6614H	Sewage Lift Station	no
X-6614J	Sewage Lift Station	no
X-6619	Sewage Treatment Facility	no

Facility Number	Facility Name and/or Function	Requires Coverage by CAAS
X-6643	Fire Water Storage Tanks 1 and 2	no
X-6644	Fire Water Pump House	no
X-7721	Maintenance Stores Training Building (Training)	no

Section 3. EXCLUSION OF ROADWAYS FOR CERTAIN MATERIALS

Exclusion of roadways, X-202, from Criticality Accident Alarm Coverage is requested during transport of the following four general classes of materials under the specified conditions. Justification for the exclusion is given following the description of the specified conditions.

Class I. Materials for which no spacing is required.

These materials will be limited to a concentration less than 5 grams U-235 in 10 liter volume (500 ppm) or all of the material being transported at a time will have less than a safe mass of U-235 at the highest enrichment in transport. Materials may be in one container or piece of equipment or several containers or pieces of equipment.

The stated concentration is given in Section 5.2 of the SAR and is consistent with the concentration given in 10CFR71.53 which exempts materials from being classified as fissile for the purposes of off-site transport.

Class II. Materials for which spacing is required.

Materials will be secured such that the spacing will be maintained during transport. The plant speed limit will be maintained. Individually, materials will contain less than a safe mass of U-235, materials will be contained in volumetrically favorable containers, or materials will be contained in geometrically favorable containers.

The securing mechanisms will ensure spacing during normal transport and small transport abnormalities; e.g., bumps in roads, minor collisions. An overturning of the transport vehicle or a major collision at speeds exceeding the plant speed limits would be required to create the potential for criticality.

Class III. Large UF6 Cylinders

The exclusion for large UF_6 cylinders of solid UF_6 in storage is addressed in Section 4. The NCS considerations for these cylinder movements on roadways would be the same as cylinder movements in the cylinder storage yards.

Class IV. Materials Packaged for Offsite Transport

Materials meeting the criteria and limits for 10CFR71 for offsite transport will not require coverage by CAAS.

Offsite shipment criteria have been established such that CAAS are not required. Therefore, materials meeting the offsite shipment criteria should be excluded from CAAS coverage.

Section 4. EXCLUSION FOR LARGE CYLINDERS OF UF_6 IN STORAGE YARDS

4.1 INTRODUCTION

The purpose of this section is to justify an exclusion from 10 CFR Part 76.89 for all cylinder storage yards/lots (X-745B Toll Enrichment Process Gas Yard-UEA; X-745D Cylinder Storage Yard; X-745F North Process Gas Stockpile Yard) that may have UF_6 cylinders containing >1 wt% ^{235}U but $\leq$ 5 wt% ^{235}U, which are not covered by an existing CAAS at the Portsmouth Gaseous Diffusion Plant (PORTS). This justification is based on the *Justification for Excluding UF_6 Cylinder Storage Yards from Criticality Accident Alarm Coverage*[11], KY/S-271 (see attachment). This document evaluates the hazards associated with, and the controls applied to, cylinders containing >1 wt% ^{235}U to determine the credibility of a criticality accident. This document demonstrates that a criticality accident is not credible in the cylinder storage yards/lots at PGDP, thus an exclusion for the UF_6 cylinder storage yards/lots from CAAS coverage is warranted. Since the cylinder storage yards/lots at PORTS are similar to those at PGDP, the exclusion can be extended to the cylinder storage yards/lots at PORTS.

The credible accident scenarios addressed in the exclusion justification for PGDP involve the introduction of moderator into the UF_6 cylinder. Accident scenarios that involve the release of UF_6 or UO_2F_2 from the cylinder to a location where the uranium might form a critical configuration are not considered credible at either PGDP or PORTS. Periodic surveillance of the cylinders will detect the collection of UF_6 or UO_2F_2 from the cylinder before a sufficiently large quantity could accumulate into a critical configuration. There are no mechanisms in the immediate area of the storage yards/lots at either PGDP or PORTS that would facilitate the collection of released material into a layer that exceeds the minimum critical slab thickness.

4.2 COMPARISON OF THE PGDP CYLINDER STORAGE YARDS/LOTS TO THE PORTS CYLINDER STORAGE YARDS/LOTS

There is no difference in materials in the cylinder yards at PGDP and the cylinder yards/lots at PORTS as far as enrichment of ^{235}U (both a maximum of 5 wt% ^{235}U), type of cylinders stored, or cylinder inspection methods (both plants use the same procedure). The following operational differences exist between PORTS and PGDP; PORTS allows the stacking of cylinders, PORTS has an overhead crane system over some of the cylinder storage yards/lots, and the PORTS peak ground acceleration for a 1,000 year earthquake (0.17 g[12]) is less than PGDP. The last difference is bounded by the PGDP case. The two differences not bounded by PGDP, stacking cylinders in the storage yards/lots and heavy equipment (overhead crane system) above/adjacent to the storage yards/lots are discussed in the following two sections.

4.2.1 STACKING CYLINDERS IN OUTSIDE CYLINDER STORAGE YARD/LOTS

At PORTS cylinders are stacked a maximum of three high in cylinder storage yards/lots (Reference 13). Two additional scenarios are possible due to stacking.

The first scenario is that a cylinder could be breached while stacking. The breach is due to impact, drop, or puncture. This scenario is covered in Reference 11 Section 4.1.

The second scenario is that a cylinder is damaged in such a way that the damage is not detected. This scenario is covered in Reference 11 Section 4.4.

4.2.2 OVERHEAD CRANE SYSTEM

Several cylinder storage yards/lots at PORTS have overhead crane systems for moving cylinders. Six additional scenarios are possible due to the presence of the overhead crane system.

The first scenario is that the crane drops the cylinder while transporting it. The dropped cylinder is breached due to impact, drop, or puncture. This scenario is covered in Reference 11 Section 4.1.

The second scenario is that the crane drops the cylinder while transporting it but it is only damaged in such away that the damage is not detected. This scenario is covered

in Reference 11 Section 4.4.

The third scenario is that the crane drops a cylinder while transporting it onto another cylinder(s) causing either the dropped cylinder or target cylinder(s) to be breached. The breach is caused by the impact, drop, or puncture. This scenario is covered in Reference 11 Section 4.1.

The fourth scenario is that the crane drops the cylinder while transporting it onto another cylinder(s) causing either the dropped cylinder or target cylinder(s) to be damaged in such away that the damage is not detected. This scenario is covered in Reference 11 Section 4.4.

The fifth scenario is that part of the overhead crane system falls onto the cylinders breaching one. The breach is caused by an external impact. This scenario is not covered in Reference 11 Section 4.2 since PGDP does not have any heavy equipment adjacent to or over their storage yards. There are four events that could cause the overhead crane system to fall; mechanical failure, tornado, earthquake, or flood. Flooding is not a credible event since PORTS is 110 feet[14] above the 500-year flood level. The mechanical failure of the overhead crane system is not considered credible since the crane is inspected every shift[14]. The remaining initiators, tornado and earthquake are credible.

The frequency of a tornado and earthquake are discussed in Reference 11 Section 4.2 for PGDP and in References 14 and 12 for PORTS. In both cases the availability of sufficient moderation, successful detection, and ease of repair was considered. For both the tornado and earthquake successful detection and repair, in less than a week, is possible due to the high alerting factor of either event (see Table 4.2.2-A and 4.2.2-3).

The sixth scenario is that part of the overhead crane system falls onto the cylinders damaging one in such away that the damage is not detected. This scenario is covered in Reference 11 Section 4.4.

Table 4.2.2-A. Criticality accident scenarios for PORTS cylinder storage yards/lots.

Mechanism of Breach	Initiators	Cause(s)	Consequences	Response Time[1]	Likelihood
1. Immediate Mechanical Breach	external impact during storage	h. tornado, tornado missiles, or high wind missiles cause part of the overhead crane to fall into the cylinder storage yards/lots	Cylinder breach; water/atmospheric moisture enter cylinder; unsafe configuration	W	A tornado causing part of the overhead crane system to fall into a cylinder yard/lot is a credible event. Reference 15 indicates a tornado missile would not permit the introduction of water unless a missile penetrated a cylinder wall or impacted a cylinder valve. Reference 15 also indicates a tornado missile will not penetrate a cylinder wall unless corrosion has reduced the thickness of the thin-walled cylinders to less than one-half. Detection of the breach is considered credible considering the high alerting factors of the event. When the cylinder is inspected following the event, the damage will be detected and repaired to limit the amount of liquid that can enter the cylinder. This criticality scenario is not considered credible.
		i. earthquake causes part of the overhead crane system to fall into the cylinder storage yards/lots	Cylinder breach; water/atmospheric moisture enter cylinder; unsafe configuration	W	An earthquake causing part of the overhead crane system to fall into a cylinder yard/lot capable of breaching a cylinder is a credible event. Detection of the breach is considered credible considering the high alerting factors of the event. When the cylinder is inspected following the event, the damage will be detected and repaired to limit the amount of liquid that can enter the cylinder. This criticality scenario is not considered credible.

[1] S = immediate (< 24 hours)
W = < week
M = < month
L = < 4 years

Table 4.2.2-B. Summary of criticality scenarios for PORTS.

Accident Identifier	Initiator/Cause Frequency	Prevention/Mitigation	Estimate of Criticality Likelihood[2]
1. Immediate Mechanical Breach			
1.h tornado, tornado missiles, or high wind missiles cause part of the overhead crane to fall into the cylinder storage yards/lots	C	Na/inspection and repair of impacted cylinders after a tornado	D - As discussed in Table 4.2.2-A, this criticality scenario is not considered to be credible.
1.i earthquake causes part of the overhead crane system to fall into the cylinder storage yards/lots	B	NA/inspection and repair of impacted cylinders after the earthquake	D - As discussed in Table 4.2.2-A, this criticality scenario is not considered to be credible.

[2] A = $f > 10^{-2}$/yr
B = $10^{-2} > f > 10^{-4}$/yr
C = $10^{-4} > f > 10^{-6}$/yr
D = $f < 10^{-6}$/yr

Section 5. EXCLUSION FOR THE BUILDING XT-847 OUTSIDE STORAGE PAD

An exclusion is requested from criticality accident alarm system coverage of the outside storage pad immediately west of XT-847.

The storage pad immediately west of XT-847 is used to store B-25 boxes containing contaminated dry waste and scrap metal. Each B-25 box stored there is limited to ≤ 100 grams U-235. All boxes have been NDA measured prior to storage. B-25 boxes can be grouped provided that there is ≤ 600 grams per group and each group is 12-inches edge-to-edge from adjacent groups.

The material is not permitted to be transferred from one container to another stored on the outside pad.

The stated gram limit for uranium-bearing waste material is stated in Section 5.2.2.5 of the SAR and is consistent with the gram limit given in 10CFR71.53 which exempts such materials from being classified as fissile for the purposes of off-site transport (15 grams U-235).

ANSI/ANS 8.3 states the need for a criticality accident alarm system is to be evaluated for all activities in which the inventory of fissionable materials in individual unrelated areas exceeds 700 grams U-235. Individual areas may be considered unrelated when the boundaries between such areas are such that there can be no interchange of materials between areas, the minimum separation between material in adjacent areas is 10 cm, and the areal density of fissile material averaged over each individual area is less than 50 grams U-235/m^2. The limits on these operations, as described above, meet these conditions. The limit of 700 grams U-235 and the areal density of 50 grams U-235/m^2 is consistent with Section 5.2.2.5 of the SAR.

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12. *Final Safety Analysis Report for Portsmouth Gaseous Diffusion Plant*, GAT/GDP-1073, originally issued April 1985.

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17. Deleted

18. Deleted

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