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Director, Nuclear Regulatory Division
DOE, RFFO

TRANSMITTAL OF AN UNREVIEWED SAFETY QUESTION DETERMINATION, USQD-559-03.0595-JCS, INTERACTIONS BETWEEN WASTE MANAGEMENT CELL, WMC-559-1 AND WMC-559-2, RCRA UNIT 10, AND BUILDING 559 COMPLEX FACILITIES - TJH-001-03

This letter transmits the subject document for your information. The Unreviewed Safety Question Determination (USQD) was prepared in support of the activation of two Waste Management Cells (WMC) controlled by the Building 559 Complex. The DOE/RFFO approval of Appendix J to the Site Safety Analysis Report (SSAR) required in Appendix A to submit all negative USQDs that could affect a Hazard Category 2 or 3 nonreactor nuclear facility to RFFO 30 days prior to authorizing operation of a WMC. Building 559 Complex management is preparing to activate the two cells in conjunction with the implementation efforts of Revision 3 of the SSAR scheduled for February 17, 2003.

If you have any questions regarding this transmittal, please contact John J. O'Brien at extension 5308.

Timothy J. Humiston
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Project Chief Engineer, RISS ESH&Q

JCS:wjd

Enclosure:
As Stated

Orig. and 1 cc - Ron Bostic



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GIBBS, F.		
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HUNTER, D.	X	
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MYERS, K.		
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SELAN, J.	X	X
POPPELL, F.		
FOSTER, K.	X	X
CORRES. CONTROL	X	X
ADMIN RECD/DOE	X	X
TRAFFIC		
PATS/130		
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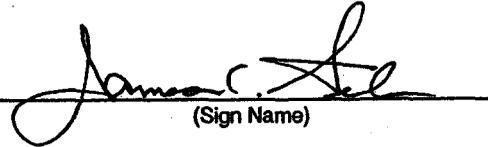
PHETS Nuclear Safety

UCR Environmental Safety & Health Department

Cover Sheet

USQD No.: <u>USQD-559-03.0595-JCS</u>	Revision No. <u>0</u>	Building <u>559</u>	Page <u>1</u> of <u>13</u>
Title: <u>Interactions Between Waste Management Cell, WMC-559-1 and WMC-559-2, RCRA Unit 10 and Building 559 Complex Facilities.</u>		Charge #: <u>FAB711-00</u>	

AB-implementing procedure cancellation

Preparer QP/QEV <u>James C. Selan</u> (Print Name)	 (Sign Name)	Date <u>1/6/03</u>
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(REVIEWED/APPROVED for non-USQ, REVIEW for USQ) Independent QEV <u>Susan K. Omberg</u> (Print Name)	 (Sign Name)	Date <u>1/6/03</u>
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Fire Protection Engineering FPE <u>Susan K. Omberg</u> (Print Name)	 (Sign Name)	Date <u>1/6/03</u>
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(Approval for USQ)

ISRC/PRC Chair _____	_____
(Print Name)	(Sign Name)

ISRC/PRC Meeting No. _____ Date _____

REVISION DOCUMENTATION

Reviewed for Classification/UCNI

Reason for Revision: _____

By: Charles Lerner

Title: DC/RO

Date: 1-7-03

NOTE: Additional signatures may be added as determined by the QP, QEV, or Independent QEV. Engineering concurrence shall be obtained when evaluating an SER or engineering design documents.

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Title: Interactions Between Waste Management Cell, WMC-559-1 and WMC-559-2, RCRA Unit 10 and Building 559 Complex Facilities.

Description and Proposed Activity or Discovered Condition:

The Proposed Activity is the activation of two Waste Management Cells controlled by the Building 559 Complex. This USQD evaluates the potential interactions between outdoor radioactive waste management activities and Building 559 Complex facilities and RCRA Unit 10. Appendix J to the Site Safety Analysis Report (Site SAR) provides the Authorization Basis for Outdoor Waste Management activities at RFETS. Specific areas are identified around the Building 559 Complex in which outdoor radioactive waste management activities may be performed, and these areas are designated as Waste Management Cells (WMCs). Appendix J evaluates various activities that may be performed within these WMCs, associated with receiving packaged radioactive waste from the facilities, staging or storing this waste, and loading it onto transportation vehicles for eventual offsite disposal or treatment. These activities could potentially impact adjacent facilities, and facility activities could potentially impact the WMCs.

There are 8 predefined WMCs around the Building 559 Complex identified in Appendix J, Section 2.2:

Designation	General Description – See Appendix J for Specific Information
WMC-559-1	Area Located north of Building 559 and west of Building 563, separated from Building 563 and Building 559 by the roads, an area approximately 140 ft by 70 ft.
WMC-559-2	Area located immediately west of Building 561. Between the building and the road, an area approximately 100 ft by 35 ft.
WMC-559-3	Area Located south of Building 559, north of Building 528, and northeast of Building 561, separated from Building 559 by the road, a pie-shaped area approximately 30 ft by 50 ft.
WMC-559-4	Area located immediately east of building 559, north of building 528, separated from building 528 by the road, an area approximately 40 ft by 25 ft.
WMC-559-5	Area located west of Building 564, an area approximately 60 ft by 50 ft.
WMC-559-6	Area located east of Building 564, an area approximately 35 ft by 50 ft.
WMC-559-7	Area located west of Building 559, in the old security zone, an area approximately 90 ft by 250 ft.
WMC-559-8	Area located southwest of Building 561, in the old security zone, an area approximately 90 ft by 130 ft.

The Building 559 Complex currently plans to activate and control only two WMCs at this time. The two WMCs are WMC-559-1 and WMC-559-2. This USQD only evaluates WMC-559-2 as WMC-559-1 meets the criteria listed in Appendix J, Section 3.1.2.9, Waste Management. Use of additional WMCs will require submittal of a negative USQD to DOE, RFFO at least 30 days prior to authorization, in accordance with Technical Direction in Appendix A of the DOE, RFFO Safety Evaluation Report approving Appendix J.

TRU wastes may be handled and staged for shipment at building docks in accordance with existing AB controls. The Building 559 Complex DBIO includes TSR AC 5.2.1.2 which allows a shipment of up to 30 TRU waste drums or 10 Standard Waste Boxes to be staged outside the building for one shift.

Impact on Facilities

The Introduction to Appendix J states that potential accidents associated with Outdoor Waste Management activities (e.g., fuel pool fires, ground vehicle impacts) that could negatively impact an adjacent Hazard Category 2 or 3 Nuclear Facility are either (1) analyzed in facility-specific AB documents or (2) must be screened against both the facility AB documents and Site SAR Appendix J using the Unreviewed Safety Question Determination process.

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This USQD identifies the potential accidents that could affect Building 561 and RCRA Unit 10, and compares these scenarios to those already evaluated.

Impact on WMCs

Potential accidents in Buildings 559 and 561 that could impact the adjacent WMCs are evaluated in Site SAR Appendix J. For instance, Appendix J evaluates a seismic event [Section 4.4, Scenario NPH 1/Seismic-Induced Structural Failure] which causes a nearby structure to fall onto packaged waste items stored in a WMC. In this analysis, all of the containers in a single WMC, with a total Material At Risk (MAR) of 900 g, are assumed to be breached by the collapse. Although most building accident scenarios do not breach the building walls and would not affect a WMC, certain scenarios could occur in associated equipment outside the building, which could affect an adjacent WMC. This USQD discusses the potential accidents in the facilities that could affect adjacent WMCs, and compares them to scenarios already evaluated in the facility ABs or in the Site SAR:

An Unreviewed Safety Question Determination (USQD) is prepared because the impact of outdoor waste management cell activities within the Building 559 Complex is not currently described in the facility AB documents.

Reference Documents:

1. Building 559 Complex Decommissioning BIO, September 24, 2002, Revision 0.
2. FHA-559-004, Building 559 Complex Fire Hazards Analysis, Revision 3
3. FHA-RCRAWMC-001, RCRA Units and Waste Management Cells Fire Hazards Analysis
4. Safety Analysis and Risk Assessment Handbook (SARAH)
5. PRO-1682-WMC-SURV-559, Waste Management Cell Monthly Surveillance.
6. Rocky Flats Environmental Technology Site Safety Analysis Report (Site SAR), Appendix J, Outdoor Waste Management, Revision 0, July 2002.
7. PRO-1683-INV-COMP, Verification of AOL 1.3 Gram Limit Compliance (DRAFT).
8. Site Safety Analysis Report, Revisions 2 and 3, November 2000 and September 2002, respectively, including Appendices I and J.
9. PRO-510-CSS, Liquid Petroleum Fuel Handling, Delivery and Monitoring, Revision 3.

Applicable Requirements:

A review of the documents on the Authorization Basis Document List (ABDL) for the Building 559 Complex, Site SAR including Appendices I (RCRA Storage Units) and J (Outdoor Waste Management) was performed during the preparation of this evaluation.

Building 559 DBIO

DBIO Chapter 2	Facility Description: Provides general descriptions of facility structures and systems.
DBIO Chapter 3	Safety Management Programs: Discusses implementation of the Site Safety Management infrastructure within the Building 559 Complex. Some of the specific SMPs relevant are COOP, Radiological Protection, Fire Protection, Waste Management.
DBIO Chapter 4	Activity Description: Discusses the Key activities along with representative tasks including waste handling/storage
DBIO Chapter 5	Hazard Identification and Analysis: Addresses the various hazards encountered within the Building 559 Complex and the available controls.
DBIO Chapter 6	Accident Analysis: Evaluates various postulated accidents including fires, spills, NPH, etc.
DBIO TSR AC 5.2.1	Material Management Controls: Discusses the controls for Waste package storage/staging.

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Building 559 DBIO (continued)

DBIO TSR AC 5.3.1	Combustible Material Controls: Discusses the control of Combustible Material involved with work and waste storage activities.
DBIO TSR AC 5.4	Safety Management Programs: Discusses action required for program deficiencies.
DBIO TSR Section-6	Design Features: Discusses the Periphery Confinement Barrier.

Site SAR

SSAR Chapter 3	Site Configurations, Support systems and Utilities: provides descriptions of Site operations, support systems, etc.
SSAR Chapter 4	Site hazards Assessment: identifies and discusses the various categories of hazards
SSAR Chapter 5	NPH and External events: Discusses these categories of hazards.
SSAR Chapter 6	Safety Management Programs; discusses the Site Safety Management Program infrastructure.
SSAR Chapter 7	Site Controls: Discusses the various Site level controls credited.
SSAR Chapter 8	Transportation Safety Analysis: Analyses various transportation accident scenarios.
SSAR Appendix I	RCRA Storage Units: Provides the safety analysis and controls of the various RCRA Storage Units including RCRA Unit 10.
SSAR Appendix J	Outdoor Waste Management:: Provides the safety analysis and controls of outdoor waste storage activities.

Safety, Operating Functions, and Operating Conditions Identification:

This evaluation is primarily concerned with interactions between activities in outdoor WMCs and Buildings within the 559 Complex and with RCRA Unit 10 that could affect credited features or functions, or that could create new or different hazards that have not been previously evaluated.

Building 559 SSCs:

Potentially Affected Credited Features – Confinement

The 559 DBIO documents the credit for confinement integrity with reducing the consequences of various accidents, to both the public and workers. Design Feature 6.1 identifies that periphery confinement barriers (e.g., walls, roof, doors, and floors) work in conjunction with the ventilation system to contain radiological releases consistent with the building leakpath factors used in the accident analysis. Periphery confinement barriers provide the boundary for maintaining pressure differentials and contain airborne contamination as credited in the accident analysis. The accident analyses do not credit the periphery confinement barriers with a specific fire rating although the walls are credited indirectly with having a 1-hour fire rating equal to the fire duration of the major fire in which confinement is maintained. They assume that combustible materials will not challenge the periphery confinement barriers, as maintained by the Combustible Control program and TSR Administrative Controls. Features included as part of periphery confinement barrier include structural integrity, fire resistance, and the ability to maintain pressure differentials. Confinement integrity is ensured by maintaining the Laboratory Area in Building 559 (Zone II) with at least 0.1 inches w.g. negative with respect to atmospheric reference in accordance with LCO 3.1.1. Building 561 does not have a credited confinement barrier differential pressure requirement. It is understood that the existence of the Building 561 walls will provide some (not credited) confinement of any release occurring within the facility.

Potentially Affected Essential Support SSCs – Electrical Power

Electrical power is an essential support system to maintain exhaust ventilation systems to meet LCO 3.1.1. Auxiliary or temporary configurations or systems may be required during decommissioning. Electrical power is provided to the Building 559 Complex via overhead transmission to a outside transformer. This transformer is located on the east side of Building 559 is at a significant distance to preclude interaction with the two WMCs. A power pole with three-mounted oil filled transformers is located at the northeast corner of building 561. These transformers can contain from 25 to 40 gallons of oil depending on the manufacturer.

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Potentially Affected Non-Essential SSCs – Diesel Generator

Building 559 has a diesel generator located within Room 131. This generator provides standby power to various systems. Diesel generators contribute to reliability or ease of operation and are maintained in accordance with AC 5.6. Maintaining non-essential required systems or components is not a credited control because these systems are not required to meet any LCO requirements or assumptions in the accident analysis. Diesel fuel to support operation of this electric generator is located in an above ground 1000-gallon storage tank located on the north side of building 559 adjacent to 59 Drive roadway. This tank is located at least 90 feet from WMC-559-1 on elevated ground above the roadway. Should a spill occur at the tank, the fuel would flow away from the building and the WMC.

RCRA Unit 10:

Based on the Hazards and low risks associated with activities of RCRA Storage units, no safety structure, system of component is credited for protection of the receptors. Therefore there are no Limiting Conditions for Operations. Several administrative controls are credited with the primary one being inventory control and material management.

Outdoor Waste Management Activities:

Outdoor radioactive waste management activities identified and evaluated in Appendix J to the Site SAR include the following:

- Receipt of radioactive packaged waste from Site transportation vehicles, including the unloading of the vehicles by forklifts and cranes or detaching trailers from tractors
- Packaging/repackaging of waste not involving externally contaminated packaged waste
- Outdoor storage of radioactive packaged waste
- Staging of radioactive waste in truck trailers, on flatbeds, or other transportation vehicles
- Bulk storage of wastewater or organic solutions in tanker trucks
- Loading of radioactive packaged waste onto Site transportation or offsite transportation vehicles, including the loading of the vehicles by forklifts and cranes or attaching trailers to tractors
- Cleanup of spills
- Maintenance / repair of trailers, cargo containers, etc.

These outdoor waste management activities are described as parts of three activity modules: Waste Storage and Handling, Waste Generation, and Routine Activities. The waste types evaluated include low Pu content wastes such as LLW/LLMW, SCO, and LSA materials. Unconfined packaging and repackaging of externally contaminated waste is not authorized. The MAR is limited by Administrative Operating Limits (AOLs) in Appendix J, and by procedural controls (e.g., PRO-1682-WMC-SURV-559), to the following:

- Total quantity of nuclear material present at a WMC – 900 grams WG Pu
- Quantity of nuclear material in a packaged waste item received, staged, or stored at a WMC:
 - Container (Box or Crate) \leq 5520 lbs – 3 grams WG Pu
 - Container (Box, Crate, or Cargo Container) $>$ 5520 lb – 6 grams WG Pu
 - non-containerized SCO or LSA item – 6 grams WG Pu

The Appendix J AOLs also include the following items, which are precluded for Building 559 Complex WMCs by procedural controls in PRO-1682-WMC-SURV-559:

- Total quantity of nuclear material in non-aqueous liquid waste at a WMC – 150 grams WG Pu
- Quantity of nuclear material in a packaged waste item received, staged, or stored at a WMC:
 - \geq 55 gallon Drums – 0.5 grams WG Pu
 - $<$ 55 gallon Drums and $>$ 10 gallon Drums – 0.4 grams WG Pu
 - \leq 10 gallon Drums – 0.2 grams WG Pu
 - Tanker truck containing liquid – 6 grams

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The Building 559 Complex DBIO allows TRU waste packages to be staged outdoors in preparation for shipment. TSR AC 5.2.1 allows up to 30 TRU waste drums (or 10 Standard Waste Boxes – SWBs) to be located in an area outside of confinement and sprinklers for the shift it is intended to be transferred.

Failure Mode, Hazard, and Accident Identification:

Given the two WMCs being evaluated and planned for activation, the following is the identification of the potential hazards:

WMC-559-1:

- Southern edge of the cell boundary is approximately 30 feet from the 59 Drive roadway and approximately 60 feet to the closest exterior wall of Building 559;
- Eastern edge of the cell is approximately 10-feet from the entrance roadway to Building 566;
- Overhead electrical power lines are running east/west approximately over the center of the cell;
- Overhead steam lines at the eastern and southern edges of the cell;
- A 1000-gallon above ground diesel fuel tank for Building 559 EGEN 1 is located approximately 90 feet from closest cell boundary. A portion of the 59 Drive is used as the fuel delivery route;
- 59 Drive is a delivery route for Argon/Liquid Nitrogen tank filling as well as the roadway encircling Building 559 on the western/southern/eastern sides of the building. This roadway is also used for other vehicle access.;
- Northern edge of the cell is approximately 45 feet from Building 566.
- A wooden shack used to house the Building 559 personnel accountability board is located adjacent to the southern cell boundary.

WMC-559-2:

- Eastern cell boundary is directly adjacent to RCRA Unit 10; Note: When the RCRA Unit is closed out and the cargo containers removed, the WMC eastern boundary can extend eastward towards the west exterior wall of Building 561;
- Western cell boundary is approximately 10 feet from security zone old patrol road;
- Northern cell boundary is approximately 20 feet from roadway encircling Buildings 559 that also separates 561 and is approximately 60 feet from the southern exterior wall of Building 559. The northern cell boundary is elevated above the roadway.
- Overhead electrical power lines are located at northern edge of the cell boundary along with a power pole with three-mounted oil filled transformers.
- Closest cell boundary to Building 559 South Dock is approximately 50 feet where material is received (e.g., samples)/transferred (e.g., waste packages).
- 59 Drive is a delivery route for Argon/Liquid Nitrogen tank filling and the roadway encircling Building 559 on the western/southern/eastern sides of the building. This roadway is also used for other vehicle access.

RCRA Unit 10:

- Currently contains 8 cargo containers with stored liquids inside a marked boundary. There is also one small cargo container with RCRA Unit miscellaneous supplies (e.g., empty drums, lids) located outside the marked boundary ;
- Cargo containers are approximately 6 feet from Building 561 exterior walls;
- Closest cargo container to a roadway (old patrol road) is approximately 25 feet.

Potential Hazards Interactions:

WMC-559-1:

- Fuel delivery route/filling for EGEN-1 storage tank;
- Vehicle impact;
- Falling utilities structures from seismic event.

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WMC-559-2:

- Vehicle impact of a waste package and/or power pole;
- Collapse of Building 561 exterior walls in seismic event;
- Building 561 internal fire;
- RCRA Unit 10 Fire/Spill;
- Falling utilities structures from seismic event;
- Argon tank breach.

Other potential impacts for both WMCs:

- Tornado/high wind missile;
- Lightning strike;
- Aircraft crash; and
- Crane load drop

Outdoor waste management activities include the use of cranes, forklifts, and other vehicles that could potentially fail and result in a loss of building confinement or a loss of credited SSCs or essential support equipment. The accidents that could potentially be associated with these failures include fires, explosions, external events, and spills due to material handling accidents (e.g., crane load drop, vehicle impacts).

The following discussions identify the applicable potential accident scenarios in the Building 559 Complex DBIO and the Site SAR Appendices I and J.

Fires

Appendix J postulates two bounding fire scenarios. The first is an *unlikely* major waste container fire in which 8500 gallons of diesel fuel are spilled on or into a WMC and all the waste containers are involved (MAR is 900 grams). The second is an *anticipated* fire in which 150 grams of non-aqueous waste (limited by inventory controls) is involved.

Appendix I considers fires with the potential to impact the immediate worker and the collocated worker. A fire originating in a cargo container would not be expected to cause any significant impact to adjacent cargo containers or contents. One scenario involves a fire resulting from the impact of a vehicle. For RCRA Unit 10 the estimated MAR is 22 gram Pu per waste storage group with the available MAR for vehicle impacts is 1.1 gram Pu. Given the low quantities of MAR, Appendix I assumes no interaction between waste storage groups the consequence for this scenario is low. A second scenario involving a fire is the aircraft crash. For this scenario, 2 waste storage groups are involved with an available MAR of 44 grams Pu. The resulting consequences for this scenario are Risk Class IV for the Public and Risk Class III for the Worker (collocated).

Control of quantities combustible materials, including separation distances of fuel packages reduces the likelihood of fire initiation and fire growth.

Major Waste Container Fire in a WMC

The major waste container fire analysis considers releases from drums that experience lid loss and seal failure, and determines that the delivery route of large fuel tanker trucks should be controlled to ensure that the tanker is not driven on a WMC. This control reduces the frequency from *unlikely* to *extremely unlikely*, and reduces the associated risk class from II (without prevention) to III. This event would bound any fire associated with the pole-mounted oil filled transformers.

Non-aqueous Liquid Waste Fire in a WMC

The analysis of a fire involving non-aqueous liquid waste (e.g., solvents, oils) stored in drums or tanker trucks at a WMC determines that an inventory control is required to limit the inventory of these liquids in a WMC. By limiting a WMC to 150 grams WG Pu in non-aqueous liquid waste, the risk class for this *anticipated* scenario is reduced from I (unmitigated) to III.

Impact on Building Confinement

The Building 559 Complex DBIO evaluated an *unlikely* major fire (Section 6.2.2.5) involving volatile liquids in the laboratory area of Building 559. The evaluations determined that building confinement would not be lost during this fire scenario. The DBIO also evaluated a large pool fire outside involving LLW and TRU waste

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(Section 6.2.2.3). Building confinement is not breached in these fire scenarios as well. The exterior west and south walls of the Building 559 laboratory area have a fire resistance rating of 2 hours. A large fire inside Building 561 involving a size Reduction tent activity is also analyzed in the DBIO. This fire results in not crediting any controls including periphery confinement barriers. The walls of the Building 561 are not cited with any fire resistance rating. The FHA concludes that the Building 561 fire area has insignificant quantities of combustible material to support fire spread. A fire in either WMCs would not be expected to exceed the DBIO and Appendix J analyses.

Impact on Electrical Power

As discussed above, electric power to Buildings 559 and 561 is via an outside transformer located on the east side of Building 559. The distance between this incoming power source and either WMC is significantly large to preclude any interaction. The DBIO (Section 6.2.6) does evaluate a station blackout event, which would bound any WMC interaction if it were to occur.

Impact of Electrical Equipment on WMC

The Fire Hazards Analysis for WMCs, FHA-RCRAWMC-001, evaluates surrounding utilities in Section 8.2.5, and concludes that overhead electrical lines can ignite combustible waste containers. The WMC FHA states that the potential for utilities to act as ignition sources is remote, and requires FPE review of WMC locations. The two planned WMCs for activation are acceptable because adequate separation from utilities is provided and the waste packages are of metal construction. The Fire Protection SMP controls combustible material loading. A vehicle impact on the power pole with the three-mounted oil filled transformers is addressed above.

Interaction with Fuel Storage Tanks and Fuel Delivery.

WMC-559-1 is located at approximately 90 feet from the above ground diesel fuel storage tank for EGEN-1 in Building 559. FHA-RCRAWMC-001 requires a separation distance of 25 feet for tanks between 501 gallons and 2,000 gallons. WMC-559-2 is located at a significant distance from either fuel the storage tank for EGEN-1 or EGEN-2. The EGEN 2 tank is located southeast of Building 562 adjacent to Eighth Street. Fuel delivery in excess of 400 gallons is required to maintain a 25-foot separation distance. For 400 gallons and less there is no separation distance requirement. A portion of the 59 Drive roadway adjacent to the fuel storage tanks is used for delivery.

Interaction with Staged TRU Waste Containers

The Building 559 DBIO authorizes staging of a shipment of TRU waste outside the building for one shift. The South Dock of Building 559 can be used for such staging although its size significantly limits the number of containers that could be staged. The distance between the South dock and WMC-559-2 (when RCRA Unit 10 is closed) is approximately 50 feet. This separation prevents a fire in WMC-559-2 from affecting TRU waste containers on the dock. No other TRU waste staging areas have been identified to date. Any new location would be evaluated by FPE and be subject to combustible material controls and separation (buffer zone). The existing DBIO analyses will not be affected by a fire in an activated WMC.

Impact on Ventilation Systems

FHA-RCRAWMC-001, Section 8.5 evaluates fires in WMCs and discusses the impact of the associated smoke on ventilation systems in adjacent buildings. The FHA states that intake plenums could be affected due to smoke exposure or smoke could enter facilities through ventilation intakes. However, standard operating procedures for other exterior fires provide direction to shut down intake ventilation systems and the FHA concludes that no additional controls are necessary.

Interaction with RCRA Unit 10

WMC-559-2 is directly adjacent to RCRA Unit 10. FPE has reviewed the boundary of WMC-559-2 in accordance with FHA-RCRAWMC-001 and determined that a separation distance of 6 feet exists between the cell and RCRA Unit 10 boundary when active. A separation distance of 6 feet exists from Building 561 when RCRA Unit 10 has been closed and the cell boundary extended eastward towards Building 561 exterior west wall. This separation is determined to be adequate given the substantial and non-combustible material construction of Building 561 and the use of only noncombustible metal containers in both RCRA Unit 10 and the WMCs. AC 5.3.3 in the DBIO prohibits the use of wooden containers for packaging radioactive waste.

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Based on the above, the interactions between WMCs and Buildings 559 and 561 and RCRA Unit 10 do not result in a clearly discernible increase in frequency or consequences of previously analyzed fire accident scenarios.

Spills

Crane Load Drop Impact

WMCs 559-1 is located at least 60 feet from Building 559 exterior walls so that a crane load impact that could breach the building is not likely to occur. A more significant distance exists to the confinement barrier surrounding the laboratory area where fissile material is present. A crane load impact accident that could breach the building is not likely in this WMC. The closest distance of a waste package located in WMC-559-2 when RCRA Unit 10 is closed is 6 feet. A crane load impact accident impacting Building 561 could occur. Building 561 is not credited with requiring a confinement barrier for maintaining a differential pressure. Crane load impacts or drop accidents are evaluated as spill accidents.

Appendix J postulates that a large waste container (e.g., cargo container) is dropped during handling by a crane and falls upon five other containers of packaged waste. All packages are assumed to be breached by the impact, and each package is assumed to contain 15 grams, for a total MAR of 90 g WG Pu. It is noted that Appendix J analyses evaluate packages with 15 grams of MAR, while the AOLs conservatively limit individual packages to a maximum of 6 grams. This spill scenario is assumed to be *anticipated* and the resulting unmitigated risk class is III. A crane load drop in a WMC that impacts an adjacent building and breaches the periphery confinement boundary is not evaluated in Appendix J, but this scenario would be a subset of accident scenarios that involve crane load impacts in WMCs and of accidents that involve impacts with structures, and it is therefore considered to be *unlikely*.

Appendix I addresses spills occurring during routine activities considering a breach and a non-breach. However, due to the types of releases involved with Low Level Waste (packaged 0.5 grams Pu /55-gallon drum and less than 3 grams Pu/waste box), the immediate worker is only affected with low consequences.

The Building 559 DBIO evaluates a crane load drop outside (Section 6.2.6) that involves the drop of a cargo container onto TRU waste packages staged outside. The source term for this scenario is 3050 grams with a damage ratio of 10% for an effective source term of 305 g Aged WG Pu. The scenario is modeled as a spill, with a frequency of *anticipated*, and the unmitigated Risk Class is III. This scenario did not consider the impact of a confinement breach although it could be shown to be at least equivalent or bounding to a breach involving Building 559. This scenario would certainly bound a breach of Building 561 due to the available source term. Crane use involving lifts directly over a building will most likely be encountered during the last stages of decommissioning (i.e., demolition), where portions of the building must be removed in order to remove large components. Crane load drops of this type are addressed in Section 6.2.3.2. There are no interactions that would increase the consequences of the crane load drop accident analyzed in the DBIO.

Explosions

Appendix I does not evaluate explosion scenarios based on the hazard not being identified.

Appendix J does not evaluate explosion scenarios, because these events were ruled out in the Safety Analysis for Outdoor Waste Management, NSTR-001-02. Appendix J Section 3.1.2.9 identifies minimum separation distances between WMCs and potential explosive hazards such as natural gas lines and propane storage tanks. These separation requirements range from 15 feet from natural gas lines to 126 feet from large propane tanks. The associated Fire Hazards Analysis, FHA-RCRAWMC-001, concludes that this is acceptable in accordance with NFPA codes to ensure that these facilities do not create an explosive hazard to material in the adjacent WMC. Explosions in a WMC would not likely simultaneously affect a waste package and breach a building. In addition, neither a vapor cloud explosion or a turbulent jet explosion of the type possible in a line breach will produce overpressures that can cause rupture of a metal container except in a turbulent jet explosion occurring in the immediate proximity to a waste container. There are no facility interactions associated with explosion scenarios that require further analysis.

AOL STC 5.4 in the Site SAR prohibits the use of propane powered Power Industrial Trucks (PITs) for unloading/loading radioactive materials.

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Accidental Criticalities

Appendix I does not evaluate a criticality scenario based on the hazard not being identified.

Radioactive waste containers permitted in WMCs are restricted to low Pu content items and Appendix J states that a criticality in the WMCs is not credible. The 200-gram TRU waste drums are permitted to be staged in a planar array. A 15-gram LLW container is considered exempt from criticality concerns and placing (or crashing) it adjacent to or on top of these drums would not exceed previous evaluations. Existing transportation accident analyses would bound potential reconfiguration of material due to an impact accident. No interactions are postulated that could result in an accidental criticality.

External Events and Natural Phenomena Hazards

Seismic Event

Appendix J postulates that a seismic event causes the collapse of an adjacent building structure onto the WMC, breaching all of the stored waste containers, with a total MAR of 900 g. The frequency of this seismically-induced spill scenario is *unlikely* and the unmitigated Risk Class is III.

Appendix I analyses a seismic event. However, RCRA Unit 10 with only an estimated MAR inventory of 69 grams Pu was not explicitly analyzed because other RCRA units with significantly more MAR were shown to be bounding due to allowing the stacking of drums. The bounding case resulted in Risk Class III to the Public and Worker (collocated) receptors with low consequences including the immediate worker.

The Building 559 DBIO evaluates a seismic event that causes structural failure and breach of the building, with a total MAR of 7050 g and an effective source term of 3585 g. The DBIO also addresses a seismic event in conjunction with a fire, an explosion and a criticality. The frequency is assumed to be *unlikely* and the unmitigated Risk Classes are II to the public and I to the worker. No controls can be credited for prevention or mitigation.

Activities in WMCs are not considered to affect the natural phenomena/external event scenarios evaluated in the DBIO. An external event (e.g., seismic, tornado, high winds, lightning) can affect both the WMCs and adjacent buildings, and the consequences for each area have been evaluated in Appendix J and in the applicable facility AB. There are no interactions between facilities and WMCs that would result in any clearly discernible increase in frequency or consequences over those already determined although it is recognized that the consequences of a common-cause event such as an earthquake are additive.

Lightning Breach

Appendix J postulates that a large isolated waste container in a WMC is directly struck by lightning and the lightning vaporizes residual internal liquids that causes a release similar to an internal explosion. The MAR is assumed to be 15 grams, the frequency is assumed to be *anticipated*, and the unmitigated risk class is III. Appendix I addresses a lightning strike as a potential fire initiator. The analysis concluded that a lightning strike in RCRA Unit 10 would not be expected to ignite a fire. If a fire were to occur due to a lightning strike it would be bounded by the aircraft crash scenario.

The Building 559 DBIO does not specifically analyze a lightning strike as an earthquake is the bounding natural phenomena event. A lightning strike may also result in loss of electric power in which the Station Black Out event analyzed (Section 6.2.6) would be bounding. A lightning strike to the pole with the mounted oil filled transformers could result in a pole/transformer fire. The magnitude and consequences of this fire are bounded by the previously analyzed fires.

Activities in WMCs are not considered to affect the natural phenomena/external event scenarios evaluated in the Building 559 DBIO. Waste containers located close to a building would be less likely to be struck by lightning, due to the protection afforded by the building's lightning protection system and nearby overhead electrical power line structures. However, no credit is taken for lightning protection. An external event (e.g., seismic, tornado, high winds, lightning) can affect both the WMCs and adjacent buildings, and the consequences for each area have been evaluated in Appendix J and in the applicable facility AB. There are no interactions between facilities and WMCs that would result in any clearly discernible increase in frequency or consequences over those already determined.

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External Vehicle Impacts

Appendix J postulates that a large vehicle leaves a roadway and crashes into an adjacent WMC, breaching 10% of the stored waste containers, with a total MAR of 900 grams and an effective MAR of 90 grams. The scenario is evaluated as a spill, with a frequency of *anticipated*, and the unmitigated Risk Class is III. The potential of a vehicle impact on the power pole with the three-mounted oil filled transformers is addressed above..

The Building 559 DBIO, although not explicitly addressed, considers that external vehicle impacts would be bounded by other external events such as tornado/high wind missile impacts, which have a frequency of *unlikely*. The use of WMCs 559-1 and 559-2 would involve the same traffic patterns and vehicle activity discussed above and does not increase the likelihood that the building will be breached by a vehicle impact.

Aircraft Crash

See the discussion under Fires above for Appendix I.

Appendix J postulates that a 6000-pound aircraft crashes into a WMC at 90 knots, causing physical damage to 25% of the waste containers and resulting in a fuel pool fire which involves the entire 900-g inventory. This scenario is evaluated as a combined spill and fire scenario, with a frequency of *extremely unlikely*, and the unmitigated Risk Class is IV.

The Building 559 DBIO considers that an aircraft crash scenario would be equivalent to an earthquake with fire. The use of WMCs does not create an interactive impact on this scenario that would exceed the consequences of an aircraft crash into a building alone.

No different type of equipment malfunction, hazard, or accident scenario is postulated for the interaction between WMCs and Buildings within the 559 Complex or RCRA Unit 10. Outdoor Waste Management activities can be performed within the limitations of the TSRs and Administrative Controls in the Site SAR Appendix J, the Building 559 Complex DBIO and the Site SAR Appendix I.

The PA does not involve an increase in the probability or consequences of prompt radiological exposure or non-standard industrial hazards to a level considered immediately dangerous to life and health of the immediate worker. No new hazards are introduced that would require additional specific TSR-level controls to prevent or mitigate consequences to the immediate worker.

USQD Questions:

1. **Could the Proposed Activity or Discovery Issue increase the probability of occurrence of an accident previously evaluated in Safety Analyses? Yes No EXPLAIN:**
Outdoor waste management activities include the use of cranes, forklifts, and other vehicles that could potentially fail and result in a loss of building confinement or a loss of credited SSCs or essential support equipment. The accidents that could potentially be associated with these failures include fires, external events, and spills due to material handling accidents (e.g., crane load drop, vehicle impacts). Potential accident scenarios are discussed above under the Failure Mode discussion. This evaluation concludes that none of the potential interactions between activities in WMCs and the adjacent facilities would increase the probability of occurrence of an accident previously evaluated in the facility and Site Safety Analyses. Outdoor waste management activities do not involve an increase in the probability of radiological consequences or non-standard industrial hazards to a level considered immediately dangerous to life and health of the Immediate Worker. Therefore, the answer to this Question is NO.

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2. **Could the Proposed Activity or Discovery Issue increase the consequences of an accident previously evaluated in Safety Analyses? Yes No EXPLAIN:**
Outdoor waste management activities and associated potential accidents are discussed above under the Failure Mode discussion. This evaluation concludes that none of the potential interactions between activities in WMCs and the adjacent facilities would increase the consequences of an accident previously evaluated in the facility and Site Safety Analyses. Outdoor waste management activities do not involve an increase in the radiological consequences or non-standard industrial hazards to a level considered immediately dangerous to life and health of the Immediate Worker. Therefore, the answer to this Question is NO.
3. **Could the Proposed Activity or Discovery Issue increase the probability of occurrence of a malfunction of Equipment Important to Safety (Safety Class, Safety Significant) previously evaluated in Safety Analyses? Yes No EXPLAIN:**
Outdoor waste management activities include the use of cranes, forklifts, and other vehicles that could potentially fail and result in a loss of building confinement or a loss of credited SSCs or essential support equipment. Activities that could potentially affect the probability of a malfunction of Equipment Important to Safety are discussed above under the Failure Mode discussion. This evaluation concludes that none of the potential interactions between activities in WMCs and the adjacent facilities would increase the probability of occurrence of a malfunction of Equipment Important to Safety, beyond that previously evaluated in the facility and Site Safety Analyses. Therefore, the answer to this Question is NO.
4. **Could the Proposed Activity or Discovery Issue increase the consequence of a malfunction of Equipment Important to Safety (Safety Class, Safety Significant) previously evaluated in Safety Analyses? Yes No EXPLAIN:**
Outdoor waste management activities and associated potential malfunctions of Equipment Important to Safety are discussed above under the Failure Mode discussion. This evaluation concludes that none of the potential interactions between activities in WMCs and the adjacent facilities would increase the consequences of a malfunction of Equipment Important to Safety beyond that previously evaluated in the facility and Site Safety Analyses. Therefore, the answer to this Question is NO.
5. **Could the Proposed Activity or Discovery Issue create the possibility of an accident of a different type than any previously evaluated in Safety Analyses? Yes No EXPLAIN:**
Outdoor waste management activities and their potential interactions with adjacent facilities are discussed above under the Failure Mode discussion. This evaluation concludes that no new or different type of hazard or accident scenario is postulated for the interaction between WMCs and facilities within the Building 559 Complex or with RCRA Unit 10. Outdoor waste management activities will be performed in accordance with credited SMPs and the associated administrative and work controls will ensure that no conditions are permitted to develop that could create the possibility of an accident of a different type than any previously evaluated. No new hazard is created that would require additional specific TSR-level controls to prevent or mitigate consequences to the Immediate Worker. Therefore, the answer to this Question is NO.
6. **Could the Proposed Activity or Discovery Issue create the possibility of a Malfunction of Equipment Important to Safety (Safety Class, Safety Significant, SC-1/2 or SC-3) of a different type than any previously evaluated in Safety Analyses? Yes No EXPLAIN:**
Outdoor waste management activities and their potential interactions with adjacent facilities are discussed above under the Failure Mode discussion. This evaluation concludes that no new or different type of equipment malfunction is postulated for the interaction between WMCs and facilities within the Building 559 Complex or with RCRA Unit 10. Outdoor waste management activities will be performed in accordance with credited SMPs. These activities do not introduce any new operating modes or change the design or function of any Equipment Important to Safety for the Building 559 Complex that could result in a malfunction of equipment important to safety not previously analyzed. The subject work activity does not create the possibility of a malfunction of a different type than any previously evaluated. Therefore, the answer to this Question is NO.

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7. **Could the Proposed Activity or Discovery Issue reduce the Margin of Safety as defined in the bases for any TSR? Yes No EXPLAIN:**
As discussed above under the Failure Modes discussion, Outdoor Waste Management activities involve interaction between WMCs and adjacent facilities, and these activities will be performed in accordance with controls in the applicable facility AB and in the Site SAR. These activities have no effect on the credited functions of the building confinement or periphery confinement barriers, or on essential support equipment required for compliance with applicable LCOs. SMP controls will be maintained during the proposed activity, including Fire Protection, Waste Management, and Environmental Protection. SMP administrative and work controls will ensure that these activities do not affect the margin of safety beyond that which exists during other routine work. Therefore, the answer to this Question is NO
8. **Does the activity constitute a USQ? Yes No EXPLAIN:**
The answers to Questions 1 through 7 are all answered "No." Therefore, a potential USQ does not exist.
9. **Was an Authorization Basis document change identified? Yes No**
None of the referenced AB documents require changes due to PA.

USQD Conclusion:

Interactions Between Waste Management Cells and facilities within the Building 559 Complex and RCRA Unit 10 have been evaluated in accordance with 10 CFR 830, do not result in an Unreviewed Safety Question, and do not require a change to existing TSRs. The PA to activate WMC-559-1 and WMC-559-2 remains within the analyzed and document safety bases.

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