From: drew.grainger[redacted]
Sent: Thursday, February 14, 2008 7:36 AM
To: Dimarzio, John A.; Groome, Chadi D.
Subject: Fw: PDCF and WSB Data

Attachments: PDCF NEPA Impact Tables CDS.doc; WSB NEPA Baseline CDS 3.doc; WSB NEPA Impact Tables CDS .doc

PDCF and WSB data.

Andrew R. Grainger, NEPA Compliance Officer
Office of the Assistant Manager for Closure Project
Savannah River Operations Office
[redacted]

----- Forwarded by Drew Grainger[redacted] on 02/14/2008 07:33 AM -----

Sachiko Mcalhany/NNSA/DOE/Srs

02/13/2008 04:17 PM

To Drew Grainger[redacted]
cc Hitesh.NIGAM[redacted]
Subject PDCF and WSB Data

Attached is the WSB and PDCF data that I spoke about this morning. Please forward to SAIC and anyone else who needs it.

Thanks,
Sachiko

Waste Solidification Building NEPA Evaluation

Following is a description of the WSB baseline information to update the Surplus Plutonium Disposition EIS (DOE/EIS-0283-SA-1) published in November 1999. The Waste Solidification Building was not envisioned until after the EIS was issued. The Waste Solidification Building project was addressed in the MOX EIS (MOX FFF EIS, NUREG-1767) and baseline information provided in the MFFF Environmental Report, Rev 5, Appendix G.

WSB Current Baseline Information

Waste Solidification Building Information Request
Baseline Data

Information Requested (Original NEPA analysis, in DOE/EIS-0283-SA-1 and MOX FFF EIS, NUREG-1767 contains no WSB baseline data)	MOX Facility & H-Canyon (No Immobilization) Alternative Initial Baseline Scope to Current NEPA Analysis

Parameter	Current Information
General	Congressional Data Sheets FY 2008
Schedule - Design	Complete – 4Q FY 2008
- Construction or Modification	Construction – 1Q FY 2009 to 1Q FY 2012
- Operation	Start - 1Q FY 2013, 15 year duration
Description of modifications to facility including: - Latitude and Longitude	N78589.5 E55500.00
- Elevation above NGVD (units)	FFE = 301.00
- Floor space used (units)	~ 34,400 sq. ft.
- Plot plan	C-CG-F-00157

- Floor plan with equipment arrangement	P-PG-F-3080 P-PG-F-3081
- Features that prevent unauthorized entry (unclassified description)	In accordance with ALARA design considerations in 10 CFR Part 835, an appropriate entry control program for WSB radiological areas will be established with associated ingress and egress monitoring to minimize the spread of contamination.
- Features that ensure safeguards against malevolent acts or material diversion by internal and external entities (unclassified description)	The Safeguards and Security System provides safeguards and physical security features for the WSB. The major components associated with this system are the personnel accountability system and cipher locks on exterior access doors.
- Fire protection systems	Automatic Fire Suppression An automatic fire suppression system (sprinkler system) is being designed to provide coverage for the entire facility. The automatic suppression system will be designed as an Ordinary Hazard Group II sprinkler system with a design basis of .20 gallon per square foot over a fifteen hundred (1500) square foot area. This design is in accordance with NFPA 13 - Sprinkler System for this type of hazard operation. In addition, to general area sprinkler coverage, there will be additional cable tray sprinkler coverage provided along all cable tray routes. This design is an additional layer of defense to ensure quick response /control of a cable tray fire in the above ceiling spaces. Fire Alarm A fire alarm system is equipped with manual pull stations, fire detection and suppression status monitoring inputs and fire evacuation alarm output capabilities that cover the entire building in accordance with NFPA 72 design criteria. The fire alarm system will alert control personnel of a fire detection device operation and/or a water flow alarm from a sprinkler system. In these cases, control personnel will have up to three (3) minutes to validate an alarm condition before the building fire evacuation alarms sound automatically. If a manual pull station is activated, then the entire building's fire alarm systems evacuation alarms (horns and strobes) will activate immediately throughout the entire facility without operator intervention. This design concept is in accordance with NFPA 72 Fire Alarm Code Fire Detection

	Smoke detection is being designed for rooms/areas where high concentration of electrical equipment and cabling may be present or where fire may cause damage that could result in an unacceptable down time situation. In addition to room/area detection coverage, beam type smoke detection systems are being designed for installation above the ceiling elevation where main cable tray routing is being planned. Note that automatic in-tray sprinkler coverage will also be provided along the cable tray routing. Heat and /or smoke detection systems are also being planned for installation in ventilation systems' ductwork in accordance with NFPA 90 requirements.
- Features that control releases of airborne contaminants (include diagram of treatment train)	See drawings M-M5-F2865 sheet 3, M-M5-F2865 sheet 4, M-M5-F2867, and M-M5-F2891
- Features that control releases of waterborne contaminants (include diagram of treatment train)	The entire facility will be an Industrial Waste Water Treatment Plant permitted by SCDHEC. The liquid releases from this facility will be discharged to ETP and to CSWTF. See drawings M-M5-F2857, and M-M5-2858
- Features/procedures that prevent criticality	Criticality accident is not credible for the WSB based on controls implemented by the sending facilities. The Waste Acceptance Criteria (WAC) ensures that these controls are met.
- Description of liquid and non-liquid waste processing	The Waste Solidification Building (WSB) receives three liquid waste streams via pipelines from the Mixed Oxide Fuel Fabrication Facility (MFFF) and Pit Disassembly and Conversion Facility (PDCF). The WSB processes these waste streams into Transuranic (TRU) and Low Level Waste (LLW) solid waste forms acceptable for shipment to the Waste Area Management Project (WMAP) in E-area. The WSB will also handle, package, and store WSB generated job control LLW and TRU wastes. The waste generated by the WSB processes can be subdivided into three groups: • Low Level Liquid Waste (LLLW) • Sanitary Waste • Job control TRU waste Low Level Liquid Waste (LLLW) The LLLW from the WSB process will be sent to the Effluent Treatment Plant (ETP) via the WSB

	Process Sewer (PSEW) System. The WSB PSEW also transfers liquid waste meeting ETP's Waste Acceptance Criteria (WAC) from the MFFF and PDCF facilities. All treated low level waste effluent streams will flow into a lift station before being pumped to ETP. WSB liquid waste feeding into the lift station includes the LAW System Effluent Hold Tank, the Building Structures (BLDG) System Floor Drain Collection Tank, and the steam system condensate after the LA Evaporator. Isolation valves at facility tie-in points provide backflow protection for waste transfers. The PSEW System consists of a piping connection at the WSB Effluent Holding Tank and underground piping to connect the WSB with the ETP via a lift station to the F-Area Process Sewer System (607-20F). Low-level liquid effluent wastes that meet the ETP input requirements are transferred via this underground line to the ETP from the WSB. The Effluent Hold Tank is sampled and analyzed to see if the constituents meet the ETP input requirements. If the results are acceptable, the liquid is transferred via underground pipe and the F-Area Process Sewer System to the ETP. Other connections to the line are double-valve shut-down to avoid back flow into the WSB. The Floor Drain Collection Tank, which collects waste liquids in the facility and steam condensate after the HA evaporator, also has the option to pump waste liquids to the process sewer line. The Floor Drain Collection Tank is sampled and analyzed before this transfer takes place. The PSEW System transfer piping is double-wall construction and equipped with leak detection and high point vents. Sanitary Sewer The Sanitary Sewer (SANS) System collects the sanitary waste water produced at the WSB and transfers it to the SRS Central Sanitary Waste Water Treatment System. The major component associated with the SANS System is the transfer piping and a lift station. The SANS System collects sanitary waste water from various sources within the WSB, including: restrooms (toilets, urinals, and sinks), change room showers (not safety showers), janitorial sink,

	drinking fountains, boiler blowdown, clean area floor drains, steam condensate (before HA and LA evaporators). Also HVAC air handler condensate, instrument air compressor discharges, breathing air compressor discharges and cooling tower blowdown are discharged into the SANS System. Because these are industrial wastes, the flow, pH and composition (metals) of these streams are monitored before received by the lift station. The SANS System transfers these waste streams via a lift station to the SRS Central Sanitary Waste Water Treatment System, with a tie-in point at the F-Area sanitary sewer existing manhole. Job Waste The Waste Management (WM) System receives the job control waste generated by WSB operations and operations support functions (i.e., maintenance and the analytical laboratory) and provides for characterization, packaging, and storage of the waste prior to transfer to WMAP in E-Area. No liquid waste will routinely be transferred out of the WSB for disposal. All liquid wastes are recycled within the WSB process systems. The major components associated with the WM System are the TRU job waste enclosures, a drum scale, and non-destructive evaluation (NDE) survey equipment. The WM System manages the following types of job control solid and liquid debris wastes generated by WSB operations and maintenance: TRU waste (including MTRU waste) Low Level Waste (LLW) Mixed LLW All job control wastes generated by WSB are manually provided to the WM System from the BLDG System. Empty waste containers for waste packaging are provided by the Material Handling (MH) System. The TRU waste and MTRU waste are managed the same way. These waste streams are manually

	packaged in 55-gallon drums in a ventilated portion of the TRU Job Waste Processing Room. If necessary, the packaged waste is manually treated for corrosive and free liquid content using neutralization and liquid absorption chemicals. The waste is characterized using analytical data from process samples and Non-Destructive Evaluation (NDE) equipment and techniques. Administrative waste documentation activities are also conducted in this room during packaging. The packaged waste containers are manually transferred using MH System equipment to the WM System scale for weighing. MH System equipment is then used to manually transfer the full waste containers to Drum Loading and Unloading area prior to transfer to WMAP in E-Area. Drums containing mixed TRU waste will be held in a Satellite Accumulation Area until full, then transferred to a staging area and prepared for transfer to a permitted E-Area storage facility. LLW is manually collected and accumulated in B-25 containers located outside the WSB. If necessary, the waste is manually treated for corrosive and free liquid content using neutralization and liquid absorption chemicals prior to transfer to the B-25 container. The waste is characterized using analytical data from process samples and typical radiation
Construction/modification	
Land disturbed for laydown (acres or hectares)	9 acres
Description of activities conducted (e.g., decontamination/removal/disposal of existing facilities/equipment, land clearing, onsite concrete plant) and modifications needed (e.g., floors, walls, support beams, roof, waste management, ventilation, new roads)	Various Constructions activities to include but not limited to earth work, concrete placement, road ways & parking lot development, site utilities installation, structural steel fabrication and erection, etc.
Describe type and quantity of air pollutant emitting equipment and frequency and duration of use.	Heavy Equipment operation during all of the construction duration.
Describe type and quantity of noise producing equipment and	Heavy Equipment operation during all of the construction duration.

frequency and duration of use.	
Emission release parameters – For any stack releases - release location (latitude & longitude), stack height, stack diameter, stack exhaust velocity or flow rate, exhaust air temperature – For fugitive releases - release location and dimensions of source area	Air pollution release location is the 9 acres of WSB construction site. The coordinates of Latitude: 33.27667534, Longitude: -81.56851034 are within the WSB construction site. The concrete batch plant is located just south of the WSB construction site.
Air emissions (point source and fugitive): - Criteria Pollutants (metric tons/yr) - HAPs (kilograms/yr) - Radioisotopes (curies/yr)	

Pollutant (kg/yr)	Diesel Equipment	Construction Fugitive Emissions	Concrete Batch Plant	Vehicles
Carbon monoxide	20,300	0	0	48,700
Nitrogen dioxide	52,700	0	0	14,100
Sulfur dioxide	24,400	0	0	0
Volatile organic compounds	3,900	<1	0	6,520
Total suspended particules	3,930	21,600	2610	49,900

Liquid effluents - Location(s) of discharge(s) and copies of permit(s) - Rate(s) of discharge(s) (units/day) - Concentrations of contaminants (picocuries/liter or micrograms/liter)	Storm water discharges are controlled under Construction Storm Water Permit (SCR100000). A detention basin will be constructed south of the WSB will be designed to collect WSB site runoff. Flow from the WSB detention basin will be metered through the concrete structure at the historic rate to the outfall pipe. The pipe discharge will be located at coordinates N78368.5, E55822.5. The rate of discharge for the design basis storms will be 6.9 cfs for the 2 year, 24 hour rainfall and 11.4 cfs for the 10 year, 24 hour rainfall.
Employment for each year (FTEs)	Year 1 : 70 Year 2 : 140 Year 3 : 210

	Year 4 : 120
Shifts	4-10 hr shift
Worker radiological exposure - total dose (person-rem)	None
Number of exposed workers	None
Utilities needed - Potable water (units/yr)	 Year 1 : 50K gallons Year 2 : 100K gallons Year 3 : 150K gallons Year 4 : 80K gallons
- Non-potable water (units/yr)	1M gallons/yr
- Electricity (units)	Year 1 Demand : 250 kVA Year 2 Demand : 450 kVA Year 3 Demand : 475 kVA Year 4 Demand : 450 kVA
- Gasoline (units/yr)	Year 1 : 6,800 gallons Year 2 : 14,200 gallons Year 3 : 20,800 gallons Year 4 : 11,500 gallons
- Diesel Fuel (units/yr)	Year 1 : 4,500 gallons Year 2 : 9,300 gallons Year 3 : 13,500 gallons Year 4 : 7,500 gallons
Resources needed - Concrete (units)	 14,500 CY
- Asphalt (units)	6,550 SY @ 2" thick
- Steel (units)	200 TN of Structural & 1,660 TN of Rebar
- Crushed stone (units) - Sand & Gravel (units)	325 TN Crushed stone, sand, & gravel
- Soil (units)	10,750 CY
- Lumber (units)	27,000 SF
- Chemicals (units)	Year 1 : 67 gallons Year 2 : 140 gallons

	Year 3 : 205 gallons Year 4 : 113 gallons
- Gases (units)	

YEAR	1 (m^3)	2 (m^3)	3 (m^3)	4 (m^3)	TOTAL (m^3)
ACETYLENE	30	50	70	40	190
OXYGEN	100	210	290	160	760
CO2 / ARGON	30	70	90	50	240
NITROGEN	70	150	210	120	550
TRIMIX	10	10	20	10	50
ARGON	720	1,580	2,230	1,220	5,750
HELIUM	20	30	40	20	110

- Other construction materials (units)	None
Waste generated (provide solid and liquid separately) (units/yr): - TRU	None
- LLW	None
- MLLW	None
- Hazardous	Liquid Totals Year 1: 40 gal Year 2: 70 gal Year 3: 110 gal Year 4: 60 gal Solid Totals Year 1: 150 lbs Year 2: 310 lbs Year 3: 460 lbs Year 4: 250 lbs
- Non-Hazardous	Liquid Totals Year 1: 2,300 gal Year 2: 4,700 gal Year 3: 6,800 gal Year 4: 3,800 gal Solid Totals Year 1: 130 cu yd Year 2: 260 cu yd Year 3: 370 cu yd Year 4: 210 cu yd
Operations	
Description of Process including:	**WSB Liquid Process Description**

	The WSB will receive liquid streams from MFFF and PDCF. MFFF will transfer a high alpha activity and stripped uranium streams. The two steams are batch transferred through separate double-walled stainless steel pipes to the WSB. The PDCF laboratory liquid is also transferred through a separate double-walled pipe to the WSB. A cementation process will be used to solidify the MFFF high alpha stream, MFFF stripped uranium stream, and PDCF laboratory liquid stream. Evaporation will be used as necessary to reduce the "water" content of the streams to that needed for efficient cement mixing. Excess water will be recycled as needed or transferred to the Effluent Treatment Project (ETP) for further processing. All liquid wastes will be treated by ETP as required to meet EPA, SCDHEC and DOE limits for discharge to site streams. **Low Activity Waste Processing** Within the WSB, MFFF Stripped Uranium and the PDCF Laboratory Liquids will be referred to as the Low Activity Waste (LAW) Stream. The LAW Stream is evaporated to reduce the amount of solid LLW generation. The resulting overheads are used as process dilution water or treated to allow transfer to the Effluent Treatment Project (ETP). The resulting bottoms are neutralized and mixed with cementation materials to produce a solid waste form. The solid form is then stored in the WSB to allow curing. The waste containers are loaded onto site vehicles for shipment to E-Area and eventual disposal at NTS. PDCF Laboratory Liquid Stream Receipts The PDCF laboratory liquid stream will be acidic (pH<1) with very little radionuclides. The stream will be pumped to the WSB from PDCF in an underground welded-jacketed stainless steel pipe. The volume of this steam is anticipated to be a nominal 12,400 gallons per year and will be received in approximately 12 transfers at a frequency of about one transfer every month. The WSB receipt system will be sized to hold two transfers (eight weeks of PDCF laboratory liquid generation) in one 3,000 gallon tank. The PDCF tank is sized to provide storage of up to eight weeks of PDCF processing capacity in the event of a process outage in the WSB.

	MFFF Stripped Uranium Stream Receipts The MFFF Stripped Uranium Stream will be acidic (nominally 0.1 Molar) with large quantities of uranium. The uranium isotopic will be less than 0.96% ^{235}U with the remainder being ^{238}U. The stream will be pumped to the WSB from MFFF in in an underground welded-jacketed stainless steel pipe. The volume of this steam is anticipated to be 37,000 gallons per year, received in approximately 42 transfers at a frequency of about one every week. The WSB receipt system will be sized to hold six transfers (six weeks of MFFF generation). The WSB receipt system has two 4,000 gallon tanks dedicated to receive the MFFF stripped uranium stream. Low Activity Waste Evaporation The low activity waste (LAW) evaporator is designed to operate at up to 130°C and supplied with 25 psig steam. The evaporator is sized to hold approximately 600 gallons. Bottoms are transferred to the LAW bottoms collection tank where it is cooled and sampled before being pumped to the LAW cementation head tanks. If sample results are unacceptable, the bottoms may be pumped back to the LAW head tank for reprocessing. Overheads will be condensed and collected in the effluent hold tank and sampled. If the overheads meet the acceptance criteria, they are pumped to the ETP for final processing to meet EPA, SCDHEC and DOE discharge limits for the Savannah River Site. In the event the overheads are not within the acceptance criteria, the overheads can be recycled backed to the LAW head tank for additional processing. Neutralization The concentrated acidic waste solution is pH adjusted to ensure compatibility with the cementation process. Sodium hydroxide (50 wt% solution) is mixed with the waste solution in the LAW cementation head tanks to achieve a basic solution. Chemical reaction heat is dissipated via cooling jacket and the process cooling water system. Cementation

	The LAW cementation process receives neutralized LAW concentrated waste solution from the LAW cementation head tanks. The waste is mixed with dry cement inside the waste container. The containers are then allowed to cure. Once the curing process is complete, the containers are packaged and transferred by truck for disposal. Approximately 400 waste containers of LAW per year are produced. **High Activity Waste Processing** The MFFF High Alpha stream is treated separately and is referred to as the High Activity Waste (HAW) Stream. Due to radionuclide constituents, primarily Americium (Am) producing a high gamma field (external) and airborne alpha (internal), design features and controls will be required to limit personnel exposure. This stream is evaporated as needed to minimize the amount of TRU solid waste generation. The resulting overheads are sent to the LAW stream for further treatment before transfer to the ETP. The resulting bottoms are neutralized and mixed with cementation materials to produce a solid. The solid form is then temporarily stored on the WSB site to allow curing to meet the Solid Waste (SW) waste acceptance criteria. Upon acceptance, the waste containers are loaded onto site vehicles for shipment to E-Area. SW will load the waste containers in TRUPACT II shipping containers for shipment to WIPP. MFFF High Alpha Stream Receipt The MFFF high alpha stream will be acidic (nominally 5 Molar) with significant quantities of americium. The stream will be pumped to the WSB from MFFF in an underground welded-jacketed stainless steel pipe. The volume of this steam is anticipated to be 10000 gallons per year. The WSB high activity receipt system will be sized to hold at least six weeks of MFFF generation. The WSB has two 2500 gallon tanks dedicated to receive the MFFF high alpha stream High Activity Waste Evaporation The high activity waste (HAW) evaporator is designed to operate at up to 130°C and supplied with 25 psig steam. The evaporator is sized to hold approximately 600 gallons. Bottoms are transferred to the HAW bottoms collection tank where it is cooled and sampled before being pumped to the HAW

	cementation head tanks. If sample results are unacceptable, the bottoms may be pumped back to the HAW head tank for reprocessing. Overheads will be condensed and collected in the HAW condensate hold tank. The overheads are transferred to the LAW evaporator head tank for further processing. Neutralization The concentrated acidic waste solution is pH adjusted to ensure compatibility with the cementation process. Sodium hydroxide (50 wt% solution) is mix with the waste solution in the HAW cementation head tanks to achieve a basic solution. Chemical reaction heat is dissipated via cooling jacket and the process cooling water system. Cementation The HAW cementation process receives neutralized HAW concentrated waste solution from the HAW cementation head tanks. The waste is blended with dry cement inside the waste container. The containers are then allowed to cure. Once the curing process is complete, the containers are packaged and transferred by truck for disposal. Approximately 800 waste containers of HAW per year are produced.
- Flowchart	M-M5-F-2857 M-M5-F-2858
- Throughput (units/yr)	800 – TRU containers (55 gallon drums) 400 – Low-level containers (55 gallon drums)
Emission release parameters - For stack releases - release location (latitude & longitude), stack height, stack diameter, stack exhaust velocity or flow rate, exhaust air temperature	Latitude: 33.27667534 Longitude: -81.56851034 Stack Height: 50 feet Stack diameter: 60 inches Exhaust flow: 60,000 cfm Exhaust Air Temp: 30 ºC
- For fugitive releases - release location and dimensions	Caustic Tank Latitude: 33.27643549

(including height) of vents or louvers from which release would occur	Longitude: -81.56799655 Vent Height: 10 feet Acid Tank Latitude: 33.27642503 Longitude: -81.56806864 Vent Height: 10 feet Building Drain Tank Latitude: 33.27704599 Longitude: -81.56812419 Vent Height: 5 feet Diesel Generator Latitude: 33.27654601 Longitude: -81.56782338 Vent Height: TBD Diesel Fuel Tank Latitude: 33.27654601 Longitude: -81.56782338 Vent Height: TBD Cooling Tower Latitude: 33.27678967 Longitude: -81.56810266 Vent Height: 48 feet
Air emissions - Criteria Pollutants (metric tons/yr)	Uncontrolled Metric ton/yr / Controlled Metric ton/yr PM 3.19E-01 / 9.24E-04 PM-10 1.18E-01 / 8.41E-05

	PM-2.5	1.14E-01	8.41E-05
	VOC	7.24E-03	7.24E-03
- HAPs (kilograms/yr)		Uncontrolled Kg/yr	Controlled Kg/yr
	Arsenic	7.83E-05	9.02E-05
	Beryllium	5.37E-07	8.16E-06
	Cadmium	8.44E-06	3.25E-08
	Chromium	1.78E-04	1.11E-04
	Lead	6.80E-05	4.72E-05
	Manganese	1.34E-02	2.67E-05
	Nickel	9.22E-04	2.07E-04
	T. Phospohorus	2.78E-03	3.19E-04
	Selenium	0.00E+00	6.52E-06
	SC Toxics Nitric Acid: 176 kg/yr (both controlled and uncontrolled)		
- Radioisotopes (curies/yr)		Uncontrolled (Ci/yr)	Controlled (Ci/yr)
	Pu-238	1.94E-02	1.94E-04
	Pu-239	1.31E-01	1.31E-03
	Pu-240	3.39E-02	3.39E-04
	Pu-241	2.36E+00	2.36E102
	Pu-242	9.05E-06	9.05E-08
	Am-241	8.43E-02	8.43E-04
	U-232	0.00E+00	0.00E-02
	U-234	6.10E-08	6.10E-10
	U-235	7.23E-05	7.23E-07
	U-236	3.18E-10	3.18E-12
	U-238	1.10E-07	1.10E-09
	Np-237	7.10E-03	7.10E-05
Liquid effluents - Location(s) of outfall(s)	The WSB liquid effluent will be to the SRS Effluent Treatment Project (ETP), which has an NPDES permit. The ETP controls emissions within the NPDES permit by establishing Waste Acceptance		

	Criteria (WAC). The WSB will maintain effluent levels to below the ETP's WAC.
- Rate(s) of discharge(s) (units/day)	Flow rate of 30 gal/min Annual Rate of 2,233,000 gal 260 batches/yr at 8590 gal/batch
- Concentrations of contaminants (picocuries/liter or micrograms/liter)	Values as given in ETP WAC limits Pu : 0.76 mg/yr HEU: 0.67 mg/yr Tritium: TBD
Employment (FTEs)	60 FTEs
Shifts	4 – 12 hrs shifts
Employee radiological exposure - total dose (person-rem)	25 person-rem/yr
Number of exposed workers	50
Utilities needed - Potable water (units/yr)	3,723,000 gallons/yr
- Non-potable water (units/yr)	8,541,000 gallons/yr
- Electricity (kw/hr)	4,000 kw/hr
- Natural gas (units/yr)	N/A
- Coal (units/yr)	N/A
- Gasoline (units/yr)	N/A
- Diesel Fuel (transportation) (units/yr)	2,500 gallons/yr
- Heating fuel oil (units/yr)	N/A
Resources needed - Metals (units/yr)	50,000 kg/yr 304L SS
- Chemicals (units/yr)	HNO_3 – 2,900 kg/yr NaOH – 11,000 kg/yr Flyash – 42,600 kg/yr Portland – 151,300 kg/yr ZrO_2- 33,600 kg/yr
- Gases (units/yr)	Argon – 2,016,000 liters/yr P-10 – 63,700 liters/yr

	Nitrogen – 8,320 liters/yr
- other materials (units/yr)	N/A
Waste generated (solid or liquid) (units/yr): - TRU	310 m^3/yr (solid)
- Mixed TRU	0.2 m^3/yr (solid)
- LLW	200,000 gal/yr (liquid) & 270 m^3/yr (solid)
- MLLW	None
- Hazardous	0.2 m^3/yr (solid)
- Non-Hazardous	2,700,000 gal/yr (liquid) & 250 m^3/yr (solid)
Please provide any safety documentation (e.g., safety assessments, safety analysis reports) for this facility.	WSRC-SA-2003-0002
List any accident scenarios (in existing safety or NEPA documents) that need to be modified because of changes produced by the proposed action. For any new or modified scenarios provide the information listed below:	N/A
Radiological accidents - Accident description (include release pathways and mitigating factors) - Accident frequency - Material at risk - Material characteristics - Source term released to environment (curies by isotope) - Release parameters: release	**High Activity Waste Process Rooms Fire** The safety analysis evaluated a fire event in the HAW Process Rooms and results in the release of HAW material. The causes for the events include combustible material and an ignition source in the area, or a wild land fire in which burning embers enter the facility through the air intake. The event results in "High" unmitigated radiological consequences to the FW (WG 1 and 2), CW (WG 3) and a "Moderate" unmitigated radiological consequence to the offsite public. The HAW Process Rooms have limited personnel access. In addition, the HAW Process Rooms are constructed of concrete, steel, conduit, and other noncombustible materials. The HAW Process Rooms are designed to have very few installed combustibles. The most likely initiator for a fire large

fractions, release timing, location, release height, release duration, and heat of release - Filtration (specify efficiency) - Number of involved workers	enough to release any radiological inventory from the HAW storage vessels is postulated to occur during maintenance on equipment. Plastic sheeting and other transient combustibles would likely be required for contamination control during maintenance activities on pipe or tank components in the HAW Process Room. This material could be ignited by hot work or other ignition sources in the HAW Process Room including electrical shorts or by embers sucked into the facility from an external fire. Fires could also be initiated during normal operations (e.g., from electrical shorts on lighting, motors), but because of the low combustible loading in these areas, such a fire would have not have a sufficient intensity to cause a significant radiological release. The bounding event is the fire postulated to occur during maintenance when transient combustibles could be introduced into the HAW Process Rooms. As the event progresses, the process solutions in the vessels are heated to boiling. The boiling action entrains radiological material that is swept into the PVV System and ultimately out the WSB stack. In this unmitigated scenario, no credit is taken for inline PVV System demisters and High Efficiency Particulate Air (HEPA) filters. Further, because the process rooms are only separated by partitions extending halfway to the ceiling it is conservatively assumed that the entire HAW process may be involved as the fire progresses. For this event, both engineered and administrative controls were selected as Safety Significant features to protect the FW and CW. The Event Response Program is credited with having the workers evacuate the area of the fire. The HAW Process Room fire suppression system is credited with controlling any fire (excluding a post-seismic fire) that occurs in the area before a significant release occurs. The Fire Protection Program acts to reduce the frequency and intensity of potential fires by minimizing combustibles and ignition sources in the HAW process rooms, and the HAW process room design, which includes minimal combustibles and a fire barrier to prevent fire propagation into or out of the HAW process room, prevents the spread of fires. The Inventory Control Program is credited with limiting the MAR to the quantity assumed in the evaluation (18.3 kg Am-241). The CHAP report shows that if the HAW solution does not boil, that the potential dose to the CW is reduced to 30 rem or “Moderate” consequences. These controls are sufficient to protect the CW. Additional protection is provided for the FW by the HAW PVV System, which provides confinement of any material that may be volatized prior to the activation of the fire suppression

	system: • HAW Process Room Fire Suppression System (SF: Mitigates fire such that a significant release does not occur.) • HAW Process Room Fire Barrier (SF: Prevents fire propagation into or out of the HAW process room.) • Fire Protection Program (SF: Minimizes combustibles and ignition sources in the HAW process rooms.) • HAW PVV System (SF: Provides filtration of airborne hazardous material.) • Event Response Program (SF: Worker performs appropriate response.) • Inventory Control Program (SF: Limits the quantity of radioactive material at risk.) **High Activity Cementation Area Fire** The safety analysis evaluated a fire event in the HAW Cementation Area and results in the release of HAW material. The causes for the events include combustible material and an ignition source in the area. The events result in a "High" unmitigated radiological consequence to the FW (WGs 1 & 2). The HAW Cementation Area is designed to have a very low combustible loading. The most likely initiator for a fire large enough to release radiological material from the HAW cementation enclosure is postulated to occur during maintenance on equipment. Plastic sheeting and other transient combustibles would likely be required for contamination control during maintenance activities on piping or equipment in the Cementation Area. This material could be ignited by hot work or other ignition sources in the HAW Process Room or Cementation Area including electrical shorts or by embers sucked into the facility from an external fire. Fires could also be initiated during normal operations (e.g., from electrical shorts on lighting, motors),

	but because of the low combustible loading in this area, such a fire would have not have a sufficient intensity to cause a significant radiological release. The bounding event is the fire postulated to occur during maintenance when larger quantities of transient combustibles could be introduced into the Cementation Area. As the event progresses, process solutions in drums in the cementation process are heated to boiling. The boiling action entrains radiological material that is released from the enclosure or any drums containing liquid outside of the enclosure and ultimately out the WSB stack. In this unmitigated scenario, no credit is taken for filtration. For these events, a Safety Significant control set including both engineered and administrative controls. For both events, the Event Response Program is credited with having the workers evacuate the area of the fire. In addition, the Inventory Control Program was credited with controlling the MAR to the quantities evaluated. In the case of the HAW Cementation Area fire that occurs outside of the enclosure, the room fire suppression system is credited with controlling any fire (excluding a post-seismic fire) that occurs in the area before a significant release occurs. • Cementation Area Fire Suppression System (SF: Mitigates a fire such that a significant release does not occur.) • Event Response Program (SF: Worker performs appropriate response). • Inventory Control Program (SF: Limits the quantity of radiological material at risk.) **Facility Wide Fire** The safety analysis evaluated a fire event that propagates to include the entire WSB facility and results in the release of the entire HAW and LAW inventory. The causes for the event include combustible material and an ignition source, or a wild land fire in which burning embers enter the facility through the air intake. The event results in a “High” unmitigated radiological consequence to the FW (WGs 1 & 2) and the CW (WG 3) and “Moderate” unmitigated radiological consequences to the public.

	For this event a SS control set including both engineered and administrative controls was selected. The Fire Protection Program acts to reduce the frequency and intensity of potential fires by reducing combustibles and ignition sources in the HAW Process Rooms. The HAW Process Rooms design, which includes a fire barrier to prevent fire propagation into the HAW Process Rooms, prevents the spread of fires. In the highly unlikely event that a fire enters the HAW process rooms, the HAW Process Room Fire Suppression System and the HAW PVV System are credited with mitigating any fire such that a significant release does not occur. In the worst case, this event has the same result as the HAW Process room fire. The more likely scenario is that the fire will propagate to involve inventories located outside of the HAW process rooms. The Event Response Program requires workers to evacuate the area of the fire, thus reducing the consequences to the FW. The Inventory Control Program is credited with limiting the radionuclide inventory outside of the HAW Process Rooms and the HAW Cementation Area. The largest inventory outside the HAW process room fire barriers is the Cementation Area. The cementation area fire suppression system is credited with protecting this inventory from release. The remainder of the building contains the LAW inventory, the laboratory sample inventory, and limited job control waste inventory. • HAW Process Room Fire Suppression System (SF: Mitigates fire such that a significant release does not occur.) • HAW Process Rooms Fire Barrier (SF: The appropriately rated fire barrier will prevent fire propagation into or out of the HAW Process Rooms.) • HAW Cementation Area Fire Suppression System (SF: Mitigates fire such that a significant release does not occur.) • Fire Protection Program (SF: Minimize combustibles and ignition sources in the HAW process rooms.) • HAW PVV System (SF: Provide filtration of airborne hazardous material.) • HAW PVV has dual trains separated by fire barriers (SF: Allow PVV filters to continue

	operating if a fire occurs in the PVV room.) • Event Response Program (SF: Worker performs appropriate response.) • Inventory Control Program (SF: Limits the amount of radioactive material at risk.) **Waste Handling Fire** The safety analysis evaluated a fire that engulfs the entire TRU waste drum storage pad as a result of the buildup of combustible material and some type of ignition source for the combustible material. Ignition sources may include forklifts, electrical wiring, sparks generated by maintenance activities, etc. The TRU waste drum storage pad may contain up to 48 55-gallon drums of TRU job waste and 132 55-gallon drums of solidified waste. For the purposes of calculating dose consequences, two of the job waste drums are assumed to be loaded to the maximum of 80 PEC and the other 46 are assumed to be at 20% of the maximum or 16 PEC and the drums of cemented waste are assumed to contain 45 grams of Am-241 each. The event results in a "High" unmitigated radiological consequence level to the FW (WGs 1 & 2) requiring SS controls. Unmitigated consequences to the CW (WG 3) were "Low," and the MOI consequences were "Negligible." Controls were selected to mitigate the consequences of this event. The Event Response Program requires the worker to evacuate the area of the event, which in turn reduces the workers exposure to the release of radiological material as a result of the fire. In addition, the TRU Waste Acceptance Criteria are credited with protecting the MAR assumption: • Event Response Program (SF: Requires workers in the area to evacuate in the event of a fire, reducing the potential consequence.) • TRU Waste Acceptance Criteria (SF: Limits the quantity of radioactive material at risk.) Also, non credited preventive and mitigative controls were selected to reduce the risk of this event. Preventive features selected consist of the Fire Protection Program, which reduces the frequency of fires by reducing combustibles and ignition sources and Operator Training & Procedures, which reduces the frequency of fires by ensuring the workers are trained to safely use equipment that may be

	a source of fire. Potential consequences are reduced further reduced by the use of non-combustible pallets for waste drum storage, which prevents fire propagation and reduces combustible loading around waste drums. Another feature that was selected was the waste container building fire suppression system which reduces the potential consequences by mitigating the fire intensity and duration. **Transfer Line Explosion** The safety analysis evaluated an explosion event involving the High Activity Transfer Line, resulting from the buildup of H_2 gas in the line and an ignition source. Because the entire HAW Transfer Line is underground, there are no physical consequences, other than for the portion of the line inside the WSB, which is addressed as a high activity process line explosion. The event results in a "High" unmitigated radiological consequence level to the FW (WGs 1 & 2) requiring SS controls. These consequences result from liquid that may bubble up through the ground following the release. Unmitigated consequences to the CW (WG 3) and the offsite public were "Moderate" and "Low," respectively. A SS mitigative engineered control set was selected to protect workers, requiring that the piping and valves of the HAW Transfer Lines be able to withstand the pressure of a H_2 detonation and not fail in a manner that compromises the containment function of the line jacket. Any material released will be contained by the pipe jacket, preventing the release of HAW solution. In addition, the Event Response Program is credited with providing additional worker protection by requiring appropriate worker response to events that result in a release of material. If such an event was to occur and the primary pipe was to have a ductile failure, problems with the transfer would be detected and appropriate responses initiated. • HAW Transfer Line core piping, valves, etc. will not fail in a manner that compromises the containment function of the jacketed line (SF: Protects jacket from effects of detonation.) • Jacketed HAW Transfer Line (SF: Contains leaks and directs them to a collection point.) • Event Response Program (SF: Worker performs appropriate response.)

	Low Activity Waste Evaporator Red Oil Explosion The safety analysis evaluated an energetic event involving a red oil explosion in the LAW Evaporator resulting in the release of LAW material. The causes for the event include an organic component as a result of primarily tributyl phosphate (TBP), carryover from the MFFF or accumulation of organic, primarily TBP, in the WSB process, plus temperature greater than 130 degrees C in the evaporator and the presence of a strong acid. The event only results in a "Low" unmitigated radiological consequence to the FW (WGs 1 & 2) and "Negligible" unmitigated radiological consequences to the CW (WG 3) and the offsite public. However, as a result of the potentially life threatening physical consequences, this event results in "High" physical consequences to the FW and requires SS controls. For this event a SS control set including both engineered and administrative controls was selected to prevent the event. Two of the controls are engineered features that prevent the conditions necessary for a red oil explosion to occur in the LAW Evaporator. The first of these is the LAW evaporator high steam pressure interlock system; the second is the LAW evaporator high temperature interlock system. An administrative control was also selected requiring waste constituents to be controlled, such that the organic content in the waste is limited. • LAW Evaporator High Steam Pressure Interlock System (SF: Prevents the evaporator steam coil pressure from exceeding 25 pounds per square inch (psig), which prevents the temperature from exceeding that required for a red oil explosion to occur.) • LAW Evaporator High Temperature Interlock system (SF: Prevents the LAW temperature from reaching 130° C, the temperature required for a red oil explosion to occur.) • Waste Constituent Limits (SF: Limits organic content in waste, primarily TBP, to levels that will not support a red oil explosion.) **High Activity Waste Evaporator Red Oil Explosion** The safety analysis evaluated an energetic event involving a red oil explosion in the HAW Evaporator resulting in the release of HAW material. The causes for the event include an organic component as a result of primarily tributyl phosphate (TBP), carryover from the MFFF or accumulation of organic, primarily TBP, in the WSB process, plus temperature greater than 130 degrees C in the evaporator

	and the presence of a strong acid. The MAR involved in the explosion is assumed to be 6 kg Am-241, the maximum inventory of a single vessel. The consequences for the "red oil" explosion are calculated using ARFxRF values from DOE-3010 for a high pressure release from a ruptured vessel. The potential unmitigated radiological consequences are "High" to the FW (WGs 1 & 2) and the CW (WG 3) and "Moderate" unmitigated radiological consequences to the offsite public. For this event a SS control set including both engineered and administrative controls was selected to prevent the event. Two of the controls are engineered features that prevent the conditions necessary for a red oil explosion to occur in the HAW Evaporator. The first of these is the HAW evaporator high steam pressure interlock system; the second is the HAW evaporator high temperature interlock system. An administrative control was also selected requiring waste constituents to be controlled, such that the organic content in the waste is limited. • HAW Evaporator High Steam Pressure Interlock System (SF: Prevents the evaporator steam coil pressure from exceeding 25 psig, which prevents the temperature from exceeding that required for a red oil explosion to occur.) • HAW Evaporator High Temperature Interlock System (SF: Prevents the HAW temperature from reaching 130° C, the temperature required for a red oil explosion to occur.) • Waste Constituent Limits (SF: Limit organic content in waste (i.e., TBP) to levels that will not support a red oil explosion.) **High Activity Waste Evaporator Hydrogen Explosion** The safety analysis evaluated an energetic event involving a hydrogen explosion in the HAW Evaporator, due to the accumulation of radiolytically generated hydrogen, resulting in the release of HAW material. This event has the potential to result in "High" unmitigated radiological consequences to the FW (WGs 1 & 2) and the CW (WG 3) and "Moderate" unmitigated radiological consequences to the offsite public. The MAR involved in the explosion is assumed to be 6 kg Am-241, the maximum inventory of a single vessel. The consequences for the hydrogen explosion are calculated based on a TNT equivalent model.

	For this event a SS control set including both engineered and administrative controls was selected to prevent the event. The primary control is the HAW PVV System which maintains the hydrogen concentration below 25% of the LFL by providing sufficient dilution flow and negative pressure in the evaporator. The HAW PVV system is designed to function following all credible events including NPH events and fires. In addition, the Waste Constituent Limits are in place to protect the assumptions used in the calculation of H_2 generation rates and time to LFL calculations. • HAW PVV System (SF: Maintain flammable gas concentration below 25% of the LFL.) • Waste Constituent Limits (SF: Protect the radionuclide content assumptions used in the calculation of H_2 generation rates and time to LFL.) **High Activity Waste Process Vessel Explosion** The safety analysis evaluated a hydrogen explosion in a HAW process vessel due to the accumulation of radiolytically generated hydrogen. The MAR involved in the explosion is assumed to be 6 kg Am-241, the maximum inventory of a single vessel. This event results in "High" unmitigated radiological consequences to the FW (WGs 1 & 2) and the CW (WG 3) and "Moderate" unmitigated radiological consequences to the offsite public. For this event a control set including both engineered and administrative controls was selected to prevent the event. The primary preventor is the HAW PVV System which maintains the hydrogen concentration below 25% of the LFL by providing sufficient dilution flow and negative pressure in the HAW vessels. The HAW PVV system is designed to function following all credible events including NPH events and fires. This is supported by the Waste Constituent Limits, which protect the assumptions used in the calculation of H_2 generation rates and time to LFL calculations. • HAW PVV System (SF: Maintain flammable gas concentration below 25% of the LFL.) • Waste Constituent Limits (SF: Protect the radionuclide content assumptions used in the calculation of H_2 generation rates and time to LFL.)

	High Activity Waste Process Piping Explosion The safety analysis evaluated a hydrogen explosion resulting from the buildup of H_2 in any HAW liquid process line. This event occurs when hydrogen accumulates due to radiolysis in stagnant process piping. Hydrogen tends to accumulate in high points and dead legs of piping resulting in an explosion hazard. In the unlikely event that accumulated hydrogen is subjected to an ignition source, the resulting explosion could result in the release of radiological material as well as physical injuries to workers in the vicinity due to flying debris. The worst case would be if the explosion occurred at the start of a transfer and the entire contents of the transfer (assumed to be the maximum inventory of a single vessel of 6 kg Am-241) are spilled following the explosion. The event involving an explosion resulting from the buildup of H_2 in any HAW liquid process line resulted in a "High" unmitigated radiological consequences to the FW (WGs 1 & 2), "Moderate" consequences to the CW (WG 3) and "Low" unmitigated radiological consequences to the public. For this event, engineered features were selected to mitigate the consequences of the event. The first of these is the HAW Process Room ventilation system (including the HEPA filters), which will confine any material released to the process rooms and protect anyone located outside of the process rooms. The second is a requirement that the piping, valves, and other components of all HAW piping be able to withstand the pressure of a H_2 detonation without compromising the containment function of the jacketed lines or resulting in fragmentation and flying debris. In addition the Event Response Program will require the worker to perform appropriate responses (i.e. evacuate) if a radiological release is detected. • HAW Process Room Ventilation System (SF: Provide filtration of airborne hazardous material.) • HAW piping, valves, etc. will not fail in a manner that compromises the containment function of jacketed lines or results in fragmentation and flying debris (SF: Protects workers from effects of detonation.) • Jacketed transfer line to the Cementation Area (SF: Contains leaks and directs them to a collection point.)

	• Event Response Program (SF: Ensure that workers perform the appropriate response.) **Fluidic Pump Charge Vessel Explosion** The safety analysis evaluated an event in which hydrogen builds up in a fluidic pump charge vessel causing an explosion that in the unmitigated scenario can damage SSCs that provide confinement resulting in a radionuclide release. This event occurs when hydrogen accumulates due to radiolysis in a stagnant charge vessel. The unmitigated consequences of this event are based on the TNT equivalent model and the volumes of the charge vessels, which range up to 400 liters in size. The unmitigated consequences are "High" to the FW (WGs 1 and 2), "Moderate" to the CW (WG 3) and "Low" to the offsite public. Engineered design features were selected to mitigate the consequences of this event. The first of these is the charge vessel design. The charge vessels are designed such that they will not fail in a manner that will cause the failure of the HAW process vessels. Second, the HAW process vessels will contain the pressure spike generated by a detonation inside a charge vessel. Analysis of the response of these systems to detonations is provided in Reference 31. The HAW PVV system will provide confinement for any airborne radioactive material resulting from an explosion. • Fluidic Transfer Pump Charge Vessels (SF: Vessel will not fail in a fashion the will cause failure of the HAW process vessels.) • HAW Process Vessels (SF: Survive the pressure spike generated by a detonation in the charge vessel.) • HAW PVV System (SF: Provides filtration of airborne hazardous material.) **Transfer Line Loss of Confinement** The safety analysis evaluated the breach and loss of confinement of the HAW Transfer Line. The breach may occur as a result of over pressurization, pipe corrosion/erosion, operator error, or overloading due to heavy equipment or construction in the area. These events result in "High"

	unmitigated radiological consequences to the FW (WGs 1 & 2) and "Moderate" unmitigated radiological consequences to the CW (WG 3). For breaches due to over pressurization, pipe corrosion/erosion, engineered design features were selected to mitigate the consequences. The HAW transfer line jacket serves to contain the leak from a damaged core pipe in the line. In addition two preventive administrative controls are in place to further reduce the risk: • Jacketed HAW Transfer Line (SF: Contains leak from damaged core pipe in the line, e.g., damaged from corrosion, erosion, impact, or an explosion within the core pipe.) • Structural Integrity Program (SF: Ensures the integrity of the HAW Transfer Line jacket is maintained.) • Transfer Control Program (SF: Identify damaged lines prior to transfer.) For breaches due to operator error, or overloading due to heavy equipment or construction in the area, three preventive administrative controls were selected. One of the controls is an administrative control requiring that the HAW transfer line be protected from inadvertent excavations. Attributes of this program will include a concrete cap placed over the line to protect it from any excavation activities in the vicinity of the line and appropriate markings to clearly identify the location of the line. Another of the administrative controls is a requirement for a site clearance permit, which provides restrictions on how and where any anticipated excavations are performed. The Traffic Control Program was also credited as a preventive control which provides restrictions on how and where heavy vehicles travel in the vicinity of the HAW Transfer Line: • HAW Transfer Line Protection Program (SF: Protect from inadvertent excavation into buried line.) • Site Clearance Permit (SF: Provide restrictions on how and where excavations take place.) • Traffic Control Program (SF: Provide restrictions on how and where heavy vehicles can travel.)

	HAW Cementation Transfer Line Loss of Confinement The safety analysis evaluated an event, where HAW solution leaks from the transfer line between the HAW Process Room and the HAW Cementation Process as a result of maintenance activity or damage from facility equipment used in the area. This event results in "High" unmitigated radiological consequences to the FW (WGs 1 & 2) and "Moderate" unmitigated radiological consequences to the CW (WG 3). A requirement that the transfer line run through a protective chase to shield the line from missile impact and/or maintenance equipment impact was chosen to prevent the scenario. • Transfer line runs through a pipe chase (SF: Protects line from missile impact and/or maintenance equipment impact) Also evaluated was an event where HAW solution leaks from the transfer line between the HAW Process Room and the HAW Cementation Process as a result of erosion/corrosion of the piping. This event results in "High" unmitigated radiological consequences to the FW (WGs 1 & 2) and "Moderate" unmitigated radiological consequences to the CW (WG 3). The consequences of this event are reduced by a combination of preventive and mitigative features. The core pipe is the primary confinement boundary and acts to prevent a release. The primary pipe is complimented by administrative programs to protect its integrity, including the Structural Integrity Program and the Transfer Control Program. While these features significantly reduce the frequency of the loss of confinement of solution, they are not sufficient to completely prevent the event. It is necessary to also include mitigative features. The transfer line jacket will contain any leaks from the core pipe. Additionally the Radiological Protection Program and the Event Response procedures to monitor radiological conditions and ensure that affected workers respond appropriately. • Jacketed Transfer Line (primary pipe and jacket) from HAW Process Room to Cementation Enclosure (SF: Prevents leaks from affecting workers.) • Structural Integrity Program (SF: Requires inspections and requirements to ensure that the integrity of the transfer line is maintained.) • Radiological Protection Program (SF: Monitor radiological conditions and specify

	appropriate response.) • Event Response Program (SF: Ensure that workers perform the appropriate response.) • Transfer Control Program (SF: Identify damaged lines prior to transfer and prevent over-pressurization of line.) **HAW Process Room Loss of Confinement** The safety analysis evaluated leaks and spills from the vessels and piping in the HAW process room. This event results in "High" unmitigated radiological consequences to the FW (WGs 1 & 2) and "Moderate" unmitigated radiological consequences to the CW (WG 3). A set of mitigative controls was selected to reduce the consequences to the FW. The process room walls and stainless steel liner act to confine the spilled liquid in the immediate area and the HAW Process Room Ventilation System provides confinement of any airborne material in the process room protecting facility workers outside of the process rooms (WG 2). The Access Control Program prevents workers from routinely being in the HAW process rooms during normal operations and the Radiological Protection Program and the Event Response procedures monitor radiological conditions and ensure that affected workers respond appropriately. In addition, for the event that is caused by a spill from one of the HAW tanks, the overflow lines on the HAW tanks act as a preventor. • Process room walls and stainless liner (SF: Contains spill to immediate area.) • HAW Process Room Ventilation System (SF: Provides filtration of airborne hazardous material.) • Radiological Protection Program (SF: Monitor radiological conditions and specify appropriate response.) • Event Response Program (SF: Ensure that workers perform the appropriate response.) • Access Control Program o HAW Process Room is not normally occupied (SF: Reduces the likelihood that

	workers will be in the immediate area of the release.) • Overflow Lines on HAW Vessels Connected to Overflow Tank (SF: Contains spills.) **HAW Sample Line Loss of Confinement** The safety analysis evaluated events involving leaks and spills from the HAW sampling lines. A set of mitigative features were selected to reduce the consequences to the FW. In the case of a leak from the portion of the sample lines that are on the process room side of the wall, the lines are jacketed and will direct spills back to the lined portion of the process room. The consequences of the spill are then mitigated by the set of controls previously discussed for the other process room spills. Leaks that occur outside of the process room, either from the portion of the sample lines outside of the sample glovebox or inside the sample glovebox, present the risk of a high consequence to the FW. The Radiological Protection Program and the Event Response Procedures are in place to monitor radiological conditions and ensure that affected workers respond appropriately. These ACs are adequate in the case of sample lines outside of the glovebox due to the low flow nature of the lines, their location in the area between the wall and glovebox, and because it would take a significant period of time for the event to develop to a level that would result in High consequences. For leaks inside the glovebox, the glovebox enclosure and glovebox ventilation are also credited with the function of preventing the splashing of liquid directly in the face of the worker and the release of airborne material. • Jacketed sample lines (SF: Directs leaks back to HAW process room.) • Sample glovebox (SF: Prevents hazardous liquid from contacting worker.) • Sample glovebox ventilation (SF: Provides filtration of airborne hazardous material that is released in the sample glovebox.) • Radiological Protection Program (SF: Monitor radiological conditions and specify appropriate response.)

	• Event Response Program (SF: Ensure that workers perform the appropriate response.) **HAW Cementation Loss of Confinement** The safety analysis evaluated events involving leaks and spills in the HAW Cementation Area and the release of airborne material during cementation operations. A combination preventive and mitigative of features is in place to reduce the risk to the FW. The jacketed transfer line is an engineered feature that acts as primary confinement for the solution. The line core pipe is complemented by administrative programs to protect its integrity, including the Structural Integrity Program and by the transfer line jacket that contains any leaks. While these features reduce the frequency of the loss of confinement of solution, they are not sufficient to completely prevent it from occurring. It is necessary to also include mitigative features for worker protection. The HAW cementation enclosure and the HAW cementation enclosure ventilation system were selected to provide containment of released material if the spill occurs inside the enclosure. The Radiological Protection Program and the Event Response Procedures are in place to monitor radiological conditions and ensure that affected workers respond appropriately. Also credited is a Leak Detection and Monitoring Program that will require surveillances to ensure that leakage from the cementation transfer line is detected. • Jacketed Transfer Line (primary pipe and jacket) from HAW Process Room to Cementation Enclosure (SF: Prevents leaks from affecting workers.) • Structural Integrity Program (SF: Inspections and requirements to ensure that the integrity of the transfer line is maintained.) • Configuration Management Program (SF: Prevent alterations that may reduce the integrity of the credited transfer line.) • HAW Cementation Enclosure (SF: Contains spill to the immediate area.) • HAW Cementation Enclosure ventilation system (SF: Provides filtration of airborne hazardous material.)

	• Radiological Protection Program (SF: Monitor radiological conditions and specify appropriate response.) • Event Response Program (SF: Ensure that workers perform the appropriate response.) • Leak Detection and Monitoring Program (SF: Ensures that leakage from transfer line is detected.) **Aircraft Crash** The safety analysis evaluated a helicopter or small airplane crash with resulting fire. This event results in "High" unmitigated radiological consequence to the FW (WGs 1 & 2) and the CW (WG 3) "Moderate" unmitigated radiological consequences to the offsite public. It has been shown that it is incredible for a small aircraft to impact the area of the WSB containing the highest activity material (the HAW process room), based upon the footprint area. The fire barrier surrounding the HAW Process Rooms will prevent fire from a crash into other areas of the building from involving material in the HAW Process Rooms. The inventory outside of the HAW Process room will be limited to levels that will not challenge guidelines for the CW. Four mitigative controls for were selected to reduce the consequences to the FW and CW: • Inventory Control Program (SF: Radiological inventory in the HAW cementation area will be limited such that the consequences to the CW will not challenge the evaluation guidelines.) • Event Response Program (SF: Worker evacuates area.) • HAW Process Rooms Fire Barrier (SF: The appropriately rated fire barrier will prevent fire propagation into or out of the HAW Process Rooms.) • HAW PVV system (SF: External duct continues to function during external event.) • Radiological Protection Program (SF: Monitor radiological conditions and specify

	appropriate response.) **Construction Equipment Impact** The safety analysis evaluated an external impact initiated by adjacent construction or maintenance activities to the WSB facility resulting in the release of radiological material. This event results in "High" unmitigated radiological consequence to the FW (WGs 1 & 2) and the CW (WG 3). Two administrative controls were selected to prevent this event from occurring. They include a program for controlling the area surrounding the WSB to prevent unanalyzed events initiated by construction or maintenance activities around the facility and a Hoisting and Rigging Program requiring evaluation for the use of cranes adjacent to WSB facility for related operations: • Site Work Control Program (SF: Prevents external impacts to WSB that could result in a release.) • Hoisting and Rigging Program (SF: Requires evaluation for the use of cranes adjacent to facility for WSB related operations.) **Seismic Events** The safety analysis evaluated a seismic event. The postulated seismic event may result in a spill of solutions in the facility, a fire in the facility, or initiate a string of events that could result in a HAW vessel explosion due to the buildup of hydrogen caused by the loss of dilution flow. A post-seismic fire is not postulated in areas designed with low combustible loads and isolated by seismically qualified fire barriers such as the HAW Process Rooms. The HAW Process Rooms will contain insufficient combustible material to support a major fire during typical operating conditions, and there are no high voltage power sources, flammable liquids, or flammable gasses which are the typical causes of post seismic fires. In addition, the facility exterior walls and fire barrier walls between the HAW process rooms and other WSB fire areas will be qualified as greater than PC-3 for seismic events, which will prevent fires that start in other facilities or other areas of the WSB from propagating into the HAW Process Rooms. Based on this evaluation, the probability of a seismically induced fire involving the WSB HAW Rooms is sufficiently below the initiation frequency for a PC-3

	seismic event that it does not warrant consideration as part of the safety analysis. This event has the potential for "High" unmitigated radiological consequence to the FW (WGs 1 & 2) and CW (WG 3). For the seismic events followed by an explosion, a number of mitigative features were chosen to prevent explosions and reduce the consequences to the FW and CW. The majority of the chosen controls were engineered features crediting the seismically qualified design of various WSB components. The HAW PVV system is qualified to function following a PC-3 seismic event to provide dilution flow and negative pressure in the vessels to prevent hydrogen accumulation, thereby preventing explosions. For the seismic event followed by fire, a number of mitigative features were chosen to reduce the consequences to the FW and CW. It is not postulated that a fire will be initiated in the HAW process rooms following a seismic event. Controls credited to limit the consequences include a limit on the amount of HAW solution allowed in the HAW cementation process and fire barriers to prevent the propagation of a fire into the HAW process rooms. To ensure continued operation of the HAW PVV system, it has two trains separated by seismically qualified fire barriers to prevent a fire in any single fire area from rendering it inoperable. • HAW process vessels and piping are seismically qualified (SF: Prevent spill of HAW material during seismic event.) • WSB building structure (SF: Maintains its structural integrity during seismic events to protect safety SSCs.) • HAW Transfer Line is seismically qualified (SF: - Prevents breaching of line due to a seismic event.) • HAW transfer line to Cementation Area seismically qualified (SF: Prevent spill of HAW material during seismic event.) • HAW sample lines seismically qualified up to isolation valves (SF: Prevent spill of HAW

	material during seismic event.) • HAW PVV system is seismically qualified (SF: Provide continual dilution flow to maintain flammable gas concentration below 25 % of LFL and prevent release of airborne hazardous material.) • HAW PVV has dual trains separated by seismically qualified fire barriers (SF: Allow PVV filters to continue operating if a fire occurs in the PVV room.) • Steam coils and cooling coils inside vessels are seismically qualified (SF: Prevent the release of HAW material outside vessels during a seismic event.) • Seismically qualified fire barrier around HAW process rooms and cementation area (SF: Prevent propagation of fire into the HAW process area, following seismic event.) • Event Response Program (SF: Reduces worker exposure and contamination potential.) **Tornado** The safety analysis evaluated a tornado. This event has the potential for "High" unmitigated radiological consequence to the FW (WGs 1 & 2) and CW (WG 3) For the tornado event, a mitigative engineered feature was chosen to prevent the release of HAW material. The HAW Process Rooms and HAW Cementation Area construction will protect the HAW process from tornado, winds, and missiles. This reduces the consequences to all receptors. • WSB building structure (SF: Maintains its structural integrity during high wind events to protect safety SSCs.)
Chemical inventory for chemical accident analysis - List chemicals, total facility	See S-EHS-F-00002, Appendix B.1.0 for Chemical Inventory & Screening

inventory, and annual usage of the chemical - Size and location of largest tank (storage container) for each chemical. Include floor area or diked area that would contain the spill when applicable. - Concentration of chemical in largest tank (identify if this is the highest concentration of the chemical being stored). If not, also list the other storage locations, size of tank and concentration of chemical being stored.	
Design basis earthquake frequency and intensity	5.0E-04 & Peak Ground Acceleration 0.2 g
Earthquake frequency that would result in loss of structural integrity	<5.0E-04
Other natural phenomena that would result in loss of structural integrity and their frequency	N/A
Aircraft crash frequency	2.36E-06

Waste Solidification Building Information Request

Information Requested (Note: Original NEPA analysis is documented in DOE/EIS-0283-SA-1 and MOX FFF EIS, NUREG-1767)	MOX Facility & H-Canyon (No Immobilization) Alternative				
	Update to Baseline Scope in Current NEPA Analysis	PDCF and MFFF process up to 9 MT additional future surplus WG Pu	MFFF process ~3.74 MT additional WG Pu meeting AFS Spec	MFFF process ~0.46 additional WG Pu with higher impurities than the AFS Spec	MFFF process ~1.4 MT Fuels Grade Pu
General					
Schedule - Design - Construction or Modification - Operation - Deactivation and decommissioning		Design: no change Construction: no change Operation: 3 more years Deactiviation and Decommissioning: no change	Design: no change Construction: no change Operation: 2 more years Deactiviation and Decommissioning: no change	Design: Due to higher impurity levels, modify flowsheet to ensure WAC limits are met. Construction: no change Operation: 6 additional months Deactiviation and Decommissioning: no change	Design: The higher Americium levels exceed the WSB WAC for high activity waste. These higher levels are outside of the current WSB design basis. The change in the WSB WAC to increase americium levels results in developing new flowsheet, developing new cementation recipe, modifying radiation dose calculations and shielding design, modifying the nuclear criticality safety evaluation (NCSE), revising documented safety analysis (DSA), and additional cementation equipment. Construction: no change if decision is made before start of construction Operation: 6 additional months Deactiviation and Decommissioning : no change

Information Requested (Note: Original NEPA analysis is documented in DOE/EIS-0283-SA-1 and MOX FFF EIS, NUREG-1767)	MOX Facility & H-Canyon (No Immobilization) Alternative				
	Update to Baseline Scope in Current NEPA Analysis	**PDCF and MFFF process up to 9 MT additional future surplus WG Pu**	**MFFF process ~3.74 MT additional WG Pu meeting AFS Spec**	**MFFF process ~0.46 additional WG Pu with higher impurities than the AFS Spec**	**MFFF process ~1.4 MT Fuels Grade Pu**
Description of modifications to facility including: - Latitude and Longitude - Elevation above NGVD (units) - Floor space used (units) - Plot plan - Floor plan with equipment arrangement - Features that prevent unauthorized entry (unclassified description) - Features that ensure safeguards against malevolent acts or material diversion by internal and external entities (unclassified description) - Fire protection systems - Features that control releases of airborne contaminants (include diagram of treatment train) - Features that control releases of waterborne contaminants (include diagram of treatment train) - Features/procedures that prevent criticality - Description of liquid and non-liquid waste processing		No impacts	No impacts	No impacts	The NCSE would be revised to account for the increase annual throughput of Americium. The floor plan and equipment arrangement would be revised for the additional shielding and cementation equipment.
Construction/modification					
Land disturbed for laydown (acres or hectares)		No impacts	No impacts	No impacts	No impacts

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	Update to Baseline Scope in Current NEPA Analysis	PDCF and MFFF process up to 9 MT additional future surplus WG Pu	MFFF process ~3.74 MT additional WG Pu meeting AFS Spec	MFFF process ~0.46 additional WG Pu with higher impurities than the AFS Spec	MFFF process ~1.4 MT Fuels Grade Pu
Description of activities conducted (e.g., decontamination/removal/disposal of existing facilities/equipment, land clearing, onsite concrete plant) and modifications needed (e.g., floors, walls, support beams, roof, waste management, ventilation, new roads)		No impacts	No impacts	No impacts	No impacts
Describe type and quantity of air pollutant emitting equipment and frequency and duration of use.		No impacts	No impacts	No impacts	No impacts
Describe type and quantity of noise producing equipment and frequency and duration of use.		No impacts	No impacts	No impacts	No impacts
Emission release parameters – For any stack releases - release location (latitude & longitude), stack height, stack diameter, stack exhaust velocity or flow rate, exhaust air temperature – For fugitive releases - release location and dimensions of source area		No impacts	No impacts	No impacts	No impacts
Air emissions (point source and fugitive): - Criteria Pollutants (metric tons/yr) - HAPs (kilograms/yr) - Radioisotopes (curies/yr)		No impacts	No impacts	No impacts	No impacts

Information Requested (Note: Original NEPA analysis is documented in DOE/EIS-0283-SA-1 and MOX FFF EIS, NUREG-1767)	MOX Facility & H-Canyon (No Immobilization) Alternative				
	Update to Baseline Scope in Current NEPA Analysis	PDCF and MFFF process up to 9 MT additional future surplus WG Pu	MFFF process ~3.74 MT additional WG Pu meeting AFS Spec	MFFF process ~0.46 additional WG Pu with higher impurities than the AFS Spec	MFFF process ~1.4 MT Fuels Grade Pu
Liquid effluents - Location(s) of discharge(s) and copies of permit(s) - Rate(s) of discharge(s) (units/day) - Concentrations of contaminants (picocuries/liter or micrograms/liter)		No impacts	No impacts	No impacts	No impacts
Employment for each year (FTEs)		No impacts	No impacts	No impacts	No impacts
Shifts		No impacts	No impacts	No impacts	No impacts
Worker radiological exposure - total dose (person-rem)		No impacts	No impacts	No impacts	No impacts
Number of exposed workers		No impacts	No impacts	No impacts	No impacts
Utilities needed - Potable water (units/yr) - Non-potable water (units/yr) - Electricity (units) - Gasoline (units/yr) - Diesel Fuel (units/yr)		No impacts	No impacts	No impacts	No impacts
Resources needed - Concrete (units) - Asphalt (units) - Steel (units) - Crushed stone (units) - Sand & Gravel (units) - Soil (units) - Lumber (units) - Chemicals (units) - Gases (units) - Other construction materials (units)		No impacts	No impacts	No impacts	Design changes will increase the quantity of steal and concrete used in shielding.
Waste generated (provide solid and liquid separately) (units/yr): - TRU - LLW - MLLW - Hazardous - Non-Hazardous		No impacts	No impacts	No impacts	No impacts

Information Requested (Note: Original NEPA analysis is documented in DOE/EIS-0283-SA-1 and MOX FFF EIS, NUREG-1767)	MOX Facility & H-Canyon (No Immobilization) Alternative				
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Operations					
Description of Process including: - Flowchart - Throughput (units/yr)		No impacts	No impacts	The increased impurity levels will result in modification of the flowsheet. This change along with the MFFF reduced liquid waste flows during processing of higher impurity material is not expected to increase the number of TRU and LLW containers produced.	The changes in the WSB WAC will result in a new cementation receipt and flowsheet and additional TRU containers being produced.
Emission release parameters - For stack releases - release location (latitude & longitude), stack height, stack diameter, stack exhaust velocity or flow rate, exhaust air temperature - For fugitive releases - release location and dimensions (including height) of vents or louvers from which release would occur - Emissions from emergency generators, boilers, and other ancillary equipment		No impacts	No impacts	No impacts	No impacts
Air emissions - Criteria Pollutants (metric tons/yr) - HAPs (kilograms/yr) - Radioisotopes (curies/yr)		No impacts to annual air emission rates. Additional feed will increase the cumulative air emission amounts by 3 years of operation.	No impacts to annual air emission rates. Additional feed will increase the cumulative air emission amounts by 2 years of operation.	No impacts to annual air emission rates. Additional feed will increase the cumulative air emission amounts by 6 months of operation	Higher Americium levels in the high activity waste would increase the americium in the air emissions and cumulative air emission amounts by 6 months of operation.

Information Requested (Note: Original NEPA analysis is documented in DOE/EIS-0283-SA-1 and MOX FFF EIS, NUREG-1767)	MOX Facility & H-Canyon (No Immobilization) Alternative				
	Update to Baseline Scope in Current NEPA Analysis	**PDCF and MFFF process up to 9 MT additional future surplus WG Pu**	**MFFF process ~3.74 MT additional WG Pu meeting AFS Spec**	**MFFF process ~0.46 additional WG Pu with higher impurities than the AFS Spec**	**MFFF process ~1.4 MT Fuels Grade Pu**
Liquid effluents - Location(s) of outfall(s) - Rate(s) of discharge(s) (units/day) - Concentrations of contaminants (picocuries/liter or micrograms/liter)		No impacts to rates and concentrations. Additional feed will increase the cumulative liquid effluent amounts by 3 years of operation.	No impacts to rates and concentrations. Additional feed will increase the cumulative liquid effluent amounts by 2 years of operation.	No impacts to rates and concentrations. Additional feed will increase the cumulative liquid effluent amounts by 6 months of operation.	No impacts to rates and concentrations. Additional feed will increase the cumulative liquid effluent amounts by 6 months of operation.
Employment (FTEs)		No impacts	No impacts	No impacts	No impacts
Shifts		No impacts	No impacts	No impacts	No impacts
Employee radiological exposure - total dose (person-rem)		Additional feed will increase lifetime facility doses. No impact to annual dose projections.	Additional feed will increase lifetime facility doses. No impact to annual dose projections.	Additional feed will increase lifetime facility doses. No impact to annual dose projections.	The higher americium levels would increase the lifetime facility and annual doses.
Number of exposed workers		Additional feed will increase lifetime facility doses. No impacts to number of exposed workers.	Additional feed will increase lifetime facility doses. No impacts to number of exposed workers.	Additional feed will increase lifetime facility doses. No impacts to number of exposed workers.	The higher americium levels would increase the lifetime facility and annual doses. No impacts to number of exposed workers.
Utilities needed - Potable water (units/yr) - Non-potable water (units/yr) - Electricity (kw/hr) - Natural gas (units/yr) - Coal (units/yr) - Gasoline (units/yr) - Diesel Fuel (transportation) (units/yr) - Heating fuel oil (units/yr)		No impacts to annual utility needs. Additional feed will increase the cumulative utility usage by 3 years of operation.	No impacts to annual utility needs. Additional feed will increase the cumulative utility usage by 2 years of operation.	No impacts to annual utility needs. Additional feed will increase the cumulative utility usage by 6 months of operation.	No impacts to annual utility needs. Additional feed will increase the cumulative utility usage by 6 months of operation.
Resources needed - Metals (units/yr) - Chemicals (units/yr) - Gases (units/yr) - other materials (units/yr)		No impacts to annual resource needs. Additional feed will increase the cumulative resource usage by 3 years of operation.	No impacts to annual resource needs. Additional feed will increase the cumulative resource usage by 2 years of operation.	No impacts to annual resource needs. Additional feed will increase the cumulative resource usage by 6 months of operation.	The additional TRU containers would increase metals and cementation materials consumed and cumulative resource usage by 6 months of operation.

Information Requested (Note: Original NEPA analysis is documented in DOE/EIS-0283-SA-1 and MOX FFF EIS, NUREG-1767)	MOX Facility & H-Canyon (No Immobilization) Alternative				
	Update to Baseline Scope in Current NEPA Analysis	**PDCF and MFFF process up to 9 MT additional future surplus WG Pu**	**MFFF process ~3.74 MT additional WG Pu meeting AFS Spec**	**MFFF process ~0.46 additional WG Pu with higher impurities than the AFS Spec**	**MFFF process ~1.4 MT Fuels Grade Pu**
Waste generated (solid or liquid) (units/yr): - TRU - Mixed TRU - LLW - MLLW - Hazardous - Non-Hazardous		No impacts to waste generation rates. Additional feed will increase the cumulative waste amounts by 3 years of operation.	No impacts to waste generation rates. Additional feed will increase the cumulative waste amounts by 2 years of operation.	No impacts to waste generation rates. Additional feed will increase the cumulative waste amounts by 6 months of operation.	Additional feed will increase the annual TRU waste volume due to additional TRU waste containers produced and cumulative waste amounts from the increased annual rate over 3 years of operation.
Please provide any safety documentation (e.g., safety assessments, safety analysis reports) for this facility.					
List any accident scenarios (in existing safety or NEPA documents) that need to be modified because of changes produced by the proposed action. For any new or modified scenarios provide the information listed below:		No impacts	No impacts	No impacts	The increase level of americium in the WSB WAC results in modification to the DSA and NSCE.
Radiological accidents - Accident description (include release pathways and mitigating factors) - Accident frequency - Material at risk - Material characteristics - Source term released to environment (curies by isotope) - Release parameters: release fractions, release timing, location, release height, release duration, and heat of release - Filtration (specify efficiency) - Number of involved workers		No impacts	No impacts	No impacts	The increase level of americium will result in changes to material at risk in the safety analysis. The increase in source term to the environment is expected to result in additional safety controls being added to the Technical Safety Requirements, TSRs.

Information Requested (Note: Original NEPA analysis is documented in DOE/EIS-0283-SA-1 and MOX FFF EIS, NUREG-1767)	MOX Facility & H-Canyon (No Immobilization) Alternative				
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Chemical inventory for chemical accident analysis - List chemicals, total facility inventory, and annual usage of the chemical - Size and location of largest tank (storage container) for each chemical. Include floor area or diked area that would contain the spill when applicable. - Concentration of chemical in largest tank (identify if this is the highest concentration of the chemical being stored). If not, also list the other storage locations, size of tank and concentration of chemical being stored.		No impacts	No impacts	No impacts	No impacts
Design basis earthquake frequency and intensity		No impacts	No impacts	No impacts	No impacts
Earthquake frequency that would result in loss of structural integrity		No impacts	No impacts	No impacts	No impacts
Other natural phenomena that would result in loss of structural integrity and their frequency		No impacts	No impacts	No impacts	No impacts
Aircraft crash frequency		No impacts	No impacts	No impacts	No impacts