Facility Utilization and Risk Analysis for Remediation of Legacy Transuranic Waste at the Savannah River Site – 13572

Michael L. Gilles and John C. Gilmour
Savannah River Nuclear Solutions, LLC

ABSTRACT

Savannah River Nuclear Solutions (SRNS) completed the Accelerated TRU Project for remediating legacy waste at the Savannah River Site with significant cost and schedule efficiencies due to early identification of resources and utilization of risk matrices. Initial project planning included identification of existing facilities that could be modified to meet the technical requirements needed for repackaging and remediating the waste. The project schedule was then optimized by utilization of risk matrices that identified alternate strategies and parallel processing paths which drove the overall success of the project. Early completion of the Accelerated TRU Project allowed SRNS to pursue stretch goals associated with remediating very difficult TRU waste such as concrete casks from the hot cells in the Savannah River National Laboratory. Project planning for stretch goals also utilized existing facilities and the risk matrices. The Accelerated TRU project and stretch goals were funded under the American Recovery and Reinvestment Act (ARRA).

INTRODUCTION

The Savannah River Nuclear Solutions' Accelerated TRU Project (ATP) involved the retrieval, remediation and characterization of legacy TRU waste at the Savannah River Site (SRS). The ARRA baseline scope for the ATP was 5,000 m^3 of legacy TRU waste with an estimated cost of $400M. The 5,000 m^3 included 5,400 containers. The stretch goal was to retrieve, remediate and characterize the remaining 200 m^3 of Very Difficult TRU (VDT) waste (at an original estimate of $108M). The VDT project cost was to be funded through efficiencies in the base scope.

There were no remediation activities or remediation facilities operational at the start of the ATP. The timeline for the Recovery Act did not provide time for a large capital construction, start-up and operation to process the 5,400 containers. The project team quickly realized that the key to successful completion of the mission was to utilize existing facility capabilities. Once viable facilities were identified, remediation teams were established, and required facility modifications to address the radiological hazards and support safe remediation activities were detailed. Administratively, nuclear safety bases and onsite nuclear transportation documents were revised; and the current storage facility, i.e., the Solid Waste Management Facility (SWMF), strengthened its waste screening and preparation processes to allow shipment of the legacy waste to the various remediation facilities.

Three onsite facilities were identified for remediation activities: H Canyon, F Canyon and an area within the SWMF. Each of these facilities have unique missions, capabilities, Safety Bases, regulators and a multitude of customers. The H Canyon is an operating nuclear facility with a wide variety of missions and infrastructure, particularly for handling large bulky items. F Canyon had been deactivated and was in a surveillance and maintenance mode with very limited staffing and services. The SWMF is an operating facility that manages the radiological waste for the SRS including storing, characterizing and shipping of LLW, MLLW and TRU waste, though SWMF had not performed remediation activities for several years.

The integration of remediation activities into existing operating schedules required a large degree of coordination between the many competing SRS missions. Maintenance scheduling, daily shipments of containers between multiple facilities across the SRS, and competition for the same support resources (engineering, safety and health, security, etc.) were just a few of the logistical challenges.

FACILITY UTILIZATION

The H Canyon Truckwell (receiving bay for trucks/shipments, internal to the hardened structure) and the Warm Maintenance Shop and adjacent cell cover areas could be available to support box remediation for the ATP; however, they were not fully configured to support remediation activities. Facility modifications were required to address Life Safety Code issues due to increased, routine occupancy of these areas. These included evacuation ladders, hand rails, emergency lighting and a fire water mister in the Warm Maintenance Shop. Additional startup construction activities addressed increased power demand, pier supports, and tools and equipment needed for processing the waste. The project required higher than normal use rates on some of the Canyon equipment which necessitated a variety of equipment upgrades and repairs. For example, upgrades were needed for cell covers, the monorail cables, and motors and clutches associated with the overhead crane; numerous repairs were needed on the truckwell roll-up door due to wear and tear; and repairs were needed for a 5 ton self-expanding self-adjusting (sesa) brake on the overhead crane. A photo of a glovebox being lifted in the H Canyon Truckwell is provided in Figure 1.

Figure 1 – Legacy Glovebox Being Lifted in H Canyon Truckwell

The deactivated F Canyon facility was in surveillance and maintenance mode. Although less robust compared to H Canyon, the F Canyon Truckwell and the F Canyon Warm Crane Maintenance Area were determined to be viable options for remediating boxes and drums. To remediate the TRU legacy boxes, including the projected rejects from H Canyon repackaging activities, a new box remediation facility with associated lag storage areas was established in the F Canyon Truckwell and adjacent pad areas. Utilization of the F Canyon Truckwell allowed the project to use an existing sand filter ventilation system and portions of the hardened facility. Prior to use, the facility was decontaminated, old equipment was removed, and the facility was modified to provide adequate electrical power and to create emergency exits. Additionally, permacon enclosures and bi-fold doors were installed to establish a series of airlocks. Other installations completed include gantry cranes and associated floor tracks for box movement and lifting activities, electrical services, lighting, a radiological control monitoring system, a control room with camera monitoring (mini-mobile external to the building), and lag storage weather enclosures. A conceptual diagram of the F Canyon Box Line is provided in Figure 2. Challenges included meeting the facility seismic requirements and performing these construction activities in the truckwell while commencing the drum remediation work in the F Canyon Drum Line. Modifications to the exiting F Canyon ventilation systems were also implemented to provide the necessary air flow to both the drum and box remediation areas.

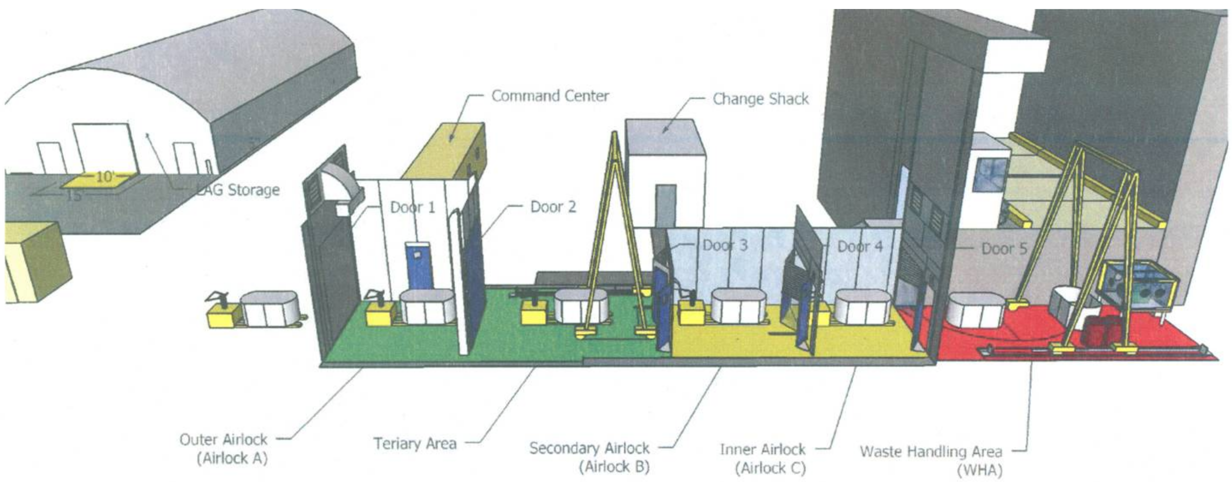

Figure 2 - Conceptual Diagram of F Canyon Box Line

In addition to the TRU box remediation work to be completed in F Canyon, it was determined that TRU legacy drums could also be remediated within F Canyon with some additional facility modifications. A drum line had previously been installed (as a temporary modification within the F Canyon Warm Crane Maintenance Area) specifically for drum remediation work. This enclosure had been wiped down, the gloveport/openings had been covered, and all services had been disconnected in 2008. The ATP utilized this existing enclosure to minimize cost and to support an early start on legacy TRU drum remediation. Construction activities included reestablishment of the enclosure ventilation system (six blowers (COPPUS brand portable blowers) providing local ventilation), electrical modifications to upgrade the temporary wiring, and establishment of a mockup facility for concurrent training and procedure development for waste streams to be remediated later in the project.

SWMF had remediated waste intermittently throughout the legacy waste program and it was recognized that an area within the SWMF, i.e., Cell 11, could also be utilized for the ATP. Cell 11, in the Low Level Waste Vaults, contained a process area, including a survey room, that had previously been used for compacting waste. To utilize this existing space, a container decontamination room was designed and constructed. Other modifications installed at the time included increased power availability and a fire water mister similar in design to the one installed in H Canyon.

RISK ANALYSIS

A matrix of the risks associated with the containers was compiled to establish remediation strategies and potential remediation locations. An initial discriminator between the facilities was the overall size of the container. With the enhanced engineering controls and overall robustness of the H Canyon facility, it could handle large volume containers with multiple inner packages. Drums were initially targeted for the F Canyon Drum Line. Smaller containers were designated to the F Canyon Truckwell. As risk parameters were identified, it became apparent that a large volume of containers targeted for F Canyon were below 4 Plutonium-239 Equivalent Curies (PEC) and did not contain excessive free liquids. This low risk waste met the existing SWMF Documented Safety Analysis (DSA) requirements for remediation in Cell 11. A crew was assembled and mock-up activities were initiated while the Cell 11 modifications were being designed and implemented.

Previously, SRS had processed 8,600 m^3 of waste which contained 114,000 PEC, though much of the high risk containers had not been addressed. Prior to completion of the ATP, the total PEC in the remaining legacy TRU waste was 330,000 PEC. Included in the high risk legacy TRU waste were 83 concrete culverts and six concrete boxes received from offsite in the 70's stored on TRU Pad 1. These culverts contained over 6,500 inner containers and 11,000 grams of Pu-238 (190,000 curies). During initial activities for remediation of the culverts, it was discovered that water had intruded the containers and the containers were leaking, increasing the risk of radiological contamination and release to the environment. To mitigate the hazards with these leaking containers, a 1,400 ton crusher run surface was installed and a canvas-based containment with HEPA filtered exhaust was constructed. This new structure, designated 9E, commonly referred to as Big Top, is the highest structure installed in the SWMF (Figure 3). The time to construct and test the system, and complete the readiness assessment was less than 3 months.

In addition to the legacy TRU waste in culverts located on Pad 1, legacy TRU waste was contained in other culverts throughout the Burial Ground and in miscellaneous steel boxes, drums, stainless steel welded "coffins", concrete casks, and polyboxes of various shapes and sizes (Figure 4). Though most of the containers had adequate integrity for movement, container integrity issues were encountered throughout the project. The 9E facility proved valuable for unpacking and repacking higher risk containers, venting special case containers, and dewatering containers with rain water intrusion.

The critical steps involved with processing the TRU legacy waste are listed below. In order to optimize productivity, a risk matrix was used to determine the location for conducting the preparation steps, with 9E facility being the key resource for completion of this work.

- Retrieval (e.g., unearthing in some cases)
- Preliminary compliance assessment (e.g., container identification and presence of prohibited items (PI))
- Preliminary characterization (e.g., presence of prohibited items (PI) and Non-Destructive Assay (NDA) measurements)
- Preparations for shipment to remediation facility (e.g., Safety Basis / DSA requirements, inter-area shipping compliance with the Onsite Safety Assessment (OSA) requirements)
- Physical steps necessary for shipment to remediation facility (e.g., venting, assay, over packing)
- Shipment to remediation facility
- Remediation
- Shipment to SWMF for disposal
- Final characterization

Figure 3 – Construction of 9E Culvert Unloading Facility

Figure 4 – Miscellaneous steel and concrete boxes containing legacy TRU waste

At its highest production, the ATP was retrieving low to medium risk containers from culverts in the SWMF, retrieving high risk culverts in 9E, remediating high risk and/or large boxes in H Canyon, remediating drums in the F Canyon Drum Line, remediating high risk small and medium size boxes in the F Canyon Box Line, remediating low risk boxes in the SWMF Cell 11, and performing non-intrusive repackaging throughout other portions of the SWMF. Each of the areas had unique DSA and shipping requirements, specific to the types of waste being processed. The design features in each area contributed to differences in the engineering and operational controls required to receive, process, move and ship containers. Controls associated with flammability determinations, compliance with Department of Transportation shipping container requirements, container integrity inspections, pre-existing knowledge of contents (preliminary x-ray results), PEC and Fissile Gram Equivalent (FGE) content, presence of containerized and free liquids, and the presence of aerosol cans were just of few of the parameters required for processing the containers.

As with the uniqueness of each remediation facility, the experience and skill of each work crew were also unique and specialized to accommodate the types of containers and waste typically processed in the respective area. The F Canyon Drum Line consisted of sub-contracted operators hired under the ARRA. Management presence and oversight for F Canyon Drum Line was therefore critical to maintain the nuclear standards required for this work. The F Canyon Box Line utilized construction and maintenance riggers and a mix of site operators and subcontractors. Management presence and oversight at F Canyon Box Line was critical here as well for both the increased hazards and DSA compliance. H Canyon Box Line utilized site operators and construction personnel. Management presence and oversight at H Canyon Box Line was critical since the most complex and higher risk activities were completed here. SWMF Cell 11 consisted of site operators and maintenance riggers that were capable of more precise work and compliance with the more rigid and restrictive DSA requirements. As such, management oversight was not as critical to success. Support functions in all areas utilized sub-contractors with experienced SRS personnel in oversight or leadership positions.

Risk matrices were developed throughout all phases of the project to help identify the necessary steps for each container and the locations for conducting these steps. DSA and OSA requirements were loaded into the matrices. Waste packaging details were included (e.g., presence of inner containers, PI, etc.). Presence of rain water and assessments of repackaging/remediation complexity were also included (e.g., determination as to whether cutting (hand held tools) of wooden or metal containers might be necessary). In addition, the experience and skill sets of the work crews were a strong consideration when evaluating the complexity of the work required. The matrices were particularly useful at identifying waste that could be worked in multiple locations. The identification of waste with similar paths and recognition of parallel paths allowed the Project to optimize throughput, avoid down time and load level the work. Deployment of these matrices allowed the project to optimize the execution of the scope and to achieve both cost and schedule efficiencies, allowing pursuit of the very difficult legacy TRU waste.

Remediation of the VDT waste, such as SRNL concrete casks, was challenging with many varied and unique complexities. However, development and utilization of a thorough risk management matrix resulted in successful remediation of a large portion of VDT including the SRNL concrete casks. Project schedules were developed for each of the VDT waste streams and risk matrices were applied to the waste.

Between 1974 and 1996, SRNL generated 35 concrete casks of waste from the Hot Cells (Figure 5). The waste had been loaded remotely and was thus assumed to be Remote Handled (RH). Remediation of RH waste would require the waste to be removed from the casks and placed in 55 gallon drums. The original estimates to remediate the waste were based on deployment of either existing or portable hot cells which were cost and schedule prohibitive. As the VDT project team reviewed the details surrounding the casks, alternative ideas emerged. Radiological analysis, field x-rays, burial slips and interviews with the generating facility enabled the team to assemble the risk matrix for this waste. The concrete casks had been previously buried in the ground and had experienced flood conditions in the burial trench. As a result, rain water intruded the casks which added complexity to the handling of this waste. Considering industrial and radiological risks and the PEC/FGE associated with each container, the team determined that Cell 11 could be utilized to remediate over half of the containers and the more robust F and H Canyon box lines could be used to remediate the remaining containers with little to no impact on the safety bases. Project cost and schedule constraints were then determined to assess alternatives for waste handling and packaging. Ultimately, all three facilities were deployed for remediation of this waste stream. Preparation for the remediation heavily involved the work crews and the use of cold, to warm, to hot mockups.

Figure 5 – SRNL Concrete Casks on Storage Pad

The risk matrix for the casks revealed that in addition to low PEC/FGE in most of the casks, the dose associated with the containers varied from non-detectable to very high. Design data and generator details allowed the Health Physics Department to provide accurate and reliable dose estimates. This dose information was used, along with the presence of any liquids, to determine the order for working the casks in Cell 11. The work crew visited the SRNL Hot Cells and interviewed technicians to get a sense of packaging, weight and other waste details to be expected in the casks. The crew visited a local vendor and identified off-the-shelf tools that could be used to support remotely repacking the waste into drums (Figure 6). In addition, the crew designed and fabricated a local exhaust system to reduce the contamination risks.

Cold and then warm mock-ups were conducted to establish the protocol for remediating the waste. Due to less than optimal contamination controls in Cell 11, the work was conducted in a small containment structure (Figures 7 and 8). Six casks were remediated in Cell 11. During remediation activities, adequacy of the ventilation system was confirmed when a waste bag failed. The ventilation system successfully prevented air born activity and the spread of contamination. However, cost and budget considerations led to cessation of remediation activities in Cell 11. Several months later, remediation of casks began in F Area. The same tools and local ventilation were deployed in F Area, and cold mock-ups were conducted to confirm feasibility. Three low risk (low dose) casks were remediated in a hot mock-up setting, with the third cask as part of the readiness assessment. The F Canyon Box Line was shut down in

December 2012. Currently, remediation of the high dose casks is ongoing and will be completed in H Canyon.

Figure 6 – Extended Reach Tools

Figure 7 – Final Cold Mockup for Cell 11 SRNL Cask Campaign

Figure 8 – Warm Mockup in Cell 11 for SRNL Cask Campaign

CONCLUSION

SRNS successfully completed the baseline scope associated with the ARRA for the ATP at SRS because the project team utilized pre-existing facilities with the capacity to repackage and remediate the legacy TRU waste. The project team employed various project management tools including integrated schedules, contingency planning, teamwork and communications to balance competing missions and resources to navigate through the technical, health and safety, and radiological requirements. The project team developed risk matrices to assess the waste containers and to optimize remediation strategies, resulting in cost and schedule efficiencies. A sample risk matrix is provided in Figure 9. These efficiencies allowed stretch goals with the very difficult TRU waste to be pursued. The risk analysis technique used for the ATP was also utilized for the VDT waste, including SRNL casks and other waste streams with varied and unique challenges, optimizing multiple work crews and facilities to successfully complete remediation of legacy TRU waste at the SRS.

REFERENCES

None

ACKNOWLEDGEMENTS

Mary Rodriguez, Former Project Director, Accelerated TRU Project, Savannah River Nuclear Solutions
Ginger Humphries, Senior Engineer, SRS Radioactive Waste Program, Savannah River Nuclear Solutions

1	2	3	4	5	6	7	8	9	10	11	12	13	14	16	17	18	19
Container ID	WATER PRESENT Y / N	WATER IN WASTE Y / N	PROHIBITED ITEMS Y / N	LCNDE 2012 COMMENTS	STEEL LINER Y / N	UNVENTED LINER Y / N	MEASURED DOSE RATE (Contact) mr/hr	CALCULATED Dose Rate mr/hr	PEC Pu-239	PROCESSING PATH	WORK FOR F-AREA	INSTALL FILTER / SAMPLE PORT	SYRINGE SAMPLE MSB	CELL 11 OVERALL RANK	DOSE RATE RANK	WATER RANK	OTHER RANK (Cell 11)
SR500418	N	N	Y	Contains 4 slip on cans 3-5 gal size - 2 liquid containing bottles - 6 oz	N	N	0	70	0.41	A	N	N	N	2	0	1	2
SR500255	N	N	Y	Contains unvented 55-gal drum, 4 unvented containers > 4 liters (slip on cans?), and 1 bottle with 3 oz of fluid	N	N	4	290	0.13	A	N	N	N	4	2	1	2
SR500416	N	N	Y	Contains 4 slip on cans 3-5 gal size	N	N	1.5	109	0.22	A	N	N	N	5	1	1	2
SR500417	N	N	Y	Two unvented containers greater than 4L, one glass bottle with about 4 oz of liquid	N	N	30	2173	0.14	A	N	N	N	7	4	1	2
SR528588 SR528589	N	N	Y	Unvented steel liner and 3 unvented containers > 4L	Y	Y	5	702	2.89	D	N	N	Y	8	3	1	2
PADTEMP9	N	N	Y	Unvented MSB (steel liner)	Y	Y	100	14038	2.15	D	N	N	Y	9	5	1	1
TEMP18	N	N	Y	Unvented MSB, scissors, nuts, bolts	Y	Y	600	84225	2.15	D	N	N	Y	12	8	1	1
SR509776	Y	N	Y	~11 gal of water between concrete and steel, MSB (steel liner) requires filter vent and sample port	Y	Y	70	9826	2.15	C	N	N	Y	14	4	2	0
TEMP15	Y	N	Y	14 gal of water between concrete and steel, poor image quality	Y	Y	80	11230	2.15	C	N	N	Y	16	5	2	0
SR668976	Y	N	Y	10 gal of water between concrete and steel	Y	Y	100	14038	2.15	C	N	N	Y	18	5	2	0
SR608900	Y	N	N	20 gal of water between concrete and steel	Y	N	300	42100	0.09	C	N	N	Y	20	7	2	0
SRPB774	N	N	Y	Unvented 30 gal inside unvented 55 gal. No other waste inside.	N	N	1	72	0.07	E	N	N	N	N	1	1	1
SR503156	N	N	N	Lab waste	N	N	0	70	**22.38**	B	Y	N	N	N	0	1	1
PAD12TEMP1	Y	Y	Y	50+ gal of water inside MSB and between concrete and steel	Y	N[A]	20	2800	2.15	B	Y	N	N	N	4	2	1
SR523564	Y	Y	Y	~20 gal of water inside MSB and between concrete and steel	Y	N[A]	50	7000	2.15	B	Y	N	Y	N	4	2	1
SR608873	Y	N	N	~15 gal of water between concrete and steel, requires HSG	Y	N	100	14038	**19.38**	B	Y	N	Y	N	5	2	0
SR610863	Y	N	N	~30 gal of water between concrete and steel, requires HSG	Y	N	120	16845	**7.43**	B	Y	N	Y	N	5	2	0
CASKTEMP01									2.15					n/a			
SR504070 SR504071									**18.91**	B				n/a			

Figure 9 – Sample Risk Matrix

1	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
Container ID	PAD 9E Supporting Cell 11	GROUP	Overall Rank	WRAPPED	PEC>4	DOSE RANK	CELL 11 Feed	OTHER	INUNDATED	NEEDS VENTING SERVICES	5cm Dose Rate (mr/hr)	30 cm Dose Rate (mr/hr)	Cont. Type	BOX PLAN CATEGORY	Non-Flamm doc (Calc, IH)	FGE Pu-239	PEC/FGE Action	Non-Flam Addtnl Info	Non-Flam action	Disposition Actions for 2011 planning	Prohibited Items	Contains Beryllium IH
SR500418	0	**B**	13	1	1	1	5	1	1	N	2	0	CC	Pad	156	0.01	None	No IMB	None	Over, NDA		
SR500255	1	**B**	13	1	1	1	5	1	1	N	4	2	CC	Pad	223	0.00	None	No IMB unV	Eng	Over, drum	>4L sealed	
SR500416	1	**A**	9	1	1	1	1	1	1	N	0	0	CC	Pad	156	0.01	None	No IMB	None	Repack	>4L sealed	
SR500417	2	**B**	13	1	1	1	5	1	1	N	20	4	CC	Pad	156	0.00	None	No IMB	None	Over, NDA		
SR528588 SR528589	1	**A**	13	1	1	1	5	1	1	Y	?	?	CC	Pad	NA	43.75	None	X-Lid NoV	Eng	Field		
PADTEMP9	1	**A**	10	1	1	1	3	1	1	?			CC	Pad	NA	0.01	Conf		Xray	Field, over	#N/A	
TEMP18	2	**C**	13	4	1	1	3	1	1	?			CC	Pad	NA	0.01	Conf		Xray	Field, over	#N/A	
SR509776	2	**D**	18	1	1	3	5	4	1	Y	80	65	CC	Pad	NA	0.01	Conf	X-Lid NoV	Eng	Field		Y
TEMP15	3	**C**	13	4	1	1	3	1	1	?			CC	Pad	NA	0.01	Conf		Xray	Field, over	#N/A	
SR668976	3	**C**	13	4	1	1	3	1	1	?			CC	Pad	NA	0.01	Conf		Xray	Field, over	#N/A	Y
SR608900	4	**C**	13	1	1	5	1	1	1	N	450	300	CC	Pad	155	1.42	None	IMB vent	None	Over, NDA		
SRPB774	5	**A**	10	1	1	1	3	1	1	?			CC	Pad	NA	0.00	None		Xray	Field, over	#N/A	Y
SR503156	5	**D**	16	1	5	1	5	1	1	?			CC	Pad	156	0.68	None	No IMB	None	Over, NDA		
PAD12TEMP1	5	**A**	10	1	1	1	3	1	1	?			CC	Pad	NA	0.01	Conf		Xray	Field, over	#N/A	
SR523564	5	**B**	13	4	1	1	3	1	1	?			CC	Pad	NA	0.01	Conf		Xray	Field, over	#N/A	Y
SR608873	5	**D**	20	1	5	5	5	1	1	?			CC	Pad	155	0.10	None	IMB vent	None	Over, NDA		
SR610863	5	**D**	20	4	5	2	5	1	1	?			CC	Pad	155	37.61	None	IMB vent	None	Over, NDA		
CASKTEMP01		**C**	14	1	1	1	3	1	3	?			CC	Clvrt	NA	0.01	Conf		Xray	Field, over	#N/A	
SR504070 SR504071		**D**	18	1	5	1	5	1	1	?			CC	Clvrt	NA	0.58	None		Xray	Field, over	#N/A	

Col. 11 Notes

A = 1. Process in Cell 11.

B = 1. Over pack into SLBII, as needed. 2. Ship to F-Area.

C = 1. Pad 9E to dew ater. 2. Pad 9E to vent and/or sample HSG. 3. Process in Cell 11.

D = 1. Pad 9E to vent and/or sample HSG. 2. Process in Cell 11.

E = 1. Pad 9E to remove drums to be sent to Pad 6 for filter vent installation.

Col. 32 Notes

CC = Concrete Cask

Col. 34 Notes

155 = N-CLC-E-00155

156 = N-CLC-E-00156

223 = S-CLC-E-00223

NA = Not available; non-compliant container if > 4 PEC

Col. 36 Notes

Conf = PEC/FGE Confirmation; calc review , assay or other

Col. 37 Notes

No IMB = No interior metal box.

IMB Vent = Interior metal box w ith filter vent.

No IMB unV = No interior metal box; internal unvented 55 g drum present.

X-Lid NoV = Xray show s metal box lid w ith no filter vent.

Col. 38 Notes

Xray = Xray to determine presence of metal box, lid, or filter vent.

Eng = Engineering Non-Flammability Determination Needed

Col. 39 Notes

Field = Field xray, fast assay.

Field, over = Field xray, fast assay (need overpack for LCNDA?).

Over, NDA = Overpack, NDA, then propose Solution Pkg for CH/RH as needed.

Over, drum = Unload drum, overpack into 85 gallon drum, NDE, NDA

Repack = Repack in Fbox, Cell 11, or Hcan

Figure 9 – Sample Risk Matrix - continued