ALARA Design Review Form

E7-1, DE-DP-384

MT or DCF/DCN Number: MT-SS-2011-00010 Title: Disposal Cell 6 Project

Brief Description of the Scope: Additional disposal cell capacity is required to meet the liquid waste system plan objectives

Reference(s): M-TC-Z-00008 and G-CDR-Z-00001

Answer the following ALARA screening questions. If the answer is YES to any of the questions, complete the appropriate Supplemental Design Checklist(s) (SDC). The SDCs can be accessed on the Design Services Web page.

RADIOLOGICAL QUESTIONS	YES	NO
1. Does the design activity involve performance in, or require entry to, an area in an existing facility posted as a " Radiation Area" or greater, or a "Contamination Area" or greater, or an "Airborne Radiation Area", or an area in a new facility which, following facility operation, will contain or process radioactive material? If yes, review attached Supplemental Design Checklist SDC-1.	✓	
2. Does the design activity involve any system that does, or will (following facility operation), contain, convey, or use radioactive materials? If yes, review attached Supplemental Design Checklist SDC-2.	✓	
3. Does the design activity involve changes to shielding requirements or the use of penetrations in shield walls? If yes, review attached Supplemental Design Checklist SDC-3.	✓	
4. Does the design activity involve new ventilation systems, modifications to existing ventilation systems, or the conversion of a clean area to a radiological area? If yes, review attached Supplemental Design Checklist SDC-4.	✓	
5. Does the design activity involve area (including Nuclear Incident Monitoring – NIM), airborne, process, or effluent radiation monitoring systems? If yes, review attached Supplemental Design Checklist SDC-5.		✓

Comments: None

Responsible Engineer: Suresh Soorma Date: 9/5/12

Checker/Verifier: Chris Schilling Date: 9-6-12

DOCUMENT TITLE: **SDC-1**

Document No.: MT-SS-2011-00010 Rev. No. 0 Date: 9/05/12

ORIGINATOR/DATE: Suresh Soorma CHECKER/VERIFIER DATE: Chris Schilling

Item No.	ITEM DESCRIPTION	YES	NO	N/A
1.	Has the design considered modular components, if appropriate, or other design considerations to reduce the duration of construction or installation activities in the area?	X		
2.	Has the design considered accessibility requirements during normal operations, shutdown, maintenance, anticipated operational transients, and postulated accident conditions?	X		
3.	Has the design considered personnel traffic flow in the facility layout?	X		
4.	Has the design considered the accessibility requirements for the maintenance, inspection, removal, or replacement of the equipment?	X		
5.	Are doorways and labyrinths wide enough to permit necessary personnel, component, and equipment passage?			X
6.	Are equipment cover plates for personnel routine or maintenance access hinged or are captive quick-opening fasteners used for personnel or maintenance access?	X		
7.	Have life expectancy and reliability of the chosen equipment been considered for their selection and location to minimize personnel access in the area?	X		
8.	Are electrical, mechanical, or hydraulic quick release mechanisms used where possible for insulation, sample bombs, electrical connections, even entire skids, etc.?	X		
9.	Are bolted flanges rather than welds used for quick removal, where appropriate?	X		

Item No.	ITEM DESCRIPTION	YES	NO	N/A
10.	Are readouts or control points for instruments and controllers located outside of the radiation area?	X		
11.	Have remote operators or robotics been considered in high radiation areas?	X		
12.	Are surfaces which could be contaminated made nonporous or sealed for ease of decontamination?	X		
13.	Have locked entrances, entry alarms, or other positive control devices been provided as required for specific radiation areas?			X

Item No.	COMMENTS

DOCUMENT TITLE: **SDC- 2**

Document No.: MT-SS-2011-00010 Rev. No. 0 Date: 9/05/12

ORIGINATOR/DATE: Suresh Soorma CHECKER/VERIFIER DATE: Chris Schilling

1.	Are manual valve operators used only for infrequently operated valves?	X		
2.	Do instruments selected contain minimum quantity of radioactive or contaminated working fluid?			X
3.	Are components designed to facilitate draining, flushing, and cleaning by chemical or mechanical means?	X		
4.	Are systems filters provided upstream of heat exchangers or demineralizers?			X
5.	Has system piping been designed to eliminate or minimize dead legs, standpipes, or low points?	X		
6.	Are drains provided at unavoidable low points and dead legs to flush out radioactive residues?	X		
7.	Are eductors and agitators or other devices provided in tanks or other vessels to ensure adequate mixing and minimize localized radioactivity buildup?			X
8.	Are tanks and other vessels designed with conical or dished bottoms with a central drain and spargers to remove radioactive sediment?			X
9.	Are large radius pipe bends, rather than elbows, used in spent resin and slurry piping?	X		
10.	Are spent resins or slurry piping designed with full-ported plug valves and without screwed connections and orifices?			X
11.	Are spent resins or slurry piping sloped downward and designed to maintain turbulent flow and to minimize pipe connections and fittings?			X
12.	For piping tees in resin or slurry piping, is the normal flow through the straight portion and is the branch line located above the run?			X

Item No.	ITEM DESCRIPTION	YES	NO	N/A
13.	For piping or tubing containing tritium, are all connections inside a ventilated hood or glove box? Are positive sealing connections used?			X
14.	For processes containing tritium, are all process fittings, valves, and equipment inside a ventilated hood or glove box? Are positive sealing connections used?			X
15.	For processes containing tritium, have valves been oriented such that the valve seats are against potentially high tritium sources?			X
16.	For a design activity that requires the breaching of a system which may contain radioactive material, have design measures been considered, as appropriate, to minimize potential releases of solids, liquids, or gasses to reduce contamination?	X		
17.	Where material might become activated, are materials with low activation potential and corrosion-resistant materials used as much as possible?			X
18.	Where material might become activated, is proper chemical and flow control used to minimize erosion and corrosion?			X
19.	For reactor facilities, have potential crud traps been identified and eliminated where possible?			X
20.	For reactor facilities, have the shielding requirements where crud may deposit been fully investigated?			X
21.	Has the volume of radioactive waste generated by operation of the system or equipment been minimized by design (e.g. minimize the quantity or volume of consumables by using high capacity filter elements or by using mechanical seals rather than packing on rotating equipment)?			X
22.	Are sampler, sample flow, and sampling line characteristics matched to the parameters(s) to be measured and the physical characteristics of the source stream or volume to be measured?			X
23.	Are effluent, airborne, and off-line process monitor lines and sampler lines as short as possible and heat-traced and insulated, as necessary, to minimize line loss, water condensation and radioactivity build-up?	X		

Item No.	ITEM DESCRIPTION	YES	NO	N/A
24.	Have design features been considered to ensure the segregation of non-radioactive waste (e.g. oil, refrigerant) from potential contamination so as to preclude the generation of mixed waste?	X		
25.	Have design considerations precluded cross-connections of radioactive drains with non-radioactive drains?			X
26.	Has the design considered accessibility requirements during normal operations, shutdown, maintenance, anticipated operational transients, and postulated accident conditions?	X		
27.	Has the design considered storage, transfer, monitoring, surveillance, and leak detection of high-level and low-level radioactive wastes?	X		
28.	Has the facility design considered segregation of waste into compatible groups for storage and disposal?	X		
29.	Has the design considered spill prevention and control?	X		
30.	Has the design considered segregation of facility functional areas based on accessibility, shielding, and contamination control requirements?	X		
31.	Has the design considered grouping of areas that are functionally and operationally alike?	X		
32.	Has the design considered grouping of areas with similar radiation and contamination potential?	X		
33.	Has the design considered separation of components or areas potentially containing radioactive materials from clean components or clean areas?	X		
34.	Has the design considered minimum number of entry points into a radiological Buffer Area (RBA)?	X		
35.	Has the design considered the selection of materials that include features that facilitate operations, maintenance, decontamination, and decommissioning?	X		

Item No.	ITEM DESCRIPTION	YES	NO	N/A
36.	Has the design incorporated measures to simplify decontamination of areas that may become contaminated with radioactive or hazardous materials?	X		

Item No.	COMMENTS

DOCUMENT TITLE: **SDC- 3**

Document No.: MT-SS-2011-00010 Rev. No. _____ Date: 9/05/12

ORIGINATOR/DATE: Suresh Soorma CHECKER/VERIFIER DATE: Chris Schilling

Item No.	ITEM DESCRIPTION	YES	NO	N/A
1.	Have process condition changes been evaluated to assess impacts on shielding requirements?	X		
2.	Has the rerouting of piping, conduit, or ductwork been evaluated to assess impacts on shielding requirements?	X		
3.	Have shielding requirements for individual components been considered (e.g. valve aisles provided, pumps and valves shielded from adjacent tanks containing radioactive materials)?			X
4.	Have penetrations been sized and located to preclude direct (line-of-sight) streaming?			X
5.	Has streaming through penetrations been minimized by the use of shadow shields, shield plugs, or filling of void spaces?			X
6.	Have labyrinths, labyrinth roofs, shield doors, and shield plugs or hatches been included as appropriate?			X
7.	Has specially constructed local shielding been considered (e.g. temporary shielding, shadow shield)?			X
8.	Has consideration been given to skid-mounted systems with shielding, or with space to add shielding, to separate components producing high dose rates from each other and from less radioactive components?			X
9.	If a pipe is used as the primary confinement barrier for materials, and the pipe exits the facility, has the design considered a secondary confinement using a double-walled pipe? A leak detection shall be provided for the primary pipe.			X

Item No.	ITEM DESCRIPTION	YES	NO	N/A
10.	Are the materials inside radiation areas capable of withstanding the total absorbed dose over the lifetime of the system, structure, or component?	X		
11.	Have pipe hangers and components been designed to support temporary shielding, where appropriate?			X
12.	Has the design provided shielded covers or plugs for each glove port with shielding equivalent to the glove box?			X
13.	Has the design avoided straight-line penetrations of shield walls to prevent radiation streaming?			X
14.	Has the design considered specialized tools and remote handling equipment where anticipated exposures to extremities and eyes would approach the limit?			X

Item No.	COMMENTS
General	Calculation N-CLC-Z-00027 estimates dose rate in the vicinity of the tank to vary between 0.2 to 0.5 mrem/hr depending on source term.

DOCUMENT TITLE: **SDC- 4**

Document No.: MT-SS-2011-00010 Rev. No. 0 Date: 9/05/12

ORIGINATOR/DATE: Suresh Soorma CHECKER/VERIFIER DATE: Chris Schilling

Item No.	ITEM DESCRIPTION	YES	NO	N/A
1.	Has ventilation flow from areas of lower potential airborne radioactivity to areas of higher potential airborne radioactivity been maintained?	X		
2.	Is ventilation flow sufficient to keep airborne radioactivity concentration below prescribed limits?			X
3.	Have ducts carrying clean air been located to eliminate, where possible, their passing through RCAs?			X
4.	In those cases where ducts carrying clean air must pass through RCAs, are the ducts at positive pressure with respect to the RCA, where they pass through areas of potential airborne radioactivity?			X
5.	Are ducts containing potentially contaminated air at negative pressure with respect to the surroundings if they pass through clean areas?	X		
6.	For ductwork containing potentially contaminated air, has appropriate leak tightness criteria of the ductwork been applied for the facility area where the ductwork is being routed?	X		
7.	Have the number of direction changes in ductwork containing potentially contaminated air been minimized?	X		
8.	Have fans or blowers been located downstream of filters?	X		
9.	Do air hoods or glove box openings have sufficient linear air velocity for the service conditions?			X
10.	Is the ventilation design in accordance with WSRC-IM-92-43, “SRS Ventilation Design Guide?”			X

Item No.	COMMENTS
2	NFPA 69 requirements for flamability achieved
10	System design, fabrication, installation, examination, and testing per ASME AG-1