APPENDIX A

MATERIAL PLACEMENT SEQUENCE

The materials to be placed in the disposal cell are summarized in the tables below. These materials are listed in more detail in Table A.1, based on information presented in SFC (1998) and updated by SFC in 2006 and 2007. The planned disposal locations within the cell are included in the table. The planned construction and material sequence is presented in Table A.2, based on the material list in Table A.1.

Material Type	Description	Estimated Volume (cu ft)	Fraction of Total Volume (%)	Natural Uranium (pCi/g)	Radium-226 (pCi/g)	Thorium-230 (pCi/g)
A	Sludge and sediment	1,081,890	21	357 - 12,100	6 – 332	211 - 16,300
B	Liner soils and subsoils	1,174,441	23	5 - 95	0.5 – 2.1	47 -70
C	Calcium fluoride sediments, debris	2,049,840	40	168 - 520	0.2 – 0.8	2.1 -4.8
D	Site soils and rock	811,685	16	250	-----	-----
	TOTALS	5,117,856	100	-----	-----	-----

Phase	Work Description	Berm Material (cu ft)	Interior Material (cu ft)
Initial	Move and store materials; solidify calcium fluoride sludge	0	687,808
Phase I	Excavate and place materials in Phase I area	225,921	346,438
Phase II	Excavate and place materials in Phase I-II areas	1,126,230	1,630,358
Phase III	Excavate and place materials in Phase I-III areas	594,716	505,385
	TOTALS	1,946,867	3,169,989
	FRACTION OF TOTAL VOLUME	38 %	62 %

Table A.1 Disposal Material Placement and Volume Summary

Material	SCU No.[a]	Material Type[b]	Current Location	Current Volume (cu ft)[c]	In-Cell Volume (cu ft)	Weight (10^9 g)[c]	Handling or Treatment	Disposal Location	Comments
SLUDGES & SEDIMENTS									
Raffinate sludge	17	A	Outside cell	299,808	299,808	9.51	Pressure filtered	Phase II cell (or off site)	Temporarily stored on yellowcake storage pad
Pond 2 residual materials	18	A	Outside cell	635,000	762,000	36.98	Solidified	Phase II cell	Mixed by contractor
Emergency basin sediment	6	A	Phase II cell	14,600	6,411	0.23	Excavated	Phase I (or off site)	Interior material
North ditch sediment	9	A	Phase II cell	20,770	9,120	0.33	Excavated	Phase I (or off site)	Interior material
Sanitary lagoon sediment	7	A	Phase II cell	10,365	4,551	0.17	Excavated	Phase I (or off site)	Interior material
Fluoride holding basin #1	13	C	Outside cell	171,400	188,540	8.21	Solidified	Phase I-III	Bottom layer of interior
Fluoride holding basin #2	12	C	Outside cell	186,000	204,600	8.91	Solidified	Phase I-III	Bottom layer of interior
Fluoride settling basins & clarifier	14	C	Outside cell	114,300	125,730	5.47	Solidified	Phase I-III	Bottom layer of interior
Buried calcium fluoride	15	C	Outside cell	96,380	106,018	4.62	Solidified	Phase I-III	Bottom layer of interior
Buried fluoride holding basin #1	15	C	Outside cell	57,200	62,920	2.74	Solidified	Phase I-III	Bottom layer of interior
LINER SOILS & SUBSOILS									
Clarifier liners	17	B	Outside cell	332,400	332,400	16.6	Cleaned	-----	Pond used for stormwater
Calcium fluoride basin liner	12 - 14	B	Outside cell	95,285	95,285	4.76	Excavated	Phase III	-----
Pond 3E	24	B	Outside cell	0	0	0	Covered	Outside of cell	Reclaimed in place
Emergency basin soils	6	B	Phase II cell	162,500	162,500	8.12	Excavated	Phase I	Interior material
North ditch soils	9	B	Phase II cell	87,500	87,500	4.37	Excavated	Phase I	Interior material
Sanitary lagoon liner	7	B	Phase II cell	56,356	56,356	2.81	Excavated	Phase I	Interior material
BURIED MATERIALS/DRUMS									
Pond 1 spoils pile	8	B	Outside cell	437,400	437,400	21.8	Excavated	Phase II	Berm material
Interim storage cell	35	C	Outside cell	154,887	154,887	7.74	Excavated	Phase II	Berm material
Solid waste burials (No. 1)	5	C	Phase II cell	43,000	43,000	--	Excavated	Phase I	Berm & interior material
Solid waste burials (No. 2)	20	C	Outside cell	8,100	8,100	--	Excavated	Phase II	Berm material
DUF_4 drummed contam. trash	29	C	Phase I cell	2,200	2,200	--	Moved	Phase I-III	Interior material
Other drummed contam. trash	--	C	Various	5,000	5,000	--	Moved	Phase I-III	Interior material
Empty contam. drums	--	C	Various	2,000	2,000	--	Moved	Phase I-III	Interior material

(Table footnotes on next page)

Table A.1 Disposal Material Placement and Volume Summary (continued)

Material	SCU No.[a]	Material Type[b]	Current Location	Current Volume	In-Cell Volume (cu ft)	Weight (10^9 g)[c]	Handling or Treatment	Disposal Location	Comments
STRUCTURAL MATERIALS									
Main process building	1	C	Phase III Cell	[2,178,000]	436,600	--	Demolished	Phase II	--
Solvent extraction (SX) building	2	C	Phase III Cell	[180,000]	36,000	--	Demolished	Phase II	--
DUF_4 building	29	C	Outside Cell	[281,000]	56,200	--	Demolished	Phase II	--
ADU/Misc. digestion bldg	21	C	Phase III Cell	[75,000]	15,000	--	Demolished	Phase II	--
Laundry building	17	C	Outside Cell	[12,500]	2,500	--	Demolished	Phase II	--
Centrifuge building	17	C	Outside Cell	[15,000]	3,000	--	Demolished	Phase II	--
Bechtel building	30	C	Phase I Cell	[27,000]	5,400	--	Demolished	Phase II	Stored prior to Phase II
Solid waste building	10	C	Phase I Cell	[18,000]	3,600	--	Demolished	Phase II	Stored prior to Phase II
Cooling tower	2	C	Phase III Cell	[30,000]	6,000	--	Demolished	Phase II	--
RCC evaporator	2	C	Phase III Cell	[18,750]	3,750	--	Demolished	Phase II	--
Incinerator	10	C	Phase I Cell	[7,500]	1,500	--	Demolished	Phase II	Stored prior to Phase II
UF6 cylinders	---	C	Phase I Cell	155,000	15,500	--	Moved	Phase III	Interior material
Concrete and asphalt	Various	C	Various	511,795	511,795	--	Excavated	Phase I-III	Stored as necessary
Scrap metal	---	C	Various	100,000	50,000	--	Moved	Phase I-III	Stored as necessary
Chipped pallets	---	B	Various	3,000	3,000	--	Moved	Phase I-III	Stored as necessary
SUBSOILS AND BEDROCK									
Contaminated soils (materials above 100 or 570 pCi/g natural uranium	Various	D	Inside and Outside Cell	811,685	811,685	40.5	Excavated	Phase I-III	Berm material

Table footnotes:
a Site characterization unit number from Section 4 of SCR (SFC, 1998).
b Disposed material type
c Values are from Attachment III of SCR or updated estimates by SFC in 2006 and 2007; values in brackets are calculated building volumes from floor area and building height; disposal volume is 20 percent of building volume.
d UF6 cylinders may be compressed or filled with calcium fluoride slurry or grout.

Table A.2 Disposal Cell Construction Sequence and Volume Summary

Phase	Cell Construction	Structure Demolition	Material Removal	Material Placement	In-Cell Volume (cu ft)
Initial work	None		Remove raffinate sludge from clarifier ponds; pressure filter raffinate sludge and place in shipping bags	Store bags of filtered raffinate sludge on prepared area of yellowcake storage pad	299,808
			Clean clarifier pond liner and repair or re-line as necessary	Use cleaned clarifier ponds for storage of stormwater runoff from disposal cell	-----
			Move UF6 cylinders	Store on pad near DUF4 building	15,500
		Incinerator building	-----	Store debris on pad near DUF4 building	1,500
		Solid waste building	-----	Store debris on pad near DUF4 building	3,600
		Bechtel building	-----	Store debris on pad near DUF4 building	5,400
			Solidify Calcium Fluoride Holding Basin No.1	Dispose in bottom of Phase I-III cell interior	188,540
			Solidify Calcium Fluoride Holding Basin No.2	Dispose in bottom of Phase I-III cell interior	204,600
			Solidify fluoride settling basins and clarifier	Dispose in bottom of Phase I-III cell interior	125,730
			Excavate buried calcium fluoride	Dispose in bottom of Phase I-III cell interior	106,018
			Excavate buried fluoride holding basin No. 1	Dispose in bottom of Phase I-III cell interior	62,920
			INITIAL WORK VOLUME TOTALS:	berm material: 0 cu ft; interior material: 687,808 cu ft	
Phase I	Phase I cell base	-----	Constructed with on-site and off-site materials	Cell base constructed as multilayered system	[135,490 ft²]
	Phase I berm	-----	Constructed with berm materials listed below	Berm materials placed on downslope sides of cell	-----
			Excavate Solid Waste Burial Area No. 1 soil cover	Dispose in Phase I area of cell, as berm material	23,000
			Excavate Solid Waste Burial Area No. 1 drums	Dispose in interior of Phase I area of cell	20,000
			Excavate Emergency Basin sediments	Dispose in interior of Phase I area of cell, Or ship offsite for uranium recovery	6,411
			Excavate Emergency Basin soils	Dispose in interior of Phase I area of cell	162,500
			Excavate North Ditch sediments	Dispose in interior of Phase I area of cell, Or ship offsite for uranium recovery	9,120
			Excavate North Ditch soils	Dispose in interior of Phase I area of cell	87,500
			Excavate Sanitary Lagoon sediments	Dispose in interior of Phase I area of cell, Or ship offsite for uranium recovery	4,551
			Excavate Sanitary Lagoon soil liner	Dispose in interior of Phase I area of cell	56,356
			Excavate contaminated soils in Phase II area (25% of contaminated soil volume)	Dispose in Phase I area of cell, as berm material	202,921
			PHASE I VOLUME TOTALS:	berm material: 225,921 cu ft; interior material: 346,438 cu ft	

Table A.2. Disposal Cell Construction Sequence and Volume Summary (continued)

Phase	Cell Construction	Structure Demolition	Material Removal	Material Placement	In-Cell Volume (cu ft)
Phase II	Phase II cell base	-----	Constructed with on-site and off-site materials	Cell base constructed as multilayered system	[254,740 ft²]
	Phase II berm	-----	Constructed with berm materials listed below	Berm materials placed on downslope sides of cell	-----
		-----	Excavate Pond 1 Spoil Pile material	Dispose in Phase II area of cell as berm material	437,400
			Excavate Solid Waste Burial Area No. 2 material	Dispose in Phase II area of cell as berm material	8,100
			Excavate Interim Storage Cell material	Dispose in Phase II area of cell as berm material	154,887
			Excavate contaminated soils north of disposal cell (10% of contaminated soil volume)	Dispose in Phase II area of cell as berm material	81,169
			Solidify Pond 2 residual materials and excavate	Dispose in interior of Phase II area of cell	762,000
		(Stockpiled debris)	Building debris from initial work	Dispose in interior of Phase II area of cell	10,500
		DUF4 building	-----	Dispose in interior of Phase II area of cell	56,200
		RCC Evaporator	-----	Dispose in interior of Phase II area of cell	3,750
		Cooling tower	-----	Dispose in interior of Phase II area of cell	6,000
		SX building	-----	Dispose in interior of Phase II area of cell	36,000
		ADU/misc.dgst.bldg	-----	Dispose in interior of Phase II area of cell	15,000
		Laundry building	-----	Dispose in interior of Phase II area of cell	2,500
		Centrifuge building	-----	Dispose in interior of Phase II area of cell	3,000
		Main process bldg	-----	Dispose in interior of Phase II area of cell	435,600
	Raffinate sludge cell	-----	Constructed with on-site and off-site materials (if filtered sludge is disposed on site)	Sludge cell liner system inside of cell base liner system	-----
			Move bags of filtered raffinate sludge from yellowcake storage pad	Place bags in raffinate sludge cell inside Phase II area of cell (if disposed on site)	299,808
		-----	Excavate concrete and soil from north side of yellowcake storage pad	Dispose in Phase I or II area of cell as berm material	120,000
			Excavate contaminated soils in Phase III area (40% of contaminated soil volume)	Dispose in Phase I or II area of cell as berm material	324,674
			PHASE II VOLUME TOTALS: berm material: 1,126,230 cu ft; interior material: 1,630,358 cu ft		

Table A.2. Disposal Cell Construction Sequence and Volume Summary (continued)

Phase	Cell Construction	Structure Demolition	Material Removal	Material Placement	In-Cell Volume (cu ft)
Phase III	Phase III cell base	-----	Constructed with on-site and off-site materials	Cell base constructed as multilayered system	[179,170 ft²]
	Phase III berm	-----	Constructed with berm materials listed below	Berm materials placed on downslope sides of cell	-----
		None	Excavate concrete and soil from south side of yellowcake storage pad	Dispose in Phase II or III area of cell as berm material	180,000
			Excavate contaminated soils south of disposal cell (25% of contaminated soil volume)	Dispose in Phase I-III areas of cell as berm material or subgrade fill for cover	202,921
			Move UF6 cylinders and cut end of cylinder	Place in Phase III area of cell for compressing or filling with calcium fluoride grout	15,500
			Excavate remaining concrete and asphalt	Dispose in Phase I-III areas of cell as berm material or subgrade fill for cover	211,795
			Excavate clarifier pond liners	Dispose in Phase I-III areas of cell	332,400
			Excavate calcium fluoride basin liner	Dispose in Phase I-III areas of cell	95,285
			Move drums and trash	Dispose in Phase I-III areas of cell	9,200
			Move scrap metal and pallets	Dispose in interior of Phase III area of cell	53,000
Post Cell Const.	Cell subgrade fill	None	Berm materials above bottom-of-cover line moved	Cover subgrade surface based on amount of fill	-----
	Cell cover		Constructed with on-site and off-site materials	Cell cover constructed as multilayered system	-----
	Site regrading		-----	Exterior areas regraded for erosional stability	-----
			PHASE III VOLUME TOTALS:	berm material: 594,716 cu ft; internal material: 505,385 cu ft	