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12/01/04 – December Monthly WCS Curie and Volume Inventory Report

Introduction

The Waste Characterization System (WCS) is an electronic information system that tracks miscellaneous waste tank data, including projected radionuclide inventories based on sample analyses, process histories, composition studies and theoretical relationships. WCS is used to aid the planning and scheduling of Closure Business Unit activities. In particular, the purpose of this memorandum is to document the WCS monthly information for the curie inventory phase partition (supernate, sludge, salt) for radionuclides tracked in waste (including phase subtotals). This information is provided in Table A1 and reflects the WCS inventories as of 12/01/04. Phase volumes reported by tank are provided in Table A2. General methods and computations performed within WCS used to generate curie inventory projections are documented in References 1 and 2.

Inputs and Assumptions

1. Reference date for sludge decay calculations: 12/1/2004
2. Tank Farm Transfer Receipt Update Status:
   Tank 26: 9/30/2004
   Tank 39: 9/30/2004
3. Tank Farm Effluent Transfer Update Status:
   Tank 40: 7/13/2004
4. Evaporator Tanks assumed to be at actual level.
5. Closed Tank Sludge Volumes included in Phase Volume Sludge Total.
6. Zeolite, Coal, Sand Volumes not accounted in volumes (impacts Supernate Total).
7. Interstitial Supernate Volumes accounted for in Sludge/Salt Volumes, Salt Volume for Salt Ci content calculations, and in Total Supernate Volume for Supernate Ci content calculations.
8. This Monthly Report incorporates new waste streams added to account for fission products per DMT-2004-00311 (CPDERS-2004-00465).

Appendix A

Table A1. December Monthly WCS Curie and Volume Inventory

Nuclide Data	Supernate Total	Sludge Total	Salt Total
H-3 (Ci)	6.16E-02	-	-
C-14 (Ci)	-	3.84E+00	3.75E+02
Co-60 (Ci)	-	3.63E+05	-
Ni-59 (Ci)	-	2.77E+03	-
Ni-63 (Ci)	-	-	-
Se-79 (Ci)	-	1.63E+03	-
Sr-90 (Ci)	-	9.13E+07	5.84E+06
Y-90 (Ci)	-	9.13E+07	5.84E+06
Nb-94 (Ci)	-	-	-
Tc-99 (Ci)	9.44E-03	2.79E+04	-
Ru-106 (Ci)	-	8.18E+03	-
Rh-106 (Ci)	-	8.18E+03	-
Sb-125 (Ci)	-	1.96E+05	-
Sn-126 (Ci)	-	2.15E+03	-
I-129 (Ci)	-	2.24E-01	-
Cs-134 (Ci)	-	1.06E+04	-
Cs-135 (Ci)	-	1.86E+01	-
Cs-137 (Ci)	1.08E+08	5.52E+06	2.61E+05
Ba-137m (Ci)	1.03E+08	5.22E+06	2.47E+05
Ce-144 (Ci)	-	6.27E+03	-
Pr-144 (Ci)	-	6.27E+03	-
Pm-147 (Ci)	-	4.22E+06	-
Eu-154 (Ci)	-	9.45E+05	-
Th-232 (Ci)	8.82E-02	2.83E+00	-
U-232 (Ci)	3.56E-02	6.16E-01	-
U-233 (Ci)	1.81E+00	1.01E+02	-
U-234 (Ci)	1.27E+00	3.68E+01	-
U-235 (Ci)	1.34E-01	1.90E+00	2.30E-01
U-236 (Ci)	2.31E-01	5.84E+00	-
U-238 (Ci)	8.93E+00	6.64E+01	5.16E+00
Np-237 (Ci)	3.36E+00	1.03E+02	-
Pu-238 (Ci)	6.44E+04	2.02E+06	7.46E+04
Pu-239 (Ci)	5.45E+03	4.98E+04	2.49E+03
Pu-240 (Ci)	1.35E+03	2.15E+04	-
Pu-241 (Ci)	4.82E+04	1.28E+06	-
Pu-242 (Ci)	1.14E+00	3.40E+01	-
iAm-241 (Ci)	1.97E+03	7.11E+04	-
Am-241 (Ci)	7.51E+03	3.00E+05	-
Am-242m (Ci)	6.27E+00	2.22E+02	-
Cm-244 (Ci)	3.64E+03	1.64E+05	-
Cm-245 (Ci)	3.44E-01	1.62E+01	-
Phase Subtotal Ci	2.11E+08	2.03E+08	1.23E+07
Total Ci		**4.26E+08**	

	Supernate Total	Sludge Total	Salt Total
Phase Volume, gal	17,417,099	2,625,682	16,421,916
Total Volume, gal			**36,464,696**

Table A2. December Monthly WCS Waste Tank Phase Volume Inventory

Tank	Free Supernate Volume, gal	Sludge Volume, gal	Salt Volume, gal
1	18,970	7,046	479,941
2	271	4,065	536,038
3	542	4,065	536,038
4	301,352	127,099	33,875
5	8,401	33,875	-
6	259,347	24,932	-
7	299,591	8,808	-
8	7,282	4,100	-
9	7,046	2,710	533,870
10	-	2,710	211,380
11	224,388	69,376	-
12	-	143,000	60,000
13	582,050	252,000	-
14	16,450	28,000	129,500
15	-	311,500	-
16	-	-	-
17	-	2,200	-
18	4,196	4,300	-
19	-	15,000	13,098
20	-	1,000	-
21	1,163,527	6,089	-
22	534,469	9,983	-
23	1,255,461	56,109	-
24	1,215,990	3,540	-
25	164,268	-	1,098,630
26	804,738	279,501	-
27	486,732	3,861	600,315
28	193,050	-	1,029,834
29	227,448	-	1,023,165
30	915,057	-	250,263
31	116,532	-	1,146,717
32	719,375	98,456	-
33	628,641	84,240	293,787
34	410,495	20,183	191,295
35	983,853	63,180	-
36	222,183	-	1,035,450
37	137,943	-	1,112,670
38	111,969	-	828,009
39	621,621	103,545	-
40	274,307	504,914	-
41	-	-	1,221,831
42	1,069,848	17,550	-
43	960,055	239,312	-
44	264,794	-	1,003,018
45	175,640	-	1,104,808
46	403,685	-	865,180
47	152,966	-	1,082,905
48	239,382	-	-
49	785,590	-	299
50	318,708	-	-
51	128,887	89,435	-
Phase Totals	17,417,099	2,625,682	16,421,916

References

1. Hester, J. R., High Level Waste Characterization System (WCS), WSRC-TR-96-0264, February 1997.
2. Ledbetter, L. A., Tank Curie Inventory (11/11/04) for Interim Strategy Technical Basis, CBU-PIT-2004-00006, November 2004.