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Subject: Best Estimation of the Concentration of Radionuclides in a Tank 50 Influent Stream Aggregate

Tank 50 receives influent streams from the H-Canyon (General Purpose Evaporator bottoms product, unirradiated fuels; Super Kukla etc.), Effluent Treatment Project, DDA (Deliquification, Dissolution, and Adjustment), and Salt Batch 2. The best estimation of the concentration of each of the radionuclides in the influent streams, and their concentration in an aggregate of predicted influent volumes to Tank 50 is presented in Table 1 for the second and third quarter of 2009.

The characterizations for the radionuclides in the influent streams in this memo were based on the best information available for each waste stream. Priority was given to sample results that were above the limit of detection. In cases where the sample result for Tank 23 or Salt Batch 2 was less than detectable, Tank Inventory (CBU-PIT-2005-00138, Rev 0) totals are used in place of the LDL sample results. Characterizations for the ETP, GPE, and Canyon additions are based on the sample results documented in each Waste Compliance Plan.

For ETP, the assumed volume is 60,000 gallons. 10,000 gallons for each of the six months of the second and 3rd quarters of calendar year 2009.

For GPE, the assumed volume is 30,000 gallons. 5,000 gallons for each of the six months of the second and 3rd quarters of 2009.

For LAW, the assumed volume is 32,000 gallons. 8,000 gallons for each month of the 3rd quarter of 2009 plus June. No LAW has been transferred to Tank 50 as of this date (6/3/09).

For HAW, the assumed volume is 73,000gallons. Approximately 10,000 gallons of HAW have been transferred to Tank 50 to date. This estimation assumes an additional

63,000 gallons of HAW to be transferred into Tank 50, 21,000 gallons per month of the 3rd quarter of 2009.

For Tank 23, the assumed volume is 850,000 gallons. Approximately 200,000 gallons of Tank 23 have been transferred to Tank 50 to date. This estimation assumes additional transfers of 650,000 gallons during the 3rd quarter of calendar year 2009.

For Salt Batch 2, the assumed volume is 960,000 gallons. Approximately 130,000 gallons of Salt Batch 2 have been transferred to Tank 50 to date by processing through ARP/MCU. This estimation assumes an additional 830,000 gallons of Salt Batch 2 to be transferred into Tank 50. This is the remaining volume of Salt Batch 2 (Tank 49, Morning report 6-2-09).

The aggregate concentration was determined by averaging the total Cuires of all the volumes. Although the summed volume of the influent waste streams does not fit into Tank 50 at one time, this approach provides a best estimation of the waste stream made up in the Saltstone "system" (feed system and vault).

It should also be noted that the contribution from Th-230 is driven by sample characterization at limit of detection of ETP and Tank 23. The Tank Radionuclide Inventory bounds the potential additions from both ETP and Tank 23.

Table 1

Nuclide		ETP Addition	GPE Addition	Canyon UIFadditions		Tank 23	Salt Batch 2	SB2 CI Total	Total additional Curies	Aggregate Concentration of Influent Streams (pCi/mL)
	gallons	60000	30000	32000	94000	850000	960000			
Ac-227		N.R.	N.R.	N.R.	N.R.	1.12E-04		1.15E-07	4.75E-07	6.20E-05
Al-26		<8.30E-01	<1.17E-01	N.R.	N.R.	3.30E+01		1.13E-01	2.19E-01	2.86E+01
Am-241		6.44E+01	<2.30E+01	4.25E+02	4.32E+04	2.04E+03	1.87E+03		2.88E+01	3.76E+03
Am-242m		<8.96E-02	<8.96E-02	<8.96E-02	<8.96E-02	3.26E-03	5.31E-04		3.18E-04	4.15E-02
Am-243		<7.30E-01	<3.41E+00	1.03E+00	2.71E+02			1.30E-03	9.84E-02	1.28E+01
Ba-137m		1.08E+04	1.29E+02	1.06E+03	1.06E+03	2.33E+07	5.34E+07		2.69E+05	3.51E+07
Bk-249		N.R.	N.R.	N.R.	N.R.	5.55E-19		1.21E-21	3.00E-21	3.91E-19
C-14		5.93E+00	1.95E+02	5.93E+00	4.17E+00	2.74E+03	5.82E+02		1.10E+01	1.43E+03
Ce-144		<2.10E+01	<1.80E+01	<2.60E+02	<2.60E+02	<8.54E+02	1.68E+02		3.49E+00	4.55E+02
Cf-249		N.R.	N.R.	N.R.	N.R.	4.20E-11		9.18E-14	2.27E-13	2.96E-11
Cf-251		N.R.	N.R.	N.R.	N.R.	1.44E-12		3.14E-15	7.77E-15	1.01E-12
Cf-252		N.R.	N.R.	N.R.	N.R.	3.62E-14		9.48E-17	2.11E-16	2.75E-14
Cm-242		<1.00E-01	<7.41E-02	7.73E+00	7.73E+00	2.95E+00	5.55E-04		1.32E-02	1.72E+00
Cm-243		N.R.	N.R.	2.76E+00	2.76E+00	3.77E-02		8.25E-05	1.52E-03	1.98E-01
Cm-244		5.10E+01	N.R.	9.58E-02	5.97E+03	1.35E+02		2.95E-01	2.86E+00	3.74E+02
Cm-245		N.R.	N.R.	N.R.	N.R.	1.33E-02		2.90E-05	1.01E-04	1.31E-02
Cm-247		N.R.	N.R.	N.R.	N.R.	7.27E-12		1.59E-14	3.93E-14	5.12E-12
Cm-248		N.R.	N.R.	N.R.	N.R.	7.58E-12		1.66E-14	4.10E-14	5.34E-12
Co-60		<8.10E-01	4.86E+00	3.33E+00	3.33E+00	2.05E+02	1.03E+01		6.99E-01	9.12E+01
Cs-134		5.27E+00	<4.00E+00	3.18E+02	3.18E+02	5.05E+04	3.23E+03		1.74E+02	2.27E+04
Cs-135		<2.68E+01	<1.01E+00	<1.70E+01	<1.70E+01	2.90E+02	6.84E+02		3.43E+00	4.48E+02
Cs-137		1.08E+04	1.29E+02	1.06E+03	1.06E+05	2.33E+07	5.34E+07		2.69E+05	3.51E+07
Eu-152		N.R.	N.R.	N.R.	N.R.	8.76E+01		1.85E+00	2.13E+00	2.78E+02
Eu-154		<2.30E+00	<5.00E+00	2.25E+02	2.25E+02	2.37E+02	8.30E+01		1.17E+00	1.53E+02
Eu-155		<9.70E+00	<9.00E+00	2.12E+02	2.12E+02	4.04E+02	2.47E+02		2.30E+00	3.00E+02
H-3		3.80E+03	<3.10E-02	9.27E+00	9.75E+01	7.99E+02	7.49E+02		6.19E+00	8.07E+02
I-129		4.60E-01	1.31E+00	4.46E-01	1.61E+02	3.93E+01	5.00E+01		3.66E-01	4.77E+01
Mo-93		<2.77E+05	<2.77E+05	<2.77E+05	<2.77E+05		3.54E+04		3.55E+02	4.63E+04
Na-22		N.R.	N.R.	N.R.	N.R.	1.88E+03		2.89E+01	3.49E+01	4.56E+03
Nb-93m		<6.17E+02	<6.17E+02	<6.17E+02	<6.17E+02				5.04E-01	6.58E+01
Nb-94		<6.90E-01	<2.00E+00	1.45E+01	1.45E+01	6.50E-04		1.42E-06	7.30E-03	9.52E-01
Ni-59		<3.32E+00	<3.32E+00	1.84E+02	1.84E+02	<7.00E+03	<4.04E+02		1.56E+00	2.03E+02
Ni-63		8.67E+02	8.67E+02	2.10E+02	2.34E+02	7.91E+02	1.38E+02		3.45E+00	4.50E+02
Np-237		<1.50E+01	<5.00E+00	5.77E+01	8.24E+01	4.30E-01	3.53E+01		1.70E-01	2.22E+01
Pa-231		N.R.	N.R.	N.R.	N.R.	3.10E-04		2.72E-07	1.27E-06	1.66E-04
Pm-147		<2.84E+02	<2.09E+01	9.80E+02	9.80E+02	5.35E+02	6.88E+02		4.76E+00	6.20E+02
Pr-144		<2.10E+01	<1.80E+01	<2.60E+02	<2.60E+02	<8.54E+02	1.68E+02		3.49E+00	4.55E+02
Pu-238		<4.90E+01	7.80E+01	7.07E+05	8.04E+05	1.50E+04	2.75E+04		5.20E+02	6.78E+04
Pu-239		<3.60E+01	9.00E+00	1.62E+04	3.67E+04	1.62E+04	2.23E+02		6.80E+01	8.86E+03
Pu-240		<3.60E+01	<5.06E+03	9.47E+03	3.67E+04	1.96E+02	2.23E+02		1.62E+01	2.12E+03
Pu-241		<9.40E+01	1.80E+02	3.64E+05	6.31E+05	4.24E+03	2.57E-01		2.82E+02	3.68E+04
Pu-242		<1.73E+01	N.R.	1.76E+02	1.79E+02	6.14E-01		8.51E-04	9.18E-02	1.20E+01
Pu-244		N.R.	N.R.	N.R.	N.R.	6.24E-03		8.65E-06	2.87E-05	3.75E-03
Ra-226		<8.83E+01	N.R.	N.R.	N.R.	1.65E+03		2.29E+00	7.62E+00	9.93E+02
Ra-228		N.R.	N.R.	N.R.	N.R.	2.26E-05		3.14E-08	1.04E-07	1.36E-05
Rh-106		<1.65E+02	<1.65E+02	4.97E+02	4.97E+02	1.06E+03	1.41E+02		4.22E+00	5.50E+02
Ru-106		<4.00E+01	<1.65E+02	<1.65E+02	<1.65E+02	1.06E+03	1.41E+02		4.03E+00	5.25E+02
Sb-125		<2.20E+01	<1.20E+01	6.74E+01	5.35E+05	4.54E+02	6.57E+01		1.92E+02	2.50E+04
Sb-126		<8.50E+00	<4.00E+00	3.33E+02	3.33E+02	5.83E+01		1.28E-01	4.77E-01	6.22E+01
Sb-126m		<8.50E+00	<4.00E+00	3.33E+02	3.33E+02	4.17E+02		9.12E-01	2.41E+00	3.15E+02
Se-79		<1.48E-03	<1.48E-03	<1.48E-03	<1.48E-03	2.33E+02	5.99E+01		9.67E-01	1.26E+02
Sm-151		<4.17E+02	<1.17E+01	1.66E+04	1.66E+04	3.92E+02	4.43E+02		1.09E+01	1.42E+03
Sn-126		<8.50E+00	<4.00E+00	3.33E+02	3.33E+02	3.41E+02	2.53E+02		2.18E+00	2.84E+02
Sr-90		7.57E+02	<6.71E+00	2.93E+02	6.55E+04	<2.18E+04	2.93E+05		1.16E+03	1.51E+05
Tc-99		<2.70E+00	<1.00E+00	9.29E+02	3.20E+02	1.20E+04	6.89E+04		2.89E+02	3.77E+04
Te-125m		4.78E+04	<1.20E+01	4.78E+04	4.78E+04	4.54E+02	6.57E+01		3.54E+01	4.61E+03
Th-229		N.R.	N.R.	N.R.	N.R.	4.28E-03		7.55E-05	8.93E-05	1.16E-02
Th-230		<9.10E+01	N.R.	N.R.	4.03E-04	4.36E+00		6.04E-03	4.07E-02	5.31E+00
Th-232		<4.80E-04	<2.44E-03	4.03E-04	4.03E-04	1.57E-01	8.97E-03		5.38E-04	7.02E-02
U-232		<3.21E-01	<3.21E-01	<3.21E-01	<3.21E-01	3.84E-09	1.58E+00		6.00E-03	7.83E-01
U-233		<4.26E+01	<3.43E+01	1.31E+01	1.31E+01	1.50E+00		2.65E-02	5.11E-02	6.67E+00
U-234		<2.74E+01	N.R.	4.51E+02	8.02E+01	4.38E+01		4.08E-02	2.71E-01	3.54E+01
U-235		0.192	<5.00E+00	7.36E-03	2.21E+00	5.44E-01		5.02E-04	3.65E-03	4.76E-01
U-236		<2.86E-01	N.R.	6.13E+01	1.64E+00	1.24E+01		1.04E-02	5.84E-02	7.61E+00
U-238		1.09E+01	1.95E+00	2.64E-02	4.58E-01	2.94E+00	1.74E+00		1.86E-02	2.43E+00
Y-90		7.57E+02	<6.71E+00	5.12E+03	5.12E+03	<2.18E+04	2.93E+05		1.14E+03	1.48E+05