Attachment 5

(DOT Spreadsheets for Tank V-2 used to calculate data for Option 3.)

Container ID # **INEEL Tank V-2 Solids (Total w/AVG)**

Constants	Units
3.70E+10	Bq/Ci
453.6	g/lb
1.00E-12	TBq/Bq or Ci/pCi
1000.00	g/kg
1.00E+09	nCi/Ci

Section I. Waste Stream Information

Container Type: N/A

Description: 520 gallons of Solids

Form#

PKE#

Note: assume solid phase volume of 520 gallons with density of 1.02 g/cc

Container Gross Wt (lb)	Container Gross Wt (kg)	Container Tare Wt (lb)	Container Tare Wt (kg)	Waste Net Wt (kg)	External Vol. (m3)	Est. Waste Vol. (m3)
4426.40	2007.82	0.00	0.00	2007.82	#N/A	1.968

Dose survey from Sxxxxx on xx/xx/00 shows < [ ] mrem/hr OC.

Radioactive liquid effluents from hot cells, labs, and decon facilities at TAN and IETF.

Note: Gross weight of contents = (520 gal)x(1 02 g/cc)x(3785.412 cc/gal.)x(2 2046E-03 lb/g) = 4,426 4 lbs

EPA regulated hazardous COCs: Barium, Cadmium, Chromium, Lead, Mercury, Silver, VOCs, SVOCs n(PCBs

Section II. List the radionuclides and activities; perform DOT RAM, RQ, LTD QTY, and Type A Packaging checks

Nuclide	Activity (Ci)	% of Total A2 Fraction	Activity (Bq)	Activity/gram (Bq/gram)	RQ limits (TBq)	RQ Ratios (amount/limit)	A2 Value (TBq)	LTD QTY Det. (amount/(10-3)A2)	Type A Pkg? (amount/A2)	DOT Fissile Mass (g)	TRU Conc. (nCi/g)	LSA-II Solids Frac	Activity/gram (pCi/g)
Sr-90	2.75E+01	5.59E+01	1.02E+12	5.07E+05	3.70E-03	2.75E+02	1.00E-01	1.02E+04	1.02E+01	0.00E+00	0.00E+00	5.07E-02	1.37E+07
Cs-137	1.55E+01	6.32E+00	5.75E+11	2.86E+05	3.70E-02	1.55E+01	5.00E-01	1.15E+03	1.15E+00	0.00E+00	0.00E+00	5.73E-03	7.74E+06
Ni-63	1.85E+00	1.25E-02	6.83E+10	3.40E+04	3.70E+00	1.85E-02	3.00E+01	2.28E+00	2.28E-03	0.00E+00	0.00E+00	1.13E-05	9.20E+05
Co-60	5.39E-01	2.74E-01	2.00E+10	9.94E+03	3.70E-01	5.39E-02	4.00E-01	4.99E+01	4.99E-02	0.00E+00	0.00E+00	2.49E-04	2.69E+05
Pu-241	4.75E-02	9.65E-01	1.76E+09	8.74E+02	3.70E-02	4.75E-02	1.00E-02	1.76E+02	1.76E-01	4.75E-04	0.00E+00	8.74E-04	2.36E+04
Eu-154	4.65E-02	1.89E-02	1.72E+09	8.57E+02	3.70E-01	4.65E-03	5.00E-01	3.44E+00	3.44E-03	0.00E+00	0.00E+00	1.71E-05	2.31E+04
Eu-152	3.24E-02	7.32E-03	1.20E+09	5.97E+02	3.70E-01	3.24E-03	9.00E-01	1.33E+00	1.33E-03	0.00E+00	0.00E+00	6.63E-06	1.61E+04
Ru-103	2.41E-02	5.45E-03	8.93E+08	4.45E+02	3.70E-01	2.41E-03	9.00E-01	9.93E-01	9.93E-04	0.00E+00	0.00E+00	4.94E-06	1.20E+04
Ru-106	2.26E-02	2.30E-02	8.37E+08	4.17E+02	3.70E-02	2.26E-02	2.00E-01	4.18E+00	4.18E-03	0.00E+00	0.00E+00	2.08E-05	1.13E+04
Ce-144	1.91E-02	1.94E-02	7.06E+08	3.52E+02	3.70E-02	1.91E-02	2.00E-01	3.53E+00	3.53E-03	0.00E+00	0.00E+00	1.76E-05	9.50E+03
Pu-238	1.58E-02	1.61E+01	5.86E+08	2.92E+02	3.70E-04	1.58E+00	2.00E-04	2.93E+03	2.93E+00	9.32E-04	7.89E+00	1.46E-02	7.89E+03
Pu-239	1.34E-02	1.36E+01	4.95E+08	2.46E+02	3.70E-04	1.34E+00	2.00E-04	2.47E+03	2.47E+00	2.16E-01	6.66E+00	1.23E-02	6.66E+03
Sb-125	8.87E-03	2.00E-03	3.28E+08	1.63E+02	3.70E-01	8.87E-04	9.00E-01	3.65E-01	3.65E-04	0.00E+00	0.00E+00	1.82E-06	4.42E+03
Eu-155	8.03E-03	8.16E-04	2.97E+08	1.48E+02	3.70E-01	8.03E-04	2.00E+00	1.48E-01	1.48E-04	0.00E+00	0.00E+00	7.40E-07	4.00E+03
U-233	6.50E-03	1.32E+00	2.41E+08	1.20E+02	3.70E-03	6.50E-02	1.00E-03	2.41E+02	2.41E-01	6.70E-01	0.00E+00	1.20E-03	3.24E+03
Zr-95	5.87E-03	1.33E-03	2.17E+08	1.08E+02	3.70E-01	5.87E-04	9.00E-01	2.41E-01	2.41E-04	0.00E+00	0.00E+00	1.20E-06	2.92E+03
Am-241	4.98E-03	5.07E+00	1.84E+08	9.19E+01	3.70E-04	4.98E-01	2.00E-04	9.22E+02	9.22E-01	0.00E+00	2.48E+00	4.59E-03	2.48E+03
Ra-226	4.92E-03	5.00E-02	1.82E+08	9.07E+01	3.70E-03	4.92E-02	2.00E-02	9.10E+00	9.10E-03	0.00E+00	0.00E+00	4.53E-05	2.45E+03
Ag-110m	3.43E-03	1.74E-03	1.27E+08	6.31E+01	3.70E-01	3.43E-04	4.00E-01	3.17E-01	3.17E-04	0.00E+00	0.00E+00	1.58E-06	1.71E+03
Nb-95	3.28E-03	6.68E-04	1.22E+08	6.05E+01	3.70E-01	3.28E-04	1.00E+00	1.22E-01	1.22E-04	0.00E+00	0.00E+00	6.05E-07	1.64E+03
Co-58	3.12E-03	6.34E-04	1.15E+08	5.75E+01	3.70E-01	3.12E-04	1.00E+00	1.15E-01	1.15E-04	0.00E+00	0.00E+00	5.75E-07	1.55E+03
Zn-65	2.98E-03	3.03E-04	1.10E+08	5.49E+01	3.70E-01	2.98E-04	2.00E+00	5.51E-02	5.51E-05	0.00E+00	0.00E+00	2.74E-07	1.48E+03
Ag-108m	2.03E-03	6.88E-04	7.51E+07	3.74E+01	3.70E-01	2.03E-04	6.00E-01	1.25E-01	1.25E-04	0.00E+00	0.00E+00	6.23E-07	1.01E+03
Mn-54	1.17E-03	2.37E-04	4.32E+07	2.15E+01	3.70E-01	1.17E-04	1.00E+00	4.32E-02	4.32E-05	0.00E+00	0.00E+00	2.15E-07	5.81E+02
Cs-134	1.10E-03	4.48E-04	4.07E+07	2.03E+01	3.70E-02	1.10E-03	5.00E-01	8.15E-02	8.15E-05	0.00E+00	0.00E+00	4.06E-07	5.48E+02
Cm-243	3.25E-04	2.20E-01	1.20E+07	5.99E+00	3.70E-04	3.25E-02	3.00E-04	4.01E+01	4.01E-02	0.00E+00	1.62E-01	2.00E-04	1.62E+02
U-235	1.99E-04	0.00E+00	7.35E+06	3.66E+00	3.70E-03	1.99E-03	Unlimited	0.00E+00	0.00E+00	9.03E+01	0.00E+00	0.00E+00	9.90E+01
U-238	1.78E-04	0.00E+00	6.58E+06	3.28E+00	3.70E-03	1.78E-03	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.85E+01
Th-234	1.78E-04	1.81E-04	6.58E+06	3.28E+00	3.70E+00	1.78E-06	2.00E-01	3.29E-02	3.29E-05	0.00E+00	0.00E+00	1.64E-07	8.85E+01
I-129	1.38E-04	0.00E+00	5.12E+06	2.55E+00	3.70E-05	1.38E-01	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.89E+01
Np-237	5.24E-05	5.33E-02	1.94E+06	9.66E-01	3.70E-04	5.24E-03	2.00E-04	9.69E+00	9.69E-03	0.00E+00	2.61E-02	4.83E-05	2.61E+01
Pa-233	5.24E-05	1.18E-05	1.94E+06	9.66E-01	3.70E+00	5.24E-07	9.00E-01	2.15E-03	2.15E-06	0.00E+00	0.00E+00	1.07E-08	2.61E+01
Cm-242	9.19E-06	1.87E-04	3.40E+05	1.69E-01	3.70E-02	9.19E-06	1.00E-02	3.40E-02	3.40E-05	0.00E+00	0.00E+00	1.69E-07	4.58E+00
Total	4 7E+01	100.00%	9E+12	8 12E)(		2 4E)(		1 32E+0	1 8 E+01	9 2E+(1	1 2E 01	9.06E-02	2 8E 07

DOT regulated as Hazard Class 7 Radioactive Material

Contains a Reportable Quantity of a Hazardous Substance; use 'RQ(radionuclid s s part f PSN

≥ Type A quantity; requires Type B Packaging

Does NOT meet LTD QTY Exception; Check if LSA

Meets Low Specific Activity (LSA)-II material - Check <Type A quantity and use Radioactive material, LSA, n.o.s. as PSN

>15 grams Fissile Material - use Radioactive material, fissile material, n.o.s. as PSN

This is a Low-level waste

Performed by: Gordon Harris Date: 9/25/01

Reviewed by: _____ Date _____

59 of 105

Section III: Check radionuclides for listing on labels and shipping papers; Check reportable radionuclides per Disposal Facility

Nuclide	Activity (Ci)	% of Total A2 Fraction	Cumulative A2 Fraction
Sr-90	2.75E+01	5.59E+01	5.59E+01
Pu-238	1.58E-02	1.61E+01	7.20E+01
Pu-239	1.34E-02	1.36E+01	8.56E+01
Cs-137	1.55E+01	6.32E+00	9.20E+01
Am-241	4.98E-03	5.07E+00	9.70E+01
U-233	6.50E-03	1.32E+00	9.83E+01
Pu-241	4.75E-02	9.65E-01	9.93E+01
Co-60	5.39E-01	2.74E-01	9.96E+01
Cm-243	3.25E-04	2.20E-01	9.98E+01
Np-237	5.24E-05	5.33E-02	9.99E+01
Ra-226	4.92E-03	5.00E-02	9.99E+01
Ru-106	2.26E-02	2.30E-02	9.99E+01
Ce-144	1.91E-02	1.94E-02	9.99E+01
Eu-154	4.65E-02	1.89E-02	1.00E+02
Ni-63	1.85E+00	1.25E-02	1.00E+02
Eu-152	3.24E-02	7.32E-03	1.00E+02
Ru-103	2.41E-02	5.45E-03	1.00E+02
Sb-125	8.87E-03	2.00E-03	1.00E+02
Ag-110m	3.43E-03	1.74E-03	1.00E+02
Zr-95	5.87E-03	1.33E-03	1.00E+02
Eu-155	8.03E-03	8.16E-04	1.00E+02
Ag-108m	2.03E-03	6.88E-04	1.00E+02
Nb-95	3.28E-03	6.68E-04	1.00E+02
Co-58	3.12E-03	6.34E-04	1.00E+02
Cs-134	1.10E-03	4.48E-04	1.00E+02
Zn-65	2.98E-03	3.03E-04	1.00E+02
Mn-54	1.17E-03	2.37E-04	1.00E+02
Cm-242	9.19E-06	1.87E-04	1.00E+02
Th-234	1.78E-04	1.81E-04	1.00E+02
Pa-233	5.24E-05	1.18E-05	1.00E+02
U-235	1.99E-04	0.00E+00	1.00E+02
U-238	1.78E-04	0.00E+00	1.00E+02
I-129	1.38E-04	0.00E+00	1.00E+02

Nuclide	Activity (Ci)	% of Total Activity	Source Material (kg)	SNM (g)	Activity Conc. (Ci/m^3)
Sr-90	2.75E+01	6.02E+01	Not applicable	Not applicable	1.40E+01
Cs-137	1.55E+01	3.40E+01	Not applicable	Not applicable	7.90E+00
Ni-63	1.85E+00	4.04E+00	Not applicable	Not applicable	9.39E-01
Co-60	5.39E-01	1.18E+00	Not applicable	Not applicable	2.74E-01
Pu-241	4.75E-02	1.04E-01	Not applicable	4.75E-04	2.41E-02
Eu-154	4.65E-02	1.02E-01	Not applicable	Not applicable	2.36E-02
Eu-152	3.24E-02	7.08E-02	Not applicable	Not applicable	1.65E-02
Ru-103	2.41E-02	5.28E-02	Not applicable	Not applicable	1.23E-02
Ru-106	2.26E-02	4.95E-02	Not applicable	Not applicable	1.15E-02
Ce-144	1.91E-02	4.17E-02	Not applicable	Not applicable	9.70E-03
Pu-238	1.58E-02	3.47E-02	Not applicable	9.32E-04	8.05E-03
Pu-239	1.34E-02	2.93E-02	Not applicable	2.16E-01	6.79E-03
Sb-125	8.87E-03	1.94E-02	Not applicable	Not applicable	4.51E-03
Eu-155	8.03E-03	1.76E-02	Not applicable	Not applicable	4.08E-03
U-233	6.50E-03	1.42E-02	Not applicable	6.70E-01	3.30E-03
Zr-95	5.87E-03	1.28E-02	Not applicable	Not applicable	2.98E-03
Am-241	4.98E-03	1.09E-02	Not applicable	Not applicable	2.53E-03
Ra-226	4.92E-03	1.08E-02	Not applicable	Not applicable	2.50E-03
Ag-110m	3.43E-03	7.49E-03	Not applicable	Not applicable	1.74E-03
Nb-95	3.28E-03	7.19E-03	Not applicable	Not applicable	1.67E-03
Co-58	3.12E-03	6.83E-03	Not applicable	Not applicable	1.59E-03
Zn-65	2.98E-03	6.52E-03	Not applicable	Not applicable	1.51E-03
Ag-108m	2.03E-03	4.44E-03	Not applicable	Not applicable	1.03E-03
Mn-54	1.17E-03	2.55E-03	Not applicable	Not applicable	5.93E-04
Cs-134	1.10E-03	2.41E-03	Not applicable	Not applicable	5.59E-04
Cm-243	3.25E-04	7.12E-04	Not applicable	Not applicable	1.65E-04
U-235	1.99E-04	4.35E-04	Not applicable	9.03E+01	1.01E-04
U-238	1.78E-04	3.89E-04	Not applicable	Not applicable	9.03E-05
Th-234	1.78E-04	3.89E-04	Not applicable	Not applicable	9.03E-05
I-129	1.38E-04	3.03E-04	Not applicable	Not applicable	7.03E-05
Np-237	5.24E-05	1.15E-04	Not applicable	Not applicable	2.66E-05
Pa-233	5.24E-05	1.15E-04	Not applicable	Not applicable	2.66E-05
Cm-242	9.19E-06	2.01E-05	Not applicable	Not applicable	4.67E-06

If #DIV/0! occurs in the Fraction of Waste Profile Column or the Does Nuclide Meet Waste Profile? Column of Section III, the nuclide is not included on the current profile and needs to be added.

Waste Classification Determination for near surface disposal per 10 CFR §61.55

Assume that Sr-90, Cs-137, and Ni-63 are major nuclides driving waste classificati n det rm nati n for Tank V 1 V 2 and V 3 wastes

Radionuclide	Table 2 limit (Ci/m^3) Column 1	Column 2	V-2 All Sludge AVG
Sr-90	0.04	150	1.40E+01
Cs-137	1	44	7.90E+00
Ni-63	3.5	70	9.39E-01

Class A Sum of Fractions: 211.66
Class B Sum of Fractions: 0.38
ClassB

60 of 105

Container ID # **INEEL Tank V-2 Solids (52 gal per drum using AVG)**

Constants	Units
3.70E+10	Bq/Ci
453.6	g/lb
1.00E-12	TBq/Bq or Ci/pCi
1000.00	g/kg
1.00E+09	nCi/Ci

Section I. Waste Stream Information

Container Type: 55 Gallon Metal OH

Description: 52 gallons of Solids

Form#

PKE#

Note: assume solid phase volume of 52 gallons with density of 1.02 g/cc

Container Gross Wt (lb)	Container Gross Wt (kg)	Container Tare Wt (lb)	Container Tare Wt (kg)	Waste Net Wt (kg)	External Vol. (m3)	(94.5% of capacity) Est. Waste Vol. (m3)
492.64	223.46	50.00	22.68	200.78	0.261	0.197

Dose survey from Sxxxxx on xx/xx/00 shows < [ ] mrem/hr OC.

Radioactive liquid effluents from hot cells, labs, and decon facilities at TAN and IETF.

EPA regulated hazardous COCs: Barium, Cadmium, Chromium, Lead, Mercury, Silver, VOCs, SVOCs, and PCBs

Note: Gross weight of contents = (52 gal.)x(1.02 g/cc)x(3785.412 cc/gal.)x(2.2046E-03 lb/g) = 442.64 lbs.

Section II. List the radionuclides and activities; perform DOT RAM, RQ, LTD QTY, and Type A Packaging checks

Nuclide	Activity (Ci)	% of Total A2 Fraction	Activity (Bq)	Activity/gram (Bq/gram)	RQ limits (TBq)	RQ Ratios (amount/limit)	A2 Value (TBq)	LTD QTY Det. (amount/(10-3)A2)	Type A Pkg? (amount/A2)	DOT Fissile Mass (g)	TRU Conc. (nCi/g)	LSA-II Solids Frac	Activity/gram (pCi/g)
Sr-90	2.75E+00	5.59E+01	1.02E+11	5.07E+05	3.70E-03	2.75E+01	1.00E-01	1.02E+03	1.02E+00	0.00E+00	0.00E+00	5.07E-02	1.37E+07
Cs-137	1.55E+00	6.32E+00	5.75E+10	2.86E+05	3.70E-02	1.55E+00	5.00E-01	1.15E+02	1.15E-01	0.00E+00	0.00E+00	5.73E-03	7.74E+06
Ni-63	1.85E-01	1.25E-02	6.83E+09	3.40E+04	3.70E+00	1.85E-03	3.00E+01	2.28E-01	2.28E-04	0.00E+00	0.00E+00	1.13E-05	9.20E+05
Co-60	5.39E-02	2.74E-01	2.00E+09	9.94E+03	3.70E-01	5.39E-03	4.00E-01	4.99E+00	4.99E-03	0.00E+00	0.00E+00	2.49E-04	2.69E+05
Pu-241	4.75E-03	9.65E-01	1.76E+08	8.74E+02	3.70E-02	4.75E-03	1.00E-02	1.76E+01	1.76E-02	4.75E-05	0.00E+00	8.74E-04	2.36E+04
Eu-154	4.65E-03	1.89E-02	1.72E+08	8.57E+02	3.70E-01	4.65E-04	5.00E-01	3.44E-01	3.44E-04	0.00E+00	0.00E+00	1.71E-05	2.31E+04
Eu-152	3.24E-03	7.32E-03	1.20E+08	5.97E+02	3.70E-01	3.24E-04	9.00E-01	1.33E-01	1.33E-04	0.00E+00	0.00E+00	6.63E-06	1.61E+04
Ru-103	2.41E-03	5.45E-03	8.93E+07	4.45E+02	3.70E-01	2.41E-04	9.00E-01	9.93E-02	9.93E-05	0.00E+00	0.00E+00	4.94E-06	1.20E+04
Ru-106	2.26E-03	2.30E-02	8.37E+07	4.17E+02	3.70E-02	2.26E-03	2.00E-01	4.18E-01	4.18E-04	0.00E+00	0.00E+00	2.08E-05	1.13E+04
Ce-144	1.91E-03	1.94E-02	7.06E+07	3.52E+02	3.70E-02	1.91E-03	2.00E-01	3.53E-01	3.53E-04	0.00E+00	0.00E+00	1.76E-05	9.50E+03
Pu-238	1.58E-03	1.61E+01	5.86E+07	2.92E+02	3.70E-04	1.58E-01	2.00E-04	2.93E+02	2.93E-01	9.32E-05	7.89E+00	1.46E-02	7.89E+03
Pu-239	1.34E-03	1.36E+01	4.95E+07	2.46E+02	3.70E-04	1.34E-01	2.00E-04	2.47E+02	2.47E-01	2.16E-02	6.66E+00	1.23E-02	6.66E+03
Sb-125	8.87E-04	2.00E-03	3.28E+07	1.63E+02	3.70E-01	8.87E-05	9.00E-01	3.65E-02	3.65E-05	0.00E+00	0.00E+00	1.82E-06	4.42E+03
Eu-155	8.03E-04	8.16E-04	2.97E+07	1.48E+02	3.70E-01	8.03E-05	2.00E+00	1.48E-02	1.48E-05	0.00E+00	0.00E+00	7.40E-07	4.00E+03
U-233	6.50E-04	1.32E+00	2.41E+07	1.20E+02	3.70E-03	6.50E-03	1.00E-03	2.41E+01	2.41E-02	6.70E-02	0.00E+00	1.20E-03	3.24E+03
Zr-95	5.87E-04	1.33E-03	2.17E+07	1.08E+02	3.70E-01	5.87E-05	9.00E-01	2.41E-02	2.41E-05	0.00E+00	0.00E+00	1.20E-06	2.92E+03
Am-241	4.98E-04	5.07E+00	1.84E+07	9.19E+01	3.70E-04	4.98E-02	2.00E-04	9.22E+01	9.22E-02	0.00E+00	2.48E+00	4.59E-03	2.48E+03
Ra-226	4.92E-04	5.00E-02	1.82E+07	9.07E+01	3.70E-03	4.92E-03	2.00E-02	9.10E-01	9.10E-04	0.00E+00	0.00E+00	4.53E-05	2.45E+03
Ag-110m	3.43E-04	1.74E-03	1.27E+07	6.31E+01	3.70E-01	3.43E-05	4.00E-01	3.17E-02	3.17E-05	0.00E+00	0.00E+00	1.58E-06	1.71E+03
Nb-95	3.28E-04	6.68E-04	1.22E+07	6.05E+01	3.70E-01	3.28E-05	1.00E+00	1.22E-02	1.22E-05	0.00E+00	0.00E+00	6.05E-07	1.64E+03
Co-58	3.12E-04	6.34E-04	1.15E+07	5.75E+01	3.70E-01	3.12E-05	1.00E+00	1.15E-02	1.15E-05	0.00E+00	0.00E+00	5.75E-07	1.55E+03
Zn-65	2.98E-04	3.03E-04	1.10E+07	5.49E+01	3.70E-01	2.98E-05	2.00E+00	5.51E-03	5.51E-06	0.00E+00	0.00E+00	2.74E-07	1.48E+03
Ag-108m	2.03E-04	6.88E-04	7.51E+06	3.74E+01	3.70E-01	2.03E-05	6.00E-01	1.25E-02	1.25E-05	0.00E+00	0.00E+00	6.23E-07	1.01E+03
Mn-54	1.17E-04	2.37E-04	4.32E+06	2.15E+01	3.70E-01	1.17E-05	1.00E+00	4.32E-03	4.32E-06	0.00E+00	0.00E+00	2.15E-07	5.81E+02
Cs-134	1.10E-04	4.48E-04	4.07E+06	2.03E+01	3.70E-02	1.10E-04	5.00E-01	8.15E-03	8.15E-06	0.00E+00	0.00E+00	4.06E-07	5.48E+02
Cm-243	3.25E-05	2.20E-01	1.20E+06	5.99E+00	3.70E-04	3.25E-03	3.00E-04	4.01E+00	4.01E-03	0.00E+00	1.62E-01	2.00E-04	1.62E+02
U-235	1.99E-05	0.00E+00	7.35E+05	3.66E+00	3.70E-03	1.99E-04	Unlimited	0.00E+00	0.00E+00	9.03E+00	0.00E+00	0.00E+00	9.90E+01
U-238	1.78E-05	0.00E+00	6.58E+05	3.28E+00	3.70E-03	1.78E-04	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.85E+01
Th-234	1.78E-05	1.81E-04	6.58E+05	3.28E+00	3.70E+00	1.78E-07	2.00E-01	3.29E-03	3.29E-06	0.00E+00	0.00E+00	1.64E-07	8.85E+01
I-129	1.38E-05	0.00E+00	5.12E+05	2.55E+00	3.70E-05	1.38E-02	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.89E+01
Np-237	5.24E-06	5.33E-02	1.94E+05	9.66E-01	3.70E-04	5.24E-04	2.00E-04	9.69E-01	9.69E-04	0.00E+00	2.61E-02	4.83E-05	2.61E+01
Pa-233	5.24E-06	1.18E-05	1.94E+05	9.66E-01	3.70E+00	5.24E-08	9.00E-01	2.15E-04	2.15E-07	0.00E+00	0.00E+00	1.07E-08	2.61E+01
Cm-242	9.19E-07	1.87E-04	3.40E+04	1.69E-01	3.70E-02	9.19E-07	1.00E-02	3.40E-03	3.40E-06	0.00E+00	0.00E+00	1.69E-07	4.58E+00
Total	4.57E+00	100.00%	1.69E+11	8.42E+05		2.94E+01		1.82E+03	1.82E+00	9.12E+00	1.72E+01	9.06E-02	2.28E+07

DOT regulated as Hazard Class 7 Radioactive Material
Contains a Reportable Quantity of a Hazardous Substance; use 'RQ(radionuclides)' as part of PSN
≥ Type A quantity; requires Type B Packaging
Does NOT meet LTD QTY Exception; Check if LSA
Meets Low Specific Activity (LSA)-II material - Check <Type A quantity and use Radioactive material, LSA, n.o.s. as PSN
Meets criteria for Fissile Excepted Package per 49 CFR 173.453
This is a Low-level waste

Performed by: Gordon Hamir Date: 9/25/01

Reviewed by: _____ Date: _____

61 of 105

Section III: Check radionuclides for listing on labels and shipping papers; Check reportable radionuclides per Disposal Facility

Nuclide	Activity (Ci)	% of Total A2 Fraction	Cumulative A2 Fraction
Sr-90	2.75E+00	5.59E+01	5.59E+01
Pu-238	1.58E-03	1.61E+01	7.20E+01
Pu-239	1.34E-03	1.36E+01	8.56E+01
Cs-137	1.55E+00	6.32E+00	9.20E+01
Am-241	4.98E-04	5.07E+00	9.70E+01
U-233	6.50E-04	1.32E+00	9.83E+01
Pu-241	4.75E-03	9.65E-01	9.93E+01
Co-60	5.39E-02	2.74E-01	9.96E+01
Cm-243	3.25E-05	2.20E-01	9.98E+01
Np-237	5.24E-06	5.33E-02	9.99E+01
Ra-226	4.92E-04	5.00E-02	9.99E+01
Ru-106	2.26E-03	2.30E-02	9.99E+01
Ce-144	1.91E-03	1.94E-02	9.99E+01
Eu-154	4.65E-03	1.89E-02	1.00E+02
Ni-63	1.85E-01	1.25E-02	1.00E+02
Eu-152	3.24E-03	7.32E-03	1.00E+02
Ru-103	2.41E-03	5.45E-03	1.00E+02
Sb-125	8.87E-04	2.00E-03	1.00E+02
Ag-110m	3.43E-04	1.74E-03	1.00E+02
Zr-95	5.87E-04	1.33E-03	1.00E+02
Eu-155	8.03E-04	8.16E-04	1.00E+02
Ag-108m	2.03E-04	6.88E-04	1.00E+02
Nb-95	3.28E-04	6.68E-04	1.00E+02
Co-58	3.12E-04	6.34E-04	1.00E+02
Cs-134	1.10E-04	4.48E-04	1.00E+02
Zn-65	2.98E-04	3.03E-04	1.00E+02
Mn-54	1.17E-04	2.37E-04	1.00E+02
Cm-242	9.19E-07	1.87E-04	1.00E+02
Th-234	1.78E-05	1.81E-04	1.00E+02
Pa-233	5.24E-06	1.18E-05	1.00E+02
U-235	1.99E-05	0.00E+00	1.00E+02
U-238	1.78E-05	0.00E+00	1.00E+02
I-129	1.38E-05	0.00E+00	1.00E+02

Nuclide	Activity (Ci)	% of Total Activity	Source Material (kg)	SNM (g)	Activity Conc. (Ci/m^3)
Sr-90	2.75E+00	6.02E+01	Not applicable	Not applicable	1.40E+01
Cs-137	1.55E+00	3.40E+01	Not applicable	Not applicable	7.89E+00
Ni-63	1.85E-01	4.04E+00	Not applicable	Not applicable	9.38E-01
Co-60	5.39E-02	1.18E+00	Not applicable	Not applicable	2.74E-01
Pu-241	4.75E-03	1.04E-01	Not applicable	4.75E-05	2.41E-02
Eu-154	4.65E-03	1.02E-01	Not applicable	Not applicable	2.36E-02
Eu-152	3.24E-03	7.08E-02	Not applicable	Not applicable	1.64E-02
Ru-103	2.41E-03	5.28E-02	Not applicable	Not applicable	1.23E-02
Ru-106	2.26E-03	4.95E-02	Not applicable	Not applicable	1.15E-02
Ce-144	1.91E-03	4.17E-02	Not applicable	Not applicable	9.69E-03
Pu-238	1.58E-03	3.47E-02	Not applicable	9.32E-05	8.04E-03
Pu-239	1.34E-03	2.93E-02	Not applicable	2.16E-02	6.79E-03
Sb-125	8.87E-04	1.94E-02	Not applicable	Not applicable	4.50E-03
Eu-155	8.03E-04	1.76E-02	Not applicable	Not applicable	4.07E-03
U-233	6.50E-04	1.42E-02	Not applicable	6.70E-02	3.30E-03
Zr-95	5.87E-04	1.28E-02	Not applicable	Not applicable	2.98E-03
Am-241	4.98E-04	1.09E-02	Not applicable	Not applicable	2.53E-03
Ra-226	4.92E-04	1.08E-02	Not applicable	Not applicable	2.50E-03
Ag-110m	3.43E-04	7.49E-03	Not applicable	Not applicable	1.74E-03
Nb-95	3.28E-04	7.19E-03	Not applicable	Not applicable	1.67E-03
Co-58	3.12E-04	6.83E-03	Not applicable	Not applicable	1.58E-03
Zn-65	2.98E-04	6.52E-03	Not applicable	Not applicable	1.51E-03
Ag-108m	2.03E-04	4.44E-03	Not applicable	Not applicable	1.03E-03
Mn-54	1.17E-04	2.55E-03	Not applicable	Not applicable	5.93E-04
Cs-134	1.10E-04	2.41E-03	Not applicable	Not applicable	5.59E-04
Cm-243	3.25E-05	7.12E-04	Not applicable	Not applicable	1.65E-04
U-235	1.99E-05	4.35E-04	Not applicable	9.03E+00	1.01E-04
U-238	1.78E-05	3.89E-04	Not applicable	Not applicable	9.02E-05
Th-234	1.78E-05	3.89E-04	Not applicable	Not applicable	9.02E-05
I-129	1.38E-05	3.03E-04	Not applicable	Not applicable	7.02E-05
Np-237	5.24E-06	1.15E-04	Not applicable	Not applicable	2.66E-05
Pa-233	5.24E-06	1.15E-04	Not applicable	Not applicable	2.66E-05
Cm-242	9.19E-07	2.01E-05	Not applicable	Not applicable	4.67E-06

If #DIV/0! occurs in the Fraction of Waste Profile Column or the Does Nuclide Meet Waste Profile? Column of Section III, the nuclide is not included on the current profile and needs to be added.

Waste Classification Determination for near surface disposal per 10 CFR §61.55

Assume that Sr-90, Cs-137, and Ni-63 are major nuclides driving waste classification determination for Tank V-1, V-2, and V-3 wastes

Radionuclide	Table 2 limit (Ci/m^3) Column 1	Column 2	V-2 Sludge(52 gal/drum w/AVG)
Cs-137	1	44	7.89E+00
Sr-90	0.04	150	1.40E+01
Ni-63	3.5	70	9.38E-01

Class A Sum of Fractions: 357.22
Class B Sum of Fractions: 0.29
ClassB

62 of 105

Container ID # **INEEL Tank V-2 Solids (Total w/MAX)**

Constants	Units
3.70E+10	Bq/Ci
453.6	g/lb
1.00E-12	TBq/Bq or Ci/pCi
1000.00	g/kg
1.00E+09	nCi/Ci

Section I. Waste Stream Information

Container Type: N/A

Description: 520 gallons of Solids

Form#

PKE#

Note: assume solid phase volume of 520 gallons with density of 1.02 g/cc

Container Gross Wt (lb)	Container Gross Wt (kg)	Container Tare Wt (lb)	Container Tare Wt (kg)	Waste Net Wt (kg)	External Vol. (m3)	Est. Waste Vol. (m3)
4426.40	2007.82	0.00	0.00	2007.82	#N/A	1.968

Dose survey from Sxxxxx on xx/xx/00 shows < [ ] mrem/hr OC.

Radioactive liquid effluents from hot cells, labs, and decon facilities at TAN and IETF.

Note: Gross weight of contents = (520 gal.)x(1.02 g/cc)x(3785.412 cc/gal.)x(2.2046E-03 lb/g) = 4,426.4 lbs

EPA regulated hazardous COCs: Barium, Cadmium, Chromium, Lead, Mercury, Silver, VOCs, SVOCs, and PCBs

Section II. List the radionuclides and activities; perform DOT RAM, RQ, LTD QTY, and Type A Packaging checks

Nuclide	Activity (Ci)	% of Total A2 Fraction	Activity (Bq)	Activity/gram (Bq/gram)	RQ limits (TBq)	RQ Ratios (amount/limit)	A2 Value (TBq)	LTD QTY Det. (amount/(10-3)A2)	Type A Pkg? (amount/A2)	DOT Fissile Mass (g)	TRU Conc. (nCi/g)	LSA-II Solids Frac	Activity/gram (pCi/g)
Sr-90	3.31E+01	4.96E+01	1.23E+12	6.10E+05	3.70E-03	3.31E+02	1.00E-01	1.23E+04	1.23E+01	0.00E+00	0.00E+00	6.10E-02	1.65E+07
Cs-137	2.83E+01	8.48E+00	1.05E+12	5.22E+05	3.70E-02	2.83E+01	5.00E-01	2.09E+03	2.09E+00	0.00E+00	0.00E+00	1.04E-02	1.41E+07
Ni-63	3.51E+00	1.75E-02	1.30E+11	6.47E+04	3.70E+00	3.51E-02	3.00E+01	4.33E+00	4.33E-03	0.00E+00	0.00E+00	2.16E-05	1.75E+06
Co-60	1.42E+00	5.30E-01	5.24E+10	2.61E+04	3.70E-01	1.42E-01	4.00E-01	1.31E+02	1.31E-01	0.00E+00	0.00E+00	6.52E-04	7.05E+05
Eu-152	9.76E-02	1.62E-02	3.61E+09	1.80E+03	3.70E-01	9.76E-03	9.00E-01	4.01E+00	4.01E-03	0.00E+00	0.00E+00	2.00E-05	4.86E+04
Pu-241	6.73E-02	1.01E+00	2.49E+09	1.24E+03	3.70E-02	6.73E-02	1.00E-02	2.49E+02	2.49E-01	6.73E-04	0.00E+00	1.24E-03	3.35E+04
Eu-154	6.71E-02	2.01E-02	2.48E+09	1.24E+03	3.70E-01	6.71E-03	5.00E-01	4.96E+00	4.96E-03	0.00E+00	0.00E+00	2.47E-05	3.34E+04
Ru-103	5.50E-02	9.16E-03	2.04E+09	1.01E+03	3.70E-01	5.50E-03	9.00E-01	2.26E+00	2.26E-03	0.00E+00	0.00E+00	1.13E-05	2.74E+04
Ru-106	5.10E-02	3.82E-02	1.89E+09	9.40E+02	3.70E-02	5.10E-02	2.00E-01	9.43E+00	9.43E-03	0.00E+00	0.00E+00	4.70E-05	2.54E+04
Ce-144	4.16E-02	3.11E-02	1.54E+09	7.66E+02	3.70E-02	4.16E-02	2.00E-01	7.69E+00	7.69E-03	0.00E+00	0.00E+00	3.83E-05	2.07E+04
Pu-238	2.79E-02	2.09E+01	1.03E+09	5.14E+02	3.70E-04	2.79E+00	2.00E-04	5.16E+03	5.16E+00	1.64E-03	1.39E+01	2.57E-02	1.39E+04
Sb-125	1.88E-02	3.13E-03	6.95E+08	3.46E+02	3.70E-01	1.88E-03	9.00E-01	7.73E-01	7.73E-04	0.00E+00	0.00E+00	3.85E-06	9.36E+03
Ra-226	1.79E-02	1.34E-01	6.63E+08	3.30E+02	3.70E-03	1.79E-01	2.00E-02	3.32E+01	3.32E-02	0.00E+00	0.00E+00	1.65E-04	8.93E+03
Pu-239	1.66E-02	1.24E+01	6.14E+08	3.06E+02	3.70E-04	1.66E+00	2.00E-04	3.07E+03	3.07E+00	2.67E-01	8.26E+00	1.53E-02	8.26E+03
Eu-155	1.53E-02	1.14E-03	5.65E+08	2.82E+02	3.70E-01	1.53E-03	2.00E+00	2.83E-01	2.83E-04	0.00E+00	0.00E+00	1.41E-06	7.61E+03
Zr-95	1.39E-02	2.31E-03	5.14E+08	2.56E+02	3.70E-01	1.39E-03	9.00E-01	5.71E-01	5.71E-04	0.00E+00	0.00E+00	2.84E-06	6.92E+03
Ag-110m	7.85E-03	2.94E-03	2.90E+08	1.45E+02	3.70E-01	7.85E-04	4.00E-01	7.26E-01	7.26E-04	0.00E+00	0.00E+00	3.62E-06	3.91E+03
Nb-95	7.81E-03	1.17E-03	2.89E+08	1.44E+02	3.70E-01	7.81E-04	1.00E+00	2.89E-01	2.89E-04	0.00E+00	0.00E+00	1.44E-06	3.89E+03
U-233	7.61E-03	1.14E+00	2.82E+08	1.40E+02	3.70E-03	7.61E-02	1.00E-03	2.82E+02	2.82E-01	7.84E-01	0.00E+00	1.40E-03	3.79E+03
Co-58	7.49E-03	1.12E-03	2.77E+08	1.38E+02	3.70E-01	7.49E-04	1.00E+00	2.77E-01	2.77E-04	0.00E+00	0.00E+00	1.38E-06	3.73E+03
Zn-65	7.29E-03	5.46E-04	2.70E+08	1.34E+02	3.70E-01	7.29E-04	2.00E+00	1.35E-01	1.35E-04	0.00E+00	0.00E+00	6.72E-07	3.63E+03
Am-241	7.07E-03	5.29E+00	2.61E+08	1.30E+02	3.70E-04	7.07E-01	2.00E-04	1.31E+03	1.31E+00	0.00E+00	3.52E+00	6.51E-03	3.52E+03
Ag-108m	4.18E-03	1.04E-03	1.55E+08	7.70E+01	3.70E-01	4.18E-04	6.00E-01	2.58E-01	2.58E-04	0.00E+00	0.00E+00	1.28E-06	2.08E+03
Mn-54	2.73E-03	4.09E-04	1.01E+08	5.03E+01	3.70E-01	2.73E-04	1.00E+00	1.01E-01	1.01E-04	0.00E+00	0.00E+00	5.03E-07	1.36E+03
Cs-134	2.55E-03	7.64E-04	9.43E+07	4.70E+01	3.70E-02	2.55E-03	5.00E-01	1.89E-01	1.89E-04	0.00E+00	0.00E+00	9.40E-07	1.27E+03
Cm-243	4.90E-04	2.45E-01	1.81E+07	9.03E+00	3.70E-04	4.90E-02	3.00E-04	6.04E+01	6.04E-02	0.00E+00	2.44E-01	3.01E-04	2.44E+02
U-238	2.63E-04	0.00E+00	9.73E+06	4.85E+00	3.70E-03	2.63E-03	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.31E+02
Th-234	2.63E-04	1.97E-04	9.73E+06	4.85E+00	3.70E+00	2.63E-06	2.00E-01	4.87E-02	4.87E-05	0.00E+00	0.00E+00	2.42E-07	1.31E+02
I-129	2.31E-04	0.00E+00	8.54E+06	4.25E+00	3.70E-05	2.31E-01	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.15E+02
U-235	2.27E-04	0.00E+00	8.39E+06	4.18E+00	3.70E-03	2.27E-03	Unlimited	0.00E+00	0.00E+00	1.03E+02	0.00E+00	0.00E+00	1.13E+02
Np-237	7.61E-05	5.70E-02	2.82E+06	1.40E+00	3.70E-04	7.61E-03	2.00E-04	1.41E+01	1.41E-02	0.00E+00	3.79E-02	7.01E-05	3.79E+01
Pa-233	7.61E-05	1.27E-05	2.82E+06	1.40E+00	3.70E+00	7.61E-07	9.00E-01	3.13E-03	3.13E-06	0.00E+00	0.00E+00	1.56E-08	3.79E+01
Cm-242	1.90E-05	2.85E-04	7.03E+05	3.50E-01	3.70E-02	1.90E-05	1.00E-02	7.03E-02	7.03E-05	0.00E+00	0.00E+00	3.50E-07	9.46E+00
Total	6.[illegible]9E-01	100.00%	2.48E+12	1.[illegible]3E+06		3.[illegible]6E-02		2.47E+04	2.[illegible]7E-01	1.[illegible]4E+02	2.[illegible]0E+01	1.[illegible]3E-01	3.[illegible]3E-07

DOT regulated as Hazard Class 7 Radioactive Material

Contains a Reportable Quantity of a Hazardous Substance; use 'RQ(radionuclides)' as part of PSN

≥ Type A quantity; requires Type B Packaging

Does NOT meet LTD QTY Exception; Check if LSA

Meets Low Specific Activity (LSA)-II material - Check <Type A quantity and use Radioactive material, LSA, n.o.s. as PSN

>15 grams Fissile Material - use Radioactive material, fissile material, n.o.s. as PSN

This is a Low-level waste

Performed by: [illegible] Date 9/25/01

Reviewed by: _____ _____

63 9/25/01

Section III: Check radionuclides for listing on labels and shipping papers; Check reportable radionuclides per Disposal Facility

Nuclide	Activity (Ci)	% of Total A2 Fraction	Cumulative A2 Fraction
Sr-90	3.31E+01	4.96E+01	4.96E+01
Pu-238	2.79E-02	2.09E+01	7.05E+01
Pu-239	1.66E-02	1.24E+01	8.30E+01
Cs-137	2.83E+01	8.48E+00	9.14E+01
Am-241	7.07E-03	5.29E+00	9.67E+01
U-233	7.61E-03	1.14E+00	9.79E+01
Pu-241	6.73E-02	1.01E+00	9.89E+01
Co-60	1.42E+00	5.30E-01	9.94E+01
Cm-243	4.90E-04	2.45E-01	9.97E+01
Ra-226	1.79E-02	1.34E-01	9.98E+01
Np-237	7.61E-05	5.70E-02	9.99E+01
Ru-106	5.10E-02	3.82E-02	9.99E+01
Ce-144	4.16E-02	3.11E-02	9.99E+01
Eu-154	6.71E-02	2.01E-02	9.99E+01
Ni-63	3.51E+00	1.75E-02	1.00E+02
Eu-152	9.76E-02	1.62E-02	1.00E+02
Ru-103	5.50E-02	9.16E-03	1.00E+02
Sb-125	1.88E-02	3.13E-03	1.00E+02
Ag-110m	7.85E-03	2.94E-03	1.00E+02
Zr-95	1.39E-02	2.31E-03	1.00E+02
Nb-95	7.81E-03	1.17E-03	1.00E+02
Eu-155	1.53E-02	1.14E-03	1.00E+02
Co-58	7.49E-03	1.12E-03	1.00E+02
Ag-108m	4.18E-03	1.04E-03	1.00E+02
Cs-134	2.55E-03	7.64E-04	1.00E+02
Zn-65	7.29E-03	5.46E-04	1.00E+02
Mn-54	2.73E-03	4.09E-04	1.00E+02
Cm-242	1.90E-05	2.85E-04	1.00E+02
Th-234	2.63E-04	1.97E-04	1.00E+02
Pa-233	7.61E-05	1.27E-05	1.00E+02
U-238	2.63E-04	0.00E+00	1.00E+02
I-129	2.31E-04	0.00E+00	1.00E+02
U-235	2.27E-04	0.00E+00	1.00E+02

Nuclide	Activity (Ci)	% of Total Activity	Source Material (kg)	SNM (g)	Activity Conc. (Ci/m^3)
Sr-90	3.31E+01	4.95E+01	Not applicable	Not applicable	1.68E+01
Cs-137	2.83E+01	4.23E+01	Not applicable	Not applicable	1.44E+01
Ni-63	3.51E+00	5.25E+00	Not applicable	Not applicable	1.79E+00
Co-60	1.42E+00	2.12E+00	Not applicable	Not applicable	7.19E-01
Eu-152	9.76E-02	1.46E-01	Not applicable	Not applicable	4.96E-02
Pu-241	6.73E-02	1.01E-01	Not applicable	6.73E-04	3.42E-02
Eu-154	6.71E-02	1.00E-01	Not applicable	Not applicable	3.41E-02
Ru-103	5.50E-02	8.22E-02	Not applicable	Not applicable	2.80E-02
Ru-106	5.10E-02	7.62E-02	Not applicable	Not applicable	2.59E-02
Ce-144	4.16E-02	6.21E-02	Not applicable	Not applicable	2.11E-02
Pu-238	2.79E-02	4.17E-02	Not applicable	1.64E-03	1.42E-02
Sb-125	1.88E-02	2.81E-02	Not applicable	Not applicable	9.55E-03
Ra-226	1.79E-02	2.68E-02	Not applicable	Not applicable	9.11E-03
Pu-239	1.66E-02	2.48E-02	Not applicable	2.67E-01	8.43E-03
Eu-155	1.53E-02	2.28E-02	Not applicable	Not applicable	7.76E-03
Zr-95	1.39E-02	2.08E-02	Not applicable	Not applicable	7.06E-03
Ag-110m	7.85E-03	1.17E-02	Not applicable	Not applicable	3.99E-03
Nb-95	7.81E-03	1.17E-02	Not applicable	Not applicable	3.97E-03
U-233	7.61E-03	1.14E-02	Not applicable	7.84E-01	3.87E-03
Co-58	7.49E-03	1.12E-02	Not applicable	Not applicable	3.81E-03
Zn-65	7.29E-03	1.09E-02	Not applicable	Not applicable	3.70E-03
Am-241	7.07E-03	1.06E-02	Not applicable	Not applicable	3.59E-03
Ag-108m	4.18E-03	6.24E-03	Not applicable	Not applicable	2.12E-03
Mn-54	2.73E-03	4.08E-03	Not applicable	Not applicable	1.39E-03
Cs-134	2.55E-03	3.81E-03	Not applicable	Not applicable	1.30E-03
Cm-243	4.90E-04	7.32E-04	Not applicable	Not applicable	2.49E-04
U-238	2.63E-04	3.93E-04	Not applicable	Not applicable	1.34E-04
Th-234	2.63E-04	3.93E-04	Not applicable	Not applicable	1.34E-04
I-129	2.31E-04	3.45E-04	Not applicable	Not applicable	1.17E-04
U-235	2.27E-04	3.39E-04	Not applicable	1.03E+02	1.15E-04
Np-237	7.61E-05	1.14E-04	Not applicable	Not applicable	3.87E-05
Pa-233	7.61E-05	1.14E-04	Not applicable	Not applicable	3.87E-05
Cm-242	1.90E-05	2.84E-05	Not applicable	Not applicable	9.65E-06

If #DIV/0! occurs in the Fraction of Waste Profile Column or the Does Nuclide Meet Waste Profile? Column of Section III, the nuclide is not included on the current profile and needs to be added.

Waste Classification Determination for near surface disposal per 10 CFR §61.55

Assume that Sr-90, Cs-137, and Ni-63 are major nuclides driving waste classification determination for Tank V-1, V-2, and V-3 wastes

Radionuclide	Table 2 limit (Ci/m^3) Column 1	Column 2	V-2 All Sludge MAX
Cs-137	1	44	1.44E+01
Sr-90	0.04	150	1.68E+01
Ni-63	3.5	70	1.79E+00

Class A Sum of Fractions: 435.73

Class B Sum of Fractions: 0.46

ClassB

64 of 105

Container ID # **INEEL Tank V-2 Solids (52 gal per drum using MAX)**

Constants	Units
3.70E+10	Bq/Ci
453.6	g/lb
1.00E-12	TBq/Bq or Ci/pCi
1000.00	g/kg
1.00E+09	nCi/Ci

Section I. Waste Stream Information

Container Type: 55 Gallon Metal OH

Description: 52 gallons of Solids

Form#

PKE#

Note: assume solid phase volume of 52 gallons with density of 1.02 g/cc

Container Gross Wt (lb)	Container Gross Wt (kg)	Container Tare Wt (lb)	Container Tare Wt (kg)	Waste Net Wt (kg)	External Vol. (m3)	(94.5% of capacity) Est. Waste Vol. (m3)
492.64	223.46	50.00	22.68	200.78	0.261	0.197

Dose survey from Sxxxxx on xx/xx/00 shows < _____ mrem/hr OC.

Radioactive liquid effluents from hot cells, labs, and decon facilities at TAN and IETF.

EPA regulated hazardous COCs: Barium, Cadmium, Chromium, Lead, Mercury, Silver, VOCs, SVOCs and PCBs

Note: Gross weight of contents = (52 gal.)x(1.02 g/cc)x(3785.412 cc/gal.)x(2.2046E-03 lb/g) = 442.64 lbs.

Section II. List the radionuclides and activities; perform DOT RAM, RQ, LTD QTY, and Type A Packaging checks

Nuclide	Activity (Ci)	% of Total A2 Fraction	Activity (Bq)	Activity/gram (Bq/gram)	RQ limits (TBq)	RQ Ratios (amount/limit)	A2 Value (TBq)	LTD QTY Det. (amount/(10-3)A2)	Type A Pkg? (amount/A2)	DOT Fissile Mass (g)	TRU Conc. (nCi/g)	LSA-II Solids Frac	Activity/gram (pCi/g)
Sr-90	3.31E+00	4.96E+01	1.23E+11	6.10E+05	3.70E-03	3.31E+01	1.00E-01	1.23E+03	1.23E+00	0.00E+00	0.00E+00	6.10E-02	1.65E+07
Cs-137	2.83E+00	8.48E+00	1.05E+11	5.22E+05	3.70E-02	2.83E+00	5.00E-01	2.09E+02	2.09E-01	0.00E+00	0.00E+00	1.04E-02	1.41E+07
Ni-63	3.51E-01	1.75E-02	1.30E+10	6.47E+04	3.70E+00	3.51E-03	3.00E+01	4.33E-01	4.33E-04	0.00E+00	0.00E+00	2.16E-05	1.75E+06
Co-60	1.42E-01	5.30E-01	5.24E+09	2.61E+04	3.70E-01	1.42E-02	4.00E-01	1.31E+01	1.31E-02	0.00E+00	0.00E+00	6.52E-04	7.05E+05
Eu-152	9.76E-03	1.62E-02	3.61E+08	1.80E+03	3.70E-01	9.76E-04	9.00E-01	4.01E-01	4.01E-04	0.00E+00	0.00E+00	2.00E-05	4.86E+04
Pu-241	6.73E-03	1.01E+00	2.49E+08	1.24E+03	3.70E-02	6.73E-03	1.00E-02	2.49E+01	2.49E-02	6.73E-05	0.00E+00	1.24E-03	3.35E+04
Eu-154	6.71E-03	2.01E-02	2.48E+08	1.24E+03	3.70E-01	6.71E-04	5.00E-01	4.96E-01	4.96E-04	0.00E+00	0.00E+00	2.47E-05	3.34E+04
Ru-103	5.50E-03	9.16E-03	2.04E+08	1.01E+03	3.70E-01	5.50E-04	9.00E-01	2.26E-01	2.26E-04	0.00E+00	0.00E+00	1.13E-05	2.74E+04
Ru-106	5.10E-03	3.82E-02	1.89E+08	9.40E+02	3.70E-02	5.10E-03	2.00E-01	9.43E-01	9.43E-04	0.00E+00	0.00E+00	4.70E-05	2.54E+04
Ce-144	4.16E-03	3.11E-02	1.54E+08	7.66E+02	3.70E-02	4.16E-03	2.00E-01	7.69E-01	7.69E-04	0.00E+00	0.00E+00	3.83E-05	2.07E+04
Pu-238	2.79E-03	2.09E+01	1.03E+08	5.14E+02	3.70E-04	2.79E-01	2.00E-04	5.16E+02	5.16E-01	1.64E-04	1.39E+01	2.57E-02	1.39E+04
Sb-125	1.88E-03	3.13E-03	6.95E+07	3.46E+02	3.70E-01	1.88E-04	9.00E-01	7.73E-02	7.73E-05	0.00E+00	0.00E+00	3.85E-06	9.36E+03
Ra-226	1.79E-03	1.34E-01	6.63E+07	3.30E+02	3.70E-03	1.79E-02	2.00E-02	3.32E+00	3.32E-03	0.00E+00	0.00E+00	1.65E-04	8.93E+03
Pu-239	1.66E-03	1.24E+01	6.14E+07	3.06E+02	3.70E-04	1.66E-01	2.00E-04	3.07E+02	3.07E-01	2.67E-02	8.26E+00	1.53E-02	8.26E+03
Eu-155	1.53E-03	1.14E-03	5.65E+07	2.82E+02	3.70E-01	1.53E-04	2.00E+00	2.83E-02	2.83E-05	0.00E+00	0.00E+00	1.41E-06	7.61E+03
Zr-95	1.39E-03	2.31E-03	5.14E+07	2.56E+02	3.70E-01	1.39E-04	9.00E-01	5.71E-02	5.71E-05	0.00E+00	0.00E+00	2.84E-06	6.92E+03
Ag-110m	7.85E-04	2.94E-03	2.90E+07	1.45E+02	3.70E-01	7.85E-05	4.00E-01	7.26E-02	7.26E-05	0.00E+00	0.00E+00	3.62E-06	3.91E+03
Nb-95	7.81E-04	1.17E-03	2.89E+07	1.44E+02	3.70E-01	7.81E-05	1.00E+00	2.89E-02	2.89E-05	0.00E+00	0.00E+00	1.44E-06	3.89E+03
U-233	7.61E-04	1.14E+00	2.82E+07	1.40E+02	3.70E-03	7.61E-03	1.00E-03	2.82E+01	2.82E-02	7.84E-02	0.00E+00	1.40E-03	3.79E+03
Co-58	7.49E-04	1.12E-03	2.77E+07	1.38E+02	3.70E-01	7.49E-05	1.00E+00	2.77E-02	2.77E-05	0.00E+00	0.00E+00	1.38E-06	3.73E+03
Zn-65	7.29E-04	5.46E-04	2.70E+07	1.34E+02	3.70E-01	7.29E-05	2.00E+00	1.35E-02	1.35E-05	0.00E+00	0.00E+00	6.72E-07	3.63E+03
Am-241	7.07E-04	5.29E+00	2.61E+07	1.30E+02	3.70E-04	7.07E-02	2.00E-04	1.31E+02	1.31E-01	0.00E+00	3.52E+00	6.51E-03	3.52E+03
Ag-108m	4.18E-04	1.04E-03	1.55E+07	7.70E+01	3.70E-01	4.18E-05	6.00E-01	2.58E-02	2.58E-05	0.00E+00	0.00E+00	1.28E-06	2.08E+03
Mn-54	2.73E-04	4.09E-04	1.01E+07	5.03E+01	3.70E-01	2.73E-05	1.00E+00	1.01E-02	1.01E-05	0.00E+00	0.00E+00	5.03E-07	1.36E+03
Cs-134	2.55E-04	7.64E-04	9.43E+06	4.70E+01	3.70E-02	2.55E-04	5.00E-01	1.89E-02	1.89E-05	0.00E+00	0.00E+00	9.40E-07	1.27E+03
Cm-243	4.90E-05	2.45E-01	1.81E+06	9.03E+00	3.70E-04	4.90E-03	3.00E-04	6.04E+00	6.04E-03	0.00E+00	2.44E-01	3.01E-04	2.44E+02
U-238	2.63E-05	0.00E+00	9.73E+05	4.85E+00	3.70E-03	2.63E-04	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.31E+02
Th-234	2.63E-05	1.97E-04	9.73E+05	4.85E+00	3.70E+00	2.63E-07	2.00E-01	4.87E-03	4.87E-06	0.00E+00	0.00E+00	2.42E-07	1.31E+02
I-129	2.31E-05	0.00E+00	8.54E+05	4.25E+00	3.70E-05	2.31E-02	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.15E+02
U-235	2.27E-05	0.00E+00	8.39E+05	4.18E+00	3.70E-03	2.27E-04	Unlimited	0.00E+00	0.00E+00	1.03E+01	0.00E+00	0.00E+00	1.13E+02
Np-237	7.61E-06	5.70E-02	2.82E+05	1.40E+00	3.70E-04	7.61E-04	2.00E-04	1.41E+00	1.41E-03	0.00E+00	3.79E-02	7.01E-05	3.79E+01
Pa-233	7.61E-06	1.27E-05	2.82E+05	1.40E+00	3.70E+00	7.61E-08	9.00E-01	3.13E-04	3.13E-07	0.00E+00	0.00E+00	1.56E-08	3.79E+01
Cm-242	1.90E-06	2.85E-04	7.03E+04	3.50E-01	3.70E-02	1.90E-06	1.00E-02	7.03E-03	7.03E-06	0.00E+00	0.00E+00	3.50E-07	9.46E+00
Total	6.69E+00	100.00%	2.48E+	1.23E+06		3.36E+01		2.7E[illegible]	2.7E+0[illegible]	1.04E+01	2.30E+01	1.23E-01	3.3[illegible]E+07

DOT regulated as Hazard Class 7 Radioactive Material

Contains a Reportable Quantity of a Hazardous Substance; use 'RQ(radionuclides)' as part of PSN

> Type A quantity; requires Type B Packaging

Does NOT meet LTD QTY Exception; Check if LSA

Meets Low Specific Activity (LSA)-II material - Check <Type A quantity and use Radioactive material, LSA, n.o.s. as PSN

Meets criteria for Fissile Excepted Package per 49 CFR 173.453

This is a Low-level waste

Performed by: [illegible] Date: 9/25/01

Reviewed by: _____ Date _____

6 5 9/05

Section III: Check radionuclides for listing on labels and shipping papers; Check reportable radionuclides per Disposal Facility

Nuclide	Activity (Ci)	% of Total A2 Fraction	Cumulative A2 Fraction
Sr-90	3.31E+00	4.96E+01	4.96E+01
Pu-238	2.79E-03	2.09E+01	7.05E+01
Pu-239	1.66E-03	1.24E+01	8.30E+01
Cs-137	2.83E+00	8.48E+00	9.14E+01
Am-241	7.07E-04	5.29E+00	9.67E+01
U-233	7.61E-04	1.14E+00	9.79E+01
Pu-241	6.73E-03	1.01E+00	9.89E+01
Co-60	1.42E-01	5.30E-01	9.94E+01
Cm-243	4.90E-05	2.45E-01	9.97E+01
Ra-226	1.79E-03	1.34E-01	9.98E+01
Np-237	7.61E-06	5.70E-02	9.99E+01
Ru-106	5.10E-03	3.82E-02	9.99E+01
Ce-144	4.16E-03	3.11E-02	9.99E+01
Eu-154	6.71E-03	2.01E-02	9.99E+01
Ni-63	3.51E-01	1.75E-02	1.00E+02
Eu-152	9.76E-03	1.62E-02	1.00E+02
Ru-103	5.50E-03	9.16E-03	1.00E+02
Sb-125	1.88E-03	3.13E-03	1.00E+02
Ag-110m	7.85E-04	2.94E-03	1.00E+02
Zr-95	1.39E-03	2.31E-03	1.00E+02
Nb-95	7.81E-04	1.17E-03	1.00E+02
Eu-155	1.53E-03	1.14E-03	1.00E+02
Co-58	7.49E-04	1.12E-03	1.00E+02
Ag-108m	4.18E-04	1.04E-03	1.00E+02
Cs-134	2.55E-04	7.64E-04	1.00E+02
Zn-65	7.29E-04	5.46E-04	1.00E+02
Mn-54	2.73E-04	4.09E-04	1.00E+02
Cm-242	1.90E-06	2.85E-04	1.00E+02
Th-234	2.63E-05	1.97E-04	1.00E+02
Pa-233	7.61E-06	1.27E-05	1.00E+02
U-238	2.63E-05	0.00E+00	1.00E+02
I-129	2.31E-05	0.00E+00	1.00E+02
U-235	2.27E-05	0.00E+00	1.00E+02

Nuclide	Activity (Ci)	% of Total Activity	Source Material (kg)	SNM (g)	Activity Conc. (Ci/m^3)
Sr-90	3.31E+00	4.95E+01	Not applicable	Not applicable	1.68E+01
Cs-137	2.83E+00	4.23E+01	Not applicable	Not applicable	1.44E+01
Ni-63	3.51E-01	5.25E+00	Not applicable	Not applicable	1.78E+00
Co-60	1.42E-01	2.12E+00	Not applicable	Not applicable	7.19E-01
Eu-152	9.76E-03	1.46E-01	Not applicable	Not applicable	4.95E-02
Pu-241	6.73E-03	1.01E-01	Not applicable	6.73E-05	3.42E-02
Eu-154	6.71E-03	1.00E-01	Not applicable	Not applicable	3.40E-02
Ru-103	5.50E-03	8.22E-02	Not applicable	Not applicable	2.79E-02
Ru-106	5.10E-03	7.62E-02	Not applicable	Not applicable	2.59E-02
Ce-144	4.16E-03	6.21E-02	Not applicable	Not applicable	2.11E-02
Pu-238	2.79E-03	4.17E-02	Not applicable	1.64E-04	1.42E-02
Sb-125	1.88E-03	2.81E-02	Not applicable	Not applicable	9.54E-03
Ra-226	1.79E-03	2.68E-02	Not applicable	Not applicable	9.10E-03
Pu-239	1.66E-03	2.48E-02	Not applicable	2.67E-02	8.42E-03
Eu-155	1.53E-03	2.28E-02	Not applicable	Not applicable	7.76E-03
Zr-95	1.39E-03	2.08E-02	Not applicable	Not applicable	7.05E-03
Ag-110m	7.85E-04	1.17E-02	Not applicable	Not applicable	3.98E-03
Nb-95	7.81E-04	1.17E-02	Not applicable	Not applicable	3.96E-03
U-233	7.61E-04	1.14E-02	Not applicable	7.84E-02	3.86E-03
Co-58	7.49E-04	1.12E-02	Not applicable	Not applicable	3.80E-03
Zn-65	7.29E-04	1.09E-02	Not applicable	Not applicable	3.70E-03
Am-241	7.07E-04	1.06E-02	Not applicable	Not applicable	3.59E-03
Ag-108m	4.18E-04	6.24E-03	Not applicable	Not applicable	2.12E-03
Mn-54	2.73E-04	4.08E-03	Not applicable	Not applicable	1.39E-03
Cs-134	2.55E-04	3.81E-03	Not applicable	Not applicable	1.29E-03
Cm-243	4.90E-05	7.32E-04	Not applicable	Not applicable	2.49E-04
U-238	2.63E-05	3.93E-04	Not applicable	Not applicable	1.34E-04
Th-234	2.63E-05	3.93E-04	Not applicable	Not applicable	1.34E-04
I-129	2.31E-05	3.45E-04	Not applicable	Not applicable	1.17E-04
U-235	2.27E-05	3.39E-04	Not applicable	1.03E+01	1.15E-04
Np-237	7.61E-06	1.14E-04	Not applicable	Not applicable	3.86E-05
Pa-233	7.61E-06	1.14E-04	Not applicable	Not applicable	3.86E-05
Cm-242	1.90E-06	2.84E-05	Not applicable	Not applicable	9.64E-06

If #DIV/0! occurs in the Fraction of Waste Profile Column or the Does Nuclide Meet Waste Profile? Column of Section III, the nuclide is not included on the current profile and needs to be added.

Waste Classification Determination for near surface disposal per 10 CFR §61.55

Assume that Sr-90, Cs-137, and Ni-63 are major nuclides driving waste classification determination for Tank V-1, V-2, and V-3 wastes

Radionuclide	Table 2 limit (Ci/m^3) Column 1	Column 2	V-2 Sludge(52 gal/drum w/MAX)
Cs-137	1	44	1.44E+01
Sr-90	0.04	150	1.68E+01
Ni-63	3.5	70	1.78E+00
Class A Sum of Fractions:			435.29
Class B Sum of Fractions:			0.46
			ClassB

66 of 105

Container ID # **INEEL Tank V-2 Liquids (Total)**

Constants	Units
3.70E+10	Bq/Ci
453.6	g/lb
1.00E-12	TBq/Bq or Ci/pCi
1000.00	g/kg
1.00E+09	nCi/Ci

Section I. Waste Stream Information

Container Type: N/A Form#

Description: 1076 gallons of liquids PKE#

NTS Waste Stream # #N/A

SNL Waste Stream# #N/A

Note: assume liquid phase volume of 1,076 gallons with density of 1.00 g/ml

Container Gross Wt (lb)	Container Gross Wt (kg)	Container Tare Wt (lb)	Container Tare Wt (kg)	Waste Net Wt (kg)	External Vol. (m3)	Est. Waste Vol. (m3)
8979.60	4073.15	0.00	0.00	4073.15	#N/A	4.073

Note: Gross weight of contents = (1076 gal.)x(1.0 g/ml)x(3785.412 ml/gal.)x(2.2046E-03 lb/g) = 8,979.6 lb

Dose survey from Sxxxxx on xx/xx/00 shows < [ ] mrem/hr OC.

Radioactive liquid effluents from hot cells, labs, and decon facilities at TAN and IETF.

EPA regulated hazardous COCs: Barium, Cadmium, Chromium, Lead, Mercury, Silver, VOCs, SVOCs, and PCBs.

Section II. List the radionuclides and activities; perform DOT RAM, RQ, LTD QTY, and Type A Packaging checks

Nuclide	Activity (Ci)	% of Total A2 Fraction	Activity (Bq)	Activity/gram (Bq/gram)	RQ limits (TBq)	RQ Ratios (amount/limit)	A2 Value (TBq)	LTD QTY Det. (amount/(10-4)A2)	Type A Pkg? (amount/A2)	DOT Fissile Mass (g)	TRU Conc. (nCi/g)	LSA-II Liquids Fraction	Activity/gram (pCi/g)
H-3	4.15E-01	2.09E+00	1.54E+10	3.77E+03	3.70E+00	4.15E-03	4.00E+01	3.84E+00	3.84E-04	0.00E+00	0.00E+00	9.43E-06	1.02E+05
Cs-137	5.50E-02	2.21E+01	2.03E+09	4.99E+02	3.70E-02	5.50E-02	5.00E-01	4.07E+01	4.07E-03	0.00E+00	0.00E+00	9.99E-05	1.35E+04
Sr-90	2.00E-02	4.01E+01	7.38E+08	1.81E+02	3.70E-03	2.00E-01	1.00E-01	7.38E+01	7.38E-03	0.00E+00	0.00E+00	1.81E-04	4.90E+03
Ni-63	1.82E-03	1.22E-02	6.75E+07	1.66E+01	3.70E+00	1.82E-05	3.00E+01	2.25E-02	2.25E-06	0.00E+00	0.00E+00	5.53E-08	4.48E+02
Ru-106	1.88E-04	1.89E-01	6.96E+06	1.71E+00	3.70E-02	1.88E-04	2.00E-01	3.48E-01	3.48E-05	0.00E+00	0.00E+00	8.55E-07	4.62E+01
U-233	1.57E-04	3.16E+01	5.82E+06	1.43E+00	3.70E-03	1.57E-03	1.00E-03	5.82E+01	5.82E-03	1.62E-02	0.00E+00	1.43E-04	3.86E+01
Ce-144	1.54E-04	1.55E-01	5.70E+06	1.40E+00	3.70E-02	1.54E-04	2.00E-01	2.85E-01	2.85E-05	0.00E+00	0.00E+00	6.99E-07	3.78E+01
Ru-103	1.47E-04	3.27E-02	5.43E+06	1.33E+00	3.70E-01	1.47E-05	9.00E-01	6.03E-02	6.03E-06	0.00E+00	0.00E+00	1.48E-07	3.60E+01
Sb-125	7.49E-05	1.67E-02	2.77E+06	6.81E-01	3.70E-01	7.49E-06	9.00E-01	3.08E-02	3.08E-06	0.00E+00	0.00E+00	7.56E-08	1.84E+01
Eu-155	5.87E-05	5.89E-03	2.17E+06	5.33E-01	3.70E-01	5.87E-06	2.00E+00	1.09E-02	1.09E-06	0.00E+00	0.00E+00	2.66E-08	1.44E+01
Co-60	5.30E-05	2.66E-02	1.96E+06	4.81E-01	3.70E-01	5.30E-06	4.00E-01	4.90E-02	4.90E-06	0.00E+00	0.00E+00	1.20E-07	1.30E+01
Ag-110m	2.90E-05	1.46E-02	1.07E+06	2.63E-01	3.70E-01	2.90E-06	4.00E-01	2.68E-02	2.68E-06	0.00E+00	0.00E+00	6.59E-08	7.12E+00
Eu-152	1.94E-05	4.33E-03	7.17E+05	1.76E-01	3.70E-01	1.94E-06	9.00E-01	7.97E-03	7.97E-07	0.00E+00	0.00E+00	1.96E-08	4.76E+00
Ra-226	1.67E-05	1.68E-01	6.18E+05	1.52E-01	3.70E-03	1.67E-04	2.00E-02	3.09E-01	3.09E-05	0.00E+00	0.00E+00	7.58E-07	4.10E+00
Ag-108m	1.61E-05	5.40E-03	5.97E+05	1.47E-01	3.70E-01	1.61E-06	6.00E-01	9.95E-03	9.95E-07	0.00E+00	0.00E+00	2.44E-08	3.96E+00
Zr-95	1.31E-05	2.92E-03	4.84E+05	1.19E-01	3.70E-01	1.31E-06	9.00E-01	5.38E-03	5.38E-07	0.00E+00	0.00E+00	1.32E-08	3.21E+00
Nb-95	7.98E-06	1.60E-03	2.95E+05	7.25E-02	3.70E-01	7.98E-07	1.00E+00	2.95E-03	2.95E-07	0.00E+00	0.00E+00	7.25E-09	1.96E+00
Eu-154	7.41E-06	2.98E-03	2.74E+05	6.73E-02	3.70E-01	7.41E-07	5.00E-01	5.49E-03	5.49E-07	0.00E+00	0.00E+00	1.35E-08	1.82E+00
Zn-65	6.92E-06	6.95E-04	2.56E+05	6.29E-02	3.70E-01	6.92E-07	2.00E+00	1.28E-03	1.28E-07	0.00E+00	0.00E+00	3.14E-09	1.70E+00
U-235	6.52E-06	0.00E+00	2.41E+05	5.92E-02	3.70E-03	6.52E-05	Unlimited	0.00E+00	0.00E+00	2.96E+00	0.00E+00	0.00E+00	1.60E+00
Co-58	6.52E-06	1.31E-03	2.41E+05	5.92E-02	3.70E-01	6.52E-07	1.00E+00	2.41E-03	2.41E-07	0.00E+00	0.00E+00	5.92E-09	1.60E+00
Cs-134	3.11E-06	1.25E-03	1.15E+05	2.83E-02	3.70E-02	3.11E-06	5.00E-01	2.30E-03	2.30E-07	0.00E+00	0.00E+00	5.65E-09	7.64E-01
Mn-54	2.92E-06	5.86E-04	1.08E+05	2.65E-02	3.70E-01	2.92E-07	1.00E+00	1.08E-03	1.08E-07	0.00E+00	0.00E+00	2.65E-09	7.16E-01
Pu-241	2.28E-06	4.59E-02	8.45E+04	2.07E-02	3.70E-02	2.28E-06	1.00E-02	8.45E-02	8.45E-06	2.28E-08	0.00E+00	2.07E-07	5.61E-01
U-238	2.03E-06	0.00E+00	7.52E+04	1.85E-02	3.70E-03	2.03E-05	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-01
Th-234	2.03E-06	2.04E-03	7.52E+04	1.85E-02	3.70E+00	2.03E-08	2.00E-01	3.76E-03	3.76E-07	0.00E+00	0.00E+00	9.23E-09	4.99E-01
Pu-238	1.93E-06	1.94E+00	7.16E+04	1.76E-02	3.70E-04	1.93E-04	2.00E-04	3.58E+00	3.58E-04	1.14E-07	4.75E-04	8.79E-06	4.75E-01
Pu-239	1.15E-06	1.16E+00	4.26E+04	1.05E-02	3.70E-04	1.15E-04	2.00E-04	2.13E+00	2.13E-04	1.86E-05	2.83E-04	5.24E-06	2.83E-01
I-129	6.88E-07	0.00E+00	2.55E+04	6.25E-03	3.70E-05	6.88E-04	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.69E-01
Am-241	2.40E-07	2.41E-01	8.88E+03	2.18E-03	3.70E-04	2.40E-05	2.00E-04	4.44E-01	4.44E-05	0.00E+00	5.89E-05	1.09E-06	5.89E-02
Np-237	1.12E-07	1.13E-01	4.16E+03	1.02E-03	3.70E-04	1.12E-05	2.00E-04	2.08E-01	2.08E-05	0.00E+00	2.76E-05	5.11E-07	2.76E-02
Pa-233	1.12E-07	2.51E-05	4.16E+03	1.02E-03	3.70E+00	1.12E-09	9.00E-01	4.62E-05	4.62E-09	0.00E+00	0.00E+00	1.13E-10	2.76E-02
Cm-243	6.60E-08	4.42E-02	2.44E+03	5.99E-04	3.70E-04	6.60E-06	3.00E-04	8.14E-02	8.14E-06	0.00E+00	1.62E-05	2.00E-07	1.62E-02
Cm-242	2.02E-08	4.06E-04	7.47E+02	1.84E-04	3.70E-02	2.02E-08	1.00E-02	7.47E-04	7.47E-08	0.00E+00	0.00E+00	1.84E-09	4.96E-03
Total	4.93E-01	100.00%	1.82E+10	4.48E+03		2.62E-01		1.84E+02	1.84E-02	2.98E+00	8.61E-04	4.52E-04	1.21E+05

DOT regulated as Hazard Class 7 Radioactive Material
NOT an RQ amount of a Hazardous Substance
< Type A quantity/package per 49 CFR 173.431(a); check if excepted quantity -> excepted packaging
Does NOT meet LTD QTY Exception; Check if LSA
Meets Low Specific Activity (LSA)-II material - Check <Type A quantity and use Radioactive material, LSA, n.o.s. as PSN
Meets criteria for Fissile Excepted Package per 49 CFR 173.453
This is a Low-level waste

Performed by: Gordon Harris Date: 9/25/01

Reviewed by: _____ Date: _____

67/4/05

Section III: Check radionuclides for listing on labels and shipping papers

Nuclide	Activity (Ci)	% of Total A2 Fraction	Cumulative A2 Fraction
Sr-90	2.00E-02	4.01E+01	4.01E+01
U-233	1.57E-04	3.16E+01	7.16E+01
Cs-137	5.50E-02	2.21E+01	9.37E+01
H-3	4.15E-01	2.09E+00	9.58E+01
Pu-238	1.93E-06	1.94E+00	9.78E+01
Pu-239	1.15E-06	1.16E+00	9.89E+01
Am-241	2.40E-07	2.41E-01	9.92E+01
Ru-106	1.88E-04	1.89E-01	9.93E+01
Ra-226	1.67E-05	1.68E-01	9.95E+01
Ce-144	1.54E-04	1.55E-01	9.97E+01
Np-237	1.12E-07	1.13E-01	9.98E+01
Pu-241	2.28E-06	4.59E-02	9.98E+01
Cm-243	6.60E-08	4.42E-02	9.99E+01
Ru-103	1.47E-04	3.27E-02	9.99E+01
Co-60	5.30E-05	2.66E-02	9.99E+01
Sb-125	7.49E-05	1.67E-02	9.99E+01
Ag-110m	2.90E-05	1.46E-02	1.00E+02
Ni-63	1.82E-03	1.22E-02	1.00E+02
Eu-155	5.87E-05	5.89E-03	1.00E+02
Ag-108m	1.61E-05	5.40E-03	1.00E+02
Eu-152	1.94E-05	4.33E-03	1.00E+02
Eu-154	7.41E-06	2.98E-03	1.00E+02
Zr-95	1.31E-05	2.92E-03	1.00E+02
Th-234	2.03E-06	2.04E-03	1.00E+02
Nb-95	7.98E-06	1.60E-03	1.00E+02
Co-58	6.52E-06	1.31E-03	1.00E+02
Cs-134	3.11E-06	1.25E-03	1.00E+02
Zn-65	6.92E-06	6.95E-04	1.00E+02
Mn-54	2.92E-06	5.86E-04	1.00E+02
Cm-242	2.02E-08	4.06E-04	1.00E+02
Pa-233	1.12E-07	2.51E-05	1.00E+02
U-235	6.52E-06	0.00E+00	1.00E+02
U-238	2.03E-06	0.00E+00	1.00E+02
I-129	6.88E-07	0.00E+00	1.00E+02

Nuclide	Activity (Ci)	% of Total Activity	Source Material (kg)	SNM (g)	Activity Conc. (Ci/m^3)
H-3	4.15E-01	8.42E+01	Not applicable	Not applicable	1.02E-01
Cs-137	5.50E-02	1.11E+01	Not applicable	Not applicable	1.35E-02
Sr-90	2.00E-02	4.05E+00	Not applicable	Not applicable	4.90E-03
Ni-63	1.82E-03	3.70E-01	Not applicable	Not applicable	4.48E-04
Ru-106	1.88E-04	3.82E-02	Not applicable	Not applicable	4.62E-05
U-233	1.57E-04	3.19E-02	Not applicable	1.62E-02	3.86E-05
Ce-144	1.54E-04	3.12E-02	Not applicable	Not applicable	3.78E-05
Ru-103	1.47E-04	2.97E-02	Not applicable	Not applicable	3.60E-05
Sb-125	7.49E-05	1.52E-02	Not applicable	Not applicable	1.84E-05
Eu-155	5.87E-05	1.19E-02	Not applicable	Not applicable	1.44E-05
Co-60	5.30E-05	1.07E-02	Not applicable	Not applicable	1.30E-05
Ag-110m	2.90E-05	5.88E-03	Not applicable	Not applicable	7.12E-06
Eu-152	1.94E-05	3.93E-03	Not applicable	Not applicable	4.76E-06
Ra-226	1.67E-05	3.39E-03	Not applicable	Not applicable	4.10E-06
Ag-108m	1.61E-05	3.27E-03	Not applicable	Not applicable	3.96E-06
Zr-95	1.31E-05	2.65E-03	Not applicable	Not applicable	3.21E-06
Nb-95	7.98E-06	1.62E-03	Not applicable	Not applicable	1.96E-06
Eu-154	7.41E-06	1.50E-03	Not applicable	Not applicable	1.82E-06
Zn-65	6.92E-06	1.40E-03	Not applicable	Not applicable	1.70E-06
U-235	6.52E-06	1.32E-03	Not applicable	2.96E+00	1.60E-06
Co-58	6.52E-06	1.32E-03	Not applicable	Not applicable	1.60E-06
Cs-134	3.11E-06	6.31E-04	Not applicable	Not applicable	7.64E-07
Mn-54	2.92E-06	5.91E-04	Not applicable	Not applicable	7.16E-07
Pu-241	2.28E-06	4.63E-04	Not applicable	2.28E-08	5.61E-07
U-238	2.03E-06	4.12E-04	Not applicable	Not applicable	4.99E-07
Th-234	2.03E-06	4.12E-04	Not applicable	Not applicable	4.99E-07
Pu-238	1.93E-06	3.92E-04	Not applicable	1.14E-07	4.75E-07
Pu-239	1.15E-06	2.34E-04	Not applicable	1.86E-05	2.83E-07
I-129	6.88E-07	1.40E-04	Not applicable	Not applicable	1.69E-07
Am-241	2.40E-07	4.86E-05	Not applicable	Not applicable	5.89E-08
Np-237	1.12E-07	2.28E-05	Not applicable	Not applicable	2.76E-08
Pa-233	1.12E-07	2.28E-05	Not applicable	Not applicable	2.76E-08
Cm-243	6.60E-08	1.34E-05	Not applicable	Not applicable	1.62E-08
Cm-242	2.02E-08	4.10E-06	Not applicable	Not applicable	4.96E-09

Waste Classification Determination for near surface disposal per 10 CFR §61.55

Assume that Sr-90, Cs-137, and Ni-63 are major nuclides driving waste classification determination for Tank V-1, V-2, and V-3 wastes

Radionuclide	Table 2 limit (Ci/m^3) Column 1	Column 2	V-2 All Liquid
H-3	40	*	1.02E-01
Cs-137	1	44	1.35E-02
Sr-90	0.04	150	4.90E-03
Ni-63	3.5	70	4.48E-04
Co-60	700	*	1.30E-05
Class A Sum of Fractions:			0.14
Class B Sum of Fractions:			0.00
			ClassA*

*Note No limits established for these radionuclides in Class B or C wastes Practical considerations such as the effects of external radiation and internal heat generation on transportation, handling, and disposal will limit the concentrations for these wastes These wastes shall be Classs B unless the concentrations of other nuclides in Table 2 determine the waste to be Class C independent of these nuclides

68 of 105

Container ID # **INEEL Tank V-2 Liquids (538 gal/HIC)**
Note: HIC Liner capacity is 804.9 gallons; assume 66.8% full

Section I. Waste Stream Information

Container Type: HIC Liner PL8-120 MT Form#
Description: 538 gallons of liquids PKE#
Note: assume liquid phase volume of 538 gallons with density of 1.00 g/ml

NTS Waste Stream # #N/A
SNL Waste Stream# #N/A

Constants	Units
3.70E+10	Bq/Ci
453.6	g/lb
1.00E-12	TBq/Bq or Ci/pCi
1000.00	g/kg
1.00E+09	nCi/Ci

Container Gross Wt (lb)	Container Gross Wt (kg)	Container Tare Wt (lb)	Container Tare Wt (kg)	Waste Net Wt (kg)	External Vol. (m3)	Est. Waste Vol. (m3)
5089.80	2308.73	600.00	272.16	2036.57	3.427	2.037

Note. Gross weight of contents = (538 gal.)x(1.0 g/ml)x(3785.412 ml/gal.)x(2.2046E-03 lb/g) = 4,489.8 lb

Dose survey from Sxxxxx on xx/xx/00 shows < mrem/hr OC.
Radioactive liquid effluents from hot cells, labs, and decon facilities at TAN and IETF.
EPA regulated hazardous COCs: Barium, Cadmium, Chromium, Lead, Mercury, Silver, VOCs, SVOCs, and PCBs.

Section II. List the radionuclides and activities; perform DOT RAM, RQ, LTD QTY, and Type A Packaging checks

Nuclide	Activity (Ci)	% of Total A2 Fraction	Activity (Bq)	Activity/gram (Bq/gram)	RQ limits (TBq)	RQ Ratios (amount/limit)	A2 Value (TBq)	LTD QTY Det. (amount/(10-4)A2)	Type A Pkg? (amount/A2)	DOT Fissile Mass (g)	TRU Conc. (nCi/g)	LSA-II Liquids Fraction	Activity/gram (pCi/g)
H-3	2.08E-01	2.09E+00	7.69E+09	3.77E+03	3.70E+00	2.08E-03	4.00E+01	1.92E+00	1.92E-04	0.00E+00	0.00E+00	9.43E-06	1.02E+05
Cs-137	2.75E-02	2.21E+01	1.02E+09	4.99E+02	3.70E-02	2.75E-02	5.00E-01	2.03E+01	2.03E-03	0.00E+00	0.00E+00	9.99E-05	1.35E+04
Sr-90	9.98E-03	4.01E+01	3.69E+08	1.81E+02	3.70E-03	9.98E-02	1.00E-01	3.69E+01	3.69E-03	0.00E+00	0.00E+00	1.81E-04	4.90E+03
Ni-63	9.12E-04	1.22E-02	3.38E+07	1.66E+01	3.70E+00	9.12E-06	3.00E+01	1.13E-02	1.13E-06	0.00E+00	0.00E+00	5.53E-08	4.48E+02
Ru-106	9.41E-05	1.89E-01	3.48E+06	1.71E+00	3.70E-02	9.41E-05	2.00E-01	1.74E-01	1.74E-05	0.00E+00	0.00E+00	8.55E-07	4.62E+01
U-233	7.86E-05	3.16E+01	2.91E+06	1.43E+00	3.70E-03	7.86E-04	1.00E-03	2.91E+01	2.91E-03	8.10E-03	0.00E+00	1.43E-04	3.86E+01
Ce-144	7.70E-05	1.55E-01	2.85E+06	1.40E+00	3.70E-02	7.70E-05	2.00E-01	1.42E-01	1.42E-05	0.00E+00	0.00E+00	6.99E-07	3.78E+01
Ru-103	7.33E-05	3.27E-02	2.71E+06	1.33E+00	3.70E-01	7.33E-06	9.00E-01	3.01E-02	3.01E-06	0.00E+00	0.00E+00	1.48E-07	3.60E+01
Sb-125	3.75E-05	1.67E-02	1.39E+06	6.81E-01	3.70E-01	3.75E-06	9.00E-01	1.54E-02	1.54E-06	0.00E+00	0.00E+00	7.56E-08	1.84E+01
Eu-155	2.93E-05	5.89E-03	1.09E+06	5.33E-01	3.70E-01	2.93E-06	2.00E+00	5.43E-03	5.43E-07	0.00E+00	0.00E+00	2.66E-08	1.44E+01
Co-60	2.65E-05	2.66E-02	9.80E+05	4.81E-01	3.70E-01	2.65E-06	4.00E-01	2.45E-02	2.45E-06	0.00E+00	0.00E+00	1.20E-07	1.30E+01
Ag-110m	1.45E-05	1.46E-02	5.37E+05	2.63E-01	3.70E-01	1.45E-06	4.00E-01	1.34E-02	1.34E-06	0.00E+00	0.00E+00	6.59E-08	7.12E+00
Eu-152	9.69E-06	4.33E-03	3.59E+05	1.76E-01	3.70E-01	9.69E-07	9.00E-01	3.99E-03	3.99E-07	0.00E+00	0.00E+00	1.96E-08	4.76E+00
Ra-226	8.35E-06	1.68E-01	3.09E+05	1.52E-01	3.70E-03	8.35E-05	2.00E-02	1.54E-01	1.54E-05	0.00E+00	0.00E+00	7.58E-07	4.10E+00
Ag-108m	8.06E-06	5.40E-03	2.98E+05	1.47E-01	3.70E-01	8.06E-07	6.00E-01	4.97E-03	4.97E-07	0.00E+00	0.00E+00	2.44E-08	3.96E+00
Zr-95	6.54E-06	2.92E-03	2.42E+05	1.19E-01	3.70E-01	6.54E-07	9.00E-01	2.69E-03	2.69E-07	0.00E+00	0.00E+00	1.32E-08	3.21E+00
Nb-95	3.99E-06	1.60E-03	1.48E+05	7.25E-02	3.70E-01	3.99E-07	1.00E+00	1.48E-03	1.48E-07	0.00E+00	0.00E+00	7.25E-09	1.96E+00
Eu-154	3.71E-06	2.98E-03	1.37E+05	6.73E-02	3.70E-01	3.71E-07	5.00E-01	2.74E-03	2.74E-07	0.00E+00	0.00E+00	1.35E-08	1.82E+00
Zn-65	3.46E-06	6.95E-04	1.28E+05	6.29E-02	3.70E-01	3.46E-07	2.00E+00	6.40E-04	6.40E-08	0.00E+00	0.00E+00	3.14E-09	1.70E+00
U-235	3.26E-06	0.00E+00	1.21E+05	5.92E-02	3.70E-03	3.26E-05	Unlimited	0.00E+00	0.00E+00	1.48E+00	0.00E+00	0.00E+00	1.60E+00
Co-58	3.26E-06	1.31E-03	1.21E+05	5.92E-02	3.70E-01	3.26E-07	1.00E+00	1.21E-03	1.21E-07	0.00E+00	0.00E+00	5.92E-09	1.60E+00
Cs-134	1.56E-06	1.25E-03	5.76E+04	2.83E-02	3.70E-02	1.56E-06	5.00E-01	1.15E-03	1.15E-07	0.00E+00	0.00E+00	5.65E-09	7.64E-01
Mn-54	1.46E-06	5.86E-04	5.40E+04	2.65E-02	3.70E-01	1.46E-07	1.00E+00	5.40E-04	5.40E-08	0.00E+00	0.00E+00	2.65E-09	7.16E-01
Pu-241	1.14E-06	4.59E-02	4.23E+04	2.07E-02	3.70E-02	1.14E-06	1.00E-02	4.23E-02	4.23E-06	1.14E-08	0.00E+00	2.07E-07	5.61E-01
U-238	1.02E-06	0.00E+00	3.76E+04	1.85E-02	3.70E-03	1.02E-05	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-01
Th-234	1.02E-06	2.04E-03	3.76E+04	1.85E-02	3.70E+00	1.02E-08	2.00E-01	1.88E-03	1.88E-07	0.00E+00	0.00E+00	9.23E-09	4.99E-01
Pu-238	9.67E-07	1.94E+00	3.58E+04	1.76E-02	3.70E-04	9.67E-05	2.00E-04	1.79E+00	1.79E-04	5.69E-08	4.75E-04	8.79E-06	4.75E-01
Pu-239	5.76E-07	1.16E+00	2.13E+04	1.05E-02	3.70E-04	5.76E-05	2.00E-04	1.07E+00	1.07E-04	9.30E-06	2.83E-04	5.24E-06	2.83E-01
I-129	3.44E-07	0.00E+00	1.27E+04	6.25E-03	3.70E-05	3.44E-04	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.69E-01
Am-241	1.20E-07	2.41E-01	4.44E+03	2.18E-03	3.70E-04	1.20E-05	2.00E-04	2.22E-01	2.22E-05	0.00E+00	5.89E-05	1.09E-06	5.89E-02
Np-237	5.62E-08	1.13E-01	2.08E+03	1.02E-03	3.70E-04	5.62E-06	2.00E-04	1.04E-01	1.04E-05	0.00E+00	2.76E-05	5.11E-07	2.76E-02
Pa-233	5.62E-08	2.51E-05	2.08E+03	1.02E-03	3.70E+00	5.62E-10	9.00E-01	2.31E-05	2.31E-09	0.00E+00	0.00E+00	1.13E-10	2.76E-02
Cm-243	3.30E-08	4.42E-02	1.22E+03	5.99E-04	3.70E-04	3.30E-06	3.00E-04	4.07E-02	4.07E-06	0.00E+00	1.62E-05	2.00E-07	1.62E-02
Cm-242	1.01E-08	4.06E-04	3.74E+02	1.84E-04	3.70E-02	1.01E-08	1.00E-02	3.74E-04	3.74E-08	0.00E+00	0.00E+00	1.84E-09	4.96E-03
Total	2.47E-01	100.00%	9.12E+09	4.48E+03		1.31E-01		9.21E+01	9.21E-03	1.49E+00	8.61E-04	4.52E-04	1.21E+05

DOT regulated as Hazard Class 7 Radioactive Material
NOT an RQ amount of a Hazardous Substance
< Type A quantity/package per 49 CFR 173.431(a); check if excepted quantity -> excepted packaging
Does NOT meet LTD QTY Exception; Check if LSA
Meets Low Specific Activity (LSA)-II material - Check <Type A quantity and use Radioactive material, LSA, n.o.s. as PSN
Meets criteria for Fissile Excepted Package per 49 CFR 173.453
This is a Low-level waste

Performed by: Gordon Harris Date: 9/25/01

Reviewed by: Date:

6 of 7 105

Section III: Check radionuclides for listing on labels and shipping papers

Nuclide	Activity (Ci)	% of Total A2 Fraction	Cumulative A2 Fraction
Sr-90	9.98E-03	4.01E+01	4.01E+01
U-233	7.86E-05	3.16E+01	7.16E+01
Cs-137	2.75E-02	2.21E+01	9.37E+01
H-3	2.08E-01	2.09E+00	9.58E+01
Pu-238	9.67E-07	1.94E+00	9.78E+01
Pu-239	5.76E-07	1.16E+00	9.89E+01
Am-241	1.20E-07	2.41E-01	9.92E+01
Ru-106	9.41E-05	1.89E-01	9.93E+01
Ra-226	8.35E-06	1.68E-01	9.95E+01
Ce-144	7.70E-05	1.55E-01	9.97E+01
Np-237	5.62E-08	1.13E-01	9.98E+01
Pu-241	1.14E-06	4.59E-02	9.98E+01
Cm-243	3.30E-08	4.42E-02	9.99E+01
Ru-103	7.33E-05	3.27E-02	9.99E+01
Co-60	2.65E-05	2.66E-02	9.99E+01
Sb-125	3.75E-05	1.67E-02	9.99E+01
Ag-110m	1.45E-05	1.46E-02	1.00E+02
Ni-63	9.12E-04	1.22E-02	1.00E+02
Eu-155	2.93E-05	5.89E-03	1.00E+02
Ag-108m	8.06E-06	5.40E-03	1.00E+02
Eu-152	9.69E-06	4.33E-03	1.00E+02
Eu-154	3.71E-06	2.98E-03	1.00E+02
Zr-95	6.54E-06	2.92E-03	1.00E+02
Th-234	1.02E-06	2.04E-03	1.00E+02
Nb-95	3.99E-06	1.60E-03	1.00E+02
Co-58	3.26E-06	1.31E-03	1.00E+02
Cs-134	1.56E-06	1.25E-03	1.00E+02
Zn-65	3.46E-06	6.95E-04	1.00E+02
Mn-54	1.46E-06	5.86E-04	1.00E+02
Cm-242	1.01E-08	4.06E-04	1.00E+02
Pa-233	5.62E-08	2.51E-05	1.00E+02
U-235	3.26E-06	0.00E+00	1.00E+02
U-238	1.02E-06	0.00E+00	1.00E+02
I-129	3.44E-07	0.00E+00	1.00E+02

Nuclide	Activity (Ci)	% of Total Activity	Source Material (kg)	SNM (g)	Activity Conc. (Ci/m^3)
H-3	2.08E-01	8.42E+01	Not applicable	Not applicable	1.02E-01
Cs-137	2.75E-02	1.11E+01	Not applicable	Not applicable	1.35E-02
Sr-90	9.98E-03	4.05E+00	Not applicable	Not applicable	4.90E-03
Ni-63	9.12E-04	3.70E-01	Not applicable	Not applicable	4.48E-04
Ru-106	9.41E-05	3.82E-02	Not applicable	Not applicable	4.62E-05
U-233	7.86E-05	3.19E-02	Not applicable	8.10E-03	3.86E-05
Ce-144	7.70E-05	3.12E-02	Not applicable	Not applicable	3.78E-05
Ru-103	7.33E-05	2.97E-02	Not applicable	Not applicable	3.60E-05
Sb-125	3.75E-05	1.52E-02	Not applicable	Not applicable	1.84E-05
Eu-155	2.93E-05	1.19E-02	Not applicable	Not applicable	1.44E-05
Co-60	2.65E-05	1.07E-02	Not applicable	Not applicable	1.30E-05
Ag-110m	1.45E-05	5.88E-03	Not applicable	Not applicable	7.12E-06
Eu-152	9.69E-06	3.93E-03	Not applicable	Not applicable	4.76E-06
Ra-226	8.35E-06	3.39E-03	Not applicable	Not applicable	4.10E-06
Ag-108m	8.06E-06	3.27E-03	Not applicable	Not applicable	3.96E-06
Zr-95	6.54E-06	2.65E-03	Not applicable	Not applicable	3.21E-06
Nb-95	3.99E-06	1.62E-03	Not applicable	Not applicable	1.96E-06
Eu-154	3.71E-06	1.50E-03	Not applicable	Not applicable	1.82E-06
Zn-65	3.46E-06	1.40E-03	Not applicable	Not applicable	1.70E-06
U-235	3.26E-06	1.32E-03	Not applicable	1.48E+00	1.60E-06
Co-58	3.26E-06	1.32E-03	Not applicable	Not applicable	1.60E-06
Cs-134	1.56E-06	6.31E-04	Not applicable	Not applicable	7.64E-07
Mn-54	1.46E-06	5.91E-04	Not applicable	Not applicable	7.16E-07
Pu-241	1.14E-06	4.63E-04	Not applicable	1.14E-08	5.61E-07
U-238	1.02E-06	4.12E-04	Not applicable	Not applicable	4.99E-07
Th-234	1.02E-06	4.12E-04	Not applicable	Not applicable	4.99E-07
Pu-238	9.67E-07	3.92E-04	Not applicable	5.69E-08	4.75E-07
Pu-239	5.76E-07	2.34E-04	Not applicable	9.30E-06	2.83E-07
I-129	3.44E-07	1.40E-04	Not applicable	Not applicable	1.69E-07
Am-241	1.20E-07	4.86E-05	Not applicable	Not applicable	5.89E-08
Np-237	5.62E-08	2.28E-05	Not applicable	Not applicable	2.76E-08
Pa-233	5.62E-08	2.28E-05	Not applicable	Not applicable	2.76E-08
Cm-243	3.30E-08	1.34E-05	Not applicable	Not applicable	1.62E-08
Cm-242	1.01E-08	4.10E-06	Not applicable	Not applicable	4.96E-09

Waste Classification Determination for near surface disposal per 10 CFR §61.55

Assume that Sr-90, Cs-137, and Ni-63 are major nuclides driving waste classification determination for Tank V-1, V-2, and V-3 wastes

Radionuclide	Table 2 limit (Ci/m^3) Column 1	Column 2	V-2 Liquid (538 gal/HIC)
H-3	40	*	1.02E-01
Cs-137	1	44	1.35E-02
Sr-90	0.04	150	4.90E-03
Ni-63	3.5	70	4.48E-04
Co-60	700	*	1.30E-05
Class A Sum of Fractions:			0.14
Class B Sum of Fractions:			0.00
			ClassA*

*Note. No limits established for these radionuclides in Class B or C wastes. Practical considerations such as the effects of external radiation and internal heat generation on transportation, handling, and disposal will limit the concentrations for these wastes. These wastes shall be Classs B unless the concentrations of other nuclides in Table 2 determine the waste to be Class C independent of these nuclides.

20 of 105

Attachment 6

(DOT Spreadsheets for Tank V-3 used to calculate data for Option 3.)

Container ID # **INEEL Tank V-3 Solids (Total w/AVG)**

Constants	Units
3.70E+10	Bq/Ci
453.6	g/lb
1.00E-12	TBq/Bq or Ci/pCi
1000.00	g/kg
1.00E+09	nCi/Ci

Section I. Waste Stream Information

Container Type: N/A

Description: 652 gallons of Solids

Form#

PKE#

Note: assume solid phase volume of 652 gallons with density of 1.02 g/cc

Container Gross Wt (lb)	Container Gross Wt (kg)	Container Tare Wt (lb)	Container Tare Wt (kg)	Waste Net Wt (kg)	External Vol. (m3)	Est. Waste Vol. (m3)
5550.00	2517.48	0.00	0.00	2517.48	#N/A	2.468

Dose survey from Sxxxxx on xx/xx/00 shows < _____ mrem/hr OC.

Radioactive liquid effluents from hot cells, labs, and decon facilities at TAN and IETF.

Note: Gross weight of contents = (652 gal.)x(1.02 g/cc)x(3785.412 cc/gal.)x(2.2046E-03 lb/g) = 5,550.0 lbs.

EPA regulated hazardous COCs: Barium, Cadmium, Chromium, Lead, Mercury, Silver, VOCs, SVOCs, and PCBs.

Section II. List the radionuclides and activities; perform DOT RAM, RQ, LTD QTY, and Type A Packaging checks

Nuclide	Activity (Ci)	% of Total A2 Fraction	Activity (Bq)	Activity/gram (Bq/gram)	RQ limits (TBq)	RQ Ratios (amount/limit)	A2 Value (TBq)	LTD QTY Det. amount/(10-3)A2	Type A Pkg? (amount/A2)	DOT Fissile Mass (g)	TRU Conc. (nCi/g)	LSA-II Solids Frac	Activity/gram (pCi/g)
Sr-90	5.44E+01	5.61E+01	2.01E+12	8.00E+05	3.70E-03	5.44E+02	1.00E-01	2.01E+04	2.01E+01	0.00E+00	0.00E+00	8.00E-02	2.16E+07
Cs-137	1.91E+01	3.95E+00	7.08E+11	2.81E+05	3.70E-02	1.91E+01	5.00E-01	1.42E+03	1.42E+00	0.00E+00	0.00E+00	5.62E-03	7.60E+06
Ni-63	2.40E+00	8.26E-03	8.89E+10	3.53E+04	3.70E+00	2.40E-02	3.00E+01	2.96E+00	2.96E-03	0.00E+00	0.00E+00	1.18E-05	9.54E+05
Co-60	4.72E-01	1.22E-01	1.74E+10	6.93E+03	3.70E-01	4.72E-02	4.00E-01	4.36E+01	4.36E-02	0.00E+00	0.00E+00	1.73E-04	1.87E+05
Pu-241	1.72E-01	1.77E+00	6.35E+09	2.52E+03	3.70E-02	1.72E-01	1.00E-02	6.35E+02	6.35E-01	1.72E-03	0.00E+00	2.52E-03	6.82E+04
Eu-154	7.91E-02	1.63E-02	2.93E+09	1.16E+03	3.70E-01	7.91E-03	5.00E-01	5.85E+00	5.85E-03	0.00E+00	0.00E+00	2.33E-05	3.14E+04
Eu-152	4.61E-02	5.28E-03	1.70E+09	6.77E+02	3.70E-01	4.61E-03	9.00E-01	1.89E+00	1.89E-03	0.00E+00	0.00E+00	7.52E-06	1.83E+04
Ru-103	4.10E-02	4.70E-03	1.52E+09	6.03E+02	3.70E-01	4.10E-03	9.00E-01	1.69E+00	1.69E-03	0.00E+00	0.00E+00	6.70E-06	1.63E+04
Ce-144	3.40E-02	1.75E-02	1.26E+09	4.99E+02	3.70E-02	3.40E-02	2.00E-01	6.28E+00	6.28E-03	0.00E+00	0.00E+00	2.50E-05	1.35E+04
Pu-238	3.36E-02	1.73E+01	1.24E+09	4.94E+02	3.70E-04	3.36E+00	2.00E-04	6.21E+03	6.21E+00	1.98E-03	1.33E+01	2.47E-02	1.33E+04
Ru-106	3.35E-02	1.73E-02	1.24E+09	4.92E+02	3.70E-02	3.35E-02	2.00E-01	6.20E+00	6.20E-03	0.00E+00	0.00E+00	2.46E-05	1.33E+04
Am-241	1.80E-02	9.29E+00	6.67E+08	2.65E+02	3.70E-04	1.80E+00	2.00E-04	3.33E+03	3.33E+00	0.00E+00	7.16E+00	1.32E-02	7.16E+03
Pu-239	1.74E-02	8.95E+00	6.42E+08	2.55E+02	3.70E-04	1.74E+00	2.00E-04	3.21E+03	3.21E+00	2.80E-01	6.89E+00	1.28E-02	6.89E+03
Sb-125	1.35E-02	1.55E-03	4.99E+08	1.98E+02	3.70E-01	1.35E-03	9.00E-01	5.55E-01	5.55E-04	0.00E+00	0.00E+00	2.20E-06	5.36E+03
Eu-155	1.08E-02	5.58E-04	4.01E+08	1.59E+02	3.70E-01	1.08E-03	2.00E+00	2.00E-01	2.00E-04	0.00E+00	0.00E+00	7.96E-07	4.30E+03
Zr-95	9.27E-03	1.06E-03	3.43E+08	1.36E+02	3.70E-01	9.27E-04	9.00E-01	3.81E-01	3.81E-04	0.00E+00	0.00E+00	1.51E-06	3.68E+03
Nb-95	8.04E-03	8.29E-04	2.97E+08	1.18E+02	3.70E-01	8.04E-04	1.00E+00	2.97E-01	2.97E-04	0.00E+00	0.00E+00	1.18E-06	3.19E+03
Ra-226	7.34E-03	3.78E-02	2.71E+08	1.08E+02	3.70E-03	7.34E-02	2.00E-02	1.36E+01	1.36E-02	0.00E+00	0.00E+00	5.39E-05	2.91E+03
U-233	5.62E-03	5.79E-01	2.08E+08	8.26E+01	3.70E-03	5.62E-02	1.00E-03	2.08E+02	2.08E-01	5.79E-01	0.00E+00	8.26E-04	2.23E+03
Cm-243	5.07E-03	1.74E+00	1.87E+08	7.44E+01	3.70E-04	5.07E-01	3.00E-04	6.25E+02	6.25E-01	0.00E+00	2.01E+00	2.48E-03	2.01E+03
Ag-110m	4.28E-03	1.10E-03	1.58E+08	6.29E+01	3.70E-01	4.28E-04	4.00E-01	3.96E-01	3.96E-04	0.00E+00	0.00E+00	1.57E-06	1.70E+03
Co-58	4.24E-03	4.37E-04	1.57E+08	6.23E+01	3.70E-01	4.24E-04	1.00E+00	1.57E-01	1.57E-04	0.00E+00	0.00E+00	6.23E-07	1.68E+03
Cs-134	3.82E-03	7.87E-04	1.41E+08	5.61E+01	3.70E-02	3.82E-03	5.00E-01	2.82E-01	2.82E-04	0.00E+00	0.00E+00	1.12E-06	1.52E+03
Zn-65	3.74E-03	1.93E-04	1.38E+08	5.50E+01	3.70E-01	3.74E-04	2.00E+00	6.92E-02	6.92E-05	0.00E+00	0.00E+00	2.75E-07	1.49E+03
Ag-108m	2.39E-03	4.11E-04	8.85E+07	3.51E+01	3.70E-01	2.39E-04	6.00E-01	1.47E-01	1.47E-04	0.00E+00	0.00E+00	5.86E-07	9.50E+02
Mn-54	1.51E-03	1.55E-04	5.58E+07	2.22E+01	3.70E-01	1.51E-04	1.00E+00	5.58E-02	5.58E-05	0.00E+00	0.00E+00	2.22E-07	5.99E+02
U-235	1.83E-04	0.00E+00	6.79E+06	2.70E+00	3.70E-03	1.83E-03	Unlimited	0.00E+00	0.00E+00	8.34E+01	0.00E+00	0.00E+00	7.29E+01
I-129	1.77E-04	0.00E+00	6.55E+06	2.60E+00	3.70E-05	1.77E-01	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.03E+01
U-238	1.71E-04	0.00E+00	6.35E+06	2.52E+00	3.70E-03	1.71E-03	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.81E+01
Th-234	1.71E-04	8.84E-05	6.35E+06	2.52E+00	3.70E+00	1.71E-06	2.00E-01	3.17E-02	3.17E-05	0.00E+00	0.00E+00	1.26E-07	6.81E+01
Cm-242	1.21E-04	1.25E-03	4.47E+06	1.78E+00	3.70E-02	1.21E-04	1.00E-02	4.47E-01	4.47E-04	0.00E+00	0.00E+00	1.78E-06	4.80E+01
Np-237	7.46E-05	3.84E-02	2.76E+06	1.10E+00	3.70E-04	7.46E-03	2.00E-04	1.38E+01	1.38E-02	0.00E+00	2.96E-02	5.48E-05	2.96E+01
Pa-233	7.46E-05	8.54E-06	2.76E+06	1.10E+00	3.70E+00	7.46E-07	9.00E-01	3.07E-03	3.07E-06	0.00E+00	0.00E+00	1.22E-08	2.96E+01
Total	7.70E+01	100.00%	2.85E+12	1.13E+06		5.72E+02		3.59E+04	3.59E+01	8.43E+01	2.94E+01	1.43E-01	3.06E+07

DOT regulated as Hazard Class 7 Radioactive Material

Contains a Reportable Quantity of a Hazardous Substance; use 'RQ(radionuclides)' as part of PSN

≥ Type A quantity; requires Type B Packaging

Does NOT meet LTD QTY Exception; Check if LSA

Meets Low Specific Activity (LSA)-II material - Check <Type A quantity and use Radioactive material, LSA, n.o.s. as PSN

>15 grams Fissile Material - use Radioactive material, fissile material, n.o.s. as PSN

This is a Low-level waste

Performed by: Gordon Harris Date: 9/25/01

Reviewed by: _____ Date: _____

72 of 105

Section III: Check radionuclides for listing on labels and shipping papers; Check reportable radionuclides per Disposal Facility

Nuclide	Activity (Ci)	% of Total A2 Fraction	Cumulative A2 Fraction
Sr-90	5.44E+01	5.61E+01	5.61E+01
Pu-238	3.36E-02	1.73E+01	7.34E+01
Am-241	1.80E-02	9.29E+00	8.27E+01
Pu-239	1.74E-02	8.95E+00	9.17E+01
Cs-137	1.91E+01	3.95E+00	9.56E+01
Pu-241	1.72E-01	1.77E+00	9.74E+01
Cm-243	5.07E-03	1.74E+00	9.91E+01
U-233	5.62E-03	5.79E-01	9.97E+01
Co-60	4.72E-01	1.22E-01	9.98E+01
Np-237	7.46E-05	3.84E-02	9.99E+01
Ra-226	7.34E-03	3.78E-02	9.99E+01
Ce-144	3.40E-02	1.75E-02	9.99E+01
Ru-106	3.35E-02	1.73E-02	1.00E+02
Eu-154	7.91E-02	1.63E-02	1.00E+02
Ni-63	2.40E+00	8.26E-03	1.00E+02
Eu-152	4.61E-02	5.28E-03	1.00E+02
Ru-103	4.10E-02	4.70E-03	1.00E+02
Sb-125	1.35E-02	1.55E-03	1.00E+02
Cm-242	1.21E-04	1.25E-03	1.00E+02
Ag-110m	4.28E-03	1.10E-03	1.00E+02
Zr-95	9.27E-03	1.06E-03	1.00E+02
Nb-95	8.04E-03	8.29E-04	1.00E+02
Cs-134	3.82E-03	7.87E-04	1.00E+02
Eu-155	1.08E-02	5.58E-04	1.00E+02
Co-58	4.24E-03	4.37E-04	1.00E+02
Ag-108m	2.39E-03	4.11E-04	1.00E+02
Zn-65	3.74E-03	1.93E-04	1.00E+02
Mn-54	1.51E-03	1.55E-04	1.00E+02
Th-234	1.71E-04	8.84E-05	1.00E+02
Pa-233	7.46E-05	8.54E-06	1.00E+02
U-235	1.83E-04	0.00E+00	1.00E+02
I-129	1.77E-04	0.00E+00	1.00E+02
U-238	1.71E-04	0.00E+00	1.00E+02

Nuclide	Activity (Ci)	% of Total Activity	Source Material (kg)	SNM (g)	Activity Conc. (Ci/m^3)
Sr-90	5.44E+01	7.07E+01	Not applicable	Not applicable	2.21E+01
Cs-137	1.91E+01	2.48E+01	Not applicable	Not applicable	7.75E+00
Ni-63	2.40E+00	3.12E+00	Not applicable	Not applicable	9.73E-01
Co-60	4.72E-01	6.12E-01	Not applicable	Not applicable	1.91E-01
Pu-241	1.72E-01	2.23E-01	Not applicable	1.72E-03	6.95E-02
Eu-154	7.91E-02	1.03E-01	Not applicable	Not applicable	3.20E-02
Eu-152	4.61E-02	5.98E-02	Not applicable	Not applicable	1.87E-02
Ru-103	4.10E-02	5.33E-02	Not applicable	Not applicable	1.66E-02
Ce-144	3.40E-02	4.41E-02	Not applicable	Not applicable	1.38E-02
Pu-238	3.36E-02	4.36E-02	Not applicable	1.98E-03	1.36E-02
Ru-106	3.35E-02	4.35E-02	Not applicable	Not applicable	1.36E-02
Am-241	1.80E-02	2.34E-02	Not applicable	Not applicable	7.30E-03
Pu-239	1.74E-02	2.25E-02	Not applicable	2.80E-01	7.03E-03
Sb-125	1.35E-02	1.75E-02	Not applicable	Not applicable	5.47E-03
Eu-155	1.08E-02	1.41E-02	Not applicable	Not applicable	4.39E-03
Zr-95	9.27E-03	1.20E-02	Not applicable	Not applicable	3.76E-03
Nb-95	8.04E-03	1.04E-02	Not applicable	Not applicable	3.26E-03
Ra-226	7.34E-03	9.53E-03	Not applicable	Not applicable	2.97E-03
U-233	5.62E-03	7.30E-03	Not applicable	5.79E-01	2.28E-03
Cm-243	5.07E-03	6.58E-03	Not applicable	Not applicable	2.05E-03
Ag-110m	4.28E-03	5.56E-03	Not applicable	Not applicable	1.73E-03
Co-58	4.24E-03	5.50E-03	Not applicable	Not applicable	1.72E-03
Cs-134	3.82E-03	4.96E-03	Not applicable	Not applicable	1.55E-03
Zn-65	3.74E-03	4.86E-03	Not applicable	Not applicable	1.52E-03
Ag-108m	2.39E-03	3.11E-03	Not applicable	Not applicable	9.69E-04
Mn-54	1.51E-03	1.96E-03	Not applicable	Not applicable	6.11E-04
U-235	1.83E-04	2.38E-04	Not applicable	8.34E+01	7.43E-05
I-129	1.77E-04	2.30E-04	Not applicable	Not applicable	7.17E-05
U-238	1.71E-04	2.23E-04	Not applicable	Not applicable	6.95E-05
Th-234	1.71E-04	2.23E-04	Not applicable	Not applicable	6.95E-05
Cm-242	1.21E-04	1.57E-04	Not applicable	Not applicable	4.89E-05
Np-237	7.46E-05	9.69E-05	Not applicable	Not applicable	3.02E-05
Pa-233	7.46E-05	9.69E-05	Not applicable	Not applicable	3.02E-05

If #DIV/0! occurs in the Fraction of Waste Profile Column or the Does Nuclide Meet Waste Profile? Column of Section III, the nuclide is not included on the current profile and needs to be added.

Waste Classification Determination for near surface disposal per 10 CFR §61.55

Assume that Sr-90, Cs-137, and Ni-63 are major nuclides driving waste classification determination for Tank V-1, V-2, and V-3 wastes

Radionuclide	Table 2 limit (Ci/m^3) Column 1	Column 2	V-3 All Sludge AVG
Sr-90	0.04	150	2.21E+01
Cs-137	1	44	7.75E+00
Ni-63	3.5	70	9.73E-01

Class A Sum of Fractions: 559.41

Class B Sum of Fractions: 0.34

ClassB

73 of 105

Container ID # **INEEL Tank V-3 Solids (50.2 gal per drum using AVG)**

Constants	Units
3.70E+10	Bq/Ci
453.6	g/lb
1.00E-12	TBq/Bq or Ci/pCi
1000.00	g/kg
1.00E+09	nCi/Ci

Section I. Waste Stream Information

Container Type: 55 Gallon Metal OH

Description: 50.2 gallons of Solids

Form#

PKE#

Note: assume solid phase volume of 50.2 gallons with density of 1.02 g/cc (91.3% of capacity)

Container Gross Wt (lb)	Container Gross Wt (kg)	Container Tare Wt (lb)	Container Tare Wt (kg)	Waste Net Wt (kg)	External Vol. (m3)	Est. Waste Vol. (m3)
477.30	216.50	50.00	22.68	193.82	0.261	0.190

Note: Gross weight of contents = (50.2 gal.)x(1.02 g/cc)x(3785.412 cc/gal.)x(2.2046E-03 lb/g) = 427.3 lbs.

Dose survey from Sxxxxx on xx/xx/00 shows < [ ] mrem/hr OC.

Radioactive liquid effluents from hot cells, labs, and decon facilities at TAN and IETF.

EPA regulated hazardous COCs: Barium, Cadmium, Chromium, Lead, Mercury, Silver, VOCs, SVOCs, and PCBs.

Section II. List the radionuclides and activities; perform DOT RAM, RQ, LTD QTY, and Type A Packaging checks

Nuclide	Activity (Ci)	% of Total A2 Fraction	Activity (Bq)	Activity/gram (Bq/gram)	RQ limits (TBq)	RQ Ratios (amount/limit)	A2 Value (TBq)	LTD QTY Det. (amount/(10-3)A2	Type A Pkg? (amount/A2)	DOT Fissile Mass (g)	TRU Conc (nCi/g)	LSA-II Solids Frac	Activity/gram (pCi/g)
Sr-90	4.19E+00	5.61E+01	1.55E+11	7.99E+05	3.70E-03	4.19E+01	1.00E-01	1.55E+03	1.55E+00	0.00E+00	0.00E+00	7.99E-02	2.16E+07
Cs-137	1.47E+00	3.95E+00	5.44E+10	2.81E+05	3.70E-02	1.47E+00	5.00E-01	1.09E+02	1.09E-01	0.00E+00	0.00E+00	5.62E-03	7.59E+06
Ni-63	1.85E-01	8.26E-03	6.83E+09	3.53E+04	3.70E+00	1.85E-03	3.00E+01	2.28E-01	2.28E-04	0.00E+00	0.00E+00	1.18E-05	9.53E+05
Co-60	3.63E-02	1.22E-01	1.34E+09	6.92E+03	3.70E-01	3.63E-03	4.00E-01	3.35E+00	3.35E-03	0.00E+00	0.00E+00	1.73E-04	1.87E+05
Pu-241	1.32E-02	1.77E+00	4.88E+08	2.52E+03	3.70E-02	1.32E-02	1.00E-02	4.88E+01	4.88E-02	1.32E-04	0.00E+00	2.52E-03	6.81E+04
Eu-154	6.08E-03	1.63E-02	2.25E+08	1.16E+03	3.70E-01	6.08E-04	5.00E-01	4.50E-01	4.50E-04	0.00E+00	0.00E+00	2.32E-05	3.14E+04
Eu-152	3.54E-03	5.28E-03	1.31E+08	6.76E+02	3.70E-01	3.54E-04	9.00E-01	1.46E-01	1.46E-04	0.00E+00	0.00E+00	7.51E-06	1.83E+04
Ru-103	3.16E-03	4.70E-03	1.17E+08	6.02E+02	3.70E-01	3.16E-04	9.00E-01	1.30E-01	1.30E-04	0.00E+00	0.00E+00	6.69E-06	1.63E+04
Ce-144	2.61E-03	1.75E-02	9.66E+07	4.99E+02	3.70E-02	2.61E-03	2.00E-01	4.83E-01	4.83E-04	0.00E+00	0.00E+00	2.49E-05	1.35E+04
Pu-238	2.58E-03	1.73E+01	9.56E+07	4.93E+02	3.70E-04	2.58E-01	2.00E-04	4.78E+02	4.78E-01	1.52E-04	1.33E+01	2.46E-02	1.33E+04
Ru-106	2.58E-03	1.73E-02	9.53E+07	4.92E+02	3.70E-02	2.58E-03	2.00E-01	4.77E-01	4.77E-04	0.00E+00	0.00E+00	2.46E-05	1.33E+04
Am-241	1.39E-03	9.29E+00	5.13E+07	2.65E+02	3.70E-04	1.39E-01	2.00E-04	2.56E+02	2.56E-01	0.00E+00	7.15E+00	1.32E-02	7.15E+03
Pu-239	1.33E-03	8.95E+00	4.94E+07	2.55E+02	3.70E-04	1.33E-01	2.00E-04	2.47E+02	2.47E-01	2.15E-02	6.88E+00	1.27E-02	6.88E+03
Sb-125	1.04E-03	1.55E-03	3.84E+07	1.98E+02	3.70E-01	1.04E-04	9.00E-01	4.27E-02	4.27E-05	0.00E+00	0.00E+00	2.20E-06	5.36E+03
Eu-155	8.33E-04	5.58E-04	3.08E+07	1.59E+02	3.70E-01	8.33E-05	2.00E+00	1.54E-02	1.54E-05	0.00E+00	0.00E+00	7.95E-07	4.30E+03
Zr-95	7.13E-04	1.06E-03	2.64E+07	1.36E+02	3.70E-01	7.13E-05	9.00E-01	2.93E-02	2.93E-05	0.00E+00	0.00E+00	1.51E-06	3.68E+03
Nb-95	6.18E-04	8.29E-04	2.29E+07	1.18E+02	3.70E-01	6.18E-05	1.00E+00	2.29E-02	2.29E-05	0.00E+00	0.00E+00	1.18E-06	3.19E+03
Ra-226	5.64E-04	3.78E-02	2.09E+07	1.08E+02	3.70E-03	5.64E-03	2.00E-02	1.04E+00	1.04E-03	0.00E+00	0.00E+00	5.39E-05	2.91E+03
U-233	4.32E-04	5.79E-01	1.60E+07	8.25E+01	3.70E-03	4.32E-03	1.00E-03	1.60E+01	1.60E-02	4.45E-02	0.00E+00	8.25E-04	2.23E+03
Cm-243	3.90E-04	1.74E+00	1.44E+07	7.44E+01	3.70E-04	3.90E-02	3.00E-04	4.80E+01	4.80E-02	0.00E+00	2.01E+00	2.48E-03	2.01E+03
Ag-110m	3.29E-04	1.10E-03	1.22E+07	6.28E+01	3.70E-01	3.29E-05	4.00E-01	3.04E-02	3.04E-05	0.00E+00	0.00E+00	1.57E-06	1.70E+03
Co-58	3.26E-04	4.37E-04	1.21E+07	6.22E+01	3.70E-01	3.26E-05	1.00E+00	1.21E-02	1.21E-05	0.00E+00	0.00E+00	6.22E-07	1.68E+03
Cs-134	2.93E-04	7.87E-04	1.09E+07	5.60E+01	3.70E-02	2.93E-04	5.00E-01	2.17E-02	2.17E-05	0.00E+00	0.00E+00	1.12E-06	1.51E+03
Zn-65	2.88E-04	1.93E-04	1.06E+07	5.49E+01	3.70E-01	2.88E-05	2.00E+00	5.32E-03	5.32E-06	0.00E+00	0.00E+00	2.75E-07	1.48E+03
Ag-108m	1.84E-04	4.11E-04	6.80E+06	3.51E+01	3.70E-01	1.84E-05	6.00E-01	1.13E-02	1.13E-05	0.00E+00	0.00E+00	5.85E-07	9.49E+02
Mn-54	1.16E-04	1.55E-04	4.29E+06	2.21E+01	3.70E-01	1.16E-05	1.00E+00	4.29E-03	4.29E-06	0.00E+00	0.00E+00	2.21E-07	5.98E+02
U-235	1.41E-05	0.00E+00	5.22E+05	2.69E+00	3.70E-03	1.41E-04	Unlimited	0.00E+00	0.00E+00	6.41E+00	0.00E+00	0.00E+00	7.28E+01
I-129	1.36E-05	0.00E+00	5.04E+05	2.60E+00	3.70E-05	1.36E-02	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.02E+01
U-238	1.32E-05	0.00E+00	4.88E+05	2.52E+00	3.70E-03	1.32E-04	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.80E+01
Th-234	1.32E-05	8.84E-05	4.88E+05	2.52E+00	3.70E+00	1.32E-07	2.00E-01	2.44E-03	2.44E-06	0.00E+00	0.00E+00	1.26E-07	6.80E+01
Cm-242	9.29E-06	1.25E-03	3.44E+05	1.77E+00	3.70E-02	9.29E-06	1.00E-02	3.44E-02	3.44E-05	0.00E+00	0.00E+00	1.77E-06	4.79E+01
Np-237	5.73E-06	3.84E-02	2.12E+05	1.09E+00	3.70E-04	5.73E-04	2.00E-04	1.06E+00	1.06E-03	0.00E+00	2.96E-02	5.47E-05	2.96E+01
Pa-233	5.73E-06	8.54E-06	2.12E+05	1.09E+00	3.70E+00	5.73E-08	9.00E-01	2.36E-04	2.36E-07	0.00E+00	0.00E+00	1.22E-08	2.96E+01
Total	5.92E+00	100.00%	2.19E+11	1.13E+06		4.39E+01		2.76E+03	2.76E+00	6.48E+00	2.94E+01	1.42E-01	3.05E+07

DOT regulated as Hazard Class 7 Radioactive Material

Contains a Reportable Quantity of a Hazardous Substance; use 'RQ(radionuclides)' as part of PSN

≥ Type A quantity; requires Type B Packaging

Does NOT meet LTD QTY Exception; Check if LSA

Meets Low Specific Activity (LSA)-II material - Check <Type A quantity and use Radioactive material, LSA, n.o.s. as PSN

Meets criteria for Fissile Excepted Package per 49 CFR 173.453

This is a Low-level waste

Performed by: [signature] Date: 9/25/01

Reviewed by: _____ Date: _____

74 of 105

Section III: Check radionuclides for listing on labels and shipping papers; Check reportable radionuclides per Disposal Facility

Nuclide	Activity (Ci)	% of Total A2 Fraction	Cumulative A2 Fraction
Sr-90	4.19E+00	5.61E+01	5.61E+01
Pu-238	2.58E-03	1.73E+01	7.34E+01
Am-241	1.39E-03	9.29E+00	8.27E+01
Pu-239	1.33E-03	8.95E+00	9.17E+01
Cs-137	1.47E+00	3.95E+00	9.56E+01
Pu-241	1.32E-02	1.77E+00	9.74E+01
Cm-243	3.90E-04	1.74E+00	9.91E+01
U-233	4.32E-04	5.79E-01	9.97E+01
Co-60	3.63E-02	1.22E-01	9.98E+01
Np-237	5.73E-06	3.84E-02	9.99E+01
Ra-226	5.64E-04	3.78E-02	9.99E+01
Ce-144	2.61E-03	1.75E-02	9.99E+01
Ru-106	2.58E-03	1.73E-02	1.00E+02
Eu-154	6.08E-03	1.63E-02	1.00E+02
Ni-63	1.85E-01	8.26E-03	1.00E+02
Eu-152	3.54E-03	5.28E-03	1.00E+02
Ru-103	3.16E-03	4.70E-03	1.00E+02
Sb-125	1.04E-03	1.55E-03	1.00E+02
Cm-242	9.29E-06	1.25E-03	1.00E+02
Ag-110m	3.29E-04	1.10E-03	1.00E+02
Zr-95	7.13E-04	1.06E-03	1.00E+02
Nb-95	6.18E-04	8.29E-04	1.00E+02
Cs-134	2.93E-04	7.87E-04	1.00E+02
Eu-155	8.33E-04	5.58E-04	1.00E+02
Co-58	3.26E-04	4.37E-04	1.00E+02
Ag-108m	1.84E-04	4.11E-04	1.00E+02
Zn-65	2.88E-04	1.93E-04	1.00E+02
Mn-54	1.16E-04	1.55E-04	1.00E+02
Th-234	1.32E-05	8.84E-05	1.00E+02
Pa-233	5.73E-06	8.54E-06	1.00E+02
U-235	1.41E-05	0.00E+00	1.00E+02
I-129	1.36E-05	0.00E+00	1.00E+02
U-238	1.32E-05	0.00E+00	1.00E+02

Nuclide	Activity (Ci)	% of Total Activity	Source Material (kg)	SNM (g)	Activity Conc. (Ci/m^3)
Sr-90	4.19E+00	7.07E+01	Not applicable	Not applicable	2.20E+01
Cs-137	1.47E+00	2.48E+01	Not applicable	Not applicable	7.74E+00
Ni-63	1.85E-01	3.12E+00	Not applicable	Not applicable	9.72E-01
Co-60	3.63E-02	6.12E-01	Not applicable	Not applicable	1.91E-01
Pu-241	1.32E-02	2.23E-01	Not applicable	1.32E-04	6.95E-02
Eu-154	6.08E-03	1.03E-01	Not applicable	Not applicable	3.20E-02
Eu-152	3.54E-03	5.98E-02	Not applicable	Not applicable	1.86E-02
Ru-103	3.16E-03	5.33E-02	Not applicable	Not applicable	1.66E-02
Ce-144	2.61E-03	4.41E-02	Not applicable	Not applicable	1.37E-02
Pu-238	2.58E-03	4.36E-02	Not applicable	1.52E-04	1.36E-02
Ru-106	2.58E-03	4.35E-02	Not applicable	Not applicable	1.36E-02
Am-241	1.39E-03	2.34E-02	Not applicable	Not applicable	7.30E-03
Pu-239	1.33E-03	2.25E-02	Not applicable	2.15E-02	7.02E-03
Sb-125	1.04E-03	1.75E-02	Not applicable	Not applicable	5.46E-03
Eu-155	8.33E-04	1.41E-02	Not applicable	Not applicable	4.38E-03
Zr-95	7.13E-04	1.20E-02	Not applicable	Not applicable	3.75E-03
Nb-95	6.18E-04	1.04E-02	Not applicable	Not applicable	3.25E-03
Ra-226	5.64E-04	9.53E-03	Not applicable	Not applicable	2.97E-03
U-233	4.32E-04	7.30E-03	Not applicable	4.45E-02	2.27E-03
Cm-243	3.90E-04	6.58E-03	Not applicable	Not applicable	2.05E-03
Ag-110m	3.29E-04	5.56E-03	Not applicable	Not applicable	1.73E-03
Co-58	3.26E-04	5.50E-03	Not applicable	Not applicable	1.71E-03
Cs-134	2.93E-04	4.96E-03	Not applicable	Not applicable	1.54E-03
Zn-65	2.88E-04	4.86E-03	Not applicable	Not applicable	1.51E-03
Ag-108m	1.84E-04	3.11E-03	Not applicable	Not applicable	9.68E-04
Mn-54	1.16E-04	1.96E-03	Not applicable	Not applicable	6.10E-04
U-235	1.41E-05	2.38E-04	Not applicable	6.41E+00	7.43E-05
I-129	1.36E-05	2.30E-04	Not applicable	Not applicable	7.16E-05
U-238	1.32E-05	2.23E-04	Not applicable	Not applicable	6.94E-05
Th-234	1.32E-05	2.23E-04	Not applicable	Not applicable	6.94E-05
Cm-242	9.29E-06	1.57E-04	Not applicable	Not applicable	4.89E-05
Np-237	5.73E-06	9.69E-05	Not applicable	Not applicable	3.02E-05
Pa-233	5.73E-06	9.69E-05	Not applicable	Not applicable	3.02E-05

If #DIV/0! occurs in the Fraction of Waste Profile Column or the Does Nuclide Meet Waste Profile? Column of Section III, the nuclide is not included on the current profile and needs to be added.

Waste Classification Determination for near surface disposal per 10 CFR §61.55

Assume that Sr-90, Cs-137, and Ni-63 are major nuclides driving waste classification determination for Tank V-1, V-2, and V-3 wastes

Radionuclide	Table 2 limit (Ci/m^3) Column 1	Column 2	V-3 Sludge(50.2 gal/drum w/AVG)
Cs-137	1	44	7.74E+00
Sr-90	0.04	150	2.20E+01
Ni-63	3.5	70	9.72E-01

Class A Sum of Fractions: 558.79

Class B Sum of Fractions: 0.34

ClassB

75 of 105

Container ID # **INEEL Tank V-3 Solids (Total w/MAX)**

Constants	Units
3.70E+10	Bq/Ci
453.6	g/lb
1.00E-12	TBq/Bq or Ci/pCi
1000.00	g/kg
1.00E+09	nCi/Ci

Section I. Waste Stream Information

Container Type: N/A

Description: 652 gallons of Solids

Form#

PKE#

Note: assume solid phase volume of 652 gallons with density of 1.02 g/cc

Container Gross Wt (lb)	Container Gross Wt (kg)	Container Tare Wt (lb)	Container Tare Wt (kg)	Waste Net Wt (kg)	External Vol. (m3)	Est. Waste Vol (m3)
5550.00	2517.48	0.00	0.00	2517.48	#N/A	2.468

Note: Gross weight of contents = (652 gal.)x(1.02 g/cc)x(3785.412 cc/gal.)x(2.2046E-03 lb/g) = 5,550.0 lbs.

Dose survey from Sxxxxx on xx/xx/00 shows < _____ mrem/hr OC.

Radioactive liquid effluents from hot cells, labs, and decon facilities at TAN and IETF.

EPA regulated hazardous COCs: Barium, Cadmium, Chromium, Lead, Mercury, Silver, VOCs, SVOCs, and PCBs.

Section II. List the radionuclides and activities; perform DOT RAM, RQ, LTD QTY, and Type A Packaging checks

Nuclide	Activity (Ci)	% of Total A2 Fraction	Activity (Bq)	Activity/gram (Bq/gram)	RQ limits (TBq)	RQ Ratios (amount/limit)	A2 Value (TBq)	LTD QTY Det. (amount/(10-3)A2	Type A Pkg? (amount/A2)	DOT Fissile Mass (g)	TRU Conc. (nCi/g)	LSA-II Solids Frac	Activity/gram (pCi/g)
Sr-90	1.12E+02	6.58E+01	4.14E+12	1.65E+06	3.70E-03	1.12E+03	1.00E-01	4.14E+04	4.14E+01	0.00E+00	0.00E+00	1.65E-01	4.45E+07
Cs-137	2.28E+01	2.68E+00	8.43E+11	3.35E+05	3.70E-02	2.28E+01	5.00E-01	1.69E+03	1.69E+00	0.00E+00	0.00E+00	6.70E-03	9.05E+06
Ni-63	4.46E+00	8.72E-03	1.65E+11	6.55E+04	3.70E+00	4.46E-02	3.00E+01	5.50E+00	5.50E-03	0.00E+00	0.00E+00	2.18E-05	1.77E+06
Co-60	8.08E-01	1.19E-01	2.99E+10	1.19E+04	3.70E-01	8.08E-02	4.00E-01	7.47E+01	7.47E-02	0.00E+00	0.00E+00	2.97E-04	3.21E+05
Pu-241	2.76E-01	1.62E+00	1.02E+10	4.05E+03	3.70E-02	2.76E-01	1.00E-02	1.02E+03	1.02E+00	2.76E-03	0.00E+00	4.05E-03	1.09E+05
Eu-154	9.54E-02	1.12E-02	3.53E+09	1.40E+03	3.70E-01	9.54E-03	5.00E-01	7.06E+00	7.06E-03	0.00E+00	0.00E+00	2.80E-05	3.79E+04
Eu-152	7.38E-02	4.81E-03	2.73E+09	1.08E+03	3.70E-01	7.38E-03	9.00E-01	3.03E+00	3.03E-03	0.00E+00	0.00E+00	1.20E-05	2.93E+04
Ce-144	6.44E-02	1.89E-02	2.38E+09	9.47E+02	3.70E-02	6.44E-02	2.00E-01	1.19E+01	1.19E-02	0.00E+00	0.00E+00	4.74E-05	2.56E+04
Ru-103	6.37E-02	4.16E-03	2.36E+09	9.36E+02	3.70E-01	6.37E-03	9.00E-01	2.62E+00	2.62E-03	0.00E+00	0.00E+00	1.04E-05	2.53E+04
Ru-106	4.51E-02	1.32E-02	1.67E+09	6.62E+02	3.70E-02	4.51E-02	2.00E-01	8.34E+00	8.34E-03	0.00E+00	0.00E+00	3.31E-05	1.79E+04
Pu-238	3.85E-02	1.13E+01	1.43E+09	5.66E+02	3.70E-04	3.85E+00	2.00E-04	7.13E+03	7.13E+00	2.27E-03	1.53E+01	2.83E-02	1.53E+04
Am-241	2.90E-02	8.50E+00	1.07E+09	4.25E+02	3.70E-04	2.90E+00	2.00E-04	5.36E+03	5.36E+00	0.00E+00	1.15E+01	2.13E-02	1.15E+04
Pu-239	2.52E-02	7.39E+00	9.31E+08	3.70E+02	3.70E-04	2.52E+00	2.00E-04	4.66E+03	4.66E+00	4.06E-01	1.00E+01	1.85E-02	1.00E+04
Nb-95	2.39E-02	1.40E-03	8.83E+08	3.51E+02	3.70E-01	2.39E-03	1.00E+00	8.83E-01	8.83E-04	0.00E+00	0.00E+00	3.51E-06	9.48E+03
Sb-125	2.09E-02	1.36E-03	7.73E+08	3.07E+02	3.70E-01	2.09E-03	9.00E-01	8.59E-01	8.59E-04	0.00E+00	0.00E+00	3.41E-06	8.30E+03
Ra-226	2.08E-02	6.11E-02	7.69E+08	3.06E+02	3.70E-03	2.08E-01	2.00E-02	3.85E+01	3.85E-02	0.00E+00	0.00E+00	1.53E-04	8.26E+03
Zr-95	1.72E-02	1.13E-03	6.38E+08	2.53E+02	3.70E-01	1.72E-03	9.00E-01	7.09E-01	7.09E-04	0.00E+00	0.00E+00	2.82E-06	6.85E+03
Eu-155	1.36E-02	4.01E-04	5.05E+08	2.01E+02	3.70E-01	1.36E-03	2.00E+00	2.52E-01	2.52E-04	0.00E+00	0.00E+00	1.00E-06	5.42E+03
U-233	1.02E-02	6.00E-01	3.78E+08	1.50E+02	3.70E-03	1.02E-01	1.00E-03	3.78E+02	3.78E-01	1.05E+00	0.00E+00	1.50E-03	4.06E+03
Cm-243	9.29E-03	1.82E+00	3.44E+08	1.37E+02	3.70E-04	9.29E-01	3.00E-04	1.15E+03	1.15E+00	0.00E+00	3.69E+00	4.55E-03	3.69E+03
Cs-134	6.65E-03	7.81E-04	2.46E+08	9.77E+01	3.70E-02	6.65E-03	5.00E-01	4.92E-01	4.92E-04	0.00E+00	0.00E+00	1.95E-06	2.64E+03
Ag-110m	6.57E-03	9.65E-04	2.43E+08	9.66E+01	3.70E-01	6.57E-04	4.00E-01	6.08E-01	6.08E-04	0.00E+00	0.00E+00	2.41E-06	2.61E+03
Co-58	5.92E-03	3.47E-04	2.19E+08	8.69E+01	3.70E-01	5.92E-04	1.00E+00	2.19E-01	2.19E-04	0.00E+00	0.00E+00	8.69E-07	2.35E+03
Zn-65	4.51E-03	1.32E-04	1.67E+08	6.62E+01	3.70E-01	4.51E-04	2.00E+00	8.34E-02	8.34E-05	0.00E+00	0.00E+00	3.31E-07	1.79E+03
Ag-108m	3.42E-03	3.35E-04	1.27E+08	5.03E+01	3.70E-01	3.42E-04	6.00E-01	2.11E-01	2.11E-04	0.00E+00	0.00E+00	8.39E-07	1.36E+03
Mn-54	2.05E-03	1.20E-04	7.59E+07	3.02E+01	3.70E-01	2.05E-04	1.00E+00	7.59E-02	7.59E-05	0.00E+00	0.00E+00	3.02E-07	8.15E+02
U-235	3.22E-04	0.00E+00	1.19E+07	4.74E+00	3.70E-03	3.22E-03	Unlimited	0.00E+00	0.00E+00	1.46E+02	0.00E+00	0.00E+00	1.28E+02
I-129	2.72E-04	0.00E+00	1.01E+07	4.00E+00	3.70E-05	2.72E-01	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.08E+02
U-238	2.14E-04	0.00E+00	7.92E+06	3.14E+00	3.70E-03	2.14E-03	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.50E+01
Th-234	2.14E-04	6.28E-05	7.92E+06	3.14E+00	3.70E+00	2.14E-06	2.00E-01	3.96E-02	3.96E-05	0.00E+00	0.00E+00	1.57E-07	8.50E+01
Cm-242	2.10E-04	1.24E-03	7.79E+06	3.09E+00	3.70E-02	2.10E-04	1.00E-02	7.79E-01	7.79E-04	0.00E+00	0.00E+00	3.09E-06	8.36E+01
Np-237	1.45E-04	4.25E-02	5.36E+06	2.13E+00	3.70E-04	1.45E-02	2.00E-04	2.68E+01	2.68E-02	0.00E+00	5.75E-02	1.06E-04	5.75E+01
Pa-233	1.45E-04	9.45E-06	5.36E+06	2.13E+00	3.70E+00	1.45E-06	9.00E-01	5.95E-03	5.95E-06	0.00E+00	0.00E+00	2.36E-08	5.75E+01
Total	1.41E+02	100.00%	5.21E+12	2.07E+06		1.15E+03		6.30E+04	6.30E+01	1.48E+02	4.05E+01	2.50E-01	5.60E+07

DOT regulated as Hazard Class 7 Radioactive Material

Contains a Reportable Quantity of a Hazardous Substance; use 'RQ(radionuclides)' as part of PSN

≥ Type A quantity; requires Type B Packaging

Does NOT meet LTD QTY Exception; Check if LSA

Meets Low Specific Activity (LSA)-II material - Check <Type A quantity and use Radioactive material, LSA, n.o.s. as PSN

>15 grams Fissile Material - use Radioactive material, fissile material, n.o.s. as PSN

This is a Low-level waste

Performed by: Gordon Harris Date: 9/25/01

Reviewed by: _____ Date: _____

76 7105

Section III: Check radionuclides for listing on labels and shipping papers; Check reportable radionuclides per Disposal Facility

Nuclide	Activity (Ci)	% of Total A2 Fraction	Cumulative A2 Fraction
Sr-90	1.12E+02	6.58E+01	6.58E+01
Pu-238	3.85E-02	1.13E+01	7.71E+01
Am-241	2.90E-02	8.50E+00	8.56E+01
Pu-239	2.52E-02	7.39E+00	9.30E+01
Cs-137	2.28E+01	2.68E+00	9.57E+01
Cm-243	9.29E-03	1.82E+00	9.75E+01
Pu-241	2.76E-01	1.62E+00	9.91E+01
U-233	1.02E-02	6.00E-01	9.97E+01
Co-60	8.08E-01	1.19E-01	9.98E+01
Ra-226	2.08E-02	6.11E-02	9.99E+01
Np-237	1.45E-04	4.25E-02	9.99E+01
Ce-144	6.44E-02	1.89E-02	9.99E+01
Ru-106	4.51E-02	1.32E-02	1.00E+02
Eu-154	9.54E-02	1.12E-02	1.00E+02
Ni-63	4.46E+00	8.72E-03	1.00E+02
Eu-152	7.38E-02	4.81E-03	1.00E+02
Ru-103	6.37E-02	4.16E-03	1.00E+02
Nb-95	2.39E-02	1.40E-03	1.00E+02
Sb-125	2.09E-02	1.36E-03	1.00E+02
Cm-242	2.10E-04	1.24E-03	1.00E+02
Zr-95	1.72E-02	1.13E-03	1.00E+02
Ag-110m	6.57E-03	9.65E-04	1.00E+02
Cs-134	6.65E-03	7.81E-04	1.00E+02
Eu-155	1.36E-02	4.01E-04	1.00E+02
Co-58	5.92E-03	3.47E-04	1.00E+02
Ag-108m	3.42E-03	3.35E-04	1.00E+02
Zn-65	4.51E-03	1.32E-04	1.00E+02
Mn-54	2.05E-03	1.20E-04	1.00E+02
Th-234	2.14E-04	6.28E-05	1.00E+02
Pa-233	1.45E-04	9.45E-06	1.00E+02
U-235	3.22E-04	0.00E+00	1.00E+02
I-129	2.72E-04	0.00E+00	1.00E+02
U-238	2.14E-04	0.00E+00	1.00E+02

Nuclide	Activity (Ci)	% of Total Activity	Source Material (kg)	SNM (g)	Activity Conc. (Ci/m^3)
Sr-90	1.12E+02	7.95E+01	Not applicable	Not applicable	4.54E+01
Cs-137	2.28E+01	1.62E+01	Not applicable	Not applicable	9.23E+00
Ni-63	4.46E+00	3.16E+00	Not applicable	Not applicable	1.81E+00
Co-60	8.08E-01	5.73E-01	Not applicable	Not applicable	3.27E-01
Pu-241	2.76E-01	1.96E-01	Not applicable	2.76E-03	1.12E-01
Eu-154	9.54E-02	6.77E-02	Not applicable	Not applicable	3.87E-02
Eu-152	7.38E-02	5.23E-02	Not applicable	Not applicable	2.99E-02
Ce-144	6.44E-02	4.57E-02	Not applicable	Not applicable	2.61E-02
Ru-103	6.37E-02	4.52E-02	Not applicable	Not applicable	2.58E-02
Ru-106	4.51E-02	3.20E-02	Not applicable	Not applicable	1.83E-02
Pu-238	3.85E-02	2.73E-02	Not applicable	2.27E-03	1.56E-02
Am-241	2.90E-02	2.05E-02	Not applicable	Not applicable	1.17E-02
Pu-239	2.52E-02	1.79E-02	Not applicable	4.06E-01	1.02E-02
Nb-95	2.39E-02	1.69E-02	Not applicable	Not applicable	9.67E-03
Sb-125	2.09E-02	1.48E-02	Not applicable	Not applicable	8.47E-03
Ra-226	2.08E-02	1.48E-02	Not applicable	Not applicable	8.43E-03
Zr-95	1.72E-02	1.22E-02	Not applicable	Not applicable	6.99E-03
Eu-155	1.36E-02	9.68E-03	Not applicable	Not applicable	5.53E-03
U-233	1.02E-02	7.25E-03	Not applicable	1.05E+00	4.14E-03
Cm-243	9.29E-03	6.59E-03	Not applicable	Not applicable	3.76E-03
Cs-134	6.65E-03	4.72E-03	Not applicable	Not applicable	2.69E-03
Ag-110m	6.57E-03	4.66E-03	Not applicable	Not applicable	2.66E-03
Co-58	5.92E-03	4.20E-03	Not applicable	Not applicable	2.40E-03
Zn-65	4.51E-03	3.20E-03	Not applicable	Not applicable	1.83E-03
Ag-108m	3.42E-03	2.43E-03	Not applicable	Not applicable	1.39E-03
Mn-54	2.05E-03	1.46E-03	Not applicable	Not applicable	8.31E-04
U-235	3.22E-04	2.29E-04	Not applicable	1.46E+02	1.31E-04
I-129	2.72E-04	1.93E-04	Not applicable	Not applicable	1.10E-04
U-238	2.14E-04	1.52E-04	Not applicable	Not applicable	8.67E-05
Th-234	2.14E-04	1.52E-04	Not applicable	Not applicable	8.67E-05
Cm-242	2.10E-04	1.49E-04	Not applicable	Not applicable	8.53E-05
Np-237	1.45E-04	1.03E-04	Not applicable	Not applicable	5.87E-05
Pa-233	1.45E-04	1.03E-04	Not applicable	Not applicable	5.87E-05

If #DIV/0! occurs in the Fraction of Waste Profile Column or the Does Nuclide Meet Waste Profile? Column of Section III, the nuclide is not included on the current profile and needs to be added.

Waste Classification Determination for near surface disposal per 10 CFR §61.55

Assume that Sr-90, Cs-137, and Ni-63 are major nuclides driving waste classification determination for Tank V-1, V-2, and V-3 wastes

Radionuclide	Table 2 limit (Ci/m^3) Column 1	Column 2	V-3 All SludgeMAX
Sr-90	0.04	150	4.54E+01
Cs-137	1	44	9.23E+00
Ni-63	3.5	70	1.81E+00

Class A Sum of Fractions: 1144.53

Class B Sum of Fractions: 0.54

ClassB

77 of 105

Container ID # **INEEL Tank V-3 Solids (50.2 gal per drum using MAX)**

Constants	Units
3.70E+10	Bq/Ci
453.6	g/lb
1.00E-12	TBq/Bq or Ci/pCi
1000.00	g/kg
1.00E+09	nCi/Ci

Section I. Waste Stream Information

Container Type: 55 Gallon Metal OH

Description: 50.2 gallons of Solids

Form#

PKE#

Note: assume solid phase volume of 50.2 gallons with density of 1.02 g/cc (91.3% of capacity)

Container Gross Wt (lb)	Container Gross Wt (kg)	Container Tare Wt (lb)	Container Tare Wt (kg)	Waste Net Wt (kg)	External Vol. (m3)	Est. Waste Vol. (m3)
477.30	216.50	50.00	22.68	193.82	0.261	0.190

Dose survey from Sxxxxx on xx/xx/00 shows < _____ mrem/hr OC.

Radioactive liquid effluents from hot cells, labs, and decon facilities at TAN and IETF.

Note: Gross weight of contents = (50.2 gal.)x(1.02 g/cc)x(3785.412 cc/gal.)x(2.2046E-03 lb/g) = 427.3 lbs.

EPA regulated hazardous COCs: Barium, Cadmium, Chromium, Lead, Mercury, Silver, VOCs, SVOCs, and PCBs.

Section II. List the radionuclides and activities; perform DOT RAM, RQ, LTD QTY, and Type A Packaging checks

Nuclide	Activity (Ci)	% of Total A2 Fraction	Activity (Bq)	Activity/gram (Bq/gram)	RQ limits (TBq)	RQ Ratios (amount/limit)	A2 Value (TBq)	LTD QTY Det. (amount/(10-3)A2	Type A Pkg? (amount/A2)	DOT Fissile Mass (g)	TRU Conc. (nCi/g)	LSA-II Solids Frac	Activity/gram (pCi/g)
Sr-90	8.63E+00	6.58E+01	3.19E+11	1.65E+06	3.70E-03	8.63E+01	1.00E-01	3.19E+03	3.19E+00	0.00E+00	0.00E+00	1.65E-01	4.45E+07
Cs-137	1.75E+00	2.67E+00	6.48E+10	3.34E+05	3.70E-02	1.75E+00	5.00E-01	1.30E+02	1.30E-01	0.00E+00	0.00E+00	6.69E-03	9.04E+06
Ni-63	3.43E-01	8.71E-03	1.27E+10	6.54E+04	3.70E+00	3.43E-03	3.00E+01	4.23E-01	4.23E-04	0.00E+00	0.00E+00	2.18E-05	1.77E+06
Co-60	6.22E-02	1.19E-01	2.30E+09	1.19E+04	3.70E-01	6.22E-03	4.00E-01	5.75E+00	5.75E-03	0.00E+00	0.00E+00	2.97E-04	3.21E+05
Pu-241	2.12E-02	1.62E+00	7.84E+08	4.05E+03	3.70E-02	2.12E-02	1.00E-02	7.84E+01	7.84E-02	2.12E-04	0.00E+00	4.05E-03	1.09E+05
Eu-154	7.35E-03	1.12E-02	2.72E+08	1.40E+03	3.70E-01	7.35E-04	5.00E-01	5.44E-01	5.44E-04	0.00E+00	0.00E+00	2.81E-05	3.79E+04
Eu-152	5.68E-03	4.81E-03	2.10E+08	1.08E+03	3.70E-01	5.68E-04	9.00E-01	2.34E-01	2.34E-04	0.00E+00	0.00E+00	1.20E-05	2.93E+04
Ce-144	4.96E-03	1.89E-02	1.83E+08	9.46E+02	3.70E-02	4.96E-03	2.00E-01	9.17E-01	9.17E-04	0.00E+00	0.00E+00	4.73E-05	2.56E+04
Ru-103	4.90E-03	4.15E-03	1.81E+08	9.35E+02	3.70E-01	4.90E-04	9.00E-01	2.01E-01	2.01E-04	0.00E+00	0.00E+00	1.04E-05	2.53E+04
Ru-106	3.47E-03	1.32E-02	1.28E+08	6.62E+02	3.70E-02	3.47E-03	2.00E-01	6.41E-01	6.41E-04	0.00E+00	0.00E+00	3.31E-05	1.79E+04
Pu-238	2.97E-03	1.13E+01	1.10E+08	5.67E+02	3.70E-04	2.97E-01	2.00E-04	5.49E+02	5.49E-01	1.75E-04	1.53E+01	2.83E-02	1.53E+04
Am-241	2.23E-03	8.49E+00	8.24E+07	4.25E+02	3.70E-04	2.23E-01	2.00E-04	4.12E+02	4.12E-01	0.00E+00	1.15E+01	2.12E-02	1.15E+04
Pu-239	1.94E-03	7.38E+00	7.16E+07	3.70E+02	3.70E-04	1.94E-01	2.00E-04	3.58E+02	3.58E-01	3.12E-02	9.99E+00	1.85E-02	9.99E+03
Nb-95	1.84E-03	1.40E-03	6.79E+07	3.50E+02	3.70E-01	1.84E-04	1.00E+00	6.79E-02	6.79E-05	0.00E+00	0.00E+00	3.50E-06	9.47E+03
Sb-125	1.61E-03	1.36E-03	5.95E+07	3.07E+02	3.70E-01	1.61E-04	9.00E-01	6.61E-02	6.61E-05	0.00E+00	0.00E+00	3.41E-06	8.29E+03
Ra-226	1.60E-03	6.10E-02	5.92E+07	3.05E+02	3.70E-03	1.60E-02	2.00E-02	2.96E+00	2.96E-03	0.00E+00	0.00E+00	1.53E-04	8.25E+03
Zr-95	1.33E-03	1.12E-03	4.91E+07	2.53E+02	3.70E-01	1.33E-04	9.00E-01	5.45E-02	5.45E-05	0.00E+00	0.00E+00	2.81E-06	6.84E+03
Eu-155	1.05E-03	4.00E-04	3.88E+07	2.00E+02	3.70E-01	1.05E-04	2.00E+00	1.94E-02	1.94E-05	0.00E+00	0.00E+00	1.00E-06	5.41E+03
U-233	7.87E-04	6.00E-01	2.91E+07	1.50E+02	3.70E-03	7.87E-03	1.00E-03	2.91E+01	2.91E-02	8.11E-02	0.00E+00	1.50E-03	4.06E+03
Cm-243	7.15E-04	1.82E+00	2.65E+07	1.36E+02	3.70E-04	7.15E-02	3.00E-04	8.82E+01	8.82E-02	0.00E+00	3.69E+00	4.55E-03	3.69E+03
Cs-134	5.12E-04	7.81E-04	1.89E+07	9.77E+01	3.70E-02	5.12E-04	5.00E-01	3.79E-02	3.79E-05	0.00E+00	0.00E+00	1.95E-06	2.64E+03
Ag-110m	5.06E-04	9.65E-04	1.87E+07	9.66E+01	3.70E-01	5.06E-05	4.00E-01	4.68E-02	4.68E-05	0.00E+00	0.00E+00	2.41E-06	2.61E+03
Co-58	4.55E-04	3.47E-04	1.68E+07	8.68E+01	3.70E-01	4.55E-05	1.00E+00	1.68E-02	1.68E-05	0.00E+00	0.00E+00	8.68E-07	2.35E+03
Zn-65	3.47E-04	1.32E-04	1.28E+07	6.62E+01	3.70E-01	3.47E-05	2.00E+00	6.41E-03	6.41E-06	0.00E+00	0.00E+00	3.31E-07	1.79E+03
Ag-108m	2.64E-04	3.36E-04	9.77E+06	5.04E+01	3.70E-01	2.64E-05	6.00E-01	1.63E-02	1.63E-05	0.00E+00	0.00E+00	8.40E-07	1.36E+03
Mn-54	1.58E-04	1.20E-04	5.84E+06	3.01E+01	3.70E-01	1.58E-05	1.00E+00	5.84E-03	5.84E-06	0.00E+00	0.00E+00	3.01E-07	8.14E+02
U-235	2.48E-05	0.00E+00	9.17E+05	4.73E+00	3.70E-03	2.48E-04	Unlimited	0.00E+00	0.00E+00	1.13E+01	0.00E+00	0.00E+00	1.28E+02
I-129	2.09E-05	0.00E+00	7.74E+05	3.99E+00	3.70E-05	2.09E-02	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.08E+02
U-238	1.65E-05	0.00E+00	6.09E+05	3.14E+00	3.70E-03	1.65E-04	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.49E+01
Th-234	1.65E-05	6.27E-05	6.09E+05	3.14E+00	3.70E+00	1.65E-07	2.00E-01	3.04E-03	3.04E-06	0.00E+00	0.00E+00	1.57E-07	8.49E+01
Cm-242	1.62E-05	1.23E-03	5.99E+05	3.09E+00	3.70E-02	1.62E-05	1.00E-02	5.99E-02	5.99E-05	0.00E+00	0.00E+00	3.09E-06	8.35E+01
Np-237	1.11E-05	4.24E-02	4.12E+05	2.12E+00	3.70E-04	1.11E-03	2.00E-04	2.06E+00	2.06E-03	0.00E+00	5.74E-02	1.06E-04	5.74E+01
Pa-233	1.11E-05	9.43E-06	4.12E+05	2.12E+00	3.70E+00	1.11E-07	9.00E-01	4.58E-04	4.58E-07	0.00E+00	0.00E+00	2.36E-08	5.74E+01
Total	1.09E+01	100.00%	4.02E+11	2.07E+06		8.89E+01		4.85E+03	4.85E+00	1.14E+01	4.05E+01	2.50E-01	5.60E+07

DOT regulated as Hazard Class 7 Radioactive Material

Contains a Reportable Quantity of a Hazardous Substance; use 'RQ(radionuclides)' as part of PSN

≥ Type A quantity; requires Type B Packaging

Does NOT meet LTD QTY Exception; Check if LSA

Meets Low Specific Activity (LSA)-II material - Check <Type A quantity and use Radioactive material, LSA, n.o.s. as PSN

Meets criteria for Fissile Excepted Package per 49 CFR 173.453

This is a Low-level waste

Performed by: [signature] Date: 9/25/01

Reviewed by: _____ Date: _____

78 of 105

Section III: Check radionuclides for listing on labels and shipping papers; Check reportable radionuclides per Disposal Facility

Nuclide	Activity (Ci)	% of Total A2 Fraction	Cumulative A2 Fraction
Sr-90	8.61E+00	6.58E+01	6.58E+01
Pu-238	2.96E-03	1.13E+01	7.71E+01
Am-241	2.23E-03	8.50E+00	8.56E+01
Pu-239	1.94E-03	7.39E+00	9.30E+01
Cs-137	1.75E+00	2.68E+00	9.57E+01
Cm-243	7.14E-04	1.82E+00	9.75E+01
Pu-241	2.12E-02	1.62E+00	9.91E+01
U-233	7.86E-04	6.00E-01	9.97E+01
Co-60	6.21E-02	1.19E-01	9.98E+01
Ra-226	1.60E-03	6.11E-02	9.99E+01
Np-237	1.11E-05	4.25E-02	9.99E+01
Ce-144	4.96E-03	1.89E-02	9.99E+01
Ru-106	3.47E-03	1.32E-02	1.00E+02
Eu-154	7.34E-03	1.12E-02	1.00E+02
Ni-63	3.43E-01	8.72E-03	1.00E+02
Eu-152	5.67E-03	4.81E-03	1.00E+02
Ru-103	4.90E-03	4.16E-03	1.00E+02
Nb-95	1.84E-03	1.40E-03	1.00E+02
Sb-125	1.61E-03	1.36E-03	1.00E+02
Cm-242	1.62E-05	1.24E-03	1.00E+02
Zr-95	1.33E-03	1.13E-03	1.00E+02
Ag-110m	5.05E-04	9.65E-04	1.00E+02
Cs-134	5.11E-04	7.81E-04	1.00E+02
Eu-155	1.05E-03	4.01E-04	1.00E+02
Co-58	4.55E-04	3.47E-04	1.00E+02
Ag-108m	2.63E-04	3.35E-04	1.00E+02
Zn-65	3.47E-04	1.32E-04	1.00E+02
Mn-54	1.58E-04	1.20E-04	1.00E+02
Th-234	1.65E-05	6.28E-05	1.00E+02
Pa-233	1.11E-05	9.45E-06	1.00E+02
U-235	2.48E-05	0.00E+00	1.00E+02
I-129	2.09E-05	0.00E+00	1.00E+02
U-238	1.65E-05	0.00E+00	1.00E+02

Nuclide	Activity (Ci)	% of Total Activity	Source Material (kg)	SNM (g)	Activity Conc. (Ci/m^3)
Sr-90	8.63E+00	7.95E+01	Not applicable	Not applicable	4.54E+01
Cs-137	1.75E+00	1.61E+01	Not applicable	Not applicable	9.22E+00
Ni-63	3.43E-01	3.16E+00	Not applicable	Not applicable	1.80E+00
Co-60	6.22E-02	5.73E-01	Not applicable	Not applicable	3.27E-01
Pu-241	2.12E-02	1.95E-01	Not applicable	2.12E-04	1.12E-01
Eu-154	7.35E-03	6.77E-02	Not applicable	Not applicable	3.87E-02
Eu-152	5.68E-03	5.23E-02	Not applicable	Not applicable	2.99E-02
Ce-144	4.96E-03	4.57E-02	Not applicable	Not applicable	2.61E-02
Ru-103	4.90E-03	4.51E-02	Not applicable	Not applicable	2.58E-02
Ru-106	3.47E-03	3.19E-02	Not applicable	Not applicable	1.82E-02
Pu-238	2.97E-03	2.74E-02	Not applicable	1.75E-04	1.56E-02
Am-241	2.23E-03	2.05E-02	Not applicable	Not applicable	1.17E-02
Pu-239	1.94E-03	1.78E-02	Not applicable	3.12E-02	1.02E-02
Nb-95	1.84E-03	1.69E-02	Not applicable	Not applicable	9.66E-03
Sb-125	1.61E-03	1.48E-02	Not applicable	Not applicable	8.46E-03
Ra-226	1.60E-03	1.47E-02	Not applicable	Not applicable	8.42E-03
Zr-95	1.33E-03	1.22E-02	Not applicable	Not applicable	6.98E-03
Eu-155	1.05E-03	9.67E-03	Not applicable	Not applicable	5.52E-03
U-233	7.87E-04	7.25E-03	Not applicable	8.11E-02	4.14E-03
Cm-243	7.15E-04	6.59E-03	Not applicable	Not applicable	3.76E-03
Cs-134	5.12E-04	4.72E-03	Not applicable	Not applicable	2.69E-03
Ag-110m	5.06E-04	4.66E-03	Not applicable	Not applicable	2.66E-03
Co-58	4.55E-04	4.19E-03	Not applicable	Not applicable	2.39E-03
Zn-65	3.47E-04	3.19E-03	Not applicable	Not applicable	1.82E-03
Ag-108m	2.64E-04	2.43E-03	Not applicable	Not applicable	1.39E-03
Mn-54	1.58E-04	1.45E-03	Not applicable	Not applicable	8.30E-04
U-235	2.48E-05	2.28E-04	Not applicable	1.13E+01	1.30E-04
I-129	2.09E-05	1.93E-04	Not applicable	Not applicable	1.10E-04
U-238	1.65E-05	1.52E-04	Not applicable	Not applicable	8.66E-05
Th-234	1.65E-05	1.52E-04	Not applicable	Not applicable	8.66E-05
Cm-242	1.62E-05	1.49E-04	Not applicable	Not applicable	8.52E-05
Np-237	1.11E-05	1.03E-04	Not applicable	Not applicable	5.86E-05
Pa-233	1.11E-05	1.03E-04	Not applicable	Not applicable	5.86E-05

If #DIV/0! occurs in the Fraction of Waste Profile Column or the Does Nuclide Meet Waste Profile? Column of Section III, the nuclide is not included on the current profile and needs to be added.

Waste Classification Determination for near surface disposal per 10 CFR §61.55

Assume that Sr-90, Cs-137, and Ni-63 are major nuclides driving waste classification determination for Tank V-1, V-2, and V-3 wastes

Radionuclide	Table 2 limit (Ci/m^3) Column 1	Column 2	V-3 Sludge(50.2 gal/drum w/MAX)
Cs-137	1	44	9.22E+00
Sr-90	0.04	150	4.54E+01
Ni-63	3.5	70	1.80E+00

Class A Sum of Fractions: 1145.26

Class B Sum of Fractions: 0.54

ClassB

79 of 105

Container ID # **INEEL Tank V-3 Liquids (Total)**

Constants	Units
3.70E+10	Bq/Ci
453.6	g/lb
1.00E-12	TBq/Bq or Ci/pCi
1000.00	g/kg
1.00E+09	nCi/Ci

Section I. Waste Stream Information

Container Type: N/A Form#

Description: 5818 gallons of liquids PKE#

NTS Waste Stream # #N/A

SNL Waste Stream# #N/A

Note: assume liquid phase volume of 5818 gallons with density of 1.00 g/ml

Container Gross Wt (lb)	Container Gross Wt (kg)	Container Tare Wt (lb)	Container Tare Wt (kg)	Waste Net Wt (kg)	External Vol. (m3)	Est. Waste Vol. (m3)
48553.00	22023.64	0.00	0.00	22023.64	#N/A	22.024

Dose survey from Sxxxxx on xx/xx/00 shows < _____ mrem/hr OC.

Radioactive liquid effluents from hot cells, labs, and decon facilities at TAN and IETF.

EPA regulated hazardous COCs: Barium, Cadmium, Chromium, Lead, Mercury, Silver, VOCs, SVOCs, and PCBs.

Note: Gross weight of contents = (5818 gal.)x(1.0 g/ml)x(3785.412 ml/gal.)x(2.2046E-03 lb/g) = 48,553.0 lb

Section II. List the radionuclides and activities; perform DOT RAM, RQ, LTD QTY, and Type A Packaging checks

Nuclide	Activity (Ci)	% of Total A2 Fraction	Activity (Bq)	Activity/gram (Bq/gram)	RQ limits (TBq)	RQ Ratios (amount/limit)	A2 Value (TBq)	LTD QTY Det. (amount/(10-4)A2)	Type A Pkg? (amount/A2)	DOT Fissile Mass (g)	TRU Conc. (nCi/g)	LSA-II Liquids Fraction	Activity/gram (pCi/g)
Sr-90	2.71E-01	8.43E+01	1.00E+10	4.55E+02	3.70E-03	2.71E+00	1.00E-01	1.00E+03	1.00E-01	0.00E+00	0.00E+00	4.55E-04	1.23E+04
H-3	1.34E-01	1.04E-01	4.96E+09	2.25E+02	3.70E+00	1.34E-03	4.00E+01	1.24E+00	1.24E-04	0.00E+00	0.00E+00	5.63E-07	6.09E+03
Cs-137	9.32E-02	5.80E+00	3.45E+09	1.57E+02	3.70E-02	9.32E-02	5.00E-01	6.89E+01	6.89E-03	0.00E+00	0.00E+00	3.13E-05	4.23E+03
Ni-63	4.51E-03	4.69E-03	1.67E+08	7.58E+00	3.70E+00	4.51E-05	3.00E+01	5.57E-02	5.57E-06	0.00E+00	0.00E+00	2.53E-08	2.05E+02
Co-60	3.26E-04	2.54E-02	1.21E+07	5.48E-01	3.70E-01	3.26E-05	4.00E-01	3.02E-01	3.02E-05	0.00E+00	0.00E+00	1.37E-07	1.48E+01
Ru-103	3.00E-04	1.04E-02	1.11E+07	5.03E-01	3.70E-01	3.00E-05	9.00E-01	1.23E-01	1.23E-05	0.00E+00	0.00E+00	5.59E-08	1.36E+01
U-233	2.93E-04	9.12E+00	1.08E+07	4.92E-01	3.70E-03	2.93E-03	1.00E-03	1.08E+02	1.08E-02	3.02E-02	0.00E+00	4.92E-05	1.33E+01
Ru-106	2.31E-04	3.60E-02	8.56E+06	3.88E-01	3.70E-02	2.31E-04	2.00E-01	4.28E-01	4.28E-05	0.00E+00	0.00E+00	1.94E-07	1.05E+01
Ce-144	2.00E-04	3.12E-02	7.42E+06	3.37E-01	3.70E-02	2.00E-04	2.00E-01	3.71E-01	3.71E-05	0.00E+00	0.00E+00	1.68E-07	9.10E+00
Eu-152	1.02E-04	3.53E-03	3.77E+06	1.71E-01	3.70E-01	1.02E-05	9.00E-01	4.19E-02	4.19E-06	0.00E+00	0.00E+00	1.90E-08	4.63E+00
Sb-125	1.01E-04	3.50E-03	3.75E+06	1.70E-01	3.70E-01	1.01E-05	9.00E-01	4.16E-02	4.16E-06	0.00E+00	0.00E+00	1.89E-08	4.60E+00
Zr-95	8.81E-05	3.05E-03	3.26E+06	1.48E-01	3.70E-01	8.81E-06	9.00E-01	3.62E-02	3.62E-06	0.00E+00	0.00E+00	1.64E-08	4.00E+00
Eu-155	6.65E-05	1.04E-03	2.46E+06	1.12E-01	3.70E-01	6.65E-06	2.00E+00	1.23E-02	1.23E-06	0.00E+00	0.00E+00	5.59E-09	3.02E+00
Nb-95	4.89E-05	1.52E-03	1.81E+06	8.21E-02	3.70E-01	4.89E-06	1.00E+00	1.81E-02	1.81E-06	0.00E+00	0.00E+00	8.21E-09	2.22E+00
Co-58	4.54E-05	1.41E-03	1.68E+06	7.62E-02	3.70E-01	4.54E-06	1.00E+00	1.68E-02	1.68E-06	0.00E+00	0.00E+00	7.62E-09	2.06E+00
Zn-65	3.61E-05	5.62E-04	1.34E+06	6.07E-02	3.70E-01	3.61E-06	2.00E+00	6.68E-03	6.68E-07	0.00E+00	0.00E+00	3.03E-09	1.64E+00
Eu-154	3.37E-05	2.10E-03	1.25E+06	5.66E-02	3.70E-01	3.37E-06	5.00E-01	2.49E-02	2.49E-06	0.00E+00	0.00E+00	1.13E-08	1.53E+00
Ag-110m	3.19E-05	2.49E-03	1.18E+06	5.36E-02	3.70E-01	3.19E-06	4.00E-01	2.95E-02	2.95E-06	0.00E+00	0.00E+00	1.34E-08	1.45E+00
Ra-226	2.69E-05	4.18E-02	9.94E+05	4.51E-02	3.70E-03	2.69E-04	2.00E-02	4.97E-01	4.97E-05	0.00E+00	0.00E+00	2.26E-07	1.22E+00
Ag-108m	1.96E-05	1.02E-03	7.25E+05	3.29E-02	3.70E-01	1.96E-06	6.00E-01	1.21E-02	1.21E-06	0.00E+00	0.00E+00	5.49E-09	8.90E-01
Mn-54	1.65E-05	5.13E-04	6.10E+05	2.77E-02	3.70E-01	1.65E-06	1.00E+00	6.10E-03	6.10E-07	0.00E+00	0.00E+00	2.77E-09	7.48E-01
Cs-134	1.60E-05	9.96E-04	5.92E+05	2.69E-02	3.70E-02	1.60E-05	5.00E-01	1.18E-02	1.18E-06	0.00E+00	0.00E+00	5.37E-09	7.26E-01
U-235	8.83E-06	0.00E+00	3.27E+05	1.48E-02	3.70E-03	8.83E-05	Unlimited	0.00E+00	0.00E+00	4.01E+00	0.00E+00	0.00E+00	4.01E-01
Pu-241	6.67E-06	2.08E-02	2.47E+05	1.12E-02	3.70E-02	6.67E-06	1.00E-02	2.47E-01	2.47E-05	6.67E-08	0.00E+00	1.12E-07	3.03E-01
I-129	4.80E-06	0.00E+00	1.78E+05	8.07E-03	3.70E-05	4.80E-03	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.18E-01
U-238	2.97E-06	0.00E+00	1.10E+05	4.99E-03	3.70E-03	2.97E-05	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.35E-01
Th-234	2.97E-06	4.63E-04	1.10E+05	4.99E-03	3.70E+00	2.97E-08	2.00E-01	5.50E-03	5.50E-07	0.00E+00	0.00E+00	2.50E-09	1.35E-01
Pu-238	8.44E-07	1.31E-01	3.12E+04	1.42E-03	3.70E-04	8.44E-05	2.00E-04	1.56E+00	1.56E-04	4.96E-08	3.83E-05	7.09E-07	3.83E-02
Np-237	8.02E-07	1.25E-01	2.97E+04	1.35E-03	3.70E-04	8.02E-05	2.00E-04	1.48E+00	1.48E-04	0.00E+00	3.64E-05	6.73E-07	3.64E-02
Pa-233	8.02E-07	2.77E-05	2.97E+04	1.35E-03	3.70E+00	8.02E-09	9.00E-01	3.30E-04	3.30E-08	0.00E+00	0.00E+00	1.50E-10	3.64E-02
Am-241	7.00E-07	1.09E-01	2.59E+04	1.18E-03	3.70E-04	7.00E-05	2.00E-04	1.30E+00	1.30E-04	0.00E+00	3.18E-05	5.88E-07	3.18E-02
Pu-239	4.34E-07	6.75E-02	1.61E+04	7.29E-04	3.70E-04	4.34E-05	2.00E-04	8.03E-01	8.03E-05	7.00E-06	1.97E-05	3.64E-07	1.97E-02
Cm-243	1.38E-07	1.44E-02	5.12E+03	2.32E-04	3.70E-04	1.38E-05	3.00E-04	1.71E-01	1.71E-05	0.00E+00	6.28E-06	7.75E-08	6.28E-03
Cm-242	1.36E-07	4.24E-04	5.04E+03	2.29E-04	3.70E-02	1.36E-07	1.00E-02	5.04E-03	5.04E-07	0.00E+00	0.00E+00	2.29E-09	6.18E-03
Total	5.05E-01	100.00%	1.87E+10	8.48E+02		2.81E+00		1.19E+03	1.19E-01	4.04E+00	1.32E-04	5.40E-04	2.29E+04

DOT regulated as Hazard Class 7 Radioactive Material

Contains a Reportable Quantity of a Hazardous Substance; use 'RQ(radionuclides)' as part of PSN

< Type A quantity/package per 49 CFR 173.431(a); check if excepted quantity -> excepted packaging

Does NOT meet LTD QTY Exception; Check if LSA

Meets Low Specific Activity (LSA)-II material - Check <Type A quantity and use Radioactive material, LSA, n.o.s. as PSN

Meets criteria for Fissile Excepted Package per 49 CFR 173.453

This is a Low-level waste

Performed by: Gordon Hamin Date: 9/25/01

Reviewed by: _____ Date: _____

80 of 105

Section III: Check radionuclides for listing on labels and shipping papers

Nuclide	Activity (Ci)	% of Total A2 Fraction	Cumulative A2 Fraction
Sr-90	2.71E-01	8.43E+01	8.43E+01
U-233	2.93E-04	9.12E+00	9.35E+01
Cs-137	9.32E-02	5.80E+00	9.93E+01
Pu-238	8.44E-07	1.31E-01	9.94E+01
Np-237	8.02E-07	1.25E-01	9.95E+01
Am-241	7.00E-07	1.09E-01	9.96E+01
H-3	1.34E-01	1.04E-01	9.97E+01
Pu-239	4.34E-07	6.75E-02	9.98E+01
Ra-226	2.69E-05	4.18E-02	9.98E+01
Ru-106	2.31E-04	3.60E-02	9.99E+01
Ce-144	2.00E-04	3.12E-02	9.99E+01
Co-60	3.26E-04	2.54E-02	9.99E+01
Pu-241	6.67E-06	2.08E-02	9.99E+01
Cm-243	1.38E-07	1.44E-02	1.00E+02
Ru-103	3.00E-04	1.04E-02	1.00E+02
Ni-63	4.51E-03	4.69E-03	1.00E+02
Eu-152	1.02E-04	3.53E-03	1.00E+02
Sb-125	1.01E-04	3.50E-03	1.00E+02
Zr-95	8.81E-05	3.05E-03	1.00E+02
Ag-110m	3.19E-05	2.49E-03	1.00E+02
Eu-154	3.37E-05	2.10E-03	1.00E+02
Nb-95	4.89E-05	1.52E-03	1.00E+02
Co-58	4.54E-05	1.41E-03	1.00E+02
Eu-155	6.65E-05	1.04E-03	1.00E+02
Ag-108m	1.96E-05	1.02E-03	1.00E+02
Cs-134	1.60E-05	9.96E-04	1.00E+02
Zn-65	3.61E-05	5.62E-04	1.00E+02
Mn-54	1.65E-05	5.13E-04	1.00E+02
Th-234	2.97E-06	4.63E-04	1.00E+02
Cm-242	1.36E-07	4.24E-04	1.00E+02
Pa-233	8.02E-07	2.77E-05	1.00E+02
U-235	8.83E-06	0.00E+00	1.00E+02
I-129	4.80E-06	0.00E+00	1.00E+02
U-238	2.97E-06	0.00E+00	1.00E+02

Nuclide	Activity (Ci)	% of Total Activity	Source Material (kg)	SNM (g)	Activity Conc. (Ci/m^3)
Sr-90	2.71E-01	5.37E+01	Not applicable	Not applicable	1.23E-02
H-3	1.34E-01	2.66E+01	Not applicable	Not applicable	6.09E-03
Cs-137	9.32E-02	1.85E+01	Not applicable	Not applicable	4.23E-03
Ni-63	4.51E-03	8.95E-01	Not applicable	Not applicable	2.05E-04
Co-60	3.26E-04	6.46E-02	Not applicable	Not applicable	1.48E-05
Ru-103	3.00E-04	5.93E-02	Not applicable	Not applicable	1.36E-05
U-233	2.93E-04	5.80E-02	Not applicable	3.02E-02	1.33E-05
Ru-106	2.31E-04	4.58E-02	Not applicable	Not applicable	1.05E-05
Ce-144	2.00E-04	3.97E-02	Not applicable	Not applicable	9.10E-06
Eu-152	1.02E-04	2.02E-02	Not applicable	Not applicable	4.63E-06
Sb-125	1.01E-04	2.01E-02	Not applicable	Not applicable	4.60E-06
Zr-95	8.81E-05	1.75E-02	Not applicable	Not applicable	4.00E-06
Eu-155	6.65E-05	1.32E-02	Not applicable	Not applicable	3.02E-06
Nb-95	4.89E-05	9.69E-03	Not applicable	Not applicable	2.22E-06
Co-58	4.54E-05	8.99E-03	Not applicable	Not applicable	2.06E-06
Zn-65	3.61E-05	7.16E-03	Not applicable	Not applicable	1.64E-06
Eu-154	3.37E-05	6.68E-03	Not applicable	Not applicable	1.53E-06
Ag-110m	3.19E-05	6.33E-03	Not applicable	Not applicable	1.45E-06
Ra-226	2.69E-05	5.32E-03	Not applicable	Not applicable	1.22E-06
Ag-108m	1.96E-05	3.88E-03	Not applicable	Not applicable	8.90E-07
Mn-54	1.65E-05	3.26E-03	Not applicable	Not applicable	7.48E-07
Cs-134	1.60E-05	3.17E-03	Not applicable	Not applicable	7.26E-07
U-235	8.83E-06	1.75E-03	Not applicable	4.01E+00	4.01E-07
Pu-241	6.67E-06	1.32E-03	Not applicable	6.67E-08	3.03E-07
I-129	4.80E-06	9.51E-04	Not applicable	Not applicable	2.18E-07
U-238	2.97E-06	5.89E-04	Not applicable	Not applicable	1.35E-07
Th-234	2.97E-06	5.89E-04	Not applicable	Not applicable	1.35E-07
Pu-238	8.44E-07	1.67E-04	Not applicable	4.96E-08	3.83E-08
Np-237	8.02E-07	1.59E-04	Not applicable	Not applicable	3.64E-08
Pa-233	8.02E-07	1.59E-04	Not applicable	Not applicable	3.64E-08
Am-241	7.00E-07	1.39E-04	Not applicable	Not applicable	3.18E-08
Pu-239	4.34E-07	8.60E-05	Not applicable	7.00E-06	1.97E-08
Cm-243	1.38E-07	2.74E-05	Not applicable	Not applicable	6.28E-09
Cm-242	1.36E-07	2.70E-05	Not applicable	Not applicable	6.18E-09

Waste Classification Determination for near surface disposal per 10 CFR §61.55

Assume that Sr-90, Cs-137, and Ni-63 are major nuclides driving waste classification determination for Tank V-1, V-2, and V 3 wastes

Radionuclide	Table 2 limit (Ci/m^3) Column 1	Column 2	V-3 All Liquid
H-3	40	*	6.09E-03
Cs-137	1	44	4.23E-03
Sr-90	0.04	150	1.23E-02
Ni-63	3.5	70	2.05E-04
Co-60	700	*	1.48E-05
Class A Sum of Fractions:			0.31
Class B Sum of Fractions:			0.00
			ClassA*

*Note: No limits established for these radionuclides in Class B or C wastes. Practical considerations such as the effects of external radiation and internal heat generation on transportation, handling, and disposal will limit the concentrations for these wastes. These wastes shall be Classs B unless the concentrations of other nuclides in Table 2 determine the waste to be Class C independent of these nuclides.

81 of 105

Container ID # **INEEL Tank V-3 Liquids (725 gal/HIC)**

Note: HIC Liner capacity is 804.9 gallons; assume 90% full to meet liner max load limit of 7500 lbs.

Constants	Units
3.70E+10	Bq/Ci
453.6	g/lb
1.00E-12	TBq/Bq or Ci/pCi
1000.00	g/kg
1.00E+09	nCi/Ci

Section I. Waste Stream Information

Container Type: HIC Liner PL8-120 MT Form#

Description: 725 gallons of liquids PKE#

NTS Waste Stream # #N/A

SNL Waste Stream# #N/A

Note: assume liquid phase volume of 725 gallons with density of 1.00 g/ml

Container Gross Wt (lb)	Container Gross Wt (kg)	Container Tare Wt (lb)	Container Tare Wt (kg)	Waste Net Wt (kg)	External Vol. (m3)	Est. Waste Vol. (m3)
6650.40	3016.62	600.00	272.16	2744.46	3.427	2.744

Dose survey from Sxxxxx on xx/xx/00 shows < _____ mrem/hr OC.

Radioactive liquid effluents from hot cells, labs, and decon facilities at TAN and IETF.

EPA regulated hazardous COCs: Barium, Cadmium, Chromium, Lead, Mercury, Silver, VOCs, SVOCs, and PCBs.

Note: Gross weight of contents = (725 gal.)x(1.0 g/ml)x(3785.412 ml/gal.)x(2.2046E-03 lb/g) = 6,050.4 lb

Section II. List the radionuclides and activities; perform DOT RAM, RQ, LTD QTY, and Type A Packaging checks

Nuclide	Activity (Ci)	% of Total A2 Fraction	Activity (Bq)	Activity/gram (Bq/gram)	RQ limits (TBq)	RQ Ratios (amount/limit)	A2 Value (TBq)	LTD QTY Det. (amount/(10-4)A2)	Type A Pkg? (amount/A2)	DOT Fissile Mass (g)	TRU Conc. (nCi/g)	LSA-II Liquids Fraction	Activity/gram (pCi/g)
Sr-90	3.38E-02	8.43E+01	1.25E+09	4.55E+02	3.70E-03	3.38E-01	1.00E-01	1.25E+02	1.25E-02	0.00E+00	0.00E+00	4.55E-04	1.23E+04
H-3	1.67E-02	1.04E-01	6.18E+08	2.25E+02	3.70E+00	1.67E-04	4.00E+01	1.55E-01	1.55E-05	0.00E+00	0.00E+00	5.63E-07	6.09E+03
Cs-137	1.16E-02	5.80E+00	4.29E+08	1.56E+02	3.70E-02	1.16E-02	5.00E-01	8.59E+00	8.59E-04	0.00E+00	0.00E+00	3.13E-05	4.23E+03
Ni-63	5.63E-04	4.69E-03	2.08E+07	7.58E+00	3.70E+00	5.63E-06	3.00E+01	6.94E-03	6.94E-07	0.00E+00	0.00E+00	2.53E-08	2.05E+02
Co-60	4.06E-05	2.54E-02	1.50E+06	5.48E-01	3.70E-01	4.06E-06	4.00E-01	3.76E-02	3.76E-06	0.00E+00	0.00E+00	1.37E-07	1.48E+01
Ru-103	3.73E-05	1.04E-02	1.38E+06	5.03E-01	3.70E-01	3.73E-06	9.00E-01	1.53E-02	1.53E-06	0.00E+00	0.00E+00	5.59E-08	1.36E+01
U-233	3.65E-05	9.12E+00	1.35E+06	4.92E-01	3.70E-03	3.65E-04	1.00E-03	1.35E+01	1.35E-03	3.76E-03	0.00E+00	4.92E-05	1.33E+01
Ru-106	2.88E-05	3.60E-02	1.07E+06	3.88E-01	3.70E-02	2.88E-05	2.00E-01	5.33E-02	5.33E-06	0.00E+00	0.00E+00	1.94E-07	1.05E+01
Ce-144	2.50E-05	3.12E-02	9.24E+05	3.37E-01	3.70E-02	2.50E-05	2.00E-01	4.62E-02	4.62E-06	0.00E+00	0.00E+00	1.68E-07	9.10E+00
Eu-152	1.27E-05	3.53E-03	4.70E+05	1.71E-01	3.70E-01	1.27E-06	9.00E-01	5.22E-03	5.22E-07	0.00E+00	0.00E+00	1.90E-08	4.63E+00
Sb-125	1.26E-05	3.50E-03	4.67E+05	1.70E-01	3.70E-01	1.26E-06	9.00E-01	5.19E-03	5.19E-07	0.00E+00	0.00E+00	1.89E-08	4.60E+00
Zr-95	1.10E-05	3.05E-03	4.06E+05	1.48E-01	3.70E-01	1.10E-06	9.00E-01	4.51E-03	4.51E-07	0.00E+00	0.00E+00	1.64E-08	4.00E+00
Eu-155	8.29E-06	1.04E-03	3.07E+05	1.12E-01	3.70E-01	8.29E-07	2.00E+00	1.53E-03	1.53E-07	0.00E+00	0.00E+00	5.59E-09	3.02E+00
Nb-95	6.09E-06	1.52E-03	2.25E+05	8.21E-02	3.70E-01	6.09E-07	1.00E+00	2.25E-03	2.25E-07	0.00E+00	0.00E+00	8.21E-09	2.22E+00
Co-58	5.65E-06	1.41E-03	2.09E+05	7.62E-02	3.70E-01	5.65E-07	1.00E+00	2.09E-03	2.09E-07	0.00E+00	0.00E+00	7.62E-09	2.06E+00
Zn-65	4.50E-06	5.62E-04	1.67E+05	6.07E-02	3.70E-01	4.50E-07	2.00E+00	8.33E-04	8.33E-08	0.00E+00	0.00E+00	3.03E-09	1.64E+00
Eu-154	4.20E-06	2.10E-03	1.55E+05	5.66E-02	3.70E-01	4.20E-07	5.00E-01	3.11E-03	3.11E-07	0.00E+00	0.00E+00	1.13E-08	1.53E+00
Ag-110m	3.98E-06	2.49E-03	1.47E+05	5.36E-02	3.70E-01	3.98E-07	4.00E-01	3.68E-03	3.68E-07	0.00E+00	0.00E+00	1.34E-08	1.45E+00
Ra-226	3.35E-06	4.18E-02	1.24E+05	4.51E-02	3.70E-03	3.35E-05	2.00E-02	6.19E-02	6.19E-06	0.00E+00	0.00E+00	2.26E-07	1.22E+00
Ag-108m	2.44E-06	1.02E-03	9.04E+04	3.29E-02	3.70E-01	2.44E-07	6.00E-01	1.51E-03	1.51E-07	0.00E+00	0.00E+00	5.49E-09	8.90E-01
Mn-54	2.05E-06	5.13E-04	7.59E+04	2.77E-02	3.70E-01	2.05E-07	1.00E+00	7.59E-04	7.59E-08	0.00E+00	0.00E+00	2.77E-09	7.48E-01
Cs-134	1.99E-06	9.96E-04	7.37E+04	2.69E-02	3.70E-02	1.99E-06	5.00E-01	1.47E-03	1.47E-07	0.00E+00	0.00E+00	5.37E-09	7.26E-01
U-235	1.10E-06	0.00E+00	4.07E+04	1.48E-02	3.70E-03	1.10E-05	Unlimited	0.00E+00	0.00E+00	5.00E-01	0.00E+00	0.00E+00	4.01E-01
Pu-241	8.31E-07	2.08E-02	3.07E+04	1.12E-02	3.70E-02	8.31E-07	1.00E-02	3.07E-02	3.07E-06	8.31E-09	0.00E+00	1.12E-07	3.03E-01
I-129	5.98E-07	0.00E+00	2.21E+04	8.07E-03	3.70E-05	5.98E-04	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.18E-01
U-238	3.70E-07	0.00E+00	1.37E+04	4.99E-03	3.70E-03	3.70E-06	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.35E-01
Th-234	3.70E-07	4.63E-04	1.37E+04	4.99E-03	3.70E+00	3.70E-09	2.00E-01	6.85E-04	6.85E-08	0.00E+00	0.00E+00	2.50E-09	1.35E-01
Pu-238	1.05E-07	1.31E-01	3.89E+03	1.42E-03	3.70E-04	1.05E-05	2.00E-04	1.94E-01	1.94E-05	6.18E-09	3.83E-05	7.08E-07	3.83E-02
Np-237	9.99E-08	1.25E-01	3.70E+03	1.35E-03	3.70E-04	9.99E-06	2.00E-04	1.85E-01	1.85E-05	0.00E+00	3.64E-05	6.73E-07	3.64E-02
Pa-233	9.99E-08	2.77E-05	3.70E+03	1.35E-03	3.70E+00	9.99E-10	9.00E-01	4.11E-05	4.11E-09	0.00E+00	0.00E+00	1.50E-10	3.64E-02
Am-241	8.73E-08	1.09E-01	3.23E+03	1.18E-03	3.70E-04	8.73E-06	2.00E-04	1.61E-01	1.61E-05	0.00E+00	3.18E-05	5.88E-07	3.18E-02
Pu-239	5.41E-08	6.75E-02	2.00E+03	7.29E-04	3.70E-04	5.41E-06	2.00E-04	1.00E-01	1.00E-05	8.72E-07	1.97E-05	3.64E-07	1.97E-02
Cm-243	1.72E-08	1.44E-02	6.38E+02	2.32E-04	3.70E-04	1.72E-06	3.00E-04	2.13E-02	2.13E-06	0.00E+00	6.28E-06	7.74E-08	6.28E-03
Cm-242	1.70E-08	4.24E-04	6.27E+02	2.29E-04	3.70E-02	1.70E-08	1.00E-02	6.27E-04	6.27E-08	0.00E+00	0.00E+00	2.29E-09	6.18E-03
Total	6.29E-02	100.00%	2.33E+09	8.48E+02		3.50E-01		1.48E+02	1.48E-02	5.04E-01	1.32E-04	5.40E-04	2.29E+04

DOT regulated as Hazard Class 7 Radioactive Material
NOT an RQ amount of a Hazardous Substance
< Type A quantity/package per 49 CFR 173.431(a); check if excepted quantity -> excepted packaging
Does NOT meet LTD QTY Exception; Check if LSA
Meets Low Specific Activity (LSA)-II material - Check <Type A quantity and use Radioactive material, LSA, n.o.s. as PSN
Meets criteria for Fissile Excepted Package per 49 CFR 173.453
This is a Low-level waste

Performed by: Gordon Harris Date: 9/25/01

Reviewed by: _____ Date: _____

8 of 105

Section III: Check radionuclides for listing on labels and shipping papers

Nuclide	Activity (Ci)	% of Total A2 Fraction	Cumulative A2 Fraction
Sr-90	3.38E-02	8.43E+01	8.43E+01
U-233	3.65E-05	9.12E+00	9.35E+01
Cs-137	1.16E-02	5.80E+00	9.93E+01
Pu-238	1.05E-07	1.31E-01	9.94E+01
Np-237	9.99E-08	1.25E-01	9.95E+01
Am-241	8.73E-08	1.09E-01	9.96E+01
H-3	1.67E-02	1.04E-01	9.97E+01
Pu-239	5.41E-08	6.75E-02	9.98E+01
Ra-226	3.35E-06	4.18E-02	9.98E+01
Ru-106	2.88E-05	3.60E-02	9.99E+01
Ce-144	2.50E-05	3.12E-02	9.99E+01
Co-60	4.06E-05	2.54E-02	9.99E+01
Pu-241	8.31E-07	2.08E-02	9.99E+01
Cm-243	1.72E-08	1.44E-02	1.00E+02
Ru-103	3.73E-05	1.04E-02	1.00E+02
Ni-63	5.63E-04	4.69E-03	1.00E+02
Eu-152	1.27E-05	3.53E-03	1.00E+02
Sb-125	1.26E-05	3.50E-03	1.00E+02
Zr-95	1.10E-05	3.05E-03	1.00E+02
Ag-110m	3.98E-06	2.49E-03	1.00E+02
Eu-154	4.20E-06	2.10E-03	1.00E+02
Nb-95	6.09E-06	1.52E-03	1.00E+02
Co-58	5.65E-06	1.41E-03	1.00E+02
Eu-155	8.29E-06	1.04E-03	1.00E+02
Ag-108m	2.44E-06	1.02E-03	1.00E+02
Cs-134	1.99E-06	9.96E-04	1.00E+02
Zn-65	4.50E-06	5.62E-04	1.00E+02
Mn-54	2.05E-06	5.13E-04	1.00E+02
Th-234	3.70E-07	4.63E-04	1.00E+02
Cm-242	1.70E-08	4.24E-04	1.00E+02
Pa-233	9.99E-08	2.77E-05	1.00E+02
U-235	1.10E-06	0.00E+00	1.00E+02
I-129	5.98E-07	0.00E+00	1.00E+02
U-238	3.70E-07	0.00E+00	1.00E+02

Nuclide	Activity (Ci)	% of Total Activity	Source Material (kg)	SNM (g)	Activity Conc. (Ci/m^3)
Sr-90	3.38E-02	5.37E+01	Not applicable	Not applicable	1.23E-02
H-3	1.67E-02	2.66E+01	Not applicable	Not applicable	6.09E-03
Cs-137	1.16E-02	1.85E+01	Not applicable	Not applicable	4.23E-03
Ni-63	5.63E-04	8.95E-01	Not applicable	Not applicable	2.05E-04
Co-60	4.06E-05	6.46E-02	Not applicable	Not applicable	1.48E-05
Ru-103	3.73E-05	5.93E-02	Not applicable	Not applicable	1.36E-05
U-233	3.65E-05	5.80E-02	Not applicable	3.76E-03	1.33E-05
Ru-106	2.88E-05	4.58E-02	Not applicable	Not applicable	1.05E-05
Ce-144	2.50E-05	3.97E-02	Not applicable	Not applicable	9.10E-06
Eu-152	1.27E-05	2.02E-02	Not applicable	Not applicable	4.63E-06
Sb-125	1.26E-05	2.01E-02	Not applicable	Not applicable	4.60E-06
Zr-95	1.10E-05	1.75E-02	Not applicable	Not applicable	4.00E-06
Eu-155	8.29E-06	1.32E-02	Not applicable	Not applicable	3.02E-06
Nb-95	6.09E-06	9.69E-03	Not applicable	Not applicable	2.22E-06
Co-58	5.65E-06	8.99E-03	Not applicable	Not applicable	2.06E-06
Zn-65	4.50E-06	7.16E-03	Not applicable	Not applicable	1.64E-06
Eu-154	4.20E-06	6.68E-03	Not applicable	Not applicable	1.53E-06
Ag-110m	3.98E-06	6.33E-03	Not applicable	Not applicable	1.45E-06
Ra-226	3.35E-06	5.32E-03	Not applicable	Not applicable	1.22E-06
Ag-108m	2.44E-06	3.88E-03	Not applicable	Not applicable	8.90E-07
Mn-54	2.05E-06	3.26E-03	Not applicable	Not applicable	7.48E-07
Cs-134	1.99E-06	3.17E-03	Not applicable	Not applicable	7.26E-07
U-235	1.10E-06	1.75E-03	Not applicable	5.00E-01	4.01E-07
Pu-241	8.31E-07	1.32E-03	Not applicable	8.31E-09	3.03E-07
I-129	5.98E-07	9.51E-04	Not applicable	Not applicable	2.18E-07
U-238	3.70E-07	5.89E-04	Not applicable	Not applicable	1.35E-07
Th-234	3.70E-07	5.89E-04	Not applicable	Not applicable	1.35E-07
Pu-238	1.05E-07	1.67E-04	Not applicable	6.18E-09	3.83E-08
Np-237	9.99E-08	1.59E-04	Not applicable	Not applicable	3.64E-08
Pa-233	9.99E-08	1.59E-04	Not applicable	Not applicable	3.64E-08
Am-241	8.73E-08	1.39E-04	Not applicable	Not applicable	3.18E-08
Pu-239	5.41E-08	8.60E-05	Not applicable	8.72E-07	1.97E-08
Cm-243	1.72E-08	2.74E-05	Not applicable	Not applicable	6.28E-09
Cm-242	1.70E-08	2.70E-05	Not applicable	Not applicable	6.18E-09

Waste Classification Determination for near surface disposal per 10 CFR §61.55

Assume that Sr-90, Cs-137, and Ni-63 are major nuclides driving waste classification determination for Tank V-1, V-2, and V-3 wastes

Radionuclide	Table 2 limit (Ci/m^3) Column 1	Column 2	V-3 Liquid (725 gal/HIC)
H-3	40	*	6.09E-03
Cs-137	1	44	4.23E-03
Sr-90	0.04	150	1.23E-02
Ni-63	3.5	70	2.05E-04
Co-60	700	*	1.48E-05
Class A Sum of Fractions:			0.31
Class B Sum of Fractions:			0.00
			ClassA*

*Note: No limits established for these radionuclides in Class B or C wastes. Practical considerations such as the effects of external radiation and internal heat generation on transportation, handling, and disposal will limit the concentrations for these wastes. These wastes shall be Classs B unless the concentrations of other nuclides in Table 2 determine the waste to be Class C independent of these nuclides.

83 of 105

Attachment 7

(DOT Spreadsheets for Tank V-9 used to calculate data for Option 3.)

Container ID # **INEEL Tank V-9 Solids (Total w/AVG)**

Constants	Units
3.70E+10	Bq/Ci
453.6	g/lb
1.00E-12	TBq/Bq or Ci/pCi
1000.00	g/kg
1.00E+09	nCi/Ci

Section I. Waste Stream Information

Container Type: N/A

Description: 250 gallons of Solids

Form#

PKE#

Note: assume solid phase volume of 250 gallons with density of 1.02 g/cc

Container Gross Wt (lb)	Container Gross Wt (kg)	Container Tare Wt (lb)	Container Tare Wt (kg)	Waste Net Wt (kg)	External Vol. (m3)	Est. Waste Vol. (m3)
2128.10	965.31	0.00	0.00	965.31	#N/A	0.946

Note: Gross weight of contents = (250 gal.)x(1.02 g/cc)x(3785.412 cc/gal.)x(2.2046E-03 lb/g) = 2,128.1 lbs.

Dose survey from Sxxxxx on xx/xx/00 shows < [ ] mrem/hr OC.

Radioactive liquid effluents from hot cells, labs, and decon facilities at TAN and IETF.

EPA regulated hazardous COCs: Barium, Cadmium, Chromium, Lead, Mercury, Silver, VOCs, SVOCs, and PCBs.

Section II. List the radionuclides and activities; perform DOT RAM, RQ, LTD QTY, and Type A Packaging checks

Nuclide	Activity (Ci)	% of Total A2 Fraction	Activity (Bq)	Activity/gram (Bq/gram)	RQ limits (TBq)	RQ Ratios (amount/limit)	A2 Value (TBq)	LTD QTY Det. (amount/(10-3)A2)	Type A Pkg? (amount/A2)	DOT Fissile Mass (g)	TRU Conc. (nCi/g)	LSA-II Solids Frac	Activity/gram (pCi/g)
Sr-90	6.18E+00	2.48E+01	2.29E+11	2.37E+05	3.70E-03	6.18E+01	1.00E-01	2.29E+03	2.29E+00	0.00E+00	0.00E+00	2.37E-02	6.40E+06
Cs-137	5.40E+00	4.33E+00	2.00E+11	2.07E+05	3.70E-02	5.40E+00	5.00E-01	3.99E+02	3.99E-01	0.00E+00	0.00E+00	4.14E-03	5.59E+06
Co-60	9.10E-01	9.14E-01	3.37E+10	3.49E+04	3.70E-01	9.10E-02	4.00E-01	8.42E+01	8.42E-02	0.00E+00	0.00E+00	8.72E-04	9.43E+05
Pu-241	4.59E-02	1.84E+00	1.70E+09	1.76E+03	3.70E-02	4.59E-02	1.00E-02	1.70E+02	1.70E-01	4.59E-04	0.00E+00	1.76E-03	4.76E+04
Eu-154	2.14E-02	1.72E-02	7.93E+08	8.21E+02	3.70E-01	2.14E-03	5.00E-01	1.59E+00	1.59E-03	0.00E+00	0.00E+00	1.64E-05	2.22E+04
Pu-238	1.94E-02	3.89E+01	7.16E+08	7.42E+02	3.70E-04	1.94E+00	2.00E-04	3.58E+03	3.58E+00	1.14E-03	2.00E+01	3.71E-02	2.00E+04
U-234	9.74E-03	3.91E+00	3.60E+08	3.73E+02	3.70E-03	9.74E-02	1.00E-03	3.60E+02	3.60E-01	0.00E+00	0.00E+00	3.73E-03	1.01E+04
Pu-239	7.03E-03	1.41E+01	2.60E+08	2.69E+02	3.70E-04	7.03E-01	2.00E-04	1.30E+03	1.30E+00	1.13E-01	7.28E+00	1.35E-02	7.28E+03
Am-241	4.83E-03	9.69E+00	1.79E+08	1.85E+02	3.70E-04	4.83E-01	2.00E-04	8.93E+02	8.93E-01	0.00E+00	5.00E+00	9.25E-03	5.00E+03
U-233	2.11E-03	8.46E-01	7.79E+07	8.07E+01	3.70E-03	2.11E-02	1.00E-03	7.79E+01	7.79E-02	2.17E-01	0.00E+00	8.07E-04	2.18E+03
Cm-244	5.58E-04	5.61E-01	2.07E+07	2.14E+01	3.70E-04	5.58E-02	4.00E-04	5.17E+01	5.17E-02	0.00E+00	0.00E+00	5.35E-04	5.78E+02
U-235	3.40E-04	0.00E+00	1.26E+07	1.30E+01	3.70E-03	3.40E-03	Unlimited	0.00E+00	0.00E+00	1.55E+02	0.00E+00	0.00E+00	3.52E+02
U-236	9.03E-05	3.62E-02	3.34E+06	3.46E+00	3.70E-03	9.03E-04	1.00E-03	3.34E+00	3.34E-03	0.00E+00	0.00E+00	3.46E-05	9.35E+01
U-238	7.76E-05	0.00E+00	2.87E+06	2.97E+00	3.70E-03	7.76E-04	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.03E+01
Th-234	7.76E-05	1.56E-04	2.87E+06	2.97E+00	3.70E+00	7.76E-07	2.00E-01	1.43E-02	1.43E-05	0.00E+00	0.00E+00	1.49E-07	8.03E+01
Np-237	2.92E-05	5.86E-02	1.08E+06	1.12E+00	3.70E-04	2.92E-03	2.00E-04	5.40E+00	5.40E-03	0.00E+00	3.02E-02	5.60E-05	3.02E+01
Pa-233	2.92E-05	1.30E-05	1.08E+06	1.12E+00	3.70E+00	2.92E-07	9.00E-01	1.20E-03	1.20E-06	0.00E+00	0.00E+00	1.24E-08	3.02E+01
Total	1.26E+01	100.00%	4.66E+11	4.83E+05		7.07E+01		9.21E+03	9.21E+00	1.55E+02	3.24E+01	9.55E-02	1.31E+07

DOT regulated as Hazard Class 7 Radioactive Material

Contains a Reportable Quantity of a Hazardous Substance; use 'RQ(radionuclides)' as part of PSN

≥ Type A quantity; requires Type B Packaging

Does NOT meet LTD QTY Exception; Check if LSA

Meets Low Specific Activity (LSA)-II material - Check <Type A quantity and use Radioactive material, LSA, n.o.s. as PSN

>15 grams Fissile Material - use Radioactive material, fissile material, n.o.s. as PSN

This is a Low-level waste

Performed by: [signature] Date: 9/25/01

Reviewed by: _____ Date: _____

85 of 105

Section III: Check radionuclides for listing on labels and shipping papers; Check reportable radionuclides per Disposal Facility

Nuclide	Activity (Ci)	% of Total A2 Fraction	Cumulative A2 Fraction
Pu-238	1.94E-02	3.89E+01	3.89E+01
Sr-90	6.18E+00	2.48E+01	6.37E+01
Pu-239	7.03E-03	1.41E+01	7.78E+01
Am-241	4.83E-03	9.69E+00	8.75E+01
Cs-137	5.40E+00	4.33E+00	9.18E+01
U-234	9.74E-03	3.91E+00	9.57E+01
Pu-241	4.59E-02	1.84E+00	9.76E+01
Co-60	9.10E-01	9.14E-01	9.85E+01
U-233	2.11E-03	8.46E-01	9.93E+01
Cm-244	5.58E-04	5.61E-01	9.99E+01
Np-237	2.92E-05	5.86E-02	9.99E+01
U-236	9.03E-05	3.62E-02	1.00E+02
Eu-154	2.14E-02	1.72E-02	1.00E+02
Th-234	7.76E-05	1.56E-04	1.00E+02
Pa-233	2.92E-05	1.30E-05	1.00E+02
U-235	3.40E-04	0.00E+00	1.00E+02
U-238	7.76E-05	0.00E+00	1.00E+02

Nuclide	Activity (Ci)	% of Total Activity	Source Material (kg)	SNM (g)	Activity Conc. (Ci/m^3)
Sr-90	6.18E+00	4.91E+01	Not applicable	Not applicable	6.54E+00
Cs-137	5.40E+00	4.28E+01	Not applicable	Not applicable	5.70E+00
Co-60	9.10E-01	7.22E+00	Not applicable	Not applicable	9.62E-01
Pu-241	4.59E-02	3.65E-01	Not applicable	4.59E-04	4.86E-02
Eu-154	2.14E-02	1.70E-01	Not applicable	Not applicable	2.27E-02
Pu-238	1.94E-02	1.54E-01	Not applicable	1.14E-03	2.05E-02
U-234	9.74E-03	7.73E-02	Not applicable	Not applicable	1.03E-02
Pu-239	7.03E-03	5.58E-02	Not applicable	1.13E-01	7.43E-03
Am-241	4.83E-03	3.83E-02	Not applicable	Not applicable	5.10E-03
U-233	2.11E-03	1.67E-02	Not applicable	2.17E-01	2.23E-03
Cm-244	5.58E-04	4.43E-03	Not applicable	Not applicable	5.90E-04
U-235	3.40E-04	2.70E-03	Not applicable	1.55E+02	3.60E-04
U-236	9.03E-05	7.16E-04	Not applicable	Not applicable	9.54E-05
U-238	7.76E-05	6.16E-04	Not applicable	Not applicable	8.20E-05
Th-234	7.76E-05	6.16E-04	Not applicable	Not applicable	8.20E-05
Np-237	2.92E-05	2.32E-04	Not applicable	Not applicable	3.09E-05
Pa-233	2.92E-05	2.32E-04	Not applicable	Not applicable	3.09E-05

If #DIV/0! occurs in the Fraction of Waste Profile Column or the Does Nuclide Meet Waste Profile? Column of Section III, the nuclide is not included on the current profile and needs to be added.

Waste Classification Determination for near surface disposal per 10 CFR §61.55

Assume that Sr-90, Cs-137, Co-60, and H-3 are major nuclides driving waste classification determination for Tank V-9 wastes

Radionuclide	Table 2 limit (Ci/m^3) Column 1	Column 2	V-9 All Sludge w/AVG
Sr-90	0.04	150	6.54E+00
Cs-137	1	44	5.70E+00
Co-60	700	*	9.62E-01
H-3	40	*	0.00E+00

*Note: No limits established for these radionuclides in Class B or C wastes. Practical considerations such as the effects of external radiation and internal heat generation on transportation, handling, and disposal will limit the concentrations for these wastes. These wastes shall be Classs B unless the concentrations of other nuclides in Table 2 determine the waste to be Class C independent of these nuclides.

Class A Sum of Fractions:	169.09
Class B Sum of Fractions:	0.17
	Class B*

86 of 105

Container ID # **INEEL Tank V-9 Solids (22.73 gal per drum using AVG)**

Constants	Units
3.70E+10	Bq/Ci
453.6	g/lb
1.00E-12	TBq/Bq or Ci/pCi
1000.00	g/kg
1.00E+09	nCi/Ci

Section I. Waste Stream Information

Container Type: 55 Gallon Metal OH

Description: 22.73 gallons of Solids

Form#

PKE#

Note: assume solid phase volume of 22.73 gallons with density of 1.02 g/cc (41.3% of capacity)

Container Gross Wt (lb)	Container Gross Wt (kg)	Container Tare Wt (lb)	Container Tare Wt (kg)	Waste Net Wt (kg)	External Vol. (m3)	Est. Waste Vol. (m3)
243.50	110.45	50.00	22.68	87.77	0.261	0.086

Dose survey from Sxxxxx on xx/xx/00 shows < _____ mrem/hr OC.

Radioactive liquid effluents from hot cells, labs, and decon facilities at TAN and IETF.

Note: Gross weight of contents = (22.73 gal.)x(1.02 g/cc)x(3785.412 cc/gal.)x(2.2046E-03 lb/g) = 193.5 lbs.

EPA regulated hazardous COCs: Barium, Cadmium, Chromium, Lead, Mercury, Silver, VOCs, SVOCs, and PCBs.

Section II. List the radionuclides and activities; perform DOT RAM, RQ, LTD QTY, and Type A Packaging checks

Nuclide	Activity (Ci)	% of Total A2 Fraction	Activity (Bq)	Activity/gram (Bq/gram)	RQ limits (TBq)	RQ Ratios (amount/limit)	A2 Value (TBq)	LTD QTY Det. (amount/(10-3)A2)	Type A Pkg? (amount/A2)	DOT Fissile Mass (g)	TRU Conc. (nCi/g)	LSA-II Solids Frac	Activity/gram (pCi/g)
Sr-90	5.62E-01	2.48E+01	2.08E+10	2.37E+05	3.70E-03	5.62E+00	1.00E-01	2.08E+02	2.08E-01	0.00E+00	0.00E+00	2.37E-02	6.40E+06
Cs-137	4.91E-01	4.34E+00	1.82E+10	2.07E+05	3.70E-02	4.91E-01	5.00E-01	3.63E+01	3.63E-02	0.00E+00	0.00E+00	4.14E-03	5.59E+06
Co-60	8.28E-02	9.14E-01	3.06E+09	3.49E+04	3.70E-01	8.28E-03	4.00E-01	7.66E+00	7.66E-03	0.00E+00	0.00E+00	8.73E-04	9.43E+05
Pu-241	4.18E-03	1.84E+00	1.55E+08	1.76E+03	3.70E-02	4.18E-03	1.00E-02	1.55E+01	1.55E-02	4.18E-05	0.00E+00	1.76E-03	4.76E+04
Eu-154	1.95E-03	1.72E-02	7.21E+07	8.21E+02	3.70E-01	1.95E-04	5.00E-01	1.44E-01	1.44E-04	0.00E+00	0.00E+00	1.64E-05	2.22E+04
Pu-238	1.76E-03	3.89E+01	6.51E+07	7.42E+02	3.70E-04	1.76E-01	2.00E-04	3.25E+02	3.25E-01	1.03E-04	2.00E+01	3.71E-02	2.00E+04
U-234	8.85E-04	3.91E+00	3.28E+07	3.73E+02	3.70E-03	8.85E-03	1.00E-03	3.28E+01	3.28E-02	0.00E+00	0.00E+00	3.73E-03	1.01E+04
Pu-239	6.39E-04	1.41E+01	2.36E+07	2.69E+02	3.70E-04	6.39E-02	2.00E-04	1.18E+02	1.18E-01	1.03E-02	7.28E+00	1.35E-02	7.28E+03
Am-241	4.39E-04	9.69E+00	1.62E+07	1.85E+02	3.70E-04	4.39E-02	2.00E-04	8.12E+01	8.12E-02	0.00E+00	5.00E+00	9.25E-03	5.00E+03
U-233	1.91E-04	8.46E-01	7.08E+06	8.07E+01	3.70E-03	1.91E-03	1.00E-03	7.08E+00	7.08E-03	1.97E-02	0.00E+00	8.07E-04	2.18E+03
Cm-244	5.08E-05	5.61E-01	1.88E+06	2.14E+01	3.70E-04	5.08E-03	4.00E-04	4.70E+00	4.70E-03	0.00E+00	0.00E+00	5.35E-04	5.78E+02
U-235	3.09E-05	0.00E+00	1.14E+06	1.30E+01	3.70E-03	3.09E-04	Unlimited	0.00E+00	0.00E+00	1.41E+01	0.00E+00	0.00E+00	3.52E+02
U-236	8.20E-06	3.62E-02	3.04E+05	3.46E+00	3.70E-03	8.20E-05	1.00E-03	3.04E-01	3.04E-04	0.00E+00	0.00E+00	3.46E-05	9.35E+01
U-238	7.05E-06	0.00E+00	2.61E+05	2.97E+00	3.70E-03	7.05E-05	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.03E+01
Th-234	7.05E-06	1.56E-04	2.61E+05	2.97E+00	3.70E+00	7.05E-08	2.00E-01	1.30E-03	1.30E-06	0.00E+00	0.00E+00	1.49E-07	8.03E+01
Np-237	2.65E-06	5.86E-02	9.82E+04	1.12E+00	3.70E-04	2.65E-04	2.00E-04	4.91E-01	4.91E-04	0.00E+00	3.02E-02	5.59E-05	3.02E+01
Pa-233	2.65E-06	1.30E-05	9.82E+04	1.12E+00	3.70E+00	2.65E-08	9.00E-01	1.09E-04	1.09E-07	0.00E+00	0.00E+00	1.24E-08	3.02E+01
Total	1.15E+00	100.00%	4.24E+10	4.83E+05		6.42E+00		8.38E+02	8.38E-01	1.41E+01	3.23E+01	9.54E-02	1.31E+07

DOT regulated as Hazard Class 7 Radioactive Material

Contains a Reportable Quantity of a Hazardous Substance; use 'RQ(radionuclides)' as part of PSN

< Type A quantity/package per 49 CFR 173.431(a); check if excepted quantity -> excepted packaging

Does NOT meet LTD QTY Exception; Check if LSA

Performed by: [signature] Date: 9/25/01

Meets Low Specific Activity (LSA)-II material - Check <Type A quantity and use Radioactive material, LSA, n.o.s. as PSN

Meets criteria for Fissile Excepted Package per 49 CFR 173.453

This is a Low-level waste

Reviewed by: _____ Date: _____

87 of 105

Section III: Check radionuclides for listing on labels and shipping papers; Check reportable radionuclides per Disposal Facility

Nuclide	Activity (Ci)	% of Total A2 Fraction	Cumulative A2 Fraction
Pu-238	1.76E-03	3.89E+01	3.89E+01
Sr-90	5.62E-01	2.48E+01	6.37E+01
Pu-239	6.39E-04	1.41E+01	7.78E+01
Am-241	4.39E-04	9.69E+00	8.75E+01
Cs-137	4.90E-01	4.33E+00	9.18E+01
U-234	8.85E-04	3.91E+00	9.57E+01
Pu-241	4.18E-03	1.84E+00	9.76E+01
Co-60	8.27E-02	9.14E-01	9.85E+01
U-233	1.91E-04	8.46E-01	9.93E+01
Cm-244	5.08E-05	5.61E-01	9.99E+01
Np-237	2.65E-06	5.86E-02	9.99E+01
U-236	8.20E-06	3.62E-02	1.00E+02
Eu-154	1.95E-03	1.72E-02	1.00E+02
Th-234	7.05E-06	1.56E-04	1.00E+02
Pa-233	2.65E-06	1.30E-05	1.00E+02
U-235	3.09E-05	0.00E+00	1.00E+02
U-238	7.05E-06	0.00E+00	1.00E+02

Nuclide	Activity (Ci)	% of Total Activity	Source Material (kg)	SNM (g)	Activity Conc. (Ci/m^3)
Sr-90	5.62E-01	4.90E+01	Not applicable	Not applicable	6.53E+00
Cs-137	4.91E-01	4.28E+01	Not applicable	Not applicable	5.71E+00
Co-60	8.28E-02	7.23E+00	Not applicable	Not applicable	9.63E-01
Pu-241	4.18E-03	3.64E-01	Not applicable	4.18E-05	4.86E-02
Eu-154	1.95E-03	1.70E-01	Not applicable	Not applicable	2.27E-02
Pu-238	1.76E-03	1.54E-01	Not applicable	1.03E-04	2.05E-02
U-234	8.85E-04	7.73E-02	Not applicable	Not applicable	1.03E-02
Pu-239	6.39E-04	5.57E-02	Not applicable	1.03E-02	7.43E-03
Am-241	4.39E-04	3.83E-02	Not applicable	Not applicable	5.10E-03
U-233	1.91E-04	1.67E-02	Not applicable	1.97E-02	2.23E-03
Cm-244	5.08E-05	4.43E-03	Not applicable	Not applicable	5.90E-04
U-235	3.09E-05	2.70E-03	Not applicable	1.41E+01	3.60E-04
U-236	8.20E-06	7.16E-04	Not applicable	Not applicable	9.54E-05
U-238	7.05E-06	6.15E-04	Not applicable	Not applicable	8.20E-05
Th-234	7.05E-06	6.15E-04	Not applicable	Not applicable	8.20E-05
Np-237	2.65E-06	2.32E-04	Not applicable	Not applicable	3.09E-05
Pa-233	2.65E-06	2.32E-04	Not applicable	Not applicable	3.09E-05

If #DIV/0! occurs in the Fraction of Waste Profile Column or the Does Nuclide Meet Waste Profile? Column of Section III, the nuclide is not included on the current profile and needs to be added.

Waste Classification Determination for near surface disposal per 10 CFR §61.55

Assume that Sr-90, Cs-137, Co-60, and H-3 are major nuclides driving waste classification determination for Tank V-9 wastes

Radionuclide	Table 2 limit (Ci/m^3) Column 1	Column 2	V-9 Sludge (22.7 gal/drum w/AVG)
Sr-90	0.04	150	6.53E+00
Cs-137	1	44	5.71E+00
Co-60	700	*	9.63E-01
H-3	40	*	0.00E+00

Class A Sum of Fractions: 169.08

Class B Sum of Fractions: 0.17

Class B*

*Note: No limits established for these radionuclides in Class B or C wastes. Practical considerations such as the effects of external radiation and internal heat generation on transportation, handling, and disposal will limit the concentrations for these wastes. These wastes shall be Classs B unless the concentrations of other nuclides in Table 2 determine the waste to be Class C independent of these nuclides.

88 7 105

Container ID # **INEEL Tank V-9 Solids (Total w/MAX)**

Constants	Units
3.70E+10	Bq/Ci
453.6	g/lb
1.00E-12	TBq/Bq or Ci/pCi
1000.00	g/kg
1.00E+09	nCi/Ci

Section I. Waste Stream Information

Container Type: N/A

Description: 250 gallons of Solids

Form#

PKE#

Note: assume solid phase volume of 250 gallons with density of 1.02 g/cc

Container Gross Wt (lb)	Container Gross Wt (kg)	Container Tare Wt (lb)	Container Tare Wt (kg)	Waste Net Wt (kg)	External Vol. (m3)	Est. Waste Vol. (m3)
2128.10	965.31	0.00	0.00	965.31	#N/A	0.946

Note: Gross weight of contents = (250 gal.)x(1.02 g/cc)x(3785.412 cc/gal.)x(2.2046E-03 lb/g) = 2,128.1 lbs.

Dose survey from Sxxxxx on xx/xx/00 shows < [ ] mrem/hr OC.

Radioactive liquid effluents from hot cells, labs, and decon facilities at TAN and IETF.

EPA regulated hazardous COCs: Barium, Cadmium, Chromium, Lead, Mercury, Silver, VOCs, SVOCs, and PCBs.

Section II. List the radionuclides and activities; perform DOT RAM, RQ, LTD QTY, and Type A Packaging checks

Nuclide	Activity (Ci)	% of Total A2 Fraction	Activity (Bq)	Activity/gram (Bq/gram)	RQ limits (TBq)	RQ Ratios (amount/limit)	A2 Value (TBq)	LTD QTY Det. (amount/(10-3)A2)	Type A Pkg? (amount/A2)	DOT Fissile Mass (g)	TRU Conc. (nCi/g)	LSA-II Solids Frac	Activity/gram (pCi/g)
Sr-90	6.82E+00	2.22E+01	2.53E+11	2.62E+05	3.70E-03	6.82E+01	1.00E-01	2.53E+03	2.53E+00	0.00E+00	0.00E+00	2.62E-02	7.07E+06
Cs-137	6.15E+00	4.00E+00	2.28E+11	2.36E+05	3.70E-02	6.15E+00	5.00E-01	4.55E+02	4.55E-01	0.00E+00	0.00E+00	4.71E-03	6.37E+06
Co-60	1.12E+00	9.10E-01	4.14E+10	4.29E+04	3.70E-01	1.12E-01	4.00E-01	1.04E+02	1.04E-01	0.00E+00	0.00E+00	1.07E-03	1.16E+06
Pu-241	5.24E-02	1.70E+00	1.94E+09	2.01E+03	3.70E-02	5.24E-02	1.00E-02	1.94E+02	1.94E-01	5.24E-04	0.00E+00	2.01E-03	5.43E+04
Pu-238	2.76E-02	4.49E+01	1.02E+09	1.06E+03	3.70E-04	2.76E+00	2.00E-04	5.11E+03	5.11E+00	1.62E-03	2.86E+01	5.29E-02	2.86E+04
Eu-154	2.14E-02	1.39E-02	7.93E+08	8.21E+02	3.70E-01	2.14E-03	5.00E-01	1.59E+00	1.59E-03	0.00E+00	0.00E+00	1.64E-05	2.22E+04
U-234	1.26E-02	4.11E+00	4.68E+08	4.85E+02	3.70E-03	1.26E-01	1.00E-03	4.68E+02	4.68E-01	0.00E+00	0.00E+00	4.85E-03	1.31E+04
Pu-239	7.12E-03	1.16E+01	2.64E+08	2.73E+02	3.70E-04	7.12E-01	2.00E-04	1.32E+03	1.32E+00	1.15E-01	7.38E+00	1.37E-02	7.38E+03
Am-241	5.50E-03	8.94E+00	2.04E+08	2.11E+02	3.70E-04	5.50E-01	2.00E-04	1.02E+03	1.02E+00	0.00E+00	5.70E+00	1.05E-02	5.70E+03
U-233	3.30E-03	1.07E+00	1.22E+08	1.27E+02	3.70E-03	3.30E-02	1.00E-03	1.22E+02	1.22E-01	3.40E-01	0.00E+00	1.27E-03	3.42E+03
Cm-244	6.80E-04	5.52E-01	2.51E+07	2.60E+01	3.70E-04	6.80E-02	4.00E-04	6.29E+01	6.29E-02	0.00E+00	0.00E+00	6.51E-04	7.04E+02
U-235	4.34E-04	0.00E+00	1.61E+07	1.66E+01	3.70E-03	4.34E-03	Unlimited	0.00E+00	0.00E+00	1.97E+02	0.00E+00	0.00E+00	4.50E+02
U-236	1.23E-04	3.98E-02	4.54E+06	4.70E+00	3.70E-03	1.23E-03	1.00E-03	4.54E+00	4.54E-03	0.00E+00	0.00E+00	4.70E-05	1.27E+02
U-238	7.96E-05	0.00E+00	2.95E+06	3.05E+00	3.70E-03	7.96E-04	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.25E+01
Th-234	7.96E-05	1.29E-04	2.95E+06	3.05E+00	3.70E+00	7.96E-07	2.00E-01	1.47E-02	1.47E-05	0.00E+00	0.00E+00	1.53E-07	8.25E+01
Np-237	3.21E-05	5.22E-02	1.19E+06	1.23E+00	3.70E-04	3.21E-03	2.00E-04	5.95E+00	5.95E-03	0.00E+00	3.33E-02	6.16E-05	3.33E+01
Pa-233	3.21E-05	1.16E-05	1.19E+06	1.23E+00	3.70E+00	3.21E-07	9.00E-01	1.32E-03	1.32E-06	0.00E+00	0.00E+00	1.37E-08	3.33E+01
Total	1.42E+01	100.00%	5.26E+11	5.45E+05		7.88E+01		1.14E+04	1.14E+01	1.98E+02	4.17E+01	1.18E-01	1.47E+07

DOT regulated as Hazard Class 7 Radioactive Material

Contains a Reportable Quantity of a Hazardous Substance; use 'RQ(radionuclides)' as part of PSN

≥ Type A quantity; requires Type B Packaging

Does NOT meet LTD QTY Exception; Check if LSA

Meets Low Specific Activity (LSA)-II material - Check <Type A quantity and use Radioactive material, LSA, n.o.s. as PSN

>15 grams Fissile Material - use Radioactive material, fissile material, n.o.s. as PSN

This is a Low-level waste

Performed by: Gordon Harris Date: 9/25/01

Reviewed by: _____ Date: _____

89 of 105

Section III: Check radionuclides for listing on labels and shipping papers; Check reportable radionuclides per Disposal Facility

Nuclide	Activity (Ci)	% of Total A2 Fraction	Cumulative A2 Fraction
Pu-238	2.76E-02	4.49E+01	4.49E+01
Sr-90	6.82E+00	2.22E+01	6.70E+01
Pu-239	7.12E-03	1.16E+01	7.86E+01
Am-241	5.50E-03	8.94E+00	8.76E+01
U-234	1.26E-02	4.11E+00	9.17E+01
Cs-137	6.15E+00	4.00E+00	9.57E+01
Pu-241	5.24E-02	1.70E+00	9.74E+01
U-233	3.30E-03	1.07E+00	9.84E+01
Co-60	1.12E+00	9.10E-01	9.93E+01
Cm-244	6.80E-04	5.52E-01	9.99E+01
Np-237	3.21E-05	5.22E-02	9.99E+01
U-236	1.23E-04	3.98E-02	1.00E+02
Eu-154	2.14E-02	1.39E-02	1.00E+02
Th-234	7.96E-05	1.29E-04	1.00E+02
Pa-233	3.21E-05	1.16E-05	1.00E+02
U-235	4.34E-04	0.00E+00	1.00E+02
U-238	7.96E-05	0.00E+00	1.00E+02

Nuclide	Activity (Ci)	% of Total Activity	Source Material (kg)	SNM (g)	Activity Conc. (Ci/m^3)
Sr-90	6.82E+00	4.80E+01	Not applicable	Not applicable	7.21E+00
Cs-137	6.15E+00	4.32E+01	Not applicable	Not applicable	6.50E+00
Co-60	1.12E+00	7.87E+00	Not applicable	Not applicable	1.18E+00
Pu-241	5.24E-02	3.68E-01	Not applicable	5.24E-04	5.54E-02
Pu-238	2.76E-02	1.94E-01	Not applicable	1.62E-03	2.92E-02
Eu-154	2.14E-02	1.51E-01	Not applicable	Not applicable	2.27E-02
U-234	1.26E-02	8.89E-02	Not applicable	Not applicable	1.34E-02
Pu-239	7.12E-03	5.01E-02	Not applicable	1.15E-01	7.53E-03
Am-241	5.50E-03	3.87E-02	Not applicable	Not applicable	5.82E-03
U-233	3.30E-03	2.32E-02	Not applicable	3.40E-01	3.49E-03
Cm-244	6.80E-04	4.78E-03	Not applicable	Not applicable	7.18E-04
U-235	4.34E-04	3.05E-03	Not applicable	1.97E+02	4.59E-04
U-236	1.23E-04	8.62E-04	Not applicable	Not applicable	1.30E-04
U-238	7.96E-05	5.60E-04	Not applicable	Not applicable	8.42E-05
Th-234	7.96E-05	5.60E-04	Not applicable	Not applicable	8.42E-05
Np-237	3.21E-05	2.26E-04	Not applicable	Not applicable	3.40E-05
Pa-233	3.21E-05	2.26E-04	Not applicable	Not applicable	3.40E-05

If #DIV/0! occurs in the Fraction of Waste Profile Column or the Does Nuclide Meet Waste Profile? Column of Section III, the nuclide is not included on the current profile and needs to be added.

Waste Classification Determination for near surface disposal per 10 CFR §61.55

Assume that Sr-90, Cs-137, Co-60, and H-3 are major nuclides driving waste classification determination for Tank V-9 wastes

Radionuclide	Table 2 limit (Ci/m^3) Column 1	Column 2	V-9 All Sludge w/MAX
Sr-90	0.04	150	7.21E+00
Cs-137	1	44	6.50E+00
Co-60	700	*	1.18E+00
H-3	40	*	0.00E+00

*Note: No limits established for these radionuclides in Class B or C wastes. Practical considerations such as the effects of external radiation and internal heat generation on transportation, handling, and disposal will limit the concentrations for these wastes. These wastes shall be Classs B unless the concentrations of other nuclides in Table 2 determine the waste to be Class C independent of these nuclides.

Class A Sum of Fractions:	186.85
Class B Sum of Fractions:	0.20
	Class B*

90 of 105

Container ID # **INEEL Tank V-9 Solids (17.85 gal per drum using MAX)**

Constants	Units
3.70E+10	Bq/Ci
453.6	g/lb
1.00E-12	TBq/Bq or Ci/pCi
1000.00	g/kg
1.00E+09	nCi/Ci

Section I. Waste Stream Information

Container Type: 55 Gallon Metal OH

Description: 17.85 gallons of Solids

Form#

PKE#

Note: assume solid phase volume of 17.85 gallons with density of 1.02 g/cc (32.47% of capacity)

Container Gross Wt (lb)	Container Gross Wt (kg)	Container Tare Wt (lb)	Container Tare Wt (kg)	Waste Net Wt (kg)	External Vol. (m3)	Est. Waste Vol. (m3)
201.90	91.58	50.00	22.68	68.90	0.261	0.068

Dose survey from Sxxxxx on xx/xx/00 shows < _____ mrem/hr OC.

Radioactive liquid effluents from hot cells, labs, and decon facilities at TAN and IETF.

Note: Gross weight of contents = (17.85 gal.)x(1.02 g/cc)x(3785.412 cc/gal.)x(2.2046E-03 lb/g) = 151.9 lbs.

EPA regulated hazardous COCs: Barium, Cadmium, Chromium, Lead, Mercury, Silver, VOCs, SVOCs, and PCBs.

Section II. List the radionuclides and activities; perform DOT RAM, RQ, LTD QTY, and Type A Packaging checks

Nuclide	Activity (Ci)	% of Total A2 Fraction	Activity (Bq)	Activity/gram (Bq/gram)	RQ limits (TBq)	RQ Ratios (amount/limit)	A2 Value (TBq)	LTD QTY Det. (amount/(10-3)A2	Type A Pkg? (amount/A2)	DOT Fissile Mass (g)	TRU Conc. (nCi/g)	LSA-II Solids Frac	Activity/gram (pCi/g)
Sr-90	4.87E-01	2.22E+01	1.80E+10	2.62E+05	3.70E-03	4.87E+00	1.00E-01	1.80E+02	1.80E-01	0.00E+00	0.00E+00	2.62E-02	7.07E+06
Cs-137	4.39E-01	4.00E+00	1.62E+10	2.36E+05	3.70E-02	4.39E-01	5.00E-01	3.25E+01	3.25E-02	0.00E+00	0.00E+00	4.72E-03	6.37E+06
Co-60	7.99E-02	9.10E-01	2.96E+09	4.29E+04	3.70E-01	7.99E-03	4.00E-01	7.40E+00	7.40E-03	0.00E+00	0.00E+00	1.07E-03	1.16E+06
Pu-241	3.74E-03	1.70E+00	1.38E+08	2.01E+03	3.70E-02	3.74E-03	1.00E-02	1.38E+01	1.38E-02	3.74E-05	0.00E+00	2.01E-03	5.43E+04
Pu-238	1.97E-03	4.49E+01	7.29E+07	1.06E+03	3.70E-04	1.97E-01	2.00E-04	3.65E+02	3.65E-01	1.16E-04	2.86E+01	5.29E-02	2.86E+04
Eu-154	1.53E-03	1.39E-02	5.66E+07	8.22E+02	3.70E-01	1.53E-04	5.00E-01	1.13E-01	1.13E-04	0.00E+00	0.00E+00	1.64E-05	2.22E+04
U-234	9.03E-04	4.11E+00	3.34E+07	4.85E+02	3.70E-03	9.03E-03	1.00E-03	3.34E+01	3.34E-02	0.00E+00	0.00E+00	4.85E-03	1.31E+04
Pu-239	5.09E-04	1.16E+01	1.88E+07	2.73E+02	3.70E-04	5.09E-02	2.00E-04	9.41E+01	9.41E-02	8.20E-03	7.38E+00	1.37E-02	7.38E+03
Am-241	3.93E-04	8.94E+00	1.45E+07	2.11E+02	3.70E-04	3.93E-02	2.00E-04	7.27E+01	7.27E-02	0.00E+00	5.70E+00	1.05E-02	5.70E+03
U-233	2.36E-04	1.07E+00	8.72E+06	1.27E+02	3.70E-03	2.36E-03	1.00E-03	8.72E+00	8.72E-03	2.43E-02	0.00E+00	1.27E-03	3.42E+03
Cm-244	4.85E-05	5.52E-01	1.80E+06	2.61E+01	3.70E-04	4.85E-03	4.00E-04	4.49E+00	4.49E-03	0.00E+00	0.00E+00	6.51E-04	7.04E+02
U-235	3.10E-05	0.00E+00	1.15E+06	1.67E+01	3.70E-03	3.10E-04	Unlimited	0.00E+00	0.00E+00	1.41E+01	0.00E+00	0.00E+00	4.50E+02
U-236	8.75E-06	3.98E-02	3.24E+05	4.70E+00	3.70E-03	8.75E-05	1.00E-03	3.24E-01	3.24E-04	0.00E+00	0.00E+00	4.70E-05	1.27E+02
U-238	5.69E-06	0.00E+00	2.10E+05	3.05E+00	3.70E-03	5.69E-05	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.25E+01
Th-234	5.69E-06	1.29E-04	2.10E+05	3.05E+00	3.70E+00	5.69E-08	2.00E-01	1.05E-03	1.05E-06	0.00E+00	0.00E+00	1.53E-07	8.25E+01
Np-237	2.30E-06	5.22E-02	8.49E+04	1.23E+00	3.70E-04	2.30E-04	2.00E-04	4.25E-01	4.25E-04	0.00E+00	3.33E-02	6.16E-05	3.33E+01
Pa-233	2.30E-06	1.16E-05	8.49E+04	1.23E+00	3.70E+00	2.30E-08	9.00E-01	9.44E-05	9.44E-08	0.00E+00	0.00E+00	1.37E-08	3.33E+01
Total	1.02E+00	100.00%	3.76E+10	5.45E+05		5.63E+00		8.13E+02	8.13E-01	1.41E+01	4.17E+01	1.18E-01	1.47E+07

DOT regulated as Hazard Class 7 Radioactive Material

Contains a Reportable Quantity of a Hazardous Substance; use 'RQ(radionuclides)' as part of PSN

< Type A quantity/package per 49 CFR 173.431(a); check if excepted quantity -> excepted packaging

Does NOT meet LTD QTY Exception; Check if LSA

Performed by: [signature] Date: 9/25/01

Meets Low Specific Activity (LSA)-II material - Check <Type A quantity and use Radioactive material, LSA, n.o.s. as PSN

Meets criteria for Fissile Excepted Package per 49 CFR 173.453

This is a Low-level waste

Reviewed by: _____ Date: _____

9/25/01

Section III: Check radionuclides for listing on labels and shipping papers; Check reportable radionuclides per Disposal Facility

Nuclide	Activity (Ci)	% of Total A2 Fraction	Cumulative A2 Fraction
Pu-238	1.97E-03	4.49E+01	4.49E+01
Sr-90	4.87E-01	2.22E+01	6.70E+01
Pu-239	5.09E-04	1.16E+01	7.86E+01
Am-241	3.93E-04	8.94E+00	8.76E+01
U-234	9.03E-04	4.11E+00	9.17E+01
Cs-137	4.39E-01	4.00E+00	9.57E+01
Pu-241	3.74E-03	1.70E+00	9.74E+01
U-233	2.36E-04	1.07E+00	9.84E+01
Co-60	7.99E-02	9.10E-01	9.93E+01
Cm-244	4.85E-05	5.52E-01	9.99E+01
Np-237	2.30E-06	5.22E-02	9.99E+01
U-236	8.75E-06	3.98E-02	1.00E+02
Eu-154	1.53E-03	1.39E-02	1.00E+02
Th-234	5.69E-06	1.29E-04	1.00E+02
Pa-233	2.30E-06	1.16E-05	1.00E+02
U-235	3.10E-05	0.00E+00	1.00E+02
U-238	5.69E-06	0.00E+00	1.00E+02

Nuclide	Activity (Ci)	% of Total Activity	Source Material (kg)	SNM (g)	Activity Conc. (Ci/m^3)
Sr-90	4.87E-01	4.80E+01	Not applicable	Not applicable	7.17E+00
Cs-137	4.39E-01	4.32E+01	Not applicable	Not applicable	6.46E+00
Co-60	7.99E-02	7.87E+00	Not applicable	Not applicable	1.18E+00
Pu-241	3.74E-03	3.68E-01	Not applicable	3.74E-05	5.50E-02
Pu-238	1.97E-03	1.94E-01	Not applicable	1.16E-04	2.90E-02
Eu-154	1.53E-03	1.51E-01	Not applicable	Not applicable	2.25E-02
U-234	9.03E-04	8.89E-02	Not applicable	Not applicable	1.33E-02
Pu-239	5.09E-04	5.01E-02	Not applicable	8.20E-03	7.48E-03
Am-241	3.93E-04	3.87E-02	Not applicable	Not applicable	5.78E-03
U-233	2.36E-04	2.32E-02	Not applicable	2.43E-02	3.47E-03
Cm-244	4.85E-05	4.78E-03	Not applicable	Not applicable	7.14E-04
U-235	3.10E-05	3.05E-03	Not applicable	1.41E+01	4.56E-04
U-236	8.75E-06	8.62E-04	Not applicable	Not applicable	1.29E-04
U-238	5.69E-06	5.60E-04	Not applicable	Not applicable	8.36E-05
Th-234	5.69E-06	5.60E-04	Not applicable	Not applicable	8.36E-05
Np-237	2.30E-06	2.26E-04	Not applicable	Not applicable	3.38E-05
Pa-233	2.30E-06	2.26E-04	Not applicable	Not applicable	3.38E-05

If #DIV/0! occurs in the Fraction of Waste Profile Column or the Does Nuclide Meet Waste Profile? Column of Section III, the nuclide is not included on the current profile and needs to be added.

Waste Classification Determination for near surface disposal per 10 CFR §61.55

Assume that Sr-90, Cs-137, Co-60, and H-3 are major nuclides driving waste classification determination for Tank V-9 wastes

Radionuclide	Table 2 limit (Ci/m^3) Column 1	Column 2	V-9 Sludge (17.9 gal/drum w/AVG)
Sr-90	0.04	150	7.17E+00
Cs-137	1	44	6.46E+00
Co-60	700	*	1.18E+00
H-3	40	*	0.00E+00

*Note: No limits established for these radionuclides in Class B or C wastes. Practical considerations such as the effects of external radiation and internal heat generation on transportation, handling, and disposal will limit the concentrations for these wastes. These wastes shall be Classs B unless the concentrations of other nuclides in Table 2 determine the waste to be Class C independent of these nuclides.

Class A Sum of Fractions: 185.60

Class B Sum of Fractions: 0.19

Class B*

92 of 105

Container ID # **INEEL Tank V-9 Liquids (Total)**

Constants	Units
3.70E+10	Bq/Ci
453.6	g/lb
1.00E-12	TBq/Bq or Ci/pCi
1000.00	g/kg
1.00E+09	nCi/Ci

Section I. Waste Stream Information

Container Type: N/A Form#

Description: 70 gallons of liquids PKE#

NTS Waste Stream # #N/A

SNL Waste Stream# #N/A

Note: assume liquid phase volume of 70 gallons with density of 1.00 g/ml

Container Gross Wt (lb)	Container Gross Wt (kg)	Container Tare Wt (lb)	Container Tare Wt (kg)	Waste Net Wt (kg)	External Vol. (m3)	Est. Waste Vol. (m3)
584.20	264.99	0.00	0.00	264.99	#N/A	0.265

Note: Gross weight of contents = (70 gal.)x(1.0 g/ml)x(3785.412 ml/gal.)x(2.2046E-03 lb/g) = 584.2 lb

Dose survey from Sxxxxx on xx/xx/00 shows < mrem/hr OC.

Radioactive liquid effluents from hot cells, labs, and decon facilities at TAN and IETF.

EPA regulated hazardous COCs: Barium, Cadmium, Chromium, Lead, Mercury, Silver, VOCs, SVOCs, and PCBs.

Section II. List the radionuclides and activities; perform DOT RAM, RQ, LTD QTY, and Type A Packaging checks

Nuclide	Activity (Ci)	% of Total A2 Fraction	Activity (Bq)	Activity/gram (Bq/gram)	RQ limits (TBq)	RQ Ratios (amount/limit)	A2 Value (TBq)	LTD QTY Det. (amount/(10-4)A2)	Type A Pkg? (amount/A2)	DOT Fissile Mass (g)	TRU Conc. (nCi/g)	LSA-II Liquids Fraction	Activity/gram (pCi/g)
H-3	9.35E-02	2.17E-01	3.46E+09	1.31E+04	3.70E+00	9.35E-04	4.00E+01	8.65E-01	8.65E-05	0.00E+00	0.00E+00	3.27E-05	3.53E+05
Sr-90	6.62E-02	6.15E+01	2.45E+09	9.25E+03	3.70E-03	6.62E-01	1.00E-01	2.45E+02	2.45E-02	0.00E+00	0.00E+00	9.25E-03	2.50E+05
Cs-137	1.11E-04	2.07E-02	4.12E+06	1.55E+01	3.70E-02	1.11E-04	5.00E-01	8.24E-02	8.24E-06	0.00E+00	0.00E+00	3.11E-06	4.20E+02
Pu-241	1.01E-04	9.41E-01	3.75E+06	1.42E+01	3.70E-02	1.01E-04	1.00E-02	3.75E+00	3.75E-04	1.01E-06	0.00E+00	1.42E-04	3.83E+02
U-234	5.59E-05	5.19E+00	2.07E+06	7.81E+00	3.70E-03	5.59E-04	1.00E-03	2.07E+01	2.07E-03	0.00E+00	0.00E+00	7.81E-04	2.11E+02
Pu-238	4.50E-05	2.09E+01	1.67E+06	6.29E+00	3.70E-04	4.50E-03	2.00E-04	8.33E+01	8.33E-03	2.65E-06	1.70E-01	3.14E-03	1.70E+02
Pu-239	1.20E-05	5.57E+00	4.44E+05	1.68E+00	3.70E-04	1.20E-03	2.00E-04	2.22E+01	2.22E-03	1.94E-04	4.53E-02	8.38E-04	4.53E+01
Am-241	1.07E-05	4.94E+00	3.94E+05	1.49E+00	3.70E-04	1.07E-03	2.00E-04	1.97E+01	1.97E-03	0.00E+00	4.02E-02	7.44E-04	4.02E+01
U-233	3.29E-06	3.05E-01	1.22E+05	4.59E-01	3.70E-03	3.29E-05	1.00E-03	1.22E+00	1.22E-04	3.39E-04	0.00E+00	4.59E-05	1.24E+01
U-235	1.83E-06	0.00E+00	6.76E+04	2.55E-01	3.70E-03	1.83E-05	Unlimited	0.00E+00	0.00E+00	8.31E-01	0.00E+00	0.00E+00	6.90E+00
Cm-244	1.38E-06	3.20E-01	5.11E+04	1.93E-01	3.70E-04	1.38E-04	4.00E-04	1.28E+00	1.28E-04	0.00E+00	0.00E+00	4.82E-05	5.21E+00
U-236	8.64E-07	8.02E-02	3.20E+04	1.21E-01	3.70E-03	8.64E-06	1.00E-03	3.20E-01	3.20E-05	0.00E+00	0.00E+00	1.21E-05	3.26E+00
Co-60	3.13E-07	7.26E-05	1.16E+04	4.37E-02	3.70E-01	3.13E-08	4.00E-01	2.89E-04	2.89E-08	0.00E+00	0.00E+00	1.09E-08	1.18E+00
U-238	2.58E-07	0.00E+00	9.53E+03	3.60E-02	3.70E-03	2.58E-06	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.72E-01
Th-234	2.58E-07	1.20E-04	9.53E+03	3.60E-02	3.70E+00	2.58E-09	2.00E-01	4.76E-04	4.76E-08	0.00E+00	0.00E+00	1.80E-08	9.72E-01
Eu-152	1.50E-07	1.55E-05	5.55E+03	2.09E-02	3.70E-01	1.50E-08	9.00E-01	6.17E-05	6.17E-09	0.00E+00	0.00E+00	2.33E-09	5.66E-01
Eu-154	7.21E-08	1.34E-05	2.67E+03	1.01E-02	3.70E-01	7.21E-09	5.00E-01	5.33E-05	5.33E-09	0.00E+00	0.00E+00	2.01E-09	2.72E-01
Np-237	5.30E-08	2.46E-02	1.96E+03	7.40E-03	3.70E-04	5.30E-06	2.00E-04	9.80E-02	9.80E-06	0.00E+00	2.00E-04	3.70E-06	2.00E-01
Pa-233	5.30E-08	5.47E-06	1.96E+03	7.40E-03	3.70E+00	5.30E-10	9.00E-01	2.18E-05	2.18E-09	0.00E+00	0.00E+00	8.22E-10	2.00E-01
Total	1.60E-01	100.00%	5.92E+09	2.24E+04		6.71E-01		3.99E+02	3.99E-02	8.32E-01	2.56E-01	1.50E-02	6.04E+05

DOT regulated as Hazard Class 7 Radioactive Material

NOT an RQ amount of a Hazardous Substance

< Type A quantity/package per 49 CFR 173.431(a); check if excepted quantity -> excepted packaging

Does NOT meet LTD QTY Exception; Check if LSA

Meets Low Specific Activity (LSA)-II material - Check <Type A quantity and use Radioactive material, LSA, n.o.s. as PSN

Meets criteria for Fissile Excepted Package per 49 CFR 173.453

This is a Low-level waste

Performed by: Gordon Harris Date: 9/25/01

Reviewed by: _____ Date: _____

93 of 105

Section III: Check radionuclides for listing on labels and shipping papers

Nuclide	Activity (Ci)	% of Total A2 Fraction	Cumulative A2 Fraction
Sr-90	6.62E-02	6.15E+01	6.15E+01
Pu-238	4.50E-05	2.09E+01	8.24E+01
Pu-239	1.20E-05	5.57E+00	8.80E+01
U-234	5.59E-05	5.19E+00	9.31E+01
Am-241	1.07E-05	4.94E+00	9.81E+01
Pu-241	1.01E-04	9.41E-01	9.90E+01
Cm-244	1.38E-06	3.20E-01	9.94E+01
U-233	3.29E-06	3.05E-01	9.97E+01
H-3	9.35E-02	2.17E-01	9.99E+01
U-236	8.64E-07	8.02E-02	1.00E+02
Np-237	5.30E-08	2.46E-02	1.00E+02
Cs-137	1.11E-04	2.07E-02	1.00E+02
Th-234	2.58E-07	1.20E-04	1.00E+02
Co-60	3.13E-07	7.26E-05	1.00E+02
Eu-152	1.50E-07	1.55E-05	1.00E+02
Eu-154	7.21E-08	1.34E-05	1.00E+02
Pa-233	5.30E-08	5.47E-06	1.00E+02
U-235	1.83E-06	0.00E+00	1.00E+02
U-238	2.58E-07	0.00E+00	1.00E+02

Nuclide	Activity (Ci)	% of Total Activity	Source Material (kg)	SNM (g)	Activity Conc. (Ci/m^3)
H-3	9.35E-02	5.84E+01	Not applicable	Not applicable	3.53E-01
Sr-90	6.62E-02	4.14E+01	Not applicable	Not applicable	2.50E-01
Cs-137	1.11E-04	6.95E-02	Not applicable	Not applicable	4.20E-04
Pu-241	1.01E-04	6.33E-02	Not applicable	1.01E-06	3.83E-04
U-234	5.59E-05	3.49E-02	Not applicable	Not applicable	2.11E-04
Pu-238	4.50E-05	2.81E-02	Not applicable	2.65E-06	1.70E-04
Pu-239	1.20E-05	7.50E-03	Not applicable	1.94E-04	4.53E-05
Am-241	1.07E-05	6.65E-03	Not applicable	Not applicable	4.02E-05
U-233	3.29E-06	2.05E-03	Not applicable	3.39E-04	1.24E-05
U-235	1.83E-06	1.14E-03	Not applicable	8.31E-01	6.90E-06
Cm-244	1.38E-06	8.62E-04	Not applicable	Not applicable	5.21E-06
U-236	8.64E-07	5.39E-04	Not applicable	Not applicable	3.26E-06
Co-60	3.13E-07	1.95E-04	Not applicable	Not applicable	1.18E-06
U-238	2.58E-07	1.61E-04	Not applicable	Not applicable	9.72E-07
Th-234	2.58E-07	1.61E-04	Not applicable	Not applicable	9.72E-07
Eu-152	1.50E-07	9.37E-05	Not applicable	Not applicable	5.66E-07
Eu-154	7.21E-08	4.50E-05	Not applicable	Not applicable	2.72E-07
Np-237	5.30E-08	3.31E-05	Not applicable	Not applicable	2.00E-07
Pa-233	5.30E-08	3.31E-05	Not applicable	Not applicable	2.00E-07

Waste Classification Determination for near surface disposal per 10 CFR §61.55

Assume that Sr-90, Cs-137, and Ni-63 are major nuclides driving waste classification determination for Tank V-1, V-2, and V-3 wastes

Radionuclide	Table 2 limit (Ci/m^3) Column 1	Column 2	V-9 All Liquid
H-3	40	*	3.53E-01
Cs-137	1	44	4.20E-04
Sr-90	0.04	150	2.50E-01
Ni-63	3.5	70	0.00E+00
Co-60	700	*	1.18E-06
Class A Sum of Fractions:			6.26
Class B Sum of Fractions:			0.00
			ClassB*

*Note: No limits established for these radionuclides in Class B or C wastes. Practical considerations such as the effects of external radiation and internal heat generation on transportation, handling, and disposal will limit the concentrations for these wastes. These wastes shall be Classs B unless the concentrations of other nuclides in Table 2 determine the waste to be Class C independent of these nuclides.

94 of 105

Container ID # **INEEL Tank V-9 Liquids (35 gal per drum)**

Constants	Units
3.70E+10	Bq/Ci
453.6	g/lb
1.00E-12	TBq/Bq or Ci/pCi
1000.00	g/kg
1.00E+09	nCi/Ci

Section I. Waste Stream Information

Container Type: 55 Gallon Metal OH

Description: 35 gallons of liquids

Form#

PKE#

Note: assume liquid phase volume of 35 gallons with density of 1.0 g/ml (63.64% of capacity)

Container Gross Wt (lb)	Container Gross Wt (kg)	Container Tare Wt (lb)	Container Tare Wt (kg)	Waste Net Wt (kg)	External Vol. (m3)	Est. Waste Vol. (m3)
342.10	155.18	50.00	22.68	132.50	0.261	0.133

Note: Gross weight of contents = (35 gal.)x(1.0 g/ml)x(3785.412 ml/gal.)x(2.2046E-03 lb/g) = 292.1 lb

Dose survey from Sxxxxx on xx/xx/00 shows < _____ mrem/hr OC.

Radioactive liquid effluents from hot cells, labs, and decon facilities at TAN and IETF.

EPA regulated hazardous COCs: Barium, Cadmium, Chromium, Lead, Mercury, Silver, VOCs, SVOCs, and PCBs.

Section II. List the radionuclides and activities; perform DOT RAM, RQ, LTD QTY, and Type A Packaging checks

Nuclide	Activity (Ci)	% of Total A2 Fraction	Activity (Bq)	Activity/gram (Bq/gram)	RQ limits (TBq)	RQ Ratios (amount/limit)	A2 Value (TBq)	LTD QTY Det. (amount/(10-4)A2	Type A Pkg? (amount/A2)	DOT Fissile Mass (g)	TRU Conc. (nCi/g)	LSA-II Liquids Fraction	Activity/gram (pCi/g)
H-3	4.68E-02	2.17E-01	1.73E+09	1.31E+04	3.70E+00	4.68E-04	4.00E+01	4.33E-01	4.33E-05	0.00E+00	0.00E+00	3.27E-05	3.53E+05
Sr-90	3.31E-02	6.15E+01	1.23E+09	9.25E+03	3.70E-03	3.31E-01	1.00E-01	1.23E+02	1.23E-02	0.00E+00	0.00E+00	9.25E-03	2.50E+05
Cs-137	5.56E-05	2.07E-02	2.06E+06	1.55E+01	3.70E-02	5.56E-05	5.00E-01	4.12E-02	4.12E-06	0.00E+00	0.00E+00	3.11E-06	4.20E+02
Pu-241	5.07E-05	9.41E-01	1.88E+06	1.42E+01	3.70E-02	5.07E-05	1.00E-02	1.88E+00	1.88E-04	5.07E-07	0.00E+00	1.42E-04	3.83E+02
U-234	2.80E-05	5.19E+00	1.03E+06	7.81E+00	3.70E-03	2.80E-04	1.00E-03	1.03E+01	1.03E-03	0.00E+00	0.00E+00	7.81E-04	2.11E+02
Pu-238	2.25E-05	2.09E+01	8.33E+05	6.29E+00	3.70E-04	2.25E-03	2.00E-04	4.17E+01	4.17E-03	1.32E-06	1.70E-01	3.14E-03	1.70E+02
Pu-239	6.00E-06	5.57E+00	2.22E+05	1.68E+00	3.70E-04	6.00E-04	2.00E-04	1.11E+01	1.11E-03	9.68E-05	4.53E-02	8.38E-04	4.53E+01
Am-241	5.33E-06	4.94E+00	1.97E+05	1.49E+00	3.70E-04	5.33E-04	2.00E-04	9.85E+00	9.85E-04	0.00E+00	4.02E-02	7.44E-04	4.02E+01
U-233	1.64E-06	3.05E-01	6.08E+04	4.59E-01	3.70E-03	1.64E-05	1.00E-03	6.08E-01	6.08E-05	1.69E-04	0.00E+00	4.59E-05	1.24E+01
U-235	9.14E-07	0.00E+00	3.38E+04	2.55E-01	3.70E-03	9.14E-06	Unlimited	0.00E+00	0.00E+00	4.16E-01	0.00E+00	0.00E+00	6.90E+00
Cm-244	6.90E-07	3.20E-01	2.55E+04	1.93E-01	3.70E-04	6.90E-05	4.00E-04	6.38E-01	6.38E-05	0.00E+00	0.00E+00	4.82E-05	5.21E+00
U-236	4.32E-07	8.02E-02	1.60E+04	1.21E-01	3.70E-03	4.32E-06	1.00E-03	1.60E-01	1.60E-05	0.00E+00	0.00E+00	1.21E-05	3.26E+00
Co-60	1.56E-07	7.26E-05	5.78E+03	4.37E-02	3.70E-01	1.56E-08	4.00E-01	1.45E-04	1.45E-08	0.00E+00	0.00E+00	1.09E-08	1.18E+00
U-238	1.29E-07	0.00E+00	4.76E+03	3.60E-02	3.70E-03	1.29E-06	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.72E-01
Th-234	1.29E-07	1.20E-04	4.76E+03	3.60E-02	3.70E+00	1.29E-09	2.00E-01	2.38E-04	2.38E-08	0.00E+00	0.00E+00	1.80E-08	9.72E-01
Eu-152	7.50E-08	1.55E-05	2.77E+03	2.09E-02	3.70E-01	7.50E-09	9.00E-01	3.08E-05	3.08E-09	0.00E+00	0.00E+00	2.33E-09	5.66E-01
Eu-154	3.60E-08	1.34E-05	1.33E+03	1.01E-02	3.70E-01	3.60E-09	5.00E-01	2.67E-05	2.67E-09	0.00E+00	0.00E+00	2.01E-09	2.72E-01
Np-237	2.65E-08	2.46E-02	9.80E+02	7.40E-03	3.70E-04	2.65E-06	2.00E-04	4.90E-02	4.90E-06	0.00E+00	2.00E-04	3.70E-06	2.00E-01
Pa-233	2.65E-08	5.47E-06	9.80E+02	7.40E-03	3.70E+00	2.65E-10	9.00E-01	1.09E-05	1.09E-09	0.00E+00	0.00E+00	8.22E-10	2.00E-01
Total	8.01E-02	100.00%	2.96E+09	2.24E+04		3.36E-01		1.99E+02	1.99E-02	4.16E-01	2.56E-01	1.50E-02	6.04E+05

DOT regulated as Hazard Class 7 Radioactive Material

NOT an RQ amount of a Hazardous Substance

< Type A quantity/package per 49 CFR 173.431(a); check if excepted quantity -> excepted packaging

Does NOT meet LTD QTY Exception; Check if LSA

Meets Low Specific Activity (LSA)-II material - Check <Type A quantity and use Radioactive material, LSA, n.o.s. as PSN

Meets criteria for Fissile Excepted Package per 49 CFR 173.453

This is a Low-level waste

Performed by: Gordon Harris Date: 9/25/01

Reviewed by: _____ Date: _____

95A105

Section III: Check radionuclides for listing on labels and shipping papers; Check reportable radionuclides per Disposal Facility

Nuclide	Activity (Ci)	% of Total A2 Fraction	Cumulative A2 Fraction
Sr-90	3.31E-02	6.15E+01	6.15E+01
Pu-238	2.25E-05	2.09E+01	8.24E+01
Pu-239	6.00E-06	5.57E+00	8.80E+01
U-234	2.80E-05	5.19E+00	9.31E+01
Am-241	5.33E-06	4.94E+00	9.81E+01
Pu-241	5.07E-05	9.41E-01	9.90E+01
Cm-244	6.90E-07	3.20E-01	9.94E+01
U-233	1.64E-06	3.05E-01	9.97E+01
H-3	4.68E-02	2.17E-01	9.99E+01
U-236	4.32E-07	8.02E-02	1.00E+02
Np-237	2.65E-08	2.46E-02	1.00E+02
Cs-137	5.56E-05	2.07E-02	1.00E+02
Th-234	1.29E-07	1.20E-04	1.00E+02
Co-60	1.56E-07	7.26E-05	1.00E+02
Eu-152	7.50E-08	1.55E-05	1.00E+02
Eu-154	3.60E-08	1.34E-05	1.00E+02
Pa-233	2.65E-08	5.47E-06	1.00E+02
U-235	9.14E-07	0.00E+00	1.00E+02
U-238	1.29E-07	0.00E+00	1.00E+02

Nuclide	Activity (Ci)	% of Total Activity	Source Material (kg)	SNM (g)	Activity Conc. (Ci/m^3)
H-3	4.68E-02	5.84E+01	Not applicable	Not applicable	3.53E-01
Sr-90	3.31E-02	4.14E+01	Not applicable	Not applicable	2.50E-01
Cs-137	5.56E-05	6.95E-02	Not applicable	Not applicable	4.20E-04
Pu-241	5.07E-05	6.33E-02	Not applicable	5.07E-07	3.83E-04
U-234	2.80E-05	3.49E-02	Not applicable	Not applicable	2.11E-04
Pu-238	2.25E-05	2.81E-02	Not applicable	1.32E-06	1.70E-04
Pu-239	6.00E-06	7.50E-03	Not applicable	9.68E-05	4.53E-05
Am-241	5.33E-06	6.65E-03	Not applicable	Not applicable	4.02E-05
U-233	1.64E-06	2.05E-03	Not applicable	1.69E-04	1.24E-05
U-235	9.14E-07	1.14E-03	Not applicable	4.16E-01	6.90E-06
Cm-244	6.90E-07	8.62E-04	Not applicable	Not applicable	5.21E-06
U-236	4.32E-07	5.39E-04	Not applicable	Not applicable	3.26E-06
Co-60	1.56E-07	1.95E-04	Not applicable	Not applicable	1.18E-06
U-238	1.29E-07	1.61E-04	Not applicable	Not applicable	9.72E-07
Th-234	1.29E-07	1.61E-04	Not applicable	Not applicable	9.72E-07
Eu-152	7.50E-08	9.37E-05	Not applicable	Not applicable	5.66E-07
Eu-154	3.60E-08	4.50E-05	Not applicable	Not applicable	2.72E-07
Np-237	2.65E-08	3.31E-05	Not applicable	Not applicable	2.00E-07
Pa-233	2.65E-08	3.31E-05	Not applicable	Not applicable	2.00E-07

If #DIV/0! occurs in the Fraction of Waste Profile Column or the Does Nuclide Meet Waste Profile? Column of Section III, the nuclide is not included on the current profile and needs to be added.

Waste Classification Determination for near surface disposal per 10 CFR §61.55

Assume that Sr-90, Cs-137, Co-60, and H-3 are major nuclides driving waste classification determination for Tank V-9 wastes

Radionuclide	Table 2 limit (Ci/m^3) Column 1	Column 2	V-9 Liqid (35 gal/drum)
Sr-90	0.04	150	2.50E-01
Cs-137	1	44	4.20E-04
Co-60	700	*	1.18E-06
H-3	40	*	3.53E-01

*Note: No limits established for these radionuclides in Class B or C wastes. Practical considerations such as the effects of external radiation and internal heat generation on transportation, handling, and disposal will limit the concentrations for these wastes. These wastes shall be Classs B unless the concentrations of other nuclides in Table 2 determine the waste to be Class C independent of these nuclides.

Class A Sum of Fractions: 6.26

Class B Sum of Fractions: 0.00

Class B*

96 of 105

Attachment 8

New Calc for all V-Tank Liquids

Container ID # **INEEL ALL V-Tank Liquids**

Constants	Units
3.70E+10	Bq/Ci
453.6	g/lb
1.00E-12	TBq/Bq or Ci/pCi
1000.00	g/kg
1.00E+09	nCi/Ci

Section I. Waste Stream Information

Container Type: N/A

Description: 8128 total gallons of all V-Tank liquids

Note: assume liquid phase volume of 8,128 gallons with density of 1.00 g/ml

Container Gross Wt (lb)	Container Gross Wt (kg)	Container Tare Wt (lb)	Container Tare Wt (kg)	Waste Net Wt (kg)	External Vol. (m3)	Est. Waste Vol. (m3)
67830.76	30768.03	0.00	0.00	30768.03	#N/A	30.766

Note: Gross weight of contents = (8128 gal.)x(1.0 g/ml)x(3785.412 ml/gal.)x(2.2046E-03 lb/g) = 67830.76 lbs

Dose survey from Sxxxxx on xx/xx/01 shows < mrem/hr OC.

Radioactive liquid effluents from hot cells, labs, and decon facilities at TAN and IETF.

EPA regulated hazardous COCs: Barium, Cadmium, Chromium, Lead, Mercury, Silver, VOCs, SVOCs, and PCBs.

Section II. List the radionuclides and activities; perform DOT RAM, RQ, LTD QTY, and Type A Packaging checks

Nuclide	Activity (Ci)	% of Total A2 Fraction	Activity (Bq)	Activity/gram (Bq/gram)	RQ limits (TBq)	RQ Ratios (amount/limit)	A2 Value (TBq)	LTD QTY Det. (amount/(10-4)A2)	Type A Pkg? (amount/A2)	DOT Fissile Mass (g)	TRU Conc. (nCi/g)	LSA-II Liquids Fraction	Activity/gram (pCi/g)
H-3	7.77E-01	3.88E-01	2.88E+10	9.34E+02	3.70E+00	7.77E-03	4.00E+01	7.19E+00	7.19E-04	0.00E+00	0.00E+00	2.34E-06	2.53E+04
Sr-90	3.66E-01	7.32E+01	1.35E+10	4.40E+02	3.70E-03	3.66E+00	1.00E-01	1.35E+03	1.35E-01	0.00E+00	0.00E+00	4.40E-04	1.19E+04
Cs-137	1.61E-01	6.44E+00	5.96E+09	1.94E+02	3.70E-02	1.61E-01	5.00E-01	1.19E+02	1.19E-02	0.00E+00	0.00E+00	3.87E-05	5.23E+03
Ni-63	7.61E-03	5.07E-03	2.82E+08	9.15E+00	3.70E+00	7.61E-05	3.00E+01	9.38E-02	9.38E-06	0.00E+00	0.00E+00	3.05E-08	2.47E+02
U-233	5.37E-04	1.07E+01	1.99E+07	6.45E-01	3.70E-03	5.37E-03	1.00E-03	1.99E+02	1.99E-02	5.53E-02	0.00E+00	6.45E-05	1.74E+01
Ru-103	5.03E-04	1.12E-02	1.86E+07	6.05E-01	3.70E-01	5.03E-05	9.00E-01	2.07E-01	2.07E-05	0.00E+00	0.00E+00	6.72E-08	1.63E+01
Ru-106	4.61E-04	4.61E-02	1.71E+07	5.54E-01	3.70E-02	4.61E-04	2.00E-01	8.53E-01	8.53E-05	0.00E+00	0.00E+00	2.77E-07	1.50E+01
Co-60	4.48E-04	2.24E-02	1.66E+07	5.38E-01	3.70E-01	4.48E-05	4.00E-01	4.14E-01	4.14E-05	0.00E+00	0.00E+00	1.35E-07	1.45E+01
Ce-144	3.88E-04	3.87E-02	1.43E+07	4.66E-01	3.70E-02	3.88E-04	2.00E-01	7.17E-01	7.17E-05	0.00E+00	0.00E+00	2.33E-07	1.26E+01
Sb-125	1.93E-04	4.29E-03	7.15E+06	2.32E-01	3.70E-01	1.93E-05	9.00E-01	7.95E-02	7.95E-06	0.00E+00	0.00E+00	2.58E-08	6.28E+00
Eu-152	1.43E-04	3.17E-03	5.29E+06	1.72E-01	3.70E-01	1.43E-05	9.00E-01	5.88E-02	5.88E-06	0.00E+00	0.00E+00	1.91E-08	4.64E+00
Eu-155	1.36E-04	1.36E-03	5.03E+06	1.63E-01	3.70E-01	1.36E-05	2.00E+00	2.51E-02	2.51E-06	0.00E+00	0.00E+00	8.17E-09	4.41E+00
Zr-95	1.20E-04	2.67E-03	4.44E+06	1.44E-01	3.70E-01	1.20E-05	9.00E-01	4.94E-02	4.94E-06	0.00E+00	0.00E+00	1.60E-08	3.90E+00
Pu-241	1.19E-04	2.37E-01	4.39E+06	1.43E-01	3.70E-02	1.19E-04	1.00E-02	4.39E+00	4.39E-04	1.19E-06	0.00E+00	1.43E-06	3.86E+00
Nb-95	6.75E-05	1.35E-03	2.50E+06	8.11E-02	3.70E-01	6.75E-06	1.00E+00	2.50E-02	2.50E-06	0.00E+00	0.00E+00	8.11E-09	2.19E+00
Ag-110m	6.65E-05	3.32E-03	2.46E+06	8.00E-02	3.70E-01	6.65E-06	4.00E-01	6.15E-02	6.15E-06	0.00E+00	0.00E+00	2.00E-08	2.16E+00
Co-58	6.14E-05	1.23E-03	2.27E+06	7.38E-02	3.70E-01	6.14E-06	1.00E+00	2.27E-02	2.27E-06	0.00E+00	0.00E+00	7.38E-09	2.00E+00
U-234	5.59E-05	1.12E+00	2.07E+06	6.72E-02	3.70E-03	5.59E-04	1.00E-03	2.07E+01	2.07E-03	0.00E+00	0.00E+00	6.72E-06	1.82E+00
Zn-65	5.07E-05	5.06E-04	1.87E+06	6.09E-02	3.70E-01	5.07E-06	2.00E+00	9.37E-03	9.37E-07	0.00E+00	0.00E+00	3.05E-09	1.65E+00
Ra-226	4.91E-05	4.91E-02	1.82E+06	5.91E-02	3.70E-03	4.91E-04	2.00E-02	9.09E-01	9.09E-05	0.00E+00	0.00E+00	2.95E-07	1.60E+00
Pu-238	4.88E-05	4.88E+00	1.81E+06	5.87E-02	3.70E-04	4.88E-03	2.00E-04	9.03E+01	9.03E-03	2.87E-06	1.59E-03	2.93E-05	1.59E+00
Eu-154	4.85E-05	1.94E-03	1.79E+06	5.83E-02	3.70E-01	4.85E-06	5.00E-01	3.59E-02	3.59E-06	0.00E+00	0.00E+00	1.17E-08	1.58E+00
Ag-108m	3.91E-05	1.30E-03	1.45E+06	4.71E-02	3.70E-01	3.91E-06	6.00E-01	2.41E-02	2.41E-06	0.00E+00	0.00E+00	7.85E-09	1.27E+00
Mn-54	2.27E-05	4.54E-04	8.41E+05	2.73E-02	3.70E-01	2.27E-06	1.00E+00	8.41E-03	8.41E-07	0.00E+00	0.00E+00	2.73E-09	7.38E-01
Cs-134	2.23E-05	8.93E-04	8.26E+05	2.69E-02	3.70E-02	2.23E-05	5.00E-01	1.65E-02	1.65E-06	0.00E+00	0.00E+00	5.37E-09	7.26E-01
U-235	1.97E-05	0.00E+00	7.28E+05	2.37E-02	3.70E-03	1.97E-04	Unlimited	0.00E+00	0.00E+00	8.94E+00	0.00E+00	0.00E+00	6.39E-01
Pu-239	1.41E-05	1.40E+00	5.20E+05	1.69E-02	3.70E-04	1.41E-03	2.00E-04	2.60E+01	2.60E-03	2.27E-04	4.57E-04	8.45E-06	4.57E-01
Am-241	1.25E-05	1.25E+00	4.61E+05	1.50E-02	3.70E-04	1.25E-03	2.00E-04	2.31E+01	2.31E-03	0.00E+00	4.05E-04	7.49E-06	4.05E-01
I-129	6.60E-06	0.00E+00	2.44E+05	7.94E-03	3.70E-05	6.60E-03	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.15E-01
Th-234	6.19E-06	6.18E-04	2.29E+05	7.44E-03	3.70E+00	6.19E-08	2.00E-01	1.14E-02	1.14E-06	0.00E+00	0.00E+00	3.72E-09	2.01E-01
U-238	6.19E-06	0.00E+00	2.29E+05	7.44E-03	3.70E-03	6.19E-05	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.01E-01
Cm-244	1.87E-06	9.33E-02	6.91E+04	2.25E-03	3.70E-04	1.87E-04	4.00E-04	1.73E+00	1.73E-04	0.00E+00	0.00E+00	5.62E-07	6.07E-02
Np-237	1.08E-06	1.08E-01	4.01E+04	1.30E-03	3.70E-04	1.08E-04	2.00E-04	2.01E+00	2.01E-04	0.00E+00	3.53E-05	6.52E-07	3.53E-02
Pa-233	1.08E-06	2.41E-05	4.01E+04	1.30E-03	3.70E+00	1.08E-08	9.00E-01	4.46E-04	4.46E-08	0.00E+00	0.00E+00	1.45E-10	3.53E-02
U-236	8.64E-07	1.73E-02	3.20E+04	1.04E-03	3.70E-03	8.64E-06	1.00E-03	3.20E-01	3.20E-05	0.00E+00	0.00E+00	1.04E-07	2.81E-02
Cm-242	1.94E-07	3.88E-04	7.19E+03	2.34E-04	3.70E-02	1.94E-07	1.00E-02	7.19E-03	7.19E-07	0.00E+00	0.00E+00	2.34E-09	6.31E-03
Total	1.32E+00	100.00%	4.87E+10	1.58E+03		3.85E+00		1.85E+03	1.85E-01	9.00E+00	2.48E-03	6.02E-04	4.28E+04

DOT regulated as Hazard Class 7 Radioactive Material
Contains a Reportable Quantity of a Hazardous Substance; use 'RQ(radionuclides)' as part of PSN
< Type A quantity/package per 49 CFR 173.431(a); check if excepted quantity -> excepted packaging
Does NOT meet LTD QTY Exception; Check if LSA
Meets Low Specific Activity (LSA)-II material - Check <Type A quantity and use Radioactive material, LSA, n.o.s. as PSN
Meets criteria for Fissile Excepted Package per 49 CFR 173.453
This is a Low-level waste

Performed by: Gordon Harris Date: 9/25/01

Reviewed by: _____ Date: _____

98 of 105

Section III: Check radionuclides for listing on labels and shipping papers

Nuclide	Activity (Ci)	% of Total A2 Fraction	Cumulative A2 Fraction
Sr-90	3.66E-01	7.32E+01	7.32E+01
U-233	5.37E-04	1.07E+01	8.39E+01
Cs-137	1.61E-01	6.44E+00	9.03E+01
Pu-238	4.88E-05	4.88E+00	9.52E+01
Pu-239	1.41E-05	1.40E+00	9.66E+01
Am-241	1.25E-05	1.25E+00	9.78E+01
U-234	5.59E-05	1.12E+00	9.90E+01
H-3	7.77E-01	3.88E-01	9.93E+01
Pu-241	1.19E-04	2.37E-01	9.96E+01
Np-237	1.08E-06	1.08E-01	9.97E+01
Cm-244	1.87E-06	9.33E-02	9.98E+01
Ra-226	4.91E-05	4.91E-02	9.98E+01
Ru-106	4.61E-04	4.61E-02	9.99E+01
Ce-144	3.88E-04	3.87E-02	9.99E+01
Co-60	4.48E-04	2.24E-02	9.99E+01
U-236	8.64E-07	1.73E-02	1.00E+02
Ru-103	5.03E-04	1.12E-02	1.00E+02
Ni-63	7.61E-03	5.07E-03	1.00E+02
Sb-125	1.93E-04	4.29E-03	1.00E+02
Ag-110m	6.65E-05	3.32E-03	1.00E+02
Eu-152	1.43E-04	3.17E-03	1.00E+02
Zr-95	1.20E-04	2.67E-03	1.00E+02
Eu-154	4.85E-05	1.94E-03	1.00E+02
Eu-155	1.36E-04	1.36E-03	1.00E+02
Nb-95	6.75E-05	1.35E-03	1.00E+02
Ag-108m	3.91E-05	1.30E-03	1.00E+02
Co-58	6.14E-05	1.23E-03	1.00E+02
Cs-134	2.23E-05	8.93E-04	1.00E+02
Th-234	6.19E-06	6.18E-04	1.00E+02
Zn-65	5.07E-05	5.06E-04	1.00E+02
Mn-54	2.27E-05	4.54E-04	1.00E+02
Cm-242	1.94E-07	3.88E-04	1.00E+02
Pa-233	1.08E-06	2.41E-05	1.00E+02
U-235	1.97E-05	0.00E+00	1.00E+02
I-129	6.60E-06	0.00E+00	1.00E+02
U-238	6.19E-06	0.00E+00	1.00E+02

Nuclide	Activity (Ci)	% of Total Activity	Source Material (kg)	SNM (g)	Activity Conc. (Ci/m^3)
H-3	7.77E-01	5.91E+01	Not applicable	Not applicable	2.53E-02
Sr-90	3.66E-01	2.78E+01	Not applicable	Not applicable	1.19E-02
Cs-137	1.61E-01	1.22E+01	Not applicable	Not applicable	5.23E-03
Ni-63	7.61E-03	5.78E-01	Not applicable	Not applicable	2.47E-04
U-233	5.37E-04	4.08E-02	Not applicable	5.53E-02	1.74E-05
Ru-103	5.03E-04	3.82E-02	Not applicable	Not applicable	1.63E-05
Ru-106	4.61E-04	3.50E-02	Not applicable	Not applicable	1.50E-05
Co-60	4.48E-04	3.40E-02	Not applicable	Not applicable	1.45E-05
Ce-144	3.88E-04	2.95E-02	Not applicable	Not applicable	1.26E-05
Sb-125	1.93E-04	1.47E-02	Not applicable	Not applicable	6.28E-06
Eu-152	1.43E-04	1.09E-02	Not applicable	Not applicable	4.64E-06
Eu-155	1.36E-04	1.03E-02	Not applicable	Not applicable	4.41E-06
Zr-95	1.20E-04	9.13E-03	Not applicable	Not applicable	3.90E-06
Pu-241	1.19E-04	9.02E-03	Not applicable	1.19E-06	3.86E-06
Nb-95	6.75E-05	5.13E-03	Not applicable	Not applicable	2.19E-06
Ag-110m	6.65E-05	5.06E-03	Not applicable	Not applicable	2.16E-06
Co-58	6.14E-05	4.67E-03	Not applicable	Not applicable	2.00E-06
U-234	5.59E-05	4.25E-03	Not applicable	Not applicable	1.82E-06
Zn-65	5.07E-05	3.85E-03	Not applicable	Not applicable	1.65E-06
Ra-226	4.91E-05	3.73E-03	Not applicable	Not applicable	1.60E-06
Pu-238	4.88E-05	3.71E-03	Not applicable	2.87E-06	1.59E-06
Eu-154	4.85E-05	3.69E-03	Not applicable	Not applicable	1.58E-06
Ag-108m	3.91E-05	2.98E-03	Not applicable	Not applicable	1.27E-06
Mn-54	2.27E-05	1.73E-03	Not applicable	Not applicable	7.38E-07
Cs-134	2.23E-05	1.70E-03	Not applicable	Not applicable	7.26E-07
U-235	1.97E-05	1.50E-03	Not applicable	8.94E+00	6.39E-07
Pu-239	1.41E-05	1.07E-03	Not applicable	2.27E-04	4.57E-07
Am-241	1.25E-05	9.47E-04	Not applicable	Not applicable	4.05E-07
I-129	6.60E-06	5.02E-04	Not applicable	Not applicable	2.15E-07
Th-234	6.19E-06	4.70E-04	Not applicable	Not applicable	2.01E-07
U-238	6.19E-06	4.70E-04	Not applicable	Not applicable	2.01E-07
Cm-244	1.87E-06	1.42E-04	Not applicable	Not applicable	6.07E-08
Np-237	1.08E-06	8.25E-05	Not applicable	Not applicable	3.53E-08
Pa-233	1.08E-06	8.25E-05	Not applicable	Not applicable	3.53E-08
U-236	8.64E-07	6.57E-05	Not applicable	Not applicable	2.81E-08
Cm-242	1.94E-07	1.48E-05	Not applicable	Not applicable	6.31E-09

Section IV: Waste Classification Determination for near surface disposal per 10 CFR §61.55

Assume that H-3, Cs-137, Sr-90, Ni-63, and Co-60 are major nuclides driving waste classification determination for all liquids from Tanks V-1, V-2, V-3, and V-9.

Radionuclide	Table 2 limit (Ci/m^3) Column 1	Column 2	All Liquid
H-3	40	*	2.53E-02
Cs-137	1	44	5.23E-03
Sr-90	0.04	150	1.19E-02
Ni-63	3.5	70	2.47E-04
Co-60	700	*	1.45E-05
Class A Sum of Fractions:			0.30
Class B Sum of Fractions:			0.00
			ClassA*

*Note: No limits established for these radionuclides in Class B or C wastes. Practical considerations such as the effects of external radiation and internal heat generation on transportation, handling, and disposal will limit the concentrations for these wastes. These wastes shall be Classs B unless the concentrations of other nuclides in Table 2 determine the waste to be Class C independent of these nuclides.

99 A 105

Container ID # **INEEL ALL V-Tank Liquids in 812.8 gal portions (10 equal portions)**

Constants	Units
3.70E+10	Bq/Ci
453.6	g/lb
1.00E-12	TBq/Bq or Ci/pCi
1000.00	g/kg
1.00E+09	nCi/Ci

Section I. Waste Stream Information

Container Type: N/A

Description: 812.8 total gallons of all V-Tank liquids

Note: assume liquid phase volume of 812.8 gallons with density of 1.00 g/ml

Container Gross Wt (lb)	Container Gross Wt (kg)	Container Tare Wt (lb)	Container Tare Wt (kg)	Waste Net Wt (kg)	External Vol. (m3)	Est. Waste Vol. (m3)
6783.08	3076.80	0.00	0.00	3076.80	#N/A	3.077

Note: Gross weight of contents = (812.8 gal.)x(1.0 g/ml)x(3785.412 ml/gal.)x(2.2046E-03 lb/g) = 6783.08 lbs

Dose survey from Sxxxxx on xx/xx/01 shows < mrem/hr OC.

Radioactive liquid effluents from hot cells, labs, and decon facilities at TAN and IETF.

EPA regulated hazardous COCs: Barium, Cadmium, Chromium, Lead, Mercury, Silver, VOCs, SVOCs, and PCBs.

Section II. List the radionuclides and activities; perform DOT RAM, RQ, LTD QTY, and Type A Packaging checks

Nuclide	Activity (Ci)	% of Total A2 Fraction	Activity (Bq)	Activity/gram (Bq/gram)	RQ limits (TBq)	RQ Ratios (amount/limit)	A2 Value (TBq)	LTD QTY Det. (amount/(10-4)A2)	Type A Pkg? (amount/A2)	DOT Fissile Mass (g)	TRU Conc. (nCi/g)	LSA-II Liquids Fraction	Activity/gram (pCi/g)
H-3	7.77E-02	3.88E-01	2.88E+09	9.34E+02	3.70E+00	7.77E-04	4.00E+01	7.19E-01	7.19E-05	0.00E+00	0.00E+00	2.34E-06	2.53E+04
Sr-90	3.66E-02	7.32E+01	1.35E+09	4.40E+02	3.70E-03	3.66E-01	1.00E-01	1.35E+02	1.35E-02	0.00E+00	0.00E+00	4.40E-04	1.19E+04
Cs-137	1.61E-02	6.44E+00	5.96E+08	1.94E+02	3.70E-02	1.61E-02	5.00E-01	1.19E+01	1.19E-03	0.00E+00	0.00E+00	3.87E-05	5.23E+03
Ni-63	7.61E-04	5.07E-03	2.82E+07	9.15E+00	3.70E+00	7.61E-06	3.00E+01	9.38E-03	9.38E-07	0.00E+00	0.00E+00	3.05E-08	2.47E+02
U-233	5.37E-05	1.07E+01	1.99E+06	6.45E-01	3.70E-03	5.37E-04	1.00E-03	1.99E+01	1.99E-03	5.53E-03	0.00E+00	6.45E-05	1.74E+01
Ru-103	5.03E-05	1.12E-02	1.86E+06	6.05E-01	3.70E-01	5.03E-06	9.00E-01	2.07E-02	2.07E-06	0.00E+00	0.00E+00	6.72E-08	1.63E+01
Ru-106	4.61E-05	4.61E-02	1.71E+06	5.54E-01	3.70E-02	4.61E-05	2.00E-01	8.53E-02	8.53E-06	0.00E+00	0.00E+00	2.77E-07	1.50E+01
Co-60	4.48E-05	2.24E-02	1.66E+06	5.38E-01	3.70E-01	4.48E-06	4.00E-01	4.14E-02	4.14E-06	0.00E+00	0.00E+00	1.35E-07	1.45E+01
Ce-144	3.88E-05	3.87E-02	1.43E+06	4.66E-01	3.70E-02	3.88E-05	2.00E-01	7.17E-02	7.17E-06	0.00E+00	0.00E+00	2.33E-07	1.26E+01
Sb-125	1.93E-05	4.29E-03	7.15E+05	2.32E-01	3.70E-01	1.93E-06	9.00E-01	7.95E-03	7.95E-07	0.00E+00	0.00E+00	2.58E-08	6.28E+00
Eu-152	1.43E-05	3.17E-03	5.29E+05	1.72E-01	3.70E-01	1.43E-06	9.00E-01	5.88E-03	5.88E-07	0.00E+00	0.00E+00	1.91E-08	4.64E+00
Eu-155	1.36E-05	1.36E-03	5.03E+05	1.63E-01	3.70E-01	1.36E-06	2.00E+00	2.51E-03	2.51E-07	0.00E+00	0.00E+00	8.17E-09	4.41E+00
Zr-95	1.20E-05	2.67E-03	4.44E+05	1.44E-01	3.70E-01	1.20E-06	9.00E-01	4.94E-03	4.94E-07	0.00E+00	0.00E+00	1.60E-08	3.90E+00
Pu-241	1.19E-05	2.37E-01	4.39E+05	1.43E-01	3.70E-02	1.19E-05	1.00E-02	4.39E-01	4.39E-05	1.19E-07	0.00E+00	1.43E-06	3.86E+00
Nb-95	6.75E-06	1.35E-03	2.50E+05	8.11E-02	3.70E-01	6.75E-07	1.00E+00	2.50E-03	2.50E-07	0.00E+00	0.00E+00	8.11E-09	2.19E+00
Ag-110m	6.65E-06	3.32E-03	2.46E+05	8.00E-02	3.70E-01	6.65E-07	4.00E-01	6.15E-03	6.15E-07	0.00E+00	0.00E+00	2.00E-08	2.16E+00
Co-58	6.14E-06	1.23E-03	2.27E+05	7.38E-02	3.70E-01	6.14E-07	1.00E+00	2.27E-03	2.27E-07	0.00E+00	0.00E+00	7.38E-09	2.00E+00
U-234	5.59E-06	1.12E+00	2.07E+05	6.72E-02	3.70E-03	5.59E-05	1.00E-03	2.07E+00	2.07E-04	0.00E+00	0.00E+00	6.72E-06	1.82E+00
Zn-65	5.07E-06	5.06E-04	1.87E+05	6.09E-02	3.70E-01	5.07E-07	2.00E+00	9.37E-04	9.37E-08	0.00E+00	0.00E+00	3.05E-09	1.65E+00
Ra-226	4.91E-06	4.91E-02	1.82E+05	5.91E-02	3.70E-03	4.91E-05	2.00E-02	9.09E-02	9.09E-06	0.00E+00	0.00E+00	2.95E-07	1.60E+00
Pu-238	4.88E-06	4.88E+00	1.81E+05	5.87E-02	3.70E-04	4.88E-04	2.00E-04	9.03E+00	9.03E-04	2.87E-07	1.59E-03	2.93E-05	1.59E+00
Eu-154	4.85E-06	1.94E-03	1.79E+05	5.83E-02	3.70E-01	4.85E-07	5.00E-01	3.59E-03	3.59E-07	0.00E+00	0.00E+00	1.17E-08	1.58E+00
Ag-108m	3.91E-06	1.30E-03	1.45E+05	4.71E-02	3.70E-01	3.91E-07	6.00E-01	2.41E-03	2.41E-07	0.00E+00	0.00E+00	7.85E-09	1.27E+00
Mn-54	2.27E-06	4.54E-04	8.41E+04	2.73E-02	3.70E-01	2.27E-07	1.00E+00	8.41E-04	8.41E-08	0.00E+00	0.00E+00	2.73E-09	7.38E-01
Cs-134	2.23E-06	8.93E-04	8.26E+04	2.69E-02	3.70E-02	2.23E-06	5.00E-01	1.65E-03	1.65E-07	0.00E+00	0.00E+00	5.37E-09	7.26E-01
U-235	1.97E-06	0.00E+00	7.28E+04	2.37E-02	3.70E-03	1.97E-05	Unlimited	0.00E+00	0.00E+00	8.94E-01	0.00E+00	0.00E+00	6.39E-01
Pu-239	1.41E-06	1.40E+00	5.20E+04	1.69E-02	3.70E-04	1.41E-04	2.00E-04	2.60E+00	2.60E-04	2.27E-05	4.57E-04	8.45E-06	4.57E-01
Am-241	1.25E-06	1.25E+00	4.61E+04	1.50E-02	3.70E-04	1.25E-04	2.00E-04	2.31E+00	2.31E-04	0.00E+00	4.05E-04	7.49E-06	4.05E-01
I-129	6.60E-07	0.00E+00	2.44E+04	7.94E-03	3.70E-05	6.60E-04	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.15E-01
Th-234	6.19E-07	6.18E-04	2.29E+04	7.44E-03	3.70E+00	6.19E-09	2.00E-01	1.14E-03	1.14E-07	0.00E+00	0.00E+00	3.72E-09	2.01E-01
U-238	6.19E-07	0.00E+00	2.29E+04	7.44E-03	3.70E-03	6.19E-06	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.01E-01
Cm-244	1.87E-07	9.33E-02	6.91E+03	2.25E-03	3.70E-04	1.87E-05	4.00E-04	1.73E-01	1.73E-05	0.00E+00	0.00E+00	5.62E-07	6.07E-02
Np-237	1.08E-07	1.08E-01	4.01E+03	1.30E-03	3.70E-04	1.08E-05	2.00E-04	2.01E-01	2.01E-05	0.00E+00	3.53E-05	6.52E-07	3.53E-02
Pa-233	1.08E-07	2.41E-05	4.01E+03	1.30E-03	3.70E+00	1.08E-09	9.00E-01	4.46E-05	4.46E-09	0.00E+00	0.00E+00	1.45E-10	3.53E-02
U-236	8.64E-08	1.73E-02	3.20E+03	1.04E-03	3.70E-03	8.64E-07	1.00E-03	3.20E-02	3.20E-06	0.00E+00	0.00E+00	1.04E-07	2.81E-02
Cm-242	1.94E-08	3.88E-04	7.19E+02	2.34E-04	3.70E-02	1.94E-08	1.00E-02	7.19E-04	7.19E-08	0.00E+00	0.00E+00	2.34E-09	6.31E-03
Total	1.32E-01	100.00%	4.87E+09	1.58E+03		3.85E-01		1.85E+02	1.85E-02	9.00E-01	2.48E-03	6.02E-04	4.28E+04

DOT regulated as Hazard Class 7 Radioactive Material
NOT an RQ amount of a Hazardous Substance
< Type A quantity/package per 49 CFR 173.431(a); check if excepted quantity -> excepted packaging
Does NOT meet LTD QTY Exception; Check if LSA
Meets Low Specific Activity (LSA)-II material - Check <Type A quantity and use Radioactive material, LSA, n.o.s. as PSN
Meets criteria for Fissile Excepted Package per 49 CFR 173.453
This is a Low-level waste

Performed by: Gordon Harris Date: 9/25/01

Reviewed by: _____ Date: _____

100 of 105

Section III: Check radionuclides for listing on labels and shipping papers

Nuclide	Activity (Ci)	% of Total A2 Fraction	Cumulative A2 Fraction
Sr-90	3.66E-02	7.32E+01	7.32E+01
U-233	5.37E-05	1.07E+01	8.39E+01
Cs-137	1.61E-02	6.44E+00	9.03E+01
Pu-238	4.88E-06	4.88E+00	9.52E+01
Pu-239	1.41E-06	1.40E+00	9.66E+01
Am-241	1.25E-06	1.25E+00	9.78E+01
U-234	5.59E-06	1.12E+00	9.90E+01
H-3	7.77E-02	3.88E-01	9.93E+01
Pu-241	1.19E-05	2.37E-01	9.96E+01
Np-237	1.08E-07	1.08E-01	9.97E+01
Cm-244	1.87E-07	9.33E-02	9.98E+01
Ra-226	4.91E-06	4.91E-02	9.98E+01
Ru-106	4.61E-05	4.61E-02	9.99E+01
Ce-144	3.88E-05	3.87E-02	9.99E+01
Co-60	4.48E-05	2.24E-02	9.99E+01
U-236	8.64E-08	1.73E-02	1.00E+02
Ru-103	5.03E-05	1.12E-02	1.00E+02
Ni-63	7.61E-04	5.07E-03	1.00E+02
Sb-125	1.93E-05	4.29E-03	1.00E+02
Ag-110m	6.65E-06	3.32E-03	1.00E+02
Eu-152	1.43E-05	3.17E-03	1.00E+02
Zr-95	1.20E-05	2.67E-03	1.00E+02
Eu-154	4.85E-06	1.94E-03	1.00E+02
Eu-155	1.36E-05	1.36E-03	1.00E+02
Nb-95	6.75E-06	1.35E-03	1.00E+02
Ag-108m	3.91E-06	1.30E-03	1.00E+02
Co-58	6.14E-06	1.23E-03	1.00E+02
Cs-134	2.23E-06	8.93E-04	1.00E+02
Th-234	6.19E-07	6.18E-04	1.00E+02
Zn-65	5.07E-06	5.06E-04	1.00E+02
Mn-54	2.27E-06	4.54E-04	1.00E+02
Cm-242	1.94E-08	3.88E-04	1.00E+02
Pa-233	1.08E-07	2.41E-05	1.00E+02
U-235	1.97E-06	0.00E+00	1.00E+02
I-129	6.60E-07	0.00E+00	1.00E+02
U-238	6.19E-07	0.00E+00	1.00E+02

Nuclide	Activity (Ci)	% of Total Activity	Source Material (kg)	SNM (g)	Activity Conc. (Ci/m^3)
H-3	7.77E-02	5.91E+01	Not applicable	Not applicable	2.53E-02
Sr-90	3.66E-02	2.78E+01	Not applicable	Not applicable	1.19E-02
Cs-137	1.61E-02	1.22E+01	Not applicable	Not applicable	5.23E-03
Ni-63	7.61E-04	5.78E-01	Not applicable	Not applicable	2.47E-04
U-233	5.37E-05	4.08E-02	Not applicable	5.53E-03	1.74E-05
Ru-103	5.03E-05	3.82E-02	Not applicable	Not applicable	1.63E-05
Ru-106	4.61E-05	3.50E-02	Not applicable	Not applicable	1.50E-05
Co-60	4.48E-05	3.40E-02	Not applicable	Not applicable	1.45E-05
Ce-144	3.88E-05	2.95E-02	Not applicable	Not applicable	1.26E-05
Sb-125	1.93E-05	1.47E-02	Not applicable	Not applicable	6.28E-06
Eu-152	1.43E-05	1.09E-02	Not applicable	Not applicable	4.64E-06
Eu-155	1.36E-05	1.03E-02	Not applicable	Not applicable	4.41E-06
Zr-95	1.20E-05	9.13E-03	Not applicable	Not applicable	3.90E-06
Pu-241	1.19E-05	9.02E-03	Not applicable	1.19E-07	3.86E-06
Nb-95	6.75E-06	5.13E-03	Not applicable	Not applicable	2.19E-06
Ag-110m	6.65E-06	5.06E-03	Not applicable	Not applicable	2.16E-06
Co-58	6.14E-06	4.67E-03	Not applicable	Not applicable	2.00E-06
U-234	5.59E-06	4.25E-03	Not applicable	Not applicable	1.82E-06
Zn-65	5.07E-06	3.85E-03	Not applicable	Not applicable	1.65E-06
Ra-226	4.91E-06	3.73E-03	Not applicable	Not applicable	1.60E-06
Pu-238	4.88E-06	3.71E-03	Not applicable	2.87E-07	1.59E-06
Eu-154	4.85E-06	3.69E-03	Not applicable	Not applicable	1.58E-06
Ag-108m	3.91E-06	2.98E-03	Not applicable	Not applicable	1.27E-06
Mn-54	2.27E-06	1.73E-03	Not applicable	Not applicable	7.38E-07
Cs-134	2.23E-06	1.70E-03	Not applicable	Not applicable	7.26E-07
U-235	1.97E-06	1.50E-03	Not applicable	8.94E-01	6.39E-07
Pu-239	1.41E-06	1.07E-03	Not applicable	2.27E-05	4.57E-07
Am-241	1.25E-06	9.47E-04	Not applicable	Not applicable	4.05E-07
I-129	6.60E-07	5.02E-04	Not applicable	Not applicable	2.15E-07
Th-234	6.19E-07	4.70E-04	Not applicable	Not applicable	2.01E-07
U-238	6.19E-07	4.70E-04	Not applicable	Not applicable	2.01E-07
Cm-244	1.87E-07	1.42E-04	Not applicable	Not applicable	6.07E-08
Np-237	1.08E-07	8.25E-05	Not applicable	Not applicable	3.53E-08
Pa-233	1.08E-07	8.25E-05	Not applicable	Not applicable	3.53E-08
U-236	8.64E-08	6.57E-05	Not applicable	Not applicable	2.81E-08
Cm-242	1.94E-08	1.48E-05	Not applicable	Not applicable	6.31E-09

Section IV: Waste Classification Determination for near surface disposal per 10 CFR §61.55

Assume that H-3, Cs-137, Sr-90, Ni-63, and Co-60 are major nuclides driving waste classification determination for all liquids from Tanks V-1, V-2, V-3, and V-9.

Radionuclide	Table 2 limit (Ci/m^3) Column 1	Column 2	All Liquid
H-3	40	*	2.53E-02
Cs-137	1	44	5.23E-03
Sr-90	0.04	150	1.19E-02
Ni-63	3.5	70	2.47E-03
Co-60	700	*	1.45E-05
Class A Sum of Fractions:			0.30
Class B Sum of Fractions:			0.00
			ClassA*

*Note: No limits established for these radionuclides in Class B or C wastes. Practical considerations such as the effects of external radiation and internal heat generation on transportation, handling, and disposal will limit the concentrations for these wastes. These wastes shall be Classs B unless the concentrations of other nuclides in Table 2 determine the waste to be Class C independent of these nuclides.

101 of 105

Attachment 9

Sand Filter Analysis

Container ID # **INEEL Sand Filter**

Constants	Units
3.70E+10	Bq/Ci
453.6	g/lb
1.00E-12	TBq/Bq or Ci/pCi
1000.00	g/kg
1.00E+09	nCi/Ci

Section I. Waste Stream Information

Container Type: N/A

Description: 5 gal of Sand Filter media

Note: assume solid phase volume of 5 gallons with density of 1.02 g/cc

Container Gross Wt (lb)	Container Gross Wt (kg)	Container Tare Wt (lb)	Container Tare Wt (kg)	Waste Net Wt (kg)	External Vol. (m3)	Est. Waste Vol. (m3)
42.56	19.31	0.00	0.00	19.31	N/A	0.019

Dose survey from Sxxxxx on xx/xx/00 shows < [ ] mrem/hr OC.
Sand Filter

Note: Gross weight of contents = (5 gal)x(1.02 g/cc)x(3785.412 cc/gal)x(2.2046E-03 lb/g) = 42.56

Section II. List the radionuclides and activities; perform DOT RAM, RQ, LTD QTY, and Type A Packaging checks

Nuclide	Activity (Ci)	% of Total A2 Fraction	Activity (Bq)	Activity/gram (Bq/gram)	RQ limits (TBq)	**RQ Ratios (amount/limit)**	A2 Value (TBq)	LTD QTY Det. (amount/(10-3)A2)	Type A Pkg? (amount/A2)	DOT **Fissile** Ma ;s (g)	TRU Conc (nCi/g)	LSA-II Solids Frac	Activity/gram (pCi/g)
Cs-137	2.104E-03	9.18E-01	7.79E+07	4.03E+03	3.70E-02	**2.10E-03**	5.00E-01	1.56E-01	1.56E-04	**0.00E+00**	0.00E+00	8.07E-05	1.09E+05
Sr-90	1.988E-03	4.34E+00	7.36E+07	3.81E+03	3.70E-03	**1.99E-02**	1.00E-01	7.36E-01	7.36E-04	**0.00E+00**	0.00E+00	3.81E-04	1.03E+05
Co-60	6.989E-04	3.81E-01	2.59E+07	1.34E+03	3.70E-01	**6.99E-05**	4.00E-01	6.46E-02	6.46E-05	**0.00E+00**	0.00E+00	3.35E-05	3.62E+04
U-234	4.228E-04	9.22E+01	1.56E+07	8.10E+02	3.70E-03	**4.23E-03**	1.00E-03	1.56E+01	1.56E-02	**0.00E+00**	0.00E+00	8.10E-03	2.19E+04
Ag-110m	1.006E-04	5.48E-02	3.72E+06	1.93E+02	3.70E-01	**1.01E-05**	4.00E-01	9.30E-03	9.30E-06	**0.00E+00**	0.00E+00	4.82E-06	5.21E+03
Tc-99	2.490E-05	6.03E-03	9.21E+05	4.77E+01	3.70E-01	**2.49E-06**	9.00E-01	1.02E-03	1.02E-06	**0.00E+00**	0.00E+00	5.30E-07	1.29E+03
U-235	1.276E-05	0.00E+00	4.72E+05	2.45E+01	3.70E-03	**1.28E-04**	Unlimited	0.00E+00	0.00E+00	**5.80E+00**	0.00E+00	0.00E+00	6.61E+02
Eu-152	1.218E-05	2.95E-03	4.51E+05	2.33E+01	3.70E-01	**1.22E-06**	9.00E-01	5.01E-04	5.01E-07	**0.00E+00**	0.00E+00	2.59E-07	6.31E+02
Zn-65	4.556E-06	4.97E-04	1.69E+05	8.73E+00	3.70E-01	**4.56E-07**	2.00E+00	8.43E-05	8.43E-08	**0.00E+00**	0.00E+00	4.37E-08	2.36E+02
Eu-154	2.182E-06	9.51E-04	8.07E+04	4.18E+00	3.70E-01	**2.18E-07**	5.00E-01	1.61E-04	1.61E-07	**0.00E+00**	0.00E+00	8.36E-08	1.13E+02
Pu-241	1.97E-06	4.29E-02	7.28E+04	3.77E+00	3.70E-02	**1.97E-06**	1.00E-02	7.28E-03	7.28E-06	**1.97E-08**	0.00E+00	3.77E-06	1.02E+02
Ru-106	1.892E-06	2.06E-03	7.00E+04	3.63E+00	3.70E-02	**1.89E-06**	2.00E-01	3.50E-04	3.50E-07	**0.00E+00**	0.00E+00	1.81E-07	9.80E+01
U-238	1.751E-06	0.00E+00	6.48E+04	3.36E+00	3.70E-03	**1.75E-05**	Unlimited	0.00E+00	0.00E+00	**0.00E+00**	0.00E+00	0.00E+00	9.07E+01
Th-234	1.75E-06	1.91E-03	6.48E+04	3.36E+00	3.70E+00	**1.75E-08**	2.00E-01	3.24E-04	3.24E-07	**0.00E+00**	0.00E+00	1.68E-07	9.07E+01
Ag-106m	1.124E-06	1.22E-02	4.16E+04	2.15E+00	3.70E-01	**1.12E-07**	2.00E-02	2.08E-03	2.08E-06	**0.00E+00**	0.00E+00	1.08E-06	5.82E+01
Pu-239	8.726E-07	9.51E-01	3.23E+04	1.67E+00	3.70E-04	**8.73E-05**	2.00E-04	1.61E-01	1.61E-04	**1.41E-05**	4.52E-02	8.36E-05	4.52E+01
Pu-238	8.128E-07	8.86E-01	3.01E+04	1.56E+00	3.70E-04	**8.13E-05**	2.00E-04	1.50E-01	1.50E-04	**4.78E-08**	4.21E-02	7.79E-05	4.21E+01
Nb-95	5.599E-07	1.22E-04	2.07E+04	1.07E+00	3.70E-01	**5.60E-08**	1.00E+00	2.07E-05	2.07E-08	**0.00E+00**	0.00E+00	1.07E-08	2.90E+01
Am-241	2.066E-07	2.25E-01	7.64E+03	3.96E-01	3.70E-04	**2.07E-05**	2.00E-04	3.82E-02	3.82E-05	**0.00E+00**	1.07E-02	1.98E-05	1.07E+01
Total	5.38E-03	100.00%	1)9E+08	1 03E)4		2 6E -02		1 0E 01	1 (E-02	)(	9.80E-02	8.79E-03	2 79E+05

DOT regulated as Hazard Class 7 Radioactive Material
NOT an RQ amount of a Hazardous Substance
< Type A quantity/package per 49 CFR 173.431(a); check if excepted quantity -> excepted packaging
Does NOT meet LTD QTY Exception; Check if LSA
Meets Low Specific Activity (LSA)-II material - Check <Type A quantity and use Radioactive material, LSA, n.o.s. as PSN
Meets criteria for Fissile Excepted Package per 49 CFR 173.453
This is a Low-level waste

Performed by: [signature] Date: 9/25/01

Reviewed by: _____ Date: _____

103 of 105

Section III: Check radionuclides for listing on labels and shipping papers; Check reportable radionuclides per NTS WAC

Nuclide	Activity (Ci)	% of Total A2 Fraction	Cumulative A2 Fraction
U-234	4.23E-04	9.22E+01	9.22E+01
Sr-90	1.99E-03	4.34E+00	9.65E+01
Pu-239	8.73E-07	9.51E-01	9.75E+01
Cs-137	2.10E-03	9.18E-01	9.84E+01
Pu-238	8.13E-07	8.86E-01	9.93E+01
Co-60	6.99E-04	3.81E-01	9.97E+01
Am-241	2.07E-07	2.25E-01	9.99E+01
Ag-110m	1.01E-04	5.48E-02	9.99E+01
Pu-241	1.97E-06	4.29E-02	1.00E+02
Ag-106m	1.12E-06	1.22E-02	1.00E+02
Tc-99	2.49E-05	6.03E-03	1.00E+02
Eu-152	1.22E-05	2.95E-03	1.00E+02
Ru-106	1.89E-06	2.06E-03	1.00E+02
Th-234	1.75E-06	1.91E-03	1.00E+02
Eu-154	2.18E-06	9.51E-04	1.00E+02
Zn-65	4.56E-06	4.97E-04	1.00E+02
Nb-95	5.60E-07	1.22E-04	1.00E+02
U-235	1.28E-05	0.00E+00	1.00E+02
U-238	1.75E-06	0.00E+00	1.00E+02

Nuclide	Activity (Ci)	% of Total Activity	Source Material (kg)	SNM (g)	Activity Conc. (Ci/m^3)
Cs-137	2.10E-03	3.91E+01	Not applicable	Not applicable	1.11E-01
Sr-90	1.99E-03	3.69E+01	Not applicable	Not applicable	1.05E-01
Co-60	6.99E-04	1.30E+01	Not applicable	Not applicable	3.69E-02
U-234	4.23E-04	7.85E+00	Not applicable	Not applicable	2.23E-02
Ag-110m	1.01E-04	1.87E+00	Not applicable	Not applicable	5.31E-03
Tc-99	2.49E-05	4.63E-01	Not applicable	Not applicable	1.32E-03
U-235	1.28E-05	2.37E-01	Not applicable	5.80E+00	6.74E-04
Eu-152	1.22E-05	2.26E-01	Not applicable	Not applicable	6.44E-04
Zn-65	4.56E-06	8.46E-02	Not applicable	Not applicable	2.41E-04
Eu-154	2.18E-06	4.05E-02	Not applicable	Not applicable	1.15E-04
Pu-241	1.97E-06	3.65E-02	Not applicable	1.97E-08	1.04E-04
Ru-106	1.89E-06	3.51E-02	Not applicable	Not applicable	1.00E-04
U-238	1.75E-06	3.25E-02	Not applicable	Not applicable	9.25E-05
Th-234	1.75E-06	3.25E-02	Not applicable	Not applicable	9.25E-05
Ag-106m	1.12E-06	2.09E-02	Not applicable	Not applicable	5.94E-05
Pu-239	8.73E-07	1.62E-02	Not applicable	1.41E-05	4.61E-05
Pu-238	8.13E-07	1.51E-02	Not applicable	4.78E-08	4.29E-05
Nb-95	5.60E-07	1.04E-02	Not applicable	Not applicable	2.96E-05
Am-241	2.07E-07	3.84E-03	Not applicable	Not applicable	1.09E-05

Section IV: Waste Classification Determination for near surface disposal p

Assume that H-3, Cs-137, Sr-90, Ni-63, and Co-60 are major nuclides driving wa

Radionuclide	Table 2 limit (Ci/m^3) Column 1	Column 2	Sand Filter
Cs-137	1	44	1.11E-01
Sr-90	0.04	150	1.05E-01
Co-60	700	*	3.69E-02
Class A Sum of Fractions:			2.74
Class B Sum of Fractions:			0.00
			ClassB

104 of 105

The purpose of this spreadsheet is to convert the Sand Filter's radionuclide activities from pCi/g to Ci.
Note that the Sand Filter utilizes 1 sample set to determine the total activity.
Source of Data: Comprehensive remedial Investigation/Feasiblity Study (RI/FS) for Test Area North Operable Unit1-10 at INEEEL, DOE/ID-10557

Constants

1gal	=	3.785E+03	cc
1pCi	=	1.000E-12	Ci
1gal	=	3.785E+00	L

Conversion Formula:

solid pCi/g -> Ci: (pCi/g)x(1Ci/1E12pCi)x(density[g/cc])x(#gallons)x(1cc/0.000264172gal)

Volume Input (gal): 5.0 (estimated)

Note: Shaded radionuclides below indicate that detection limits were used if the measurement result was less than the detection limit to be conservative.

	TV9001017A-RAD	
	pCi/g	Ci
Ag-106m	5.820E+01	1.124E-06
Ag-110m	5.210E+03	1.006E-04
Am-241	1.070E+01	2.066E-07
Co-60	3.620E+04	6.989E-04
Cs-137	1.090E+05	2.104E-03
Eu-152	6.310E+02	1.218E-05
Eu-154	1.130E+02	2.182E-06
Nb-95	2.900E+01	5.599E-07
Pu-238	4.210E+01	8.128E-07
Pu-239	4.520E+01	8.726E-07
Ru-106	9.800E+01	1.892E-06
Sr-90	1.030E+05	1.988E-03
Tc-99	1.290E+03	2.490E-05
U-234	2.190E+04	4.228E-04
U-235	6.610E+02	1.276E-05
U-238	9.070E+01	1.751E-06
Zn-65	2.360E+02	4.556E-06

The following daughter (decay) products are in secular equilibrium with the parent radionuclide and should be included for DOT determinations:

Th-234	9.070E+01	1.751E-06

Add Pu-241 at 9.52 times the activity of Am-241per 49 CFR 173.433 requirements.

Pu-241	1.019E+02	1.967E-06

105 of 111

Attachment 10

10 CFR 61 Land Disposal of Radioactive Waste

[Code of Federal Regulations]
[Title 10, Volume 2]
[Revised as of January 1, 2001]
From the U.S. Government Printing Office via GPO Access
[**CITE: 10CFR61.56**]

TITLE 10--ENERGY

CHAPTER I--NUCLEAR REGULATORY COMMISSION

PART 61--LICENSING REQUIREMENTS FOR LAND DISPOSAL OF RADIOACTIVE WASTE--Table of Cc

Subpart D--Technical Requirements for Land Disposal Facilities

Sec. 61.**56** Waste characteristics.

(a) The following requirements are minimum requirements for all classes of waste and are intended to facilitate handling at the disposal site and provide protection of health and safety of personnel at the disposal site.

(1) Waste must not be packaged for disposal in cardboard or fiberboard boxes.

(2) Liquid waste must be solidified or packaged in sufficient absorbent material to absorb twice the volume of the liquid.

(3) Solid waste containing liquid shall contain as little free standing and noncorrosive liquid as is reasonably achievable, but in no case shall the liquid exceed 1% of the volume.

(4) Waste must not be readily capable of detonation or of explosive decomposition or reaction at normal pressures and temperatures, or of explosive reaction with water.

(5) Waste must not contain, or be capable of generating, quantities of toxic gases, vapors, or fumes harmful to persons transporting, handling, or disposing of the waste. This does not apply to radioactive gaseous waste packaged in accordance with paragraph (a)(7) of this section.

(6) Waste must not be pyrophoric. Pyrophoric materials contained in waste shall be treated, prepared, and packaged to be nonflammable.

(7) Waste in a gaseous form must be packaged at a pressure that does not exceed 1.5 atmospheres at 20 deg.C. Total activity must not exceed 100 curies per container.

(8) Waste containing hazardous, biological, pathogenic, or infectious material must be treated to reduce to the maximum extent practicable the potential hazard from the non-radiological materials.

(b) The requirements in this section are intended to provide stability of the waste. Stability is intended to ensure that the waste does not structurally degrade and affect overall stability of the site through slumping, collapse, or other failure of the disposal unit and thereby lead to water infiltration. Stability is also a factor in limiting exposure to an inadvertent intruder, since it provides a recognizable and nondispersible waste.

(1) Waste must have structural stability. A structurally stable waste form will generally maintain its physical dimensions and its form, under the expected disposal conditions such as weight of overburden and compaction equipment, the presence of moisture, and microbial activity, and internal factors such as radiation effects and chemical changes. Structural stability can be provided by the waste form itself, processing the waste to a stable form, or placing the waste in a disposal container or structure that provides stability after disposal.

(2) Notwithstanding the provisions in Sec. 61.**56**(a) (2) and (3), liquid wastes, or wastes containing liquid, must be converted into a form that contains as little free standing and noncorrosive liquid as is

reasonably achievable, but in no case shall the liquid exceed 1% of the volume of the waste when the waste is in a disposal container designed to ensure stability, or 0.5% of the volume of the waste for waste processed to a stable form.

(3) Void spaces within the waste and between the waste and its package must be reduced to the extent practicable.

Attachment 11

E-mail from Phil Strahm at Duratek, Inc.

Brennecke, Dan

From: Kenneth E. Schaus [kenschau@bellsouth.net]
Sent: Monday, July 02, 2001 7:44 AM
To: Dan F. Brennecke
Subject: Fw: Type "B" Cask Shipments

Dan,
This is the explaination for water in Type B casks. This is the best that we can do for support our position. If you have any question call me.
Ken Schaus
----- Original Message -----
From: "Phil Strahm" <PSTRAHM@duratekinc.com>
To: <Kenschau@bellsouth.net>
Sent: Friday, June 29, 2001 10:15 AM
Subject: Type "B" Cask Shipments

Ken,

The following information is provided in response to your question about shipping dewatered waste in Type "B" casks.

The CNSI 8-120 Type "B" shipping cask was originally licensed by the Nuclear Regulatory Commission (NRC) in the 1970s. The current Certificate of Compliance for the 8-120 cask specifically allows for the shipment of dewatered resin and filter media within a liner contained within this cask. No specific guidance is provided as to the amount of allowable residual water in the resin or filter media.

In the early 1980s, the NRC promulgated 10CFR61 describing acceptable disposal site criteria. Included in 10CFR61 are requirements for limiting the free-standing liquid in disposal containers. The Barnwell, SC disposal site currently requires that carbon steel liners received for disposal have a maximum of 0.5% (of the waste volume) as free-standing liquid. Similarly, the Barnwell site has a limit of 1.0% (of the waste volume) free-standing liquid in High Integrity Containers (HICs) received for disposal.

As you can see from the above background information, the regulations for Type "B" casks were implemented long before the disposal site liquid limits were established. It is a long-standing industry standard to ship dewatered resin and flter media in Type "B" shipping casks. I believe that the lack of a specific limitation on freestanding liquids inside Type "B" casks is not an oversight by the NRC. In fact the original 8-120-B Safety Analysis Report analyzed the effects of the water under the Fire Test Analysis to ensure that cask integrity is maintained. If additional restrictions on the amount of liquid authorized in a Type "B" cask were necessary, I feel confident that the NRC would issue more stringent controls.

Virtually every nuclear power plant in the United States ships dewatered resin and filter media inside Type "B" casks. In some cases, resin or filter media waste has been received at disposal sites with greater than the allowable amount of free-standing liquid present in the disposal container. Even in these cases, where the disposal site liquid limits are exceeded, I am not aware of any case where the NRC cited the shipper for improper shipping or violation of transportation regulations as a result of liquid in the shipment.

In closing, I think that it is important to keep in mind that shipping and disposal site regulations were written at different times and focus on different issues. It is probably not appropriate to attempt to interpret disposal site free-standing lquid requirements as applying directly to transportation regulations. Therefore, I am confident that shipment of dewatered resin and filter media inside Type "B" shipping casks has been

thoroughly reviewed by the NRC and is authorized under the existing regulations.

Please feel free to contact either me, or Mr. Martin Brownstein at (865) 376-8164 if you have further questions about this subject.
Thank you.

Phil Strahm