ABQ13

CALCULATION COVER SHEET

WESTON
MANAGERS DESIGNERS/CONSULTANTS

Project:	**INEEL V-Tank Waste**				**Number of Sheets:** 1 of 27
Site:	Test Area North (TAN) Waste Area Group (WAG) 1 Technical Support Facility (TSF) 09 & 18				
Calculation Number:	ABQ13 – HP005		**Work Order Number:**	12393.002.001	
Subject:	**Quantity Determination of V-Tank Pipe Wastes and V Tank Debris With Respect to DOT Packaging Requirements and Classification per 10 CFR §61.55**				
Rev #	**Date:**	**Revision:**	**Calculated by:**	**Checked by:**	**Approved:**
RAA	6/27/01	90% Polish	Gordon Harris Ken Schaus	Berg Keshian	
RAB	9/27/01	Draft Final	Gordon Harris	Berg Keshian	Dan Brennecke
RAC	10/23	Draft Final Polish	Gordon Harris	Berg Keshian	Jim Lockhart 10/24/01

Problem Statement:

Determine the disposal and packaging requirements for the pipe and tanks (assuming that it contains a uniformly distributed residue on the inside of the pipe). Determine the amount of pipe that can be shipped in one package that does not exceed a *Type A quantity* (per the DOT definition specified at 49 CFR §173.403).

Determine the quantity of sludge heel that can remain in a tank (assuming that it contains a uniformly distributed residue on the inside of the tank) that does not exceed a *Type A quantity* (per the DOT definition specified at 49 CFR §173.403).

Method of Solution:

Pipe:
Utilizing standard mathematical formulas for geometric shapes and standard constants for metric conversions, calculate the volume per foot of 4 and 6-inch diameter pipe and convert this volume to gallons. Next, using characterization data and volume estimates from references above, calculate the total maximum activity of the sludge or solid phase for Tank V-3. Finally, calculate the maximum (total) linear feet of pipe that can be determined to not exceed a Type A quantity per package as specified in 49 CFR §173.403.

Then, assume that the maximum linear feet of pipe will be packaged into a suitable container in which the volume of the waste container is not greater than 10% of the volume of waste. Based on the final container volume determines the 10 CFR 61.55 classification.

Tank:
Utilizing standard mathematical formulas for geometric shapes and standard constants for metric conversions, calculate the approximate volume of sludge heel in gallons that can remain in tank upon completion of contents removal. Next, using characterization data and volume estimates from references above, calculate the total maximum activity of the sludge or solid phase for Tank V-3. Finally, calculate the maximum (total) amount of sludge that could remain on the inside of the tank that can be determined to not exceed a Type A quantity per package as specified in 49 CFR §173.403.

Then, assuming that the above waste is stabilized within the tank using a suitable solidification media, determine the 10 CFR 61.55 classification based on the solidified waste volume.

Calculation:
Input data, specifications, and applicable regulatory criteria into Excel 97 (or DOT) spreadsheets that have been designed and validated to determine appropriate DOT shipping criteria and 10 CFR §61.55 classification. Note that these spreadsheets are attached as referenced herein.

Note: The DOT spreadsheet contains formulas that have been validated or "check printed" to ensure cells are referenced correctly and arithmetic operations and algebraic calculations are correct. The spreadsheet is then "locked" using the password protection function. The values and subsequent determinations that the algebraic formulas calculate have been independently verified using RADCALC software available through the DOE/NTP website. Calculations are also independently verified using a Hewlett-Packard model 48G+ hand held calculator.

Assumptions:

1. Each pipe contains a uniformly distributed residue on the inside that is .25 inches thick for both the 4 and 6-inch pipes.
2. Evaluate the 6-inch pipe with only 1/16th inch of waste to determine the disposal requirements.
3. Tank V-3 is assumed to have the highest representative activity of all V-Tank solid phase wastes and is therefore suitable to represent the worst case scenario for determining the volume limit of ancillary tank pipe and tank sludge heel for packaging and disposal.
4. In accordance with Low-level Waste Licensing Branch Technical Position on Radioactive Waste Classification (May 1983, Rev. 0); (c)(2): Radionuclide concentrations should be determined based upon

volume or weight of the final waste form, or (3) in many cases, the volume used for waste classification purposes may be considered to correspond to the volume of the waste container.
5. The tank contents can be uniformly distributed within a suitable solidification media.
6. This evaluation does not evaluate V-Tank wastes for compliance with the waste acceptance criteria (WAC) of any disposal facility or with respect to RCRA/TSCA constituents.
7. The numbers derived by the DOT spreadsheets should be used as estimates only. The determinations made by interpretation of the data in the DOT spreadsheets should be carefully considered with respect to the quality of the radiological characterization data provided.
8. With regards to the characterization data, when a radionuclide was not detected, its detection limit was used as a conservative estimate. Note that this conservative assumption has essentially no effect on the overall determinations.
9. Th-234 and Pa-233 are assumed to be in secular equilibrium with the parent radionuclides, U-238 and Np-237 respectively; their activities have been added as appropriate.
10. In accordance with 49 CFR §173.433 requirements, the activity of Pu-241 has been added at 9.52 times the activity of Am-241.

Sources of Data:

Characterization Data from:

Comprehensive Remedial Investigation/Feasibility Study (RI/FS) *for Test Area North Operable Unit 1-10 at INEEL,* DOE/ID-10557, November 1997, Dept. of Energy/Idaho Operations Office, Idaho Falls, ID.

V-Tank Waste Volumes from:

Memorandum from Carolyn S. Blackmore to J. Todd Taylor, 03/10/98, *Criticality Safety Issues Associated With The Test Area North V-Tanks* – CSB-004-98, Lockheed Martin Idaho Technologies Company

Formulas for Geometric Calculations:

CRC Standard Mathematical Tables, 26th Edition, William H. Beyer, Ph.D., CRC Press, Inc. Boca Raton, Florida

Conversion Factors and Constants:

The Health Physics and Radiological Health Handbook, Revised Edition, Edited by Bernard Schleien, 1992, Scinta, Inc. Silver Spring, Maryland.

Regulatory Requirements from:

49 CFR 171-178, October 2000, "Transportation," Parts 171 through 178, "General Information, Regulations, and Definitions, Hazardous Materials Tables, and Shipping and Packaging Requirements," *Code of Federal Regulations*, Office of the Federal Register.

10 CFR 61, October 2000, "Energy," Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste," *Code of Federal Regulations*, Office of the Federal Register.

Issuance of Final Branch Technical Position on Concentration Averaging & Encapsulation, revision in part to waste classification technical position, January 17, 1995, Nuclear Regulatory Agency, Washington D.C.

Low-level Waste Licensing Branch Technical Position on Radioactive Waste Classification, May 1983, Rev. 0, Nuclear Regulatory Commission, Washington, D.C.

Calculation:

Piping:

Referring to the Attachments 1 through 3, the radionuclide activities used in these spreadsheets are from the characterization data provided in *Comprehensive Remedial Investigation/Feasibility Study* (RI/FS) *for Test Area North Operable Unit 1-10 at INEEL (*DOE/ID-10557, November 1997), which was provided by INEEL personnel in electronic format (i.e., Excel spreadsheets). The characterization data was converted from picocuries per gram (pCi/g) to curies (Ci). Average data values were then calculated for each radionuclide for the Tank V-3 solid or sludge phase. The solid or sludge density was converted from the applicable Tank V-3 analytical data and converted to g/cc.

The total activity for Tank V-3 was then calculated using average activities (refer to attachment 1). The data was then copied into another DOT spreadsheet manipulating the volume of waste, weight, and percent of total activity before copying. The amount of waste and percent activity is dependent upon a reasonable assumption of the amount of sludge residue remaining in the pipe (refer to attachment 2). The total linear feet of pipe allowed per package that will not exceed a Type A quantity, is a function of the total amount of sludge per package that does not exceed a Type A quantity. The total amount of sludge per package (that does not exceed a Type A quantity) can be determined by plotting a graph of gallons versus Type A Package unity calculation and then interpolating the number of gallons at 99 percent of the Type A quantity limit. Once the total amount of sludge per package is known, the dividend of the total amount of sludge per package and the amount of sludge in one linear foot of pipe is the total amount of pipe allowed per package that will not exceed a DOT Type A quantity.

The volume per linear foot of 4 and 6-inch diameter pipe and the volume and weight of sludge per linear foot are calculated in attachment 4. The results of the analysis shows that the pipe can be packaged as LSA II materials but because of the Sr-90 levels assumed, even 1/16 inch of sludge results in the pipe being classified as a Class B waste. (Attachment 2)

Tank:
The spreadsheets labeled MT Tank with residue, was used to estimate the DOT Type for the V-3 tank. The radionuclide activities used in this spreadsheets are from the characterization data provided in *Comprehensive Remedial Investigation/Feasibility Study* (RI/FS) *for Test Area North Operable Unit 1-10 at INEEL (*DOE/ID-10557, November 1997). The characterization data was converted from picocuries per gram (pCi/g) to curies (Ci). Average sludge sample data values were used when calculating each radionuclide for the Tank V-3 solid or sludge heel. The solid or sludge density was converted from the applicable Tank V-3 analytical data and converted to g/cc.

The total activity for a 17.26-gallon sludge heel remaining in Tank V-3 was then calculated using average activities. The sludge heel is assumed to be uniformly distributed along the 19.5-foot length of tank. The data was then copied into another DOT spreadsheet using the 17.26-gallon volume of waste, weight, and percent of total activity. The amount of waste and percent activity is dependent upon a reasonable assumption that the amount of sludge heel remaining in the tank pipe can be achieved. The 17.26-gallon volume of sludge remaining in the tank, combined with the volume of the tank, is a goal that when using average activity levels. This quantity results in a classification of the Tanks as Class A surface contaminated debris, which can be shipped as LSA II quantity. The actual amount of sludge per tank (that does not exceed a LSA II quantity) will be determined by analysis of the actual waste stream and by plotting a graph of gallons versus LSA II Package unity calculation and then interpolating the number of gallons at 99 percent of the LSA II quantity limit against the actual activity of the sludge heel. IN reality the controlling factor is the total curies of Sr-90 that is determined in the sludge, as that is what is controlling the determination that the waste is a Class A waste. Under the above condition, the waste is Class A, but the addition of any more curries of Sr-90 would result in the Waste being classified as Class B.

Discussion:

Piping:

To determine the respective amount of activity that the sludge represented in a foot of pipe, the total activity in the total sludge or solid phase of Tank V-3 needs to be determined (refer to Attachment 1). The DOT spreadsheet entitled "V-3 All Sludge AVG" analyzes the 652 total gallons of sludge or solid phase waste in Tank V-3. For a 6-inch pipe, with 1/8th inch of contamination or 0.038 gallons, in one foot of pipe would represent 5.8E-03 percent of the total (i.e., 652 gallons) of Tank V-3 sludge or solid phase waste. Therefore,

the individual radionuclide activities for the total Tank V-3 can be multiplied by 5.8E-05 to determine the activities that would be present in 0.038 gallon (refer to Attachment 2). These values can then be used to plot a graph of total gallons of sludge versus the sum of the ratios of activities per A_2 for the total amount of sludge in the Tank V-3 and 0.038 gallons. Refer to Table 1.

Table 1. X and Y values for plotting the graph of total gallons of sludge In piping versus sum of the A_2 ratios

Description	Total gallons (x)	Sum of A^2 ratios (y)
Total V-3 Tank sludge	652	35.9
Total V-3 sludge in 1 foot of pipe	0.038	0.00206

Using the graph of the values in Table 1(see attachment 2), the volume of sludge at 99 percent of the Type A quantity per package is 17.97 gallons. The total linear feet of pipe per package is (17.97 gallons) / (0.038 gallons/ft.) or 472 feet.

Tank:
Using the average sample values the 17.26-gallon volume of sludge heel distributed along the bottom of the tank will not exceed the DOT Type LSA II shipping requirements. Using a specific gravity of 1.25 g/cc, this amount of sludge will weigh approximately 179 lbs.

Conclusions and Recommendations:

Piping:
1. 472 linear feet of 6-inch pipe can be placed into a DOT Type LSA II package and not exceed a Type A quantity per package. Since this quantity is so large the packaging of the pipe will not be an issue, as packaging will contain considerably less pipe
2. With respect to its radioactive constituents only, the pipe meets the definition of a low-level waste.
3. With respect to DOT transportation, the pipe would be a Class 7 Radioactive material.
4. With respect to DOT packaging, the pipe would meet the definition of a low specific activity II (LSA-II solid or UN2912) material and could be placed into excepted packaging (IP-2).
5. The amount of fissile material per package (2.28 grams actual) would be less than 15 g/pkg. and would therefore be considered "fissile excepted."
6. Since the contamination in the pipe will exceed the limits for Class A waste, the pipe will need to be flushed to remove lose contamination and to meet the goal of deposal as a Class A waste.

Tank:
1. The goal for sludge remaining inside the tanks will be less than 17.26 gallons. A quantity < 17.26gallons of sludge heel will meet the DOT Type LSA II package requirements and not exceed a Type A quantity per tank.
2. With respect to its radioactive constituents only, the tank meets the definition of a low-level waste.
3. With respect to DOT transportation, the tank would be a Class 7 Radioactive material.
4. With respect to DOT packaging, the tank with the 17.26 gallons of sludge heel would meet the definition of a limited quantity or low specific activity II (LSA-II solid) and could not be placed into excepted packaging.
5. The amount of fissile material per package (2.5 grams actual) would be less than 15 g/pkg. and would therefore be considered "fissile excepted."
6. Assuming 10% of the activity inside the tank is removable contamination, the tank would exceed the DOT SCO-II limits for removable contamination and would require Type A packaging.

Computer Source:
Hewlett-Packard Kayak XU800 with Microsoft Window NT, operating system and Office 97 software.

List of Attachments

Attachment	Title
1	DOT Spreadsheet entitled, "V-3 All Sludge AVG"
2	0.25 Inch Sludge per 4" and 6" Pipe per Linear Foot and 0.0625 Inch Sludge per 6" Pipe
3	Tank with 17.26 gal Residue
4	Volume and Weight Calculation for 4 and 6 Inch Pipe
5	Volume and Weight of V-Tanks and Contamination Prior to Removal from Ground

Attachment 1

DOT Spreadsheet entitled, "V-3 All Sludge AVG"

Container ID / INEEL Tank V-3 Sludge (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 10,000 gallon stainless steel tank (10' dia. X 19.5' le 1337 ft^3 or 37.86 m^3 external volume

Description: 652 gallons of Sludge

Note: assume solid phase volume of 652 gallons with density of 1.25 g/cc

Container Gross Wt (lb)	Container Gross Wt (kg	Container Tare Wt (lb)	Container Tare Wt (kg)	Waste Net Wt (kg)	External Vol. (m^3)	Est. Waste Vol. (m^3)
6801.44	3085.13	0.00	0.00	3085.13	37.864	2.468

Note: Gross weight of contents = (652 gal.)x(1.25 g/cc)x(3785.412 cc/gal.)x(2.2046E-03 lb/g) = 6801.44

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, SV(

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)A	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	6.53E+05	3.70E-03	5.44E+02	1.00E-01	2.01E+04	2.01E+01	0.00E+00	0.00E+00	6.53E-02	1.76E+07
Cs-137	1.91E+01	3.95E+00	7.08E+11	2.29E+05	3.70E-02	1.91E+01	5.00E-01	1.42E+03	1.42E+00	0.00E+00	0.00E+00	4.59E-03	6.20E+06
Ni-63	2.40E+00	8.26E-03	8.89E+10	2.88E+04	3.70E+00	2.40E-02	3.00E+01	2.96E+00	2.96E-03	0.00E+00	0.00E+00	9.60E-06	7.79E+05
Co-60	4.72E-01	1.22E-01	1.74E+10	5.65E+03	3.70E-01	4.72E-02	4.00E-01	4.36E+01	4.36E-02	0.00E+00	0.00E+00	1.41E-04	1.53E+05
Pu-241	1.72E-01	1.77E+00	6.35E+09	2.06E+03	3.70E-02	1.72E-01	1.00E-02	6.35E+02	6.35E-01	1.72E-03	0.00E+00	2.06E-03	5.56E+04
Eu-154	7.91E-02	1.63E-02	2.93E+09	9.49E+02	3.70E-01	7.91E-03	5.00E-01	5.85E+00	5.85E-03	0.00E+00	0.00E+00	1.90E-05	2.56E+04
Eu-152	4.61E-02	5.28E-03	1.70E+09	5.52E+02	3.70E-01	4.61E-03	9.00E-01	1.89E+00	1.89E-03	0.00E+00	0.00E+00	6.14E-06	1.49E+04
Ru-103	4.10E-02	4.70E-03	1.52E+09	4.92E+02	3.70E-01	4.10E-03	9.00E-01	1.69E+00	1.69E-03	0.00E+00	0.00E+00	5.47E-06	1.33E+04
Ce-144	3.40E-02	1.75E-02	1.26E+09	4.07E+02	3.70E-02	3.40E-02	2.00E-01	6.28E+00	6.28E-03	0.00E+00	0.00E+00	2.04E-05	1.10E+04
Pu-238	3.36E-02	1.73E+01	1.24E+09	4.03E+02	3.70E-04	3.36E+00	2.00E-04	6.21E+03	6.21E+00	1.98E-03	1.09E+01	2.01E-02	1.09E+04
Ru-106	3.35E-02	1.73E-02	1.24E+09	4.02E+02	3.70E-02	3.35E-02	2.00E-01	6.20E+00	6.20E-03	0.00E+00	0.00E+00	2.01E-05	1.09E+04
Am-241	1.80E-02	9.29E+00	6.67E+08	2.16E+02	3.70E-04	1.80E+00	2.00E-04	3.33E+03	3.33E+00	0.00E+00	5.84E+00	1.08E-02	5.84E+03
Pu-239	1.74E-02	8.95E+00	6.42E+08	2.08E+02	3.70E-04	1.74E+00	2.00E-04	3.21E+03	3.21E+00	2.80E-01	5.62E+00	1.04E-02	5.62E+03
Sb-125	1.35E-02	1.55E-03	4.99E+08	1.62E+02	3.70E-01	1.35E-03	9.00E-01	5.55E-01	5.55E-04	0.00E+00	0.00E+00	1.80E-06	4.38E+03
Eu-155	1.08E-02	5.58E-04	4.01E+08	1.30E+02	3.70E-01	1.08E-03	2.00E+00	2.00E-01	2.00E-04	0.00E+00	0.00E+00	6.49E-07	3.51E+03
Zr-95	9.27E-03	1.06E-03	3.43E+08	1.11E+02	3.70E-01	9.27E-04	9.00E-01	3.81E-01	3.81E-04	0.00E+00	0.00E+00	1.24E-06	3.00E+03
Nb-95	8.04E-03	8.29E-04	2.97E+08	9.64E+01	3.70E-01	8.04E-04	1.00E+00	2.97E-01	2.97E-04	0.00E+00	0.00E+00	9.64E-07	2.61E+03
Ra-226	7.34E-03	3.78E-02	2.71E+08	8.80E+01	3.70E-03	7.34E-02	2.00E-02	1.36E+01	1.36E-02	0.00E+00	0.00E+00	4.40E-05	2.38E+03
U-233	5.62E-03	5.79E-01	2.08E+08	6.74E+01	3.70E-03	5.62E-02	1.00E-03	2.08E+02	2.08E-01	5.79E-01	0.00E+00	6.74E-04	1.82E+03
Cm-243	5.07E-03	1.74E+00	1.87E+08	6.07E+01	3.70E-04	5.07E-01	3.00E-04	6.25E+02	6.25E-01	0.00E+00	1.64E+00	2.02E-03	1.64E+03
Ag-110m	4.28E-03	1.10E-03	1.58E+08	5.13E+01	3.70E-01	4.28E-04	4.00E-01	3.96E-01	3.96E-04	0.00E+00	0.00E+00	1.28E-06	1.39E+03
Co-58	4.24E-03	4.37E-04	1.57E+08	5.08E+01	3.70E-01	4.24E-04	1.00E+00	1.57E-01	1.57E-04	0.00E+00	0.00E+00	5.08E-07	1.37E+03
Cs-134	3.82E-03	7.87E-04	1.41E+08	4.58E+01	3.70E-02	3.82E-03	5.00E-01	2.82E-01	2.82E-04	0.00E+00	0.00E+00	9.15E-07	1.24E+03
Zn-65	3.74E-03	1.93E-04	1.38E+08	4.49E+01	3.70E-01	3.74E-04	2.00E+00	6.92E-02	6.92E-05	0.00E+00	0.00E+00	2.24E-07	1.21E+03
Ag-108m	2.39E-03	4.11E-04	8.85E+07	2.87E+01	3.70E-01	2.39E-04	6.00E-01	1.47E-01	1.47E-04	0.00E+00	0.00E+00	4.78E-07	7.75E+02
Mn-54	1.51E-03	1.55E-04	5.58E+07	1.81E+01	3.70E-01	1.51E-04	1.00E+00	5.58E-02	5.58E-05	0.00E+00	0.00E+00	1.81E-07	4.89E+02
U-235	1.83E-04	0.00E+00	6.79E+06	2.20E+00	3.70E-03	1.83E-03	Unlimited	0.00E+00	0.00E+00	8.34E+01	0.00E+00	0.00E+00	5.95E+01
I-129	1.77E-04	0.00E+00	6.55E+06	2.12E+00	3.70E-05	1.77E-01	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.74E+01
U-238	1.71E-04	0.00E+00	6.35E+06	2.06E+00	3.70E-03	1.71E-03	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.56E+01
Th-234	1.71E-04	8.84E-05	6.35E+06	2.06E+00	3.70E+00	1.71E-06	2.00E-01	3.17E-02	3.17E-05	0.00E+00	0.00E+00	1.03E-07	5.56E+01
Cm-242	1.21E-04	1.25E-03	4.47E+06	1.45E+00	3.70E-02	1.21E-04	1.00E-02	4.47E-01	4.47E-04	0.00E+00	0.00E+00	1.45E-06	3.92E+01
Np-237	7.46E-05	3.84E-02	2.76E+06	8.94E-01	3.70E-04	7.46E-03	2.00E-04	1.38E+01	1.38E-02	0.00E+00	2.42E-02	4.47E-05	2.42E+01
Pa-233	7.46E-05	8.54E-06	2.76E+06	8.94E-01	3.70E+00	7.46E-07	9.00E-01	3.07E-03	3.07E-06	0.00E+00	0.00E+00	9.94E-09	2.42E+01
Total	7.70E+01	100.00%	2.85E+12	9.23E+05		5.72E+02		3.59E+04	3.59E+01	8.43E+01	2.40E+01	1.16E-01	2.50E+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

Performed by: Carolyn Harris Date: 9/26/01

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

Reviewed by: _____ Date: _____

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

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	Activity Conc. (pCi/g)	Source Materia (kg)	SNM (g)	Activity Conc. (Ci/m^3)
Sr-90	5.44E+01	7.07E+01	1.76E+07	Not applicable	Not applicable	1.44E+00
Cs-137	1.91E+01	2.48E+01	6.20E+06	Not applicable	Not applicable	5.05E-01
Ni-63	2.40E+00	3.12E+00	7.79E+05	Not applicable	Not applicable	6.34E-02
Co-60	4.72E-01	6.12E-01	1.53E+05	Not applicable	Not applicable	1.25E-02
Pu-241	1.72E-01	2.23E-01	5.56E+04	Not applicable	1.72E-03	4.53E-03
Eu-154	7.91E-02	1.03E-01	2.56E+04	Not applicable	Not applicable	2.09E-03
Eu-152	4.61E-02	5.98E-02	1.49E+04	Not applicable	Not applicable	1.22E-03
Ru-103	4.10E-02	5.33E-02	1.33E+04	Not applicable	Not applicable	1.08E-03
Ce-144	3.40E-02	4.41E-02	1.10E+04	Not applicable	Not applicable	8.97E-04
Pu-238	3.36E-02	4.36E-02	1.09E+04	Not applicable	1.98E-03	8.87E-04
Ru-106	3.35E-02	4.35E-02	1.09E+04	Not applicable	Not applicable	8.85E-04
Am-241	1.80E-02	2.34E-02	5.84E+03	Not applicable	Not applicable	4.76E-04
Pu-239	1.74E-02	2.25E-02	5.62E+03	Not applicable	2.80E-01	4.58E-04
Sb-125	1.35E-02	1.75E-02	4.38E+03	Not applicable	Not applicable	3.57E-04
Eu-155	1.08E-02	1.41E-02	3.51E+03	Not applicable	Not applicable	2.86E-04
Zr-95	9.27E-03	1.20E-02	3.00E+03	Not applicable	Not applicable	2.45E-04
Nb-95	8.04E-03	1.04E-02	2.61E+03	Not applicable	Not applicable	2.12E-04
Ra-226	7.34E-03	9.53E-03	2.38E+03	Not applicable	Not applicable	1.94E-04
U-233	5.62E-03	7.30E-03	1.82E+03	Not applicable	5.79E-01	1.48E-04
Cm-243	5.07E-03	6.58E-03	1.64E+03	Not applicable	Not applicable	1.34E-04
Ag-110m	4.28E-03	5.56E-03	1.39E+03	Not applicable	Not applicable	1.13E-04
Co-58	4.24E-03	5.50E-03	1.37E+03	Not applicable	Not applicable	1.12E-04
Cs-134	3.82E-03	4.96E-03	1.24E+03	Not applicable	Not applicable	1.01E-04
Zn-65	3.74E-03	4.86E-03	1.21E+03	Not applicable	Not applicable	9.88E-05
Ag-108m	2.39E-03	3.11E-03	7.75E+02	Not applicable	Not applicable	6.32E-05
Mn-54	1.51E-03	1.96E-03	4.89E+02	Not applicable	Not applicable	3.98E-05
U-235	1.83E-04	2.38E-04	5.95E+01	Not applicable	8.34E+01	4.85E-06
I-129	1.77E-04	2.30E-04	5.74E+01	Not applicable	Not applicable	4.68E-06
U-238	1.71E-04	2.23E-04	5.56E+01	Not applicable	Not applicable	4.53E-06
Th-234	1.71E-04	2.23E-04	5.56E+01	Not applicable	Not applicable	4.53E-06
Cm-242	1.21E-04	1.57E-04	3.92E+01	Not applicable	Not applicable	3.19E-06
Np-237	7.46E-05	9.69E-05	2.42E+01	Not applicable	Not applicable	1.97E-06
Pa-233	7.46E-05	9.69E-05	2.42E+01	Not applicable	Not applicable	1.97E-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-3 wastes

Radionucli	Table 2 limit (Ci/m^3) Column 1	Column 2	V-3 All Sludge AVG
Sr-90	0.04	150	1.44E+00
Cs-137	1	44	5.05E-01
Ni-63	3.5	70	6.34E-02

Class A Sum of Fractions: 14.08

Class B Sum of Fractions: 0.04

ClassB Must stabilize using suitable solidification media and meet applicable 10 CFR 61.56 requirements

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Attachment 2

0.25 Inch Sludge per 4" and 6" Pipe per Linear Foot
and 0.0625 Inch Sludge per 6" Pipe

Container ID #.25" V-3 Tank Sludge in one foot of 4-inch pipe

Note: based upon BTP Radioactive Waste Classification (May 1983, Rev.0), the final waste form volume may be used for 10 CFR 61.55 Classification

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

Section I. Waste Stream Information

Container Typ N/A

Volume of .25" sludge in one foot of 4" pipe is 0..088 gal.

Description: 0..088 gallons of Sludge

Note: assume solid phase volume of 0..088 gallons with density of 1.25 g/cc

Container Gross Wt (lb)	Container Gross Wt (kg)	Container Tare Wt (lb)	Container Tare Wt (kg)	Waste Net Wt (kg)	Est. Waste Vol. (m3)	Final Waste Vol. (m3)
6.33	2.87	5.55	2.52	0.35	3.33E-04	2.47E-03

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, S'

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	7.35E-03	5.61E+01	2.72E+08	7.68E+05	3.70E-03	7.35E-02	1.00E-01	2.72E+00	2.72E-03	0.00E+00	0.00E+00	7.68E-02	2.08E+07
Cs-137	2.58E-03	3.95E+00	9.55E+07	2.70E+05	3.70E-02	2.58E-03	5.00E-01	1.91E-01	1.91E-04	0.00E+00	0.00E+00	5.40E-03	7.30E+06
Ni-63	3.24E-04	8.26E-03	1.20E+07	3.39E+04	3.70E+00	3.24E-06	3.00E+01	4.00E-04	4.00E-07	0.00E+00	0.00E+00	1.13E-05	9.16E+05
Co-60	6.36E-05	1.22E-01	2.35E+06	6.66E+03	3.70E-01	6.36E-06	4.00E-01	5.89E-03	5.89E-06	0.00E+00	0.00E+00	1.66E-04	1.80E+05
Pu-241	2.32E-05	1.77E+00	8.57E+05	2.42E+03	3.70E-02	2.32E-05	1.00E-02	8.57E-02	8.57E-05	2.32E-07	0.00E+00	2.42E-03	6.55E+04
Eu-154	1.07E-05	1.63E-02	3.95E+05	1.12E+03	3.70E-01	1.07E-06	5.00E-01	7.90E-04	7.90E-07	0.00E+00	0.00E+00	2.23E-05	3.02E+04
Eu-152	6.22E-06	5.28E-03	2.30E+05	6.50E+02	3.70E-01	6.22E-07	9.00E-01	2.56E-04	2.56E-07	0.00E+00	0.00E+00	7.22E-06	1.76E+04
Ru-103	5.54E-06	4.70E-03	2.05E+05	5.79E+02	3.70E-01	5.54E-07	9.00E-01	2.28E-04	2.28E-07	0.00E+00	0.00E+00	6.44E-06	1.57E+04
Ce-144	4.58E-06	1.75E-02	1.70E+05	4.79E+02	3.70E-02	4.58E-06	2.00E-01	8.48E-04	8.48E-07	0.00E+00	0.00E+00	2.40E-05	1.30E+04
Pu-238	4.53E-06	1.73E+01	1.68E+05	4.74E+02	3.70E-04	4.53E-04	2.00E-04	8.39E-01	8.39E-04	2.67E-07	1.28E+01	2.37E-02	1.28E+04
Ru-106	4.52E-06	1.73E-02	1.67E+05	4.73E+02	3.70E-02	4.52E-06	2.00E-01	8.37E-04	8.37E-07	0.00E+00	0.00E+00	2.36E-05	1.28E+04
Am-241	2.43E-06	9.29E+00	9.00E+04	2.54E+02	3.70E-04	2.43E-04	2.00E-04	4.50E-01	4.50E-04	0.00E+00	6.88E+00	1.27E-02	6.88E+03
Pu-239	2.34E-06	8.95E+00	8.66E+04	2.45E+02	3.70E-04	2.34E-04	2.00E-04	4.33E-01	4.33E-04	3.78E-05	6.62E+00	1.22E-02	6.62E+03
Sb-125	1.82E-06	1.55E-03	6.74E+04	1.91E+02	3.70E-01	1.82E-07	9.00E-01	7.49E-05	7.49E-08	0.00E+00	0.00E+00	2.12E-06	5.15E+03
Eu-155	1.46E-06	5.58E-04	5.41E+04	1.53E+02	3.70E-01	1.46E-07	2.00E+00	2.70E-05	2.70E-08	0.00E+00	0.00E+00	7.64E-07	4.13E+03
Zr-95	1.25E-06	1.06E-03	4.63E+04	1.31E+02	3.70E-01	1.25E-07	9.00E-01	5.14E-05	5.14E-08	0.00E+00	0.00E+00	1.45E-06	3.54E+03
Nb-95	1.08E-06	8.29E-04	4.01E+04	1.13E+02	3.70E-01	1.08E-07	1.00E+00	4.01E-05	4.01E-08	0.00E+00	0.00E+00	1.13E-06	3.07E+03
Ra-226	9.90E-07	3.78E-02	3.66E+04	1.04E+02	3.70E-03	9.90E-06	2.00E-02	1.83E-03	1.83E-06	0.00E+00	0.00E+00	5.18E-05	2.80E+03
U-233	7.58E-07	5.79E-01	2.81E+04	7.93E+01	3.70E-03	7.58E-06	1.00E-03	2.81E-02	2.81E-05	7.82E-05	0.00E+00	7.93E-04	2.14E+03
Cm-243	6.84E-07	1.74E+00	2.53E+04	7.15E+01	3.70E-04	6.84E-05	3.00E-04	8.43E-02	8.43E-05	0.00E+00	1.93E+00	2.38E-03	1.93E+03
Ag-110m	5.78E-07	1.10E-03	2.14E+04	6.04E+01	3.70E-01	5.78E-08	4.00E-01	5.34E-05	5.34E-08	0.00E+00	0.00E+00	1.51E-06	1.63E+03
Co-58	5.72E-07	4.37E-04	2.12E+04	5.98E+01	3.70E-01	5.72E-08	1.00E+00	2.12E-05	2.12E-08	0.00E+00	0.00E+00	5.98E-07	1.62E+03
Cs-134	5.15E-07	7.87E-04	1.91E+04	5.39E+01	3.70E-02	5.15E-07	5.00E-01	3.81E-05	3.81E-08	0.00E+00	0.00E+00	1.08E-06	1.46E+03
Zn-65	5.05E-07	1.93E-04	1.87E+04	5.28E+01	3.70E-01	5.05E-08	2.00E+00	9.34E-06	9.34E-09	0.00E+00	0.00E+00	2.64E-07	1.43E+03
Ag-108m	3.23E-07	4.11E-04	1.19E+04	3.38E+01	3.70E-01	3.23E-08	6.00E-01	1.99E-05	1.99E-08	0.00E+00	0.00E+00	5.63E-07	9.12E+02
Mn-54	2.03E-07	1.55E-04	7.53E+03	2.13E+01	3.70E-01	2.03E-08	1.00E+00	7.53E-06	7.53E-09	0.00E+00	0.00E+00	2.13E-07	5.75E+02
U-235	2.48E-08	0.00E+00	9.16E+02	2.59E+00	3.70E-03	2.48E-07	Unlimited	0.00E+00	0.00E+00	1.13E-02	0.00E+00	0.00E+00	7.00E+01
I-129	2.39E-08	0.00E+00	8.84E+02	2.50E+00	3.70E-05	2.39E-05	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.75E+01
U-238	2.31E-08	0.00E+00	8.56E+02	2.42E+00	3.70E-03	2.31E-07	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.54E+01
Th-234	2.31E-08	8.84E-05	8.56E+02	2.42E+00	3.70E+00	2.31E-10	2.00E-01	4.28E-06	4.28E-09	0.00E+00	0.00E+00	1.21E-07	6.54E+01
Cm-242	1.63E-08	1.25E-03	6.03E+02	1.70E+00	3.70E-02	1.63E-08	1.00E-02	6.03E-05	6.03E-08	0.00E+00	0.00E+00	1.70E-06	4.61E+01
Np-237	1.01E-08	3.84E-02	3.72E+02	1.05E+00	3.70E-04	1.01E-06	2.00E-04	1.86E-03	1.86E-06	0.00E+00	2.84E-02	5.26E-05	2.84E+01
Pa-233	1.01E-08	8.54E-06	3.72E+02	1.05E+00	3.70E+00	1.01E-10	9.00E-01	4.14E-07	4.14E-10	0.00E+00	0.00E+00	1.17E-08	2.84E+01
Total	1.04E-02	100.00%	3.84E+08	1.09E+06		7.71E-02		4.84E+00	4.84E-03	1.14E-02	2.83E+01	1.37E-01	2.94E+07

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

Performed by:_____ Date:_____

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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:_____

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

Nuclide	Activity (Ci)	% of Total A2 Fraction	Cumulative A2 Fraction
Sr-90	7.35E-03	5.61E+01	5.61E+01
Pu-238	2.58E-03	1.73E+01	7.34E+01
Am-241	3.24E-04	9.29E+00	8.27E+01
Pu-239	6.36E-05	8.95E+00	9.17E+01
Cs-137	2.32E-05	3.95E+00	9.56E+01
Pu-241	1.07E-05	1.77E+00	9.74E+01
Cm-243	6.22E-06	1.74E+00	9.91E+01
U-233	5.54E-06	5.79E-01	9.97E+01
Co-60	4.58E-06	1.22E-01	9.98E+01
Np-237	4.53E-06	3.84E-02	9.99E+01
Ra-226	4.52E-06	3.78E-02	9.99E+01
Ce-144	2.43E-06	1.75E-02	9.99E+01
Ru-106	2.34E-06	1.73E-02	1.00E+02
Eu-154	1.82E-06	1.63E-02	1.00E+02
Ni-63	1.46E-06	8.26E-03	1.00E+02
Eu-152	1.25E-06	5.28E-03	1.00E+02
Ru-103	1.08E-06	4.70E-03	1.00E+02
Sb-125	9.90E-07	1.55E-03	1.00E+02
Cm-242	7.58E-07	1.25E-03	1.00E+02
Ag-110m	6.84E-07	1.10E-03	1.00E+02
Zr-95	5.78E-07	1.06E-03	1.00E+02
Nb-95	5.72E-07	8.29E-04	1.00E+02
Cs-134	5.15E-07	7.87E-04	1.00E+02
Eu-155	5.05E-07	5.58E-04	1.00E+02
Co-58	3.23E-07	4.37E-04	1.00E+02
Ag-108m	2.03E-07	4.11E-04	1.00E+02
Zn-65	2.48E-08	1.93E-04	1.00E+02
Mn-54	2.39E-08	1.55E-04	1.00E+02
Th-234	2.31E-08	8.84E-05	1.00E+02
Pa-233	2.31E-08	8.54E-06	1.00E+02
U-235	1.63E-08	0.00E+00	1.00E+02
I-129	1.01E-08	0.00E+00	1.00E+02
U-238	1.01E-08	0.00E+00	1.00E+02

Nuclide	Activity (Ci)	% of Total Activity	Activity Conc. (pCi/g)	Source Material (kg)	SNM (g)	Activity Conc. (Ci/m^3)
Sr-90	7.35E-03	7.07E+01	2.08E+07	Not applicable	Not applicable	2.98E+00
Cs-137	2.58E-03	2.48E+01	7.30E+06	Not applicable	Not applicable	1.05E+00
Ni-63	3.24E-04	3.12E+00	9.16E+05	Not applicable	Not applicable	1.31E-01
Co-60	6.36E-05	6.12E-01	1.80E+05	Not applicable	Not applicable	2.58E-02
Pu-241	2.32E-05	2.23E-01	6.55E+04	Not applicable	2.32E-07	9.38E-03
Eu-154	1.07E-05	1.03E-01	3.02E+04	Not applicable	Not applicable	4.32E-03
Eu-152	6.22E-06	5.98E-02	1.76E+04	Not applicable	Not applicable	2.52E-03
Ru-103	5.54E-06	5.33E-02	1.57E+04	Not applicable	Not applicable	2.24E-03
Ce-144	4.58E-06	4.41E-02	1.30E+04	Not applicable	Not applicable	1.86E-03
Pu-238	4.53E-06	4.36E-02	1.28E+04	Not applicable	2.67E-07	1.84E-03
Ru-106	4.52E-06	4.35E-02	1.28E+04	Not applicable	Not applicable	1.83E-03
Am-241	2.43E-06	2.34E-02	6.88E+03	Not applicable	Not applicable	9.85E-04
Pu-239	2.34E-06	2.25E-02	6.62E+03	Not applicable	3.78E-05	9.48E-04
Sb-125	1.82E-06	1.75E-02	5.15E+03	Not applicable	Not applicable	7.38E-04
Eu-155	1.46E-06	1.41E-02	4.13E+03	Not applicable	Not applicable	5.92E-04
Zr-95	1.25E-06	1.20E-02	3.54E+03	Not applicable	Not applicable	5.07E-04
Nb-95	1.08E-06	1.04E-02	3.07E+03	Not applicable	Not applicable	4.39E-04
Ra-226	9.90E-07	9.53E-03	2.80E+03	Not applicable	Not applicable	4.01E-04
U-233	7.58E-07	7.30E-03	2.14E+03	Not applicable	7.82E-05	3.07E-04
Cm-243	6.84E-07	6.58E-03	1.93E+03	Not applicable	Not applicable	2.77E-04
Ag-110m	5.78E-07	5.56E-03	1.63E+03	Not applicable	Not applicable	2.34E-04
Co-58	5.72E-07	5.50E-03	1.62E+03	Not applicable	Not applicable	2.32E-04
Cs-134	5.15E-07	4.96E-03	1.46E+03	Not applicable	Not applicable	2.09E-04
Zn-65	5.05E-07	4.86E-03	1.43E+03	Not applicable	Not applicable	2.05E-04
Ag-108m	3.23E-07	3.11E-03	9.12E+02	Not applicable	Not applicable	1.31E-04
Mn-54	2.03E-07	1.96E-03	5.75E+02	Not applicable	Not applicable	8.24E-05
U-235	2.48E-08	2.38E-04	7.00E+01	Not applicable	1.13E-02	1.00E-05
I-129	2.39E-08	2.30E-04	6.75E+01	Not applicable	Not applicable	9.68E-06
U-238	2.31E-08	2.23E-04	6.54E+01	Not applicable	Not applicable	9.37E-06
Th-234	2.31E-08	2.23E-04	6.54E+01	Not applicable	Not applicable	9.37E-06
Cm-242	1.63E-08	1.57E-04	4.61E+01	Not applicable	Not applicable	6.60E-06
Np-237	1.01E-08	9.69E-05	2.84E+01	Not applicable	Not applicable	4.08E-06
Pa-233	1.01E-08	9.69E-05	2.84E+01	Not applicable	Not applicable	4.08E-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

Radionuclic	Table 2 limit (Ci/m^3) Column 1	Column 2	.25" V-3 Sludge in a 6" pipe
Sr-90	0.04	150	2.98E+00
Cs-137	1	44	9.38E-03
Ni-63	3.5	70	5.92E-04

Class A Sum of Fractions: 74.39
Class B Sum of Fractions: 0.02

Class B

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Container ID # .25" V-3 Tank Sludge in one foot of 6-inch pipe

Note: based upon BTP Radioactive Waste Classification (May 1983, Rev.0), the final waste form volume may be used for 10 CFR 61.55 Classification

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

Section I. Waste Stream Information

Container Typ N/A

Volume of .25" sludge in one foot of 6" pipe is 0.15 gal.

Description: 0.15 gallons of Sludge

Note: assume solid phase volume of 0.12 gallons with density of 1.25 g/cc

Container Gross Wt (lb)	Container Gross Wt (kg)	Container Tare Wt (lb)	Container Tare Wt (kg)	Waste Net Wt (kg)	Est. Waste Vol. (m3)	Final Waste Vol. (m3)
9.52	4.32	8.27	3.75	0.57	5.68E-04	5.55E-03

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, S'

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	1.25E-02	5.61E+01	4.63E+08	8.17E+05	3.70E-03	1.25E-01	1.00E-01	4.63E+00	4.63E-03	0.00E+00	0.00E+00	8.17E-02	2.21E+07
Cs-137	4.40E-03	3.95E+00	1.63E+08	2.87E+05	3.70E-02	4.40E-03	5.00E-01	3.26E-01	3.26E-04	0.00E+00	0.00E+00	5.74E-03	7.76E+06
Ni-63	5.53E-04	8.26E-03	2.04E+07	3.61E+04	3.70E+00	5.53E-06	3.00E+01	6.82E-04	6.82E-07	0.00E+00	0.00E+00	1.20E-05	9.75E+05
Co-60	1.08E-04	1.22E-01	4.01E+06	7.08E+03	3.70E-01	1.08E-05	4.00E-01	1.00E-02	1.00E-05	0.00E+00	0.00E+00	1.77E-04	1.91E+05
Pu-241	3.95E-05	1.77E+00	1.46E+06	2.58E+03	3.70E-02	3.95E-05	1.00E-02	1.46E-01	1.46E-04	3.95E-07	0.00E+00	2.58E-03	6.96E+04
Eu-154	1.82E-05	1.63E-02	6.73E+05	1.19E+03	3.70E-01	1.82E-06	5.00E-01	1.35E-03	1.35E-06	0.00E+00	0.00E+00	2.37E-05	3.21E+04
Eu-152	1.06E-05	5.28E-03	3.92E+05	6.91E+02	3.70E-01	1.06E-06	9.00E-01	4.36E-04	4.36E-07	0.00E+00	0.00E+00	7.68E-06	1.87E+04
Ru-103	9.44E-06	4.70E-03	3.49E+05	6.16E+02	3.70E-01	9.44E-07	9.00E-01	3.88E-04	3.88E-07	0.00E+00	0.00E+00	6.84E-06	1.66E+04
Ce-144	7.81E-06	1.75E-02	2.89E+05	5.10E+02	3.70E-02	7.81E-06	2.00E-01	1.45E-03	1.45E-06	0.00E+00	0.00E+00	2.55E-05	1.38E+04
Pu-238	7.73E-06	1.73E+01	2.86E+05	5.04E+02	3.70E-04	7.73E-04	2.00E-04	1.43E+00	1.43E-03	4.54E-07	1.36E+01	2.52E-02	1.36E+04
Ru-106	7.71E-06	1.73E-02	2.85E+05	5.03E+02	3.70E-02	7.71E-06	2.00E-01	1.43E-03	1.43E-06	0.00E+00	0.00E+00	2.51E-05	1.36E+04
Am-241	4.15E-06	9.29E+00	1.53E+05	2.71E+02	3.70E-04	4.15E-04	2.00E-04	7.67E-01	7.67E-04	0.00E+00	7.31E+00	1.35E-02	7.31E+03
Pu-239	3.99E-06	8.95E+00	1.48E+05	2.60E+02	3.70E-04	3.99E-04	2.00E-04	7.38E-01	7.38E-04	6.44E-05	7.04E+00	1.30E-02	7.04E+03
Sb-125	3.11E-06	1.55E-03	1.15E+05	2.03E+02	3.70E-01	3.11E-07	9.00E-01	1.28E-04	1.28E-07	0.00E+00	0.00E+00	2.25E-06	5.48E+03
Eu-155	2.49E-06	5.58E-04	9.22E+04	1.63E+02	3.70E-01	2.49E-07	2.00E+00	4.61E-05	4.61E-08	0.00E+00	0.00E+00	8.13E-07	4.39E+03
Zr-95	2.13E-06	1.06E-03	7.89E+04	1.39E+02	3.70E-01	2.13E-07	9.00E-01	8.77E-05	8.77E-08	0.00E+00	0.00E+00	1.55E-06	3.76E+03
Nb-95	1.85E-06	8.29E-04	6.84E+04	1.21E+02	3.70E-01	1.85E-07	1.00E+00	6.84E-05	6.84E-08	0.00E+00	0.00E+00	1.21E-06	3.26E+03
Ra-226	1.69E-06	3.78E-02	6.25E+04	1.10E+02	3.70E-03	1.69E-05	2.00E-02	3.12E-03	3.12E-06	0.00E+00	0.00E+00	5.51E-05	2.98E+03
U-233	1.29E-06	5.79E-01	4.78E+04	8.44E+01	3.70E-03	1.29E-05	1.00E-03	4.78E-02	4.78E-05	1.33E-04	0.00E+00	8.44E-04	2.28E+03
Cm-243	1.17E-06	1.74E+00	4.31E+04	7.60E+01	3.70E-04	1.17E-04	3.00E-04	1.44E-01	1.44E-04	0.00E+00	2.06E+00	2.53E-03	2.06E+03
Ag-110m	9.85E-07	1.10E-03	3.64E+04	6.43E+01	3.70E-01	9.85E-08	4.00E-01	9.11E-05	9.11E-08	0.00E+00	0.00E+00	1.61E-06	1.74E+03
Co-58	9.75E-07	4.37E-04	3.61E+04	6.36E+01	3.70E-01	9.75E-08	1.00E+00	3.61E-05	3.61E-08	0.00E+00	0.00E+00	6.36E-07	1.72E+03
Cs-134	8.78E-07	7.87E-04	3.25E+04	5.73E+01	3.70E-02	8.78E-07	5.00E-01	6.50E-05	6.50E-08	0.00E+00	0.00E+00	1.15E-06	1.55E+03
Zn-65	8.61E-07	1.93E-04	3.18E+04	5.62E+01	3.70E-01	8.61E-08	2.00E+00	1.59E-05	1.59E-08	0.00E+00	0.00E+00	2.81E-07	1.52E+03
Ag-108m	5.50E-07	4.11E-04	2.04E+04	3.59E+01	3.70E-01	5.50E-08	6.00E-01	3.39E-05	3.39E-08	0.00E+00	0.00E+00	5.98E-07	9.70E+02
Mn-54	3.47E-07	1.55E-04	1.28E+04	2.26E+01	3.70E-01	3.47E-08	1.00E+00	1.28E-05	1.28E-08	0.00E+00	0.00E+00	2.26E-07	6.12E+02
U-235	4.22E-08	0.00E+00	1.56E+03	2.75E+00	3.70E-03	4.22E-07	Unlimited	0.00E+00	0.00E+00	1.92E-02	0.00E+00	0.00E+00	7.44E+01
I-129	4.07E-08	0.00E+00	1.51E+03	2.66E+00	3.70E-05	4.07E-05	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.18E+01
U-238	3.95E-08	0.00E+00	1.46E+03	2.57E+00	3.70E-03	3.95E-07	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.96E+01
Th-234	3.95E-08	8.84E-05	1.46E+03	2.57E+00	3.70E+00	3.95E-10	2.00E-01	7.30E-06	7.30E-09	0.00E+00	0.00E+00	1.29E-07	6.96E+01
Cm-242	2.78E-08	1.25E-03	1.03E+03	1.81E+00	3.70E-02	2.78E-08	1.00E-02	1.03E-04	1.03E-07	0.00E+00	0.00E+00	1.81E-06	4.90E+01
Np-237	1.72E-08	3.84E-02	6.35E+02	1.12E+00	3.70E-04	1.72E-06	2.00E-04	3.17E-03	3.17E-06	0.00E+00	3.03E-02	5.60E-05	3.03E+01
Pa-233	1.72E-08	8.54E-06	6.35E+02	1.12E+00	3.70E+00	1.72E-10	9.00E-01	7.05E-07	7.05E-10	0.00E+00	0.00E+00	1.24E-08	3.03E+01
Total	1.77E-02	100.00%	6.55E+08	1.16E+06		1.31E-01		8.25E+00	8.25E-03	1.94E-02	3.01E+01	1.46E-01	3.12E+07

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

Performed by:_____ Date:_____

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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:_____

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

Nuclide	Activity (Ci)	% of Total A2 Fraction	Cumulative A2 Fraction	Nuclide	Activity (Ci)	% of Total Activity	Activity Conc. (pCi/g)	Source Material (kg)	SNM (g)	Activity Conc. (Ci/m^3)
Sr-90	1.25E-02	5.61E+01	5.61E+01	Sr-90	1.25E-02	7.07E+01	2.21E+07	Not applicable	Not applicable	2.26E+00
Pu-238	4.40E-03	1.73E+01	7.34E+01	Cs-137	4.40E-03	2.48E+01	7.76E+06	Not applicable	Not applicable	7.93E-01
Am-241	5.53E-04	9.29E+00	8.27E+01	Ni-63	5.53E-04	3.12E+00	9.75E+05	Not applicable	Not applicable	9.96E-02
Pu-239	1.08E-04	8.95E+00	9.17E+01	Co-60	1.08E-04	6.12E-01	1.91E+05	Not applicable	Not applicable	1.95E-02
Cs-137	3.95E-05	3.95E+00	9.56E+01	Pu-241	3.95E-05	2.23E-01	6.96E+04	Not applicable	3.95E-07	7.11E-03
Pu-241	1.82E-05	1.77E+00	9.74E+01	Eu-154	1.82E-05	1.03E-01	3.21E+04	Not applicable	Not applicable	3.28E-03
Cm-243	1.06E-05	1.74E+00	9.91E+01	Eu-152	1.06E-05	5.98E-02	1.87E+04	Not applicable	Not applicable	1.91E-03
U-233	9.44E-06	5.79E-01	9.97E+01	Ru-103	9.44E-06	5.33E-02	1.66E+04	Not applicable	Not applicable	1.70E-03
Co-60	7.81E-06	1.22E-01	9.98E+01	Ce-144	7.81E-06	4.41E-02	1.38E+04	Not applicable	Not applicable	1.41E-03
Np-237	7.73E-06	3.84E-02	9.99E+01	Pu-238	7.73E-06	4.36E-02	1.36E+04	Not applicable	4.54E-07	1.39E-03
Ra-226	7.71E-06	3.78E-02	9.99E+01	Ru-106	7.71E-06	4.35E-02	1.36E+04	Not applicable	Not applicable	1.39E-03
Ce-144	4.15E-06	1.75E-02	9.99E+01	Am-241	4.15E-06	2.34E-02	7.31E+03	Not applicable	Not applicable	7.47E-04
Ru-106	3.99E-06	1.73E-02	1.00E+02	Pu-239	3.99E-06	2.25E-02	7.04E+03	Not applicable	6.44E-05	7.19E-04
Eu-154	3.11E-06	1.63E-02	1.00E+02	Sb-125	3.11E-06	1.75E-02	5.48E+03	Not applicable	Not applicable	5.60E-04
Ni-63	2.49E-06	8.26E-03	1.00E+02	Eu-155	2.49E-06	1.41E-02	4.39E+03	Not applicable	Not applicable	4.49E-04
Eu-152	2.13E-06	5.28E-03	1.00E+02	Zr-95	2.13E-06	1.20E-02	3.76E+03	Not applicable	Not applicable	3.84E-04
Ru-103	1.85E-06	4.70E-03	1.00E+02	Nb-95	1.85E-06	1.04E-02	3.26E+03	Not applicable	Not applicable	3.33E-04
Sb-125	1.69E-06	1.55E-03	1.00E+02	Ra-226	1.69E-06	9.53E-03	2.98E+03	Not applicable	Not applicable	3.04E-04
Cm-242	1.29E-06	1.25E-03	1.00E+02	U-233	1.29E-06	7.30E-03	2.28E+03	Not applicable	1.33E-04	2.33E-04
Ag-110m	1.17E-06	1.10E-03	1.00E+02	Cm-243	1.17E-06	6.58E-03	2.06E+03	Not applicable	Not applicable	2.10E-04
Zr-95	9.85E-07	1.06E-03	1.00E+02	Ag-110m	9.85E-07	5.56E-03	1.74E+03	Not applicable	Not applicable	1.77E-04
Nb-95	9.75E-07	8.29E-04	1.00E+02	Co-58	9.75E-07	5.50E-03	1.72E+03	Not applicable	Not applicable	1.76E-04
Cs-134	8.78E-07	7.87E-04	1.00E+02	Cs-134	8.78E-07	4.96E-03	1.55E+03	Not applicable	Not applicable	1.58E-04
Eu-155	8.61E-07	5.58E-04	1.00E+02	Zn-65	8.61E-07	4.86E-03	1.52E+03	Not applicable	Not applicable	1.55E-04
Co-58	5.50E-07	4.37E-04	1.00E+02	Ag-108m	5.50E-07	3.11E-03	9.70E+02	Not applicable	Not applicable	9.91E-05
Ag-108m	3.47E-07	4.11E-04	1.00E+02	Mn-54	3.47E-07	1.96E-03	6.12E+02	Not applicable	Not applicable	6.25E-05
Zn-65	4.22E-08	1.93E-04	1.00E+02	U-235	4.22E-08	2.38E-04	7.44E+01	Not applicable	1.92E-02	7.61E-06
Mn-54	4.07E-08	1.55E-04	1.00E+02	I-129	4.07E-08	2.30E-04	7.18E+01	Not applicable	Not applicable	7.34E-06
Th-234	3.95E-08	8.84E-05	1.00E+02	U-238	3.95E-08	2.23E-04	6.96E+01	Not applicable	Not applicable	7.11E-06
Pa-233	3.95E-08	8.54E-06	1.00E+02	Th-234	3.95E-08	2.23E-04	6.96E+01	Not applicable	Not applicable	7.11E-06
U-235	2.78E-08	0.00E+00	1.00E+02	Cm-242	2.78E-08	1.57E-04	4.90E+01	Not applicable	Not applicable	5.01E-06
I-129	1.72E-08	0.00E+00	1.00E+02	Np-237	1.72E-08	9.69E-05	3.03E+01	Not applicable	Not applicable	3.09E-06
U-238	1.72E-08	0.00E+00	1.00E+02	Pa-233	1.72E-08	9.69E-05	3.03E+01	Not applicable	Not applicable	3.09E-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

	Table 2 limit (Ci/m^3)		
Radionuclic	Column 1	Column 2	.25" V-3 Sludge in a 6" pipe
Sr-90	0.04	150	2.26E+00
Cs-137	1	44	7.11E-03
Ni-63	3.5	70	4.49E-04

Class A Sum of Fractions: 56.41
Class B Sum of Fractions: 0.02

Class B

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Container ID #.0625" V-3 Tank Sludge in one foot of 6-inch pipe

Note: based upon BTP Radioactive Waste Classification (May 1983, Rev.0), the final waste form volume may be used for 10 CFR 61.55 Classification

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

Section I. Waste Stream Information

Container Typ N/A

Volume of .0625" sludge in one foot of 6" pipe is 0.038 gal.

Description: 0.038 gallons of Sludge

Note: assume solid phase volume of 0..038 gallons with density of 1.25 g/cc

Container Gross Wt (lb)	Container Gross Wt (kg)	Container Tare Wt (lb)	Container Tare Wt (kg)	Waste Net Wt (kg)	Est. Waste Vol. (m3)	Final Waste Vol. (m3)
9.52	4.32	8.27	3.75	0.14	5.68E-04	5.55E-03

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, S'

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	3.13E-03	5.61E+01	1.16E+08	8.17E+05	3.70E-03	3.13E-02	1.00E-01	1.16E+00	1.16E-03	0.00E+00	0.00E+00	8.17E-02	2.21E+07
Cs-137	1.10E-03	3.95E+00	4.07E+07	2.87E+05	3.70E-02	1.10E-03	5.00E-01	8.14E-02	8.14E-05	0.00E+00	0.00E+00	5.74E-03	7.76E+06
Ni-63	1.38E-04	8.26E-03	5.11E+06	3.61E+04	3.70E+00	1.38E-06	3.00E+01	1.70E-04	1.70E-07	0.00E+00	0.00E+00	1.20E-05	9.75E+05
Co-60	2.71E-05	1.22E-01	1.00E+06	7.08E+03	3.70E-01	2.71E-06	4.00E-01	2.51E-03	2.51E-06	0.00E+00	0.00E+00	1.77E-04	1.91E+05
Pu-241	9.87E-06	1.77E+00	3.65E+05	2.58E+03	3.70E-02	9.87E-06	1.00E-02	3.65E-02	3.65E-05	9.87E-08	0.00E+00	2.58E-03	6.96E+04
Eu-154	4.55E-06	1.63E-02	1.68E+05	1.19E+03	3.70E-01	4.55E-07	5.00E-01	3.37E-04	3.37E-07	0.00E+00	0.00E+00	2.37E-05	3.21E+04
Eu-152	2.65E-06	5.28E-03	9.80E+04	6.91E+02	3.70E-01	2.65E-07	9.00E-01	1.09E-04	1.09E-07	0.00E+00	0.00E+00	7.68E-06	1.87E+04
Ru-103	2.36E-06	4.70E-03	8.73E+04	6.16E+02	3.70E-01	2.36E-07	9.00E-01	9.70E-05	9.70E-08	0.00E+00	0.00E+00	6.84E-06	1.66E+04
Ce-144	1.95E-06	1.75E-02	7.23E+04	5.10E+02	3.70E-02	1.95E-06	2.00E-01	3.61E-04	3.61E-07	0.00E+00	0.00E+00	2.55E-05	1.38E+04
Pu-238	1.93E-06	1.73E+01	7.15E+04	5.04E+02	3.70E-04	1.93E-04	2.00E-04	3.57E-01	3.57E-04	1.14E-07	1.36E+01	2.52E-02	1.36E+04
Ru-106	1.93E-06	1.73E-02	7.13E+04	5.03E+02	3.70E-02	1.93E-06	2.00E-01	3.56E-04	3.56E-07	0.00E+00	0.00E+00	2.51E-05	1.36E+04
Am-241	1.04E-06	9.29E+00	3.84E+04	2.71E+02	3.70E-04	1.04E-04	2.00E-04	1.92E-01	1.92E-04	0.00E+00	7.31E+00	1.35E-02	7.31E+03
Pu-239	9.98E-07	8.95E+00	3.69E+04	2.60E+02	3.70E-04	9.98E-05	2.00E-04	1.85E-01	1.85E-04	1.61E-05	7.04E+00	1.30E-02	7.04E+03
Sb-125	7.76E-07	1.55E-03	2.87E+04	2.03E+02	3.70E-01	7.76E-08	9.00E-01	3.19E-05	3.19E-08	0.00E+00	0.00E+00	2.25E-06	5.48E+03
Eu-155	6.23E-07	5.58E-04	2.30E+04	1.63E+02	3.70E-01	6.23E-08	2.00E+00	1.15E-05	1.15E-08	0.00E+00	0.00E+00	8.13E-07	4.39E+03
Zr-95	5.33E-07	1.06E-03	1.97E+04	1.39E+02	3.70E-01	5.33E-08	9.00E-01	2.19E-05	2.19E-08	0.00E+00	0.00E+00	1.55E-06	3.76E+03
Nb-95	4.62E-07	8.29E-04	1.71E+04	1.21E+02	3.70E-01	4.62E-08	1.00E+00	1.71E-05	1.71E-08	0.00E+00	0.00E+00	1.21E-06	3.26E+03
Ra-226	4.22E-07	3.78E-02	1.56E+04	1.10E+02	3.70E-03	4.22E-06	2.00E-02	7.81E-04	7.81E-07	0.00E+00	0.00E+00	5.51E-05	2.98E+03
U-233	3.23E-07	5.79E-01	1.20E+04	8.44E+01	3.70E-03	3.23E-06	1.00E-03	1.20E-02	1.20E-05	3.33E-05	0.00E+00	8.44E-04	2.28E+03
Cm-243	2.91E-07	1.74E+00	1.08E+04	7.60E+01	3.70E-04	2.91E-05	3.00E-04	3.59E-02	3.59E-05	0.00E+00	2.06E+00	2.53E-03	2.06E+03
Ag-110m	2.46E-07	1.10E-03	9.11E+03	6.43E+01	3.70E-01	2.46E-08	4.00E-01	2.28E-05	2.28E-08	0.00E+00	0.00E+00	1.61E-06	1.74E+03
Co-58	2.44E-07	4.37E-04	9.02E+03	6.36E+01	3.70E-01	2.44E-08	1.00E+00	9.02E-06	9.02E-09	0.00E+00	0.00E+00	6.36E-07	1.72E+03
Cs-134	2.19E-07	7.87E-04	8.12E+03	5.73E+01	3.70E-02	2.19E-07	5.00E-01	1.62E-05	1.62E-08	0.00E+00	0.00E+00	1.15E-06	1.55E+03
Zn-65	2.15E-07	1.93E-04	7.96E+03	5.62E+01	3.70E-01	2.15E-08	2.00E+00	3.98E-06	3.98E-09	0.00E+00	0.00E+00	2.81E-07	1.52E+03
Ag-108m	1.38E-07	4.11E-04	5.09E+03	3.59E+01	3.70E-01	1.38E-08	6.00E-01	8.48E-06	8.48E-09	0.00E+00	0.00E+00	5.98E-07	9.70E+02
Mn-54	8.67E-08	1.55E-04	3.21E+03	2.26E+01	3.70E-01	8.67E-09	1.00E+00	3.21E-06	3.21E-09	0.00E+00	0.00E+00	2.26E-07	6.12E+02
U-235	1.06E-08	0.00E+00	3.90E+02	2.75E+00	3.70E-03	1.06E-07	Unlimited	0.00E+00	0.00E+00	4.80E-03	0.00E+00	0.00E+00	7.44E+01
I-129	1.02E-08	0.00E+00	3.77E+02	2.66E+00	3.70E-05	1.02E-05	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.18E+01
U-238	9.86E-09	0.00E+00	3.65E+02	2.57E+00	3.70E-03	9.86E-08	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.96E+01
Th-234	9.86E-09	8.84E-05	3.65E+02	2.57E+00	3.70E+00	9.86E-11	2.00E-01	1.82E-06	1.82E-09	0.00E+00	0.00E+00	1.29E-07	6.96E+01
Cm-242	6.95E-09	1.25E-03	2.57E+02	1.81E+00	3.70E-02	6.95E-09	1.00E-02	2.57E-05	2.57E-08	0.00E+00	0.00E+00	1.81E-06	4.90E+01
Np-237	4.29E-09	3.84E-02	1.59E+02	1.12E+00	3.70E-04	4.29E-07	2.00E-04	7.93E-04	7.93E-07	0.00E+00	3.03E-02	5.60E-05	3.03E+01
Pa-233	4.29E-09	8.54E-06	1.59E+02	1.12E+00	3.70E+00	4.29E-11	9.00E-01	1.76E-07	1.76E-10	0.00E+00	0.00E+00	1.24E-08	3.03E+01
Total	4.43E-03	100.00%	1.64E+08	1.16E+06		3.29E-02		2.06E+00	2.06E-03	4.85E-03	3.01E+01	1.46E-01	3.12E+07

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

Performed by:_____ Date:_____

154827

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:_____

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

Nuclide	Activity (Ci)	% of Total A2 Fraction	Cumulative A2 Fraction	Nuclide	Activity (Ci)	% of Total Activity	Activity Conc. (pCi/g)	Source Material (kg)	SNM (g)	Activity Conc. (Ci/m^3)
Sr-90	3.13E-03	5.61E+01	5.61E+01	Sr-90	3.13E-03	7.07E+01	2.21E+07	Not applicable	Not applicable	5.64E-01
Pu-238	1.10E-03	1.73E+01	7.34E+01	Cs-137	1.10E-03	2.48E+01	7.76E+06	Not applicable	Not applicable	1.98E-01
Am-241	1.38E-04	9.29E+00	8.27E+01	Ni-63	1.38E-04	3.12E+00	9.75E+05	Not applicable	Not applicable	2.49E-02
Pu-239	2.71E-05	8.95E+00	9.17E+01	Co-60	2.71E-05	6.12E-01	1.91E+05	Not applicable	Not applicable	4.89E-03
Cs-137	9.87E-06	3.95E+00	9.56E+01	Pu-241	9.87E-06	2.23E-01	6.96E+04	Not applicable	9.87E-08	1.78E-03
Pu-241	4.55E-06	1.77E+00	9.74E+01	Eu-154	4.55E-06	1.03E-01	3.21E+04	Not applicable	Not applicable	8.20E-04
Cm-243	2.65E-06	1.74E+00	9.91E+01	Eu-152	2.65E-06	5.98E-02	1.87E+04	Not applicable	Not applicable	4.77E-04
U-233	2.36E-06	5.79E-01	9.97E+01	Ru-103	2.36E-06	5.33E-02	1.66E+04	Not applicable	Not applicable	4.25E-04
Co-60	1.95E-06	1.22E-01	9.98E+01	Ce-144	1.95E-06	4.41E-02	1.38E+04	Not applicable	Not applicable	3.52E-04
Np-237	1.93E-06	3.84E-02	9.99E+01	Pu-238	1.93E-06	4.36E-02	1.36E+04	Not applicable	1.14E-07	3.48E-04
Ra-226	1.93E-06	3.78E-02	9.99E+01	Ru-106	1.93E-06	4.35E-02	1.36E+04	Not applicable	Not applicable	3.47E-04
Ce-144	1.04E-06	1.75E-02	9.99E+01	Am-241	1.04E-06	2.34E-02	7.31E+03	Not applicable	Not applicable	1.87E-04
Ru-106	9.98E-07	1.73E-02	1.00E+02	Pu-239	9.98E-07	2.25E-02	7.04E+03	Not applicable	1.61E-05	1.80E-04
Eu-154	7.76E-07	1.63E-02	1.00E+02	Sb-125	7.76E-07	1.75E-02	5.48E+03	Not applicable	Not applicable	1.40E-04
Ni-63	6.23E-07	8.26E-03	1.00E+02	Eu-155	6.23E-07	1.41E-02	4.39E+03	Not applicable	Not applicable	1.12E-04
Eu-152	5.33E-07	5.28E-03	1.00E+02	Zr-95	5.33E-07	1.20E-02	3.76E+03	Not applicable	Not applicable	9.61E-05
Ru-103	4.62E-07	4.70E-03	1.00E+02	Nb-95	4.62E-07	1.04E-02	3.26E+03	Not applicable	Not applicable	8.33E-05
Sb-125	4.22E-07	1.55E-03	1.00E+02	Ra-226	4.22E-07	9.53E-03	2.98E+03	Not applicable	Not applicable	7.60E-05
Cm-242	3.23E-07	1.25E-03	1.00E+02	U-233	3.23E-07	7.30E-03	2.28E+03	Not applicable	3.33E-05	5.82E-05
Ag-110m	2.91E-07	1.10E-03	1.00E+02	Cm-243	2.91E-07	6.58E-03	2.06E+03	Not applicable	Not applicable	5.25E-05
Zr-95	2.46E-07	1.06E-03	1.00E+02	Ag-110m	2.46E-07	5.56E-03	1.74E+03	Not applicable	Not applicable	4.44E-05
Nb-95	2.44E-07	8.29E-04	1.00E+02	Co-58	2.44E-07	5.50E-03	1.72E+03	Not applicable	Not applicable	4.39E-05
Cs-134	2.19E-07	7.87E-04	1.00E+02	Cs-134	2.19E-07	4.96E-03	1.55E+03	Not applicable	Not applicable	3.95E-05
Eu-155	2.15E-07	5.58E-04	1.00E+02	Zn-65	2.15E-07	4.86E-03	1.52E+03	Not applicable	Not applicable	3.88E-05
Co-58	1.38E-07	4.37E-04	1.00E+02	Ag-108m	1.38E-07	3.11E-03	9.70E+02	Not applicable	Not applicable	2.48E-05
Ag-108m	8.67E-08	4.11E-04	1.00E+02	Mn-54	8.67E-08	1.96E-03	6.12E+02	Not applicable	Not applicable	1.56E-05
Zn-65	1.06E-08	1.93E-04	1.00E+02	U-235	1.06E-08	2.38E-04	7.44E+01	Not applicable	4.80E-03	1.90E-06
Mn-54	1.02E-08	1.55E-04	1.00E+02	I-129	1.02E-08	2.30E-04	7.18E+01	Not applicable	Not applicable	1.83E-06
Th-234	9.86E-09	8.84E-05	1.00E+02	U-238	9.86E-09	2.23E-04	6.96E+01	Not applicable	Not applicable	1.78E-06
Pa-233	9.86E-09	8.54E-06	1.00E+02	Th-234	9.86E-09	2.23E-04	6.96E+01	Not applicable	Not applicable	1.78E-06
U-235	6.95E-09	0.00E+00	1.00E+02	Cm-242	6.95E-09	1.57E-04	4.90E+01	Not applicable	Not applicable	1.25E-06
I-129	4.29E-09	0.00E+00	1.00E+02	Np-237	4.29E-09	9.69E-05	3.03E+01	Not applicable	Not applicable	7.73E-07
U-238	4.29E-09	0.00E+00	1.00E+02	Pa-233	4.29E-09	9.69E-05	3.03E+01	Not applicable	Not applicable	7.73E-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, and Ni-63 are major nuclides driving waste classification determination for Tank V-1, V-2, and V-3 wastes

	Table 2 limit (Ci/m^3)		
Radionuclic	Column 1	Column 2	.25" V-3 Sludge in a 6" pipe
Sr-90	0.04	150	5.64E-01
Cs-137	1	44	1.78E-03
Ni-63	3.5	70	1.12E-04

Class A Sum of Fractions: 14.10
Class B Sum of Fractions: 0.00

Class B

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Attachment 3

Tank with 17.26 gal Residue

Container ID # **Empty V-Tank with 17.26 gallons of sludge residue**

Note: based upon BTP Radioactive Waste Classification (May 1983, Rev.0), the final waste form volume may be used for 10 CFR 61.55 Classification

Section I. Waste Stream Information Also assume that sludge will be dispersed uniformly and solidified with suitable media

Container Typ 10,000 gallon stainless steel tank (10' dia. X 19.5' leng 1337 ft^3 or 37.86 m^3 external volume

Description: 17.26 gallons of Sludge

Note: assume solid phase volume of 17.26 gallons with density of 1.25 g/cc

Constants	Units
3.70E+10	Bq/Ci
453.6	g/lb
1.00E-12	ΓBq/Bq or Ci/pC
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)	Est. Waste Vol. (m3)	Final Waste Vol. (m3)
180.05	81.67	0.00	0.00	81.67	3.79E+01	1.07E+00

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 = (17.26 gal.)x(1.25 g/cc)x(3785.412 cc/gal.)x(2.2046E-03 lb/g) = 180.05 lbs.

EPA regulated hazardous COCs: Barium, Cadmium, Chromium, Lead, Mercury, Silver, VOCs, S'

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 Mas: (g)	TRU Conc. (nCi/g)	LSA-II Solids Frac	Activity/gram (pCi/g)
Sr-90	1.44E+00	5.61E+01	5.33E+10	6.53E+05	3.70E-03	1.44E+01	1.00E-01	5.33E+02	5.33E-01	0.00E+00	0.00E+00	6.53E-02	1.76E+07
Cs-137	5.06E-01	3.95E+00	1.87E+10	2.29E+05	3.70E-02	5.06E-01	5.00E-01	3.75E+01	3.75E-02	0.00E+00	0.00E+00	4.59E-03	6.20E+06
Ni-63	6.36E-02	8.26E-03	2.35E+09	2.88E+04	3.70E+00	6.36E-04	3.00E+01	7.84E-02	7.84E-05	0.00E+00	0.00E+00	9.60E-06	7.79E+05
Co-60	1.25E-02	1.22E-01	4.62E+08	5.65E+03	3.70E-01	1.25E-03	4.00E-01	1.15E+00	1.15E-03	0.00E+00	0.00E+00	1.41E-04	1.53E+05
Pu-241	4.54E-03	1.77E+00	1.68E+08	2.06E+03	3.70E-02	4.54E-03	1.00E-02	1.68E+01	1.68E-02	4.54E-05	0.00E+00	2.06E-03	5.56E+04
Eu-154	2.09E-03	1.63E-02	7.75E+07	9.49E+02	3.70E-01	2.09E-04	5.00E-01	1.55E-01	1.55E-04	0.00E+00	0.00E+00	1.90E-05	2.56E+04
Eu-152	1.22E-03	5.28E-03	4.51E+07	5.52E+02	3.70E-01	1.22E-04	9.00E-01	5.01E-02	5.01E-05	0.00E+00	0.00E+00	6.14E-06	1.49E+04
Ru-103	1.09E-03	4.70E-03	4.02E+07	4.92E+02	3.70E-01	1.09E-04	9.00E-01	4.47E-02	4.47E-05	0.00E+00	0.00E+00	5.47E-06	1.33E+04
Ce-144	8.99E-04	1.75E-02	3.33E+07	4.07E+02	3.70E-02	8.99E-04	2.00E-01	1.66E-01	1.66E-04	0.00E+00	0.00E+00	2.04E-05	1.10E+04
Pu-238	8.89E-04	1.73E+01	3.29E+07	4.03E+02	3.70E-04	8.89E-02	2.00E-04	1.64E+02	1.64E-01	5.23E-05	1.09E+01	2.01E-02	1.09E+04
Ru-106	8.87E-04	1.73E-02	3.28E+07	4.02E+02	3.70E-02	8.87E-04	2.00E-01	1.64E-01	1.64E-04	0.00E+00	0.00E+00	2.01E-05	1.09E+04
Am-241	4.77E-04	9.29E+00	1.77E+07	2.16E+02	3.70E-04	4.77E-02	2.00E-04	8.83E+01	8.83E-02	0.00E+00	5.84E+00	1.08E-02	5.84E+03
Pu-239	4.59E-04	8.95E+00	1.70E+07	2.08E+02	3.70E-04	4.59E-02	2.00E-04	8.50E+01	8.50E-02	7.41E-03	5.62E+00	1.04E-02	5.62E+03
Sb-125	3.57E-04	1.55E-03	1.32E+07	1.62E+02	3.70E-01	3.57E-05	9.00E-01	1.47E-02	1.47E-05	0.00E+00	0.00E+00	1.80E-06	4.38E+03
Eu-155	2.87E-04	5.58E-04	1.06E+07	1.30E+02	3.70E-01	2.87E-05	2.00E+00	5.30E-03	5.30E-06	0.00E+00	0.00E+00	6.49E-07	3.51E+03
Zr-95	2.45E-04	1.06E-03	9.08E+06	1.11E+02	3.70E-01	2.45E-05	9.00E-01	1.01E-02	1.01E-05	0.00E+00	0.00E+00	1.24E-06	3.00E+03
Nb-95	2.13E-04	8.29E-04	7.87E+06	9.64E+01	3.70E-01	2.13E-05	1.00E+00	7.87E-03	7.87E-06	0.00E+00	0.00E+00	9.64E-07	2.61E+03
Ra-226	1.94E-04	3.78E-02	7.19E+06	8.80E+01	3.70E-03	1.94E-03	2.00E-02	3.59E-01	3.59E-04	0.00E+00	0.00E+00	4.40E-05	2.38E+03
U-233	1.49E-04	5.79E-01	5.50E+06	6.74E+01	3.70E-03	1.49E-03	1.00E-03	5.50E+00	5.50E-03	1.53E-02	0.00E+00	6.74E-04	1.82E+03
Cm-243	1.34E-04	1.74E+00	4.96E+06	6.07E+01	3.70E-04	1.34E-02	3.00E-04	1.65E+01	1.65E-02	0.00E+00	1.64E+00	2.02E-03	1.64E+03
Ag-110m	1.13E-04	1.10E-03	4.19E+06	5.13E+01	3.70E-01	1.13E-05	4.00E-01	1.05E-02	1.05E-05	0.00E+00	0.00E+00	1.28E-06	1.39E+03
Co-58	1.12E-04	4.37E-04	4.15E+06	5.08E+01	3.70E-01	1.12E-05	1.00E+00	4.15E-03	4.15E-06	0.00E+00	0.00E+00	5.08E-07	1.37E+03
Cs-134	1.01E-04	7.87E-04	3.74E+06	4.58E+01	3.70E-02	1.01E-04	5.00E-01	7.47E-03	7.47E-06	0.00E+00	0.00E+00	9.15E-07	1.24E+03
Zn-65	9.90E-05	1.93E-04	3.66E+06	4.49E+01	3.70E-01	9.90E-06	2.00E+00	1.83E-03	1.83E-06	0.00E+00	0.00E+00	2.24E-07	1.21E+03
Ag-108m	6.33E-05	4.11E-04	2.34E+06	2.87E+01	3.70E-01	6.33E-06	6.00E-01	3.90E-03	3.90E-06	0.00E+00	0.00E+00	4.78E-07	7.75E+02
Mn-54	3.99E-05	1.55E-04	1.48E+06	1.81E+01	3.70E-01	3.99E-06	1.00E+00	1.48E-03	1.48E-06	0.00E+00	0.00E+00	1.81E-07	4.89E+02
U-235	4.86E-06	0.00E+00	1.80E+05	2.20E+00	3.70E-03	4.86E-05	Unlimited	0.00E+00	0.00E+00	2.21E+00	0.00E+00	0.00E+00	5.95E+01
I-129	4.69E-06	0.00E+00	1.73E+05	2.12E+00	3.70E-05	4.69E-03	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.74E+01
U-238	4.54E-06	0.00E+00	1.68E+05	2.06E+00	3.70E-03	4.54E-05	Unlimited	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.56E+01
Th-234	4.54E-06	8.84E-05	1.68E+05	2.06E+00	3.70E+00	4.54E-08	2.00E-01	8.40E-04	8.40E-07	0.00E+00	0.00E+00	1.03E-07	5.56E+01
Cm-242	3.20E-06	1.25E-03	1.18E+05	1.45E+00	3.70E-02	3.20E-06	1.00E-02	1.18E-02	1.18E-05	0.00E+00	0.00E+00	1.45E-06	3.92E+01
Np-237	1.97E-06	3.84E-02	7.30E+04	8.94E-01	3.70E-04	1.97E-04	2.00E-04	3.65E-01	3.65E-04	0.00E+00	2.42E-02	4.47E-05	2.42E+01
Pa-233	1.97E-06	8.54E-06	7.30E+04	8.94E-01	3.70E+00	1.97E-08	9.00E-01	8.12E-05	8.12E-08	0.00E+00	0.00E+00	9.94E-09	2.42E+01
Total	2.04E+00	100.00%	7.54E+10	9.23E+05		1.51E+01		9.50E+02	9.50E-01	2.23E+00	2.40E+01	1.16E-01	2.50E+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:_____ Date:_____

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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:_____

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

Nuclide	Activity (Ci)	% of Total A2 Fraction	Cumulative A2 Fraction
Sr-90	1.44E+00	5.61E+01	5.61E+01
Pu-238	8.89E-04	1.73E+01	7.34E+01
Am-241	4.77E-04	9.29E+00	8.27E+01
Pu-239	4.59E-04	8.95E+00	9.17E+01
Cs-137	5.06E-01	3.95E+00	9.56E+01
Pu-241	4.54E-03	1.77E+00	9.74E+01
Cm-243	1.34E-04	1.74E+00	9.91E+01
U-233	1.49E-04	5.79E-01	9.97E+01
Co-60	1.25E-02	1.22E-01	9.98E+01
Np-237	1.97E-06	3.84E-02	9.99E+01
Ra-226	1.94E-04	3.78E-02	9.99E+01
Ce-144	8.99E-04	1.75E-02	9.99E+01
Ru-106	8.87E-04	1.73E-02	1.00E+02
Eu-154	2.09E-03	1.63E-02	1.00E+02
Ni-63	6.36E-02	8.26E-03	1.00E+02
Eu-152	1.22E-03	5.28E-03	1.00E+02
Ru-103	1.09E-03	4.70E-03	1.00E+02
Sb-125	3.57E-04	1.55E-03	1.00E+02
Cm-242	3.20E-06	1.25E-03	1.00E+02
Ag-110m	1.13E-04	1.10E-03	1.00E+02
Zr-95	2.45E-04	1.06E-03	1.00E+02
Nb-95	2.13E-04	8.29E-04	1.00E+02
Cs-134	1.01E-04	7.87E-04	1.00E+02
Eu-155	2.87E-04	5.58E-04	1.00E+02
Co-58	1.12E-04	4.37E-04	1.00E+02
Ag-108m	6.33E-05	4.11E-04	1.00E+02
Zn-65	9.90E-05	1.93E-04	1.00E+02
Mn-54	3.99E-05	1.55E-04	1.00E+02
Th-234	4.54E-06	8.84E-05	1.00E+02
Pa-233	1.97E-06	8.54E-06	1.00E+02
U-235	4.86E-06	0.00E+00	1.00E+02
I-129	4.69E-06	0.00E+00	1.00E+02
U-238	4.54E-06	0.00E+00	1.00E+02

Nuclide	Activity (Ci)	% of Total Activity	Activity Conc. (pCi/g)	Source Material (kg)	SNM (g)	Activity Conc. (Ci/m^3)
Sr-90	1.44E+00	7.07E+01	1.76E+07	Not applicable	Not applicable	3.81E-02
Cs-137	5.06E-01	2.48E+01	6.20E+06	Not applicable	Not applicable	1.34E-02
Ni-63	6.36E-02	3.12E+00	7.79E+05	Not applicable	Not applicable	1.68E-03
Co-60	1.25E-02	6.12E-01	1.53E+05	Not applicable	Not applicable	3.30E-04
Pu-241	4.54E-03	2.23E-01	5.56E+04	Not applicable	4.54E-05	1.20E-04
Eu-154	2.09E-03	1.03E-01	2.56E+04	Not applicable	Not applicable	5.53E-05
Eu-152	1.22E-03	5.98E-02	1.49E+04	Not applicable	Not applicable	3.22E-05
Ru-103	1.09E-03	5.33E-02	1.33E+04	Not applicable	Not applicable	2.87E-05
Ce-144	8.99E-04	4.41E-02	1.10E+04	Not applicable	Not applicable	2.37E-05
Pu-238	8.89E-04	4.36E-02	1.09E+04	Not applicable	5.23E-05	2.35E-05
Ru-106	8.87E-04	4.35E-02	1.09E+04	Not applicable	Not applicable	2.34E-05
Am-241	4.77E-04	2.34E-02	5.84E+03	Not applicable	Not applicable	1.26E-05
Pu-239	4.59E-04	2.25E-02	5.62E+03	Not applicable	7.41E-03	1.21E-05
Sb-125	3.57E-04	1.75E-02	4.38E+03	Not applicable	Not applicable	9.44E-06
Eu-155	2.87E-04	1.41E-02	3.51E+03	Not applicable	Not applicable	7.57E-06
Zr-95	2.45E-04	1.20E-02	3.00E+03	Not applicable	Not applicable	6.48E-06
Nb-95	2.13E-04	1.04E-02	2.61E+03	Not applicable	Not applicable	5.62E-06
Ra-226	1.94E-04	9.53E-03	2.38E+03	Not applicable	Not applicable	5.13E-06
U-233	1.49E-04	7.30E-03	1.82E+03	Not applicable	1.53E-02	3.93E-06
Cm-243	1.34E-04	6.58E-03	1.64E+03	Not applicable	Not applicable	3.54E-06
Ag-110m	1.13E-04	5.56E-03	1.39E+03	Not applicable	Not applicable	2.99E-06
Co-58	1.12E-04	5.50E-03	1.37E+03	Not applicable	Not applicable	2.96E-06
Cs-134	1.01E-04	4.96E-03	1.24E+03	Not applicable	Not applicable	2.67E-06
Zn-65	9.90E-05	4.86E-03	1.21E+03	Not applicable	Not applicable	2.62E-06
Ag-108m	6.33E-05	3.11E-03	7.75E+02	Not applicable	Not applicable	1.67E-06
Mn-54	3.99E-05	1.96E-03	4.89E+02	Not applicable	Not applicable	1.05E-06
U-235	4.86E-06	2.38E-04	5.95E+01	Not applicable	2.21E+00	1.28E-07
I-129	4.69E-06	2.30E-04	5.74E+01	Not applicable	Not applicable	1.24E-07
U-238	4.54E-06	2.23E-04	5.56E+01	Not applicable	Not applicable	1.20E-07
Th-234	4.54E-06	2.23E-04	5.56E+01	Not applicable	Not applicable	1.20E-07
Cm-242	3.20E-06	1.57E-04	3.92E+01	Not applicable	Not applicable	8.44E-08
Np-237	1.97E-06	9.69E-05	2.42E+01	Not applicable	Not applicable	5.21E-08
Pa-233	1.97E-06	9.69E-05	2.42E+01	Not applicable	Not applicable	5.21E-08

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

Radionuclic	Table 2 limit (Ci/m^3) Column 1	Column 2	2" heel and .25" residue of V-3 Sludge in a 10,000 gallon steel tank
Sr-90	0.04	150	3.81E-02
Cs-137	1	44	1.20E-04
Ni-63	3.5	70	7.57E-06

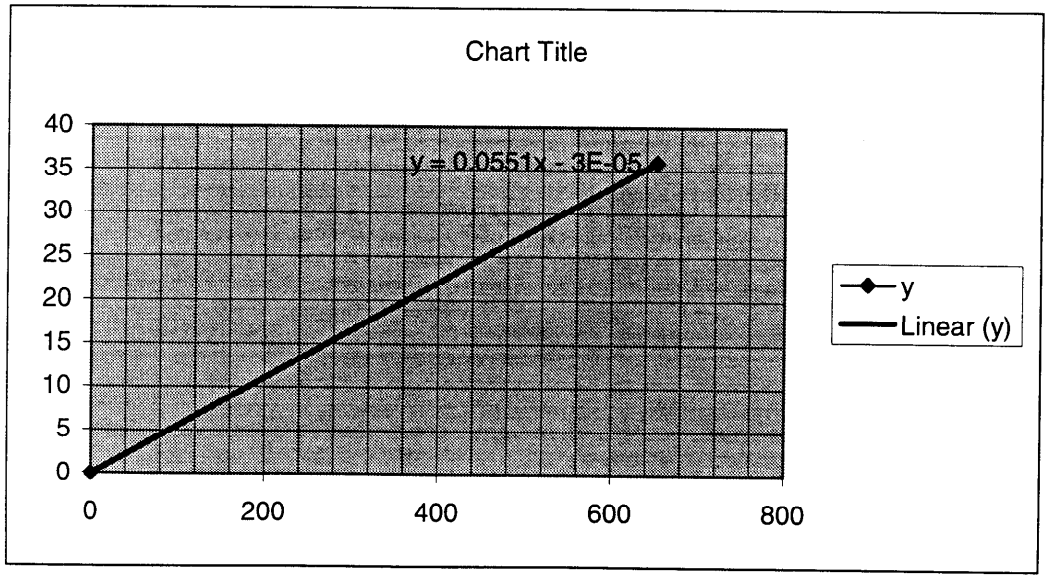
33.5

Class A Sum of Fractions: 0.95
Class B Sum of Fractions: 0.00

Class A

19427

x	y
652	35.9
0.038	0.00206



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Attachment 4

Volume and Weight Calculation for 4 and 6 Inch Pipe

WESTON
MANAGERS DESIGNERS/CONSULTANTS

CLIENT/SUBJECT U-TANKS W.O. NO.

TASK DESCRIPTION Determine Pipe WTs / LF TASK NO.

PREPARED BY P. KESHIAN DEPT DATE 9/24/01

MATH CHECK BY DEPT DATE

METHOD REV. BY DEPT DATE

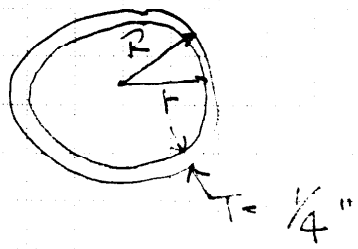
APPROVED BY

DEPT DATE

1. Determine weight per linear ft for both 4" and 6" STAinless Steel pipe

- Assume pipe is 1/4" Thick

$$A = \pi (R^2 - r^2) \quad \text{or} \quad \frac{\pi (D^2 - d^2)}{4}$$



Density of Stainless Steel = 496 #/CF @ 20°C

USE 495 #/CF

4" Pipe

$$A = \frac{\pi}{4}\left(\left(\frac{4.25}{12}\right)^2 - \left(\frac{4}{12}\right)^2\right) = .0112 \text{ SF}$$

$$\times 1 \text{ FT} \times 495 \text{ \#/CF} = \underline{5.55 \text{ \#/LF}}$$

6" Pipe

$$A = \frac{\pi}{4}\left(\left(\frac{6.25}{12}\right)^2 - \left(\frac{6}{12}\right)^2\right) = .0168 \text{ SF}$$

$$\times 1 \times 495 \text{ \#/CF} = \underline{8.27 \text{ \#/LF}}$$

WESTON MANAGERS DESIGNERS/CONSULTANTS

CLIENT/SUBJECT V TANKS W.O. NO.

TASK DESCRIPTION Determine wt & Vol of Contamination in Pipe TASK NO.

PREPARED BY B LESHAW DEPT DATE 9/26/01

MATH CHECK BY DEPT DATE

METHOD REV. BY DEPT DATE

APPROVED BY

DEPT DATE

1. Determine wt and Vol of contamination remaining in pipes as surface contamination

- For all pipe Assume 1/4" of contamination remains
- Assume wt of contamination is 1.25 gm/cc or 78 #/CF

4" PIPE

$$A = \frac{\pi}{4}\left(\left(\frac{4}{12}\right)^2 - \left(\frac{3.75}{12}\right)^2\right) = .0106 \text{ SF}$$

$$\text{WT} = 1 \times .0106 \times 78 = .83 \text{ \#/LF of contamination}$$

6" PIPE

$$A = \frac{\pi}{4}\left(\left(\frac{6}{12}\right)^2 - \left(\frac{5.75}{12}\right)^2\right) = 0.160 \text{ SF}$$

$$\text{WT} = 1 \times .16 \times 78 = 1.25 \text{ \#/LF}$$

Attachment 5

Volume and Weight of V-Tanks and Contamination Prior to Removal from the Ground

WESTON MANAGERS DESIGNERS/CONSULTANTS

CLIENT/SUBJECT V TANKS W.O. NO.

TASK DESCRIPTION Determine mass of TANKS TASK NO.

PREPARED BY B LESHIAN DEPT DATE 9/24/01

MATH CHECK BY DEPT DATE

METHOD REV. BY DEPT DATE

APPROVED BY

DEPT DATE

Determine wt of TANKS

DIA 10'
Length 19'-6"

Thickness 1/4"

$A = \pi(5.021^2 - 5^2) \times 19.5 \times .1278\ \#/LF \times 495\ \#/CF$

WT = 6327.5 #

wt of TANK ends

$2 \times 10'\ DIA \times \pi \times \frac{.25}{12} \times 495 = 647.62$

TOTAL wt / TANK = 6975.12

ADD for Riser pipes, Flanges, manifolds 200 lbs

WESTON MANAGERS DESIGNERS/CONSULTANTS

CLIENT/SUBJECT V TANKS W.O. NO.

TASK DESCRIPTION TASK NO.

PREPARED BY B KESHIAN DEPT DATE 9/25/01

MATH CHECK BY DEPT DATE

METHOD REV. BY DEPT DATE

APPROVED BY DEPT DATE

Determine WT of Contamination remaining in TANKS

As surface Contamination & heel

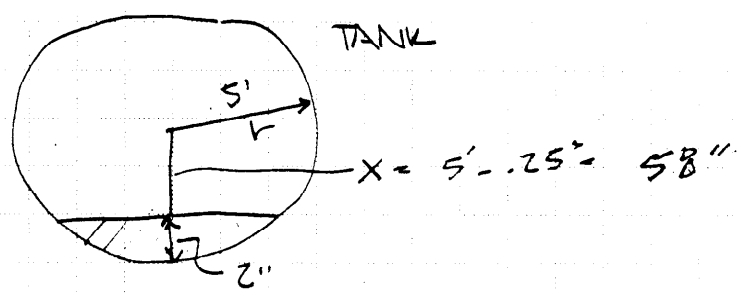
- Assume 1/4" of Contamination on interior of TANK
- Assume 2" of sludge in Bottom of TANK Cannot be removed

DIA = 10' Assume density of 78 #/CF

L = 19.5'

$A = \pi\left(5^2 - \left(\frac{59.75}{12}\right)^2\right) = .653$ SF

$\times$ 19.5' $\times$ 78 #/CF = $\boxed{993 \text{ \#s Contamination}}$



$$A = \frac{\pi r^2}{2} - \left[x\sqrt{r^2 - x^2} + r^2 \sin^{-1}\left(\frac{x}{r}\right) \right]$$

OR

WESTON
MANAGERS DESIGNERS/CONSULTANTS

SHEET 27 of 27

CLIENT/SUBJECT V TANKS W.O. NO.

TASK DESCRIPTION TASK NO.

PREPARED BY Bkeshine DEPT DATE 9/25/01

MATH CHECK BY DEPT DATE

METHOD REV. BY DEPT DATE

APPROVED BY

DEPT DATE

Area of Segment

$$= \frac{\pi r^2 \theta}{360} - \frac{r^2 \sin\theta}{2}$$

$$\theta = 180 - \left[2 \sin^{-1}\left(\frac{x}{r}\right)\right]$$

$$= 180 - 150.33$$

$$= 29.67°$$

$$= \frac{3.14 \times 25 \times 29.67}{360} - \frac{25 \sin 29.67}{2}$$

$$= 6.47 - 6.19 = .28 \text{ SF}$$

$$\times 19.5 \text{ ft} = 5.5 \text{ cf}$$

$$\times 7.48 \text{ gal/CF} = 41.16 \text{ gal}$$

or

$$5.5 \times 78 = 429 \text{ \# of Sludge}$$

RFW 10-05-003/A-5/85
512-5642