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SRR-CWDA-2013-00103
Revision 0

AUG 26 2013

Sherri R. Ross, Program Manager
Waste Removal and Tank Closure
Waste Disposition Programs Division
Savannah River Operations Office

Dear Ms. Ross:

FOLLOW-UP IN SUPPORT OF U.S. NUCLEAR REGULATORY COMMISSION MONITORING ACTIVITIES FOR F-TANK FARM

Ref:

1. ML13127A291, *Summary of May 1, 2013, Clarifying Teleconference Call Between the U.S. Nuclear Regulatory Commission and the U.S. Department of Energy Regarding Tank 18 Grouting Operation Videos From F-Area Tank Farm at the Savannah River Site (Docket No. PROJ0734)*, U.S. Nuclear Regulatory Commission, Washington, DC, May 24, 2013.
2. ML13150A219 *Summary of May 15, 2013, Clarifying Teleconference Call Between the U.S. Nuclear Regulatory Commission and the U.S. Department of Energy Regarding F-Area Tank Farm Volume Mapping and Inventory for the Savannah River Site (Docket No. PROJ0734)*, U.S. Nuclear Regulatory Commission, Washington, DC, June 18, 2013.

The U.S. Nuclear Regulatory Commission (NRC) conducted an onsite observation visit for F-Tank Farm (FTF) under their monitoring role per Section 3116 of the *Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005*. The observation visit was held on March 27 & 28, 2013, and a series of clarifying phone calls were held between the NRC and the U.S. Department of Energy (DOE) as a follow-up to the observation visit. As a result of the observation visit and subsequent calls, there were several follow-up actions for which DOE was responsible.

During a follow-up call held on May 1, 2013, DOE committed to provide specification information on the cleanout balls, or "pigs" used to clear the grout lines during operations. In

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addition, the NRC summary report contained two additional requests for information from the NRC concerning a daily summary of the quantity of grout trucks delivered and "pigs" utilized during grouting operations (Reference 1). The follow-up information from the May 1, 2013 clarifying call is provided in Attachment 1 to this memorandum.

During the phone call held on May 15, 2013, DOE committed to providing clarifying text for FTF residual inventory adjustments discussed during the call (Reference 2). The follow-up information from the May 15, 2013 clarifying call is provided in Attachment 2.

If you have any questions please contact me at 557-8960.

Sincerely,

Steven A. Thomas
Deputy Manager
Closure & Waste Disposal Authority

SAT/lr

Att.

c: K. A. Hauer, 705-1C
K. H. Rosenberger, 705-1C
M. H. Layton, 705-1C
L. B. Romanowski, 705-1C
M. J. Mahoney, 705-1C
W. B. Dean, 705-1C

Attachment 1: Follow-up to FTF Tank 18 Grouting Operations Call on May 1, 2013

Action Item:

DOE will provide NRC with specifications of "pigs."

DOE Response:

The "pigs" (i.e., cleanout balls) utilized during Tank 18 grouting operations were cleanout balls from Construction Forms, Inc. The cleanout balls were soft sponge cleanout balls Construction Forms model # COBS50. Attached Figure A1-1 is the vendor catalog page for the cleanout balls and Figure A1-2 contains the company information. In addition, Figure A1-3 contains a picture of one of the cleanout balls.

Additional Questions Provided in NRC Summary:

…Combining with one of the additional questions, it would be helpful to NRC if this also included the schedule of tank activities, number of trucks per day, and total number of trucks.

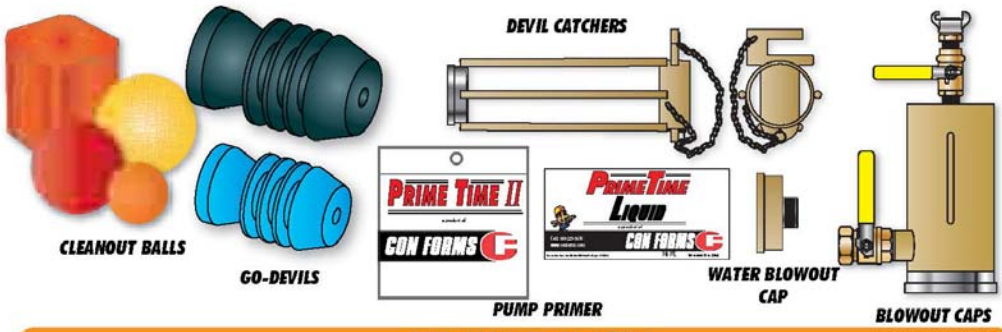
…Combining with one of the additional questions, it would be helpful to NRC if this also included the schedule of "pigs" and total number released into the tanks.

DOE Response:

Table A1-1 provides the information on the number of grout trucks per day and the schedule and number of "pigs" (i.e., cleanout balls) utilized during Tank 18 grouting operations.

Figure A1-1: Cleanout Balls Catalog Sheet (Model COBS50)

CLEAN OUT ACCESSORIES



BALL, SPONGES, GO-DEVILS

Size	Boom Go-Devil	Go-Devil	Cleanout Cubes	Foam Boom Ball	SpongeCleanout Ball - Hard	High Performance Elastomeric compound Cleanout Ball	Sponge Cleanout Ball - Soft
2.0	-	GO-D20	-	-	COBH20		COBS20
2.5	-	GO-D25	-	-	COBH25		COBS25
3.0	-	GO-D30	-	-	COBH30		COBS30
4.0	-	GO-D40	-	BB40	COBH40		COBS40
5.0	BGO-D50	GO-D50	COCM-50	BB50	COBH50	COBP50	COBS50
6.0	-	GO-D60	COCM-60	BB60	COBH60		COBS60
7.0	-	GO-D70	-	-	-		-
8.0	-	GO-D80	-	-	-		-

BALL, SPONGES - BOX QUANTITIES

Size	Foam Boom Ball	Units Per Box	SpongeCleanout Ball - Hard	Sponge Cleanout Ball - Soft	Units Per Box
2.0	-	–	COBH20-BX	COBS20-BX	12
2.5	-	–	COBH25-BX	COBS25-BX	20
3.0	-	–	COBH30-BX	COBS30-BX	20
4.0	BB40-BX	12	COBH40-BX	COBS40-BX	25
5.0	BB50-BX	8	COBH50-BX	COBS50-BX	50
6.0	BB60-BX	4	COBH60-BX	COBS60-BX	32

Cleanout Accessories

CONCRETE PUMP PRIMER

Product	Contents	Part Number
Prime Time II	1 Pail / with 60 - 8oz.bags	PTPII
Prime Time II	Skid of 36 Pails	PTPII-S
Prime Time Liquid	1/pack	PTL
Prime Time Liquid	1 Box / with 60 packs	PTL-BX

DEVIL CATCHERS, BLOW-OUT CAPS, END CAPS

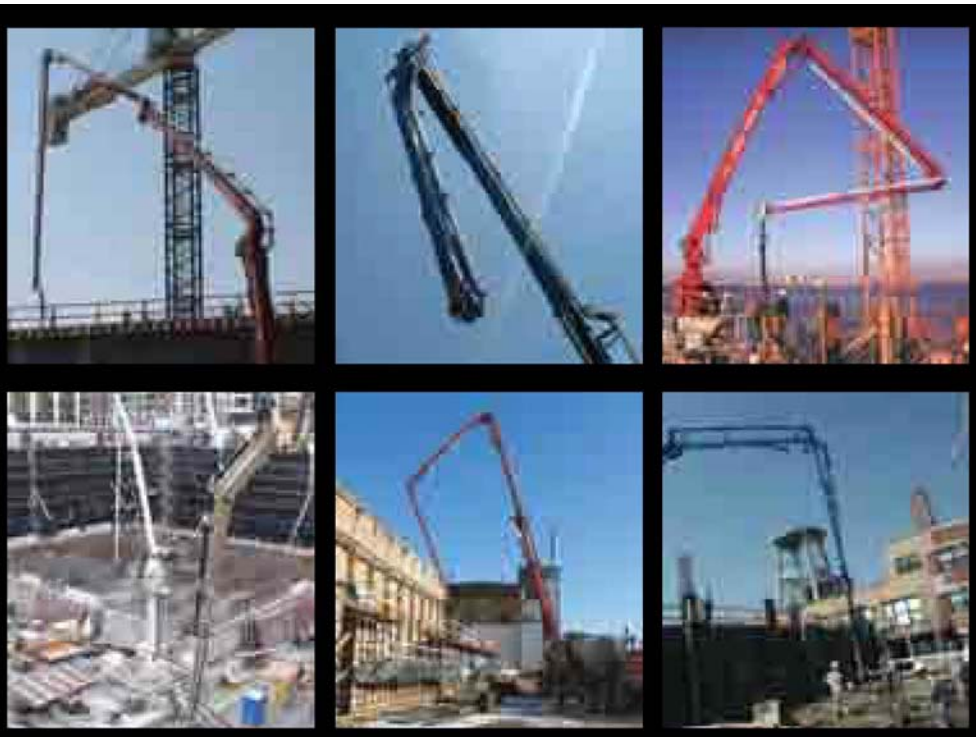
Size	Devil Catcher	Air Blowout Cap	Water Blowout Cap	Water Blowout Cap with 3/4 nipple	End Cap
2.0	DC20D	----------	----------	BOC20D-3/4	EC20D
2.5	DC25D	----------	BOC25D	BOC25D-3/4	EC25D
3.0	DC30D	BOC30_A	BOC30D	BOC30D-3/4	EC30D
4.0	DC40D	BOC40_A	BOC40D	BOC40D-3/4	EC40D
5.0	DC50D	BOC50_A	BOC50D	BOC50D-3/4	EC50D
6.0	DC60D	BOC60_A	BOC60D	----------	EC60D
148mm	DC50M	BOC50MA	BOC50M	BOC50M-3/4	EC148M

Specify types of ends required.

For additional information or to place an order, please call **800.223.3676**

31 |Clean out

Figure A1-2: Cleanout Ball Company Information



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Fax: 310-323-7313

Con Forms Eastern Sales
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Con Forms South Central Sales
Tel: 262-284-7819
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Fax: + 607-557-3868

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2012REV.013

Figure A1-3: Photograph of Cleanout Ball

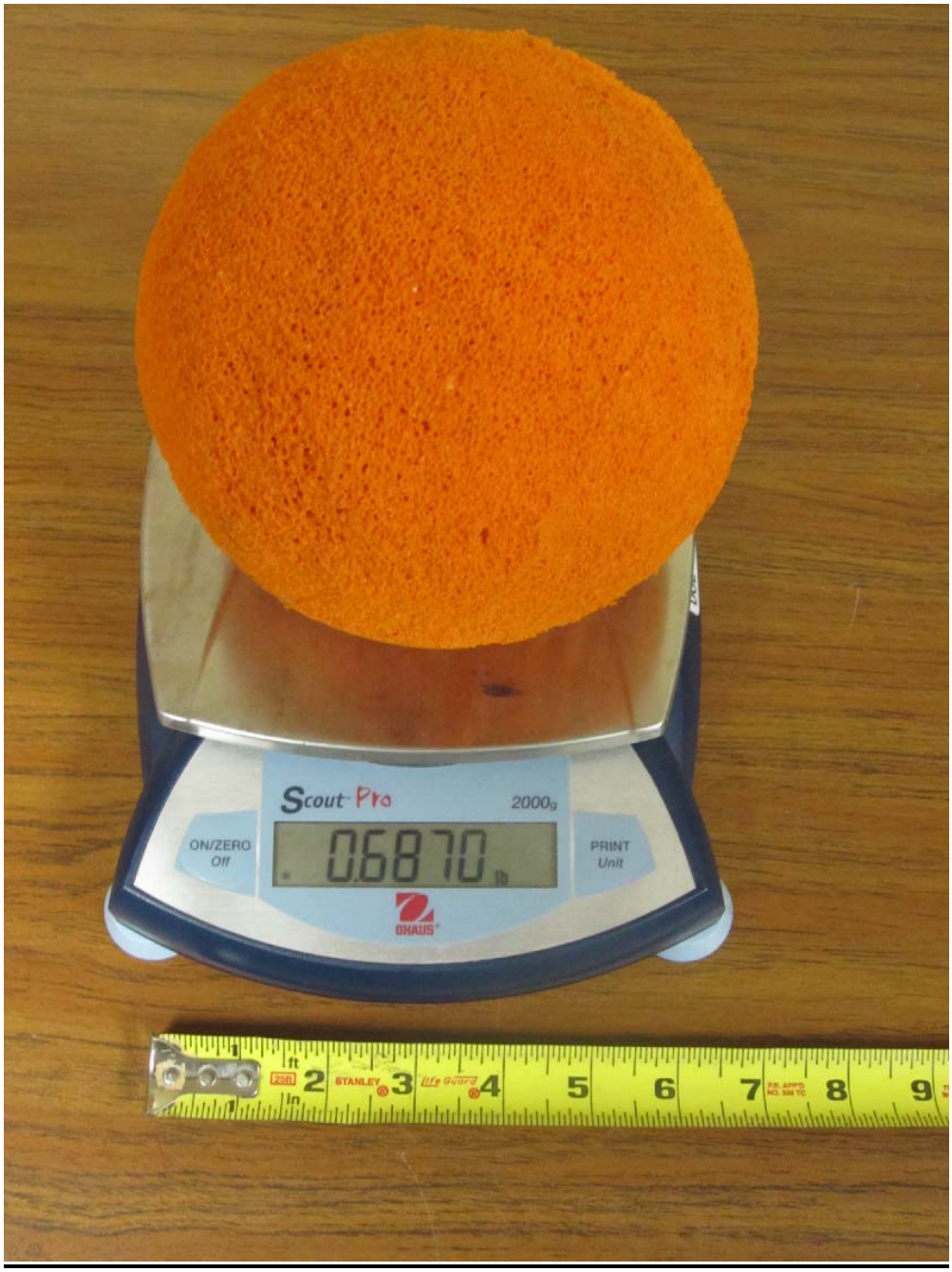

Table A1-1: Tank 18 Grouting Operations

Date	# Trucks Unloaded in Tank 18	# Pigs Added to Tank 18
4/3/2012	35	1
4/4/2012	19	0
4/9/2013	0	1
4/18/2012	40	1
4/19/2012	37	1
5/2/2012	53	1
5/3/2012	43	1
5/7/2012	38	1
5/8/2012	42	1
5/9/2012	30	1
5/10/2012	40	1
5/11/2012	44	1
5/29/2012	13	1
5/30/2012	48	1
5/31/2012	21	1
6/1/2012	51	1
6/4/2012	24	1
6/5/2012	39	1
6/6/2012	32	1
6/7/2012	50	1
6/8/2012	47	1
6/11/2012	34	1
6/12/2012	45	1
6/15/2012	34	1
6/19/2012	18	1
6/22/2012	30	1
6/25/2012	43	1
6/27/2012	38	1
6/28/2012	32	1
Total	**1020**	**28**

Attachment 2: Follow-up to FTF Volume Mapping and Inventory Call on May 15, 2013

Action Item:

> *DOE will provide NRC with an e-mail containing the methodology for doing inventory adjustments and examples of using that methodology, such as for I-129 and for Tc-99.*

DOE Response:

The following steps outline the methodology for estimating the FTF inventory for use in the Tanks 5 and 6 Special Analysis:

1) The starting point for the Tank 5 and 6 Special Analysis inventory was the inventory used for the FTF Performance Assessment, Revision 0.

From the initial starting inventory the additional adjustments listed below were made. The adjustments varied in application; some were made to all tanks, some to specific radionuclides, and some to the associated concentration:

2) Closed tanks (Tanks 5, 6, 17, 18, 19, and 20) final inventories from actual waste characterization reports were used exclusively and were not adjusted.
3) For the Type I and IIIA tank groups, the individual tank inventories were increased by an order of magnitude.
4) New analytical detection limits were assumed for a subset of radionuclides. For any risk significant radionuclides with a concentration less than the radionuclide's specific detection limit, the concentration was increased to the detection limit and a new inventory, based on the increased concentration, was estimated.
5) For non-risk significant radionuclides, any inventories less than one curie were increased to one curie.
6) For each tank the most recent tank farm inventory and volume estimate contained in *Information on the Radiological and Chemical Characterization of the Savannah River Site Tank Waste, As of July 5, 2011,* SRR-LWE-2011-00201, was reviewed to determine whether significant differences exist between the previous tank farm inventory basis and the most recent estimates. Inventory adjustment was made if significant differences existed.
7) For Tc-99, estimates were lowered based on the significant difference observed between the Tanks 5 and 6 final inventories and the FTF Performance Assessment, Revision 1, estimate.
8) For the Type I and IIIA tank groups, the maximum concentration for each radionuclide within the group was assumed for all the tanks within the group

Following is an example showing the adjustments made to I-129 and Tc-99 inventories in the Type I, IIIA, and III tanks. This example shows the I-129 and Tc-99 inventory estimate at each step of the methodology. The highlighted values in the tables, Tables A2-1 through A2-10, represent values that were impacted by each step. F-Tank Farm does not have any Type II tanks and the Type IV tanks (Tanks 17, 18, 19, 20) used the final actual inventories and therefore were not impacted by the adjustments shown.

1) *The starting point for the Tank 5 and 6 Special Analysis inventory was the inventory used for the FTF Performance Assessment, Revision 0.*

   Table A2-1 provides the starting point inventories. These values are from Table 3.3-2 of the FTF Performance Assessment, Revision 0. [SRS-REG-2007-00002]

Table A2-1: Initial Inventories

Type I		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
I-129	Ci	2.98E-05	7.92E-06	6.64E-06	7.86E-06	3.13E-05	3.73E-05	9.48E-07	2.25E-06
Tc-99	Ci	6.25E+00	1.66E+00	1.39E+00	1.65E+00	6.57E+00	7.82E+00	1.99E-01	4.73E-01
Type IIIA		**25**	**26**	**27**	**28**	**44**	**45**	**46**	**47**
I-129	Ci	1.05E-07	1.85E-07	8.66E-08	1.85E-07	1.85E-07	1.85E-07	1.85E-07	1.85E-07
Tc-99	Ci	2.21E-02	3.90E-02	1.82E-02	3.90E-02	3.90E-02	3.90E-02	3.90E-02	3.90E-02
Type III		**33**	**34**						
I-129	Ci	2.43E-05	1.06E-04						
Tc-99	Ci	5.10E+00	2.23E+01						

2) *Closed tanks (Tanks 5, 6, 17, 18, 19, and 20) final inventories were used exclusively and were not adjusted.*

   The Tank 5 and 6 inventories, as well as the Type IV tanks (not shown), were set to the final actual inventories and no further adjustments were made for any of the subsequent steps.

Table A2-2: Inventories Adjusted for Actuals

Type I		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
I-129	Ci	2.98E-05	7.92E-06	6.64E-06	7.86E-06	2.2E-03	3.0E-03	9.48E-07	2.25E-06
Tc-99	Ci	6.25E+00	1.66E+00	1.39E+00	1.65E+00	1.0E-01	1.7E+00	1.99E-01	4.73E-01
Type IIIA		**25**	**26**	**27**	**28**	**44**	**45**	**46**	**47**
I-129	Ci	1.05E-07	1.85E-07	8.66E-08	1.85E-07	1.85E-07	1.85E-07	1.85E-07	1.85E-07
Tc-99	Ci	2.21E-02	3.90E-02	1.82E-02	3.90E-02	3.90E-02	3.90E-02	3.90E-02	3.90E-02
Type III		**33**	**34**						
I-129	Ci	2.43E-05	1.06E-04						
Tc-99	Ci	5.10E+00	2.23E+01						

3) *For the Type I and IIIA tank groups, the individual tank inventories were increased by an order of magnitude.*

Due to future waste removal uncertainties (e.g., unknowns regarding the effectiveness of waste tank cleaning technologies), the initial waste tank inventories were increased one order of magnitude. This adjustment was not applied to the Type III tanks due to the cooling coil arrangement and the planned closure timeframe of the two FTF Type III waste tanks. There are no cooling coils at the bottom of Type III waste tanks to limit cleaning activities. Also, the planned closure dates for these tanks are sufficiently in the future, that the cleaning technology was expected to have progressed to a higher cleaning efficiency. Table A2-3 shows the volume estimates (an increase of one order of magnitude from FTF Performance Assessment, Revision 0) used in the inventory assignments. After adjusting for the change in volume and rounding, Table A2-4 shows the inventory assignment progress.

Table A2-3: Closure Volume Estimates used in Inventory Assignments

	Tanks 1-4, 7-8	**Tanks 25-28, 44-47**	**Tanks 33 & 34**
Volume (Gallons)	1,700	2,200	220

Table A2-4: Inventories Adjusted for Increase by Order of Magnitude

Type I		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
I-129	Ci	3.0E-04	7.9E-05	6.6E-05	7.9E-05	2.2E-03	3.0E-03	9.5E-06	2.3E-05
Tc-99	Ci	6.3E+01	1.7E+01	1.4E+01	1.7E+01	1.0E-01	1.7E+00	2.0E+00	4.7E+00
Type IIIA		**25**	**26**	**27**	**28**	**44**	**45**	**46**	**47**
I-129	Ci	1.1E-06	1.9E-06	8.7E-07	1.9E-06	1.9E-06	1.9E-06	1.9E-06	1.9E-06
Tc-99	Ci	2.2E-01	3.9E-01	1.8E-01	3.9E-01	3.9E-01	3.9E-01	3.9E-01	3.9E-01
Type III		**33**	**34**						
I-129	Ci	2.4E-05	1.1E-04						
Tc-99	Ci	5.1E+00	2.2E+01						

4) *New analytical detection limits were assigned to a subset of radionuclides. For any risk significant radionuclides with a concentration less than the radionuclide's specific detection limit, the concentration was increased to the detection limit and a new inventory, based on the increased concentration, was estimated*

This step applied to I-129 since the FTF Performance Assessment, Revision 0, inventory was based on a different detection limit. Utilizing the revised analytical detection limit of 1E-05 µCi/g @ 1.4 g/ml, I-129 inventories for the tanks were adjusted. Volumes utilized for adjustment were 1,700 gallons for Type I tanks, 2,200 gallons for Type IIIA tanks and 220 gallons for Type III tanks. The analytical detection limit for Tc-99 was not revised, therefore, there were no changes to Tc-99 inventories in this step. Other radionuclides adjusted in this step are included in Table 6.1-1 of SRR-CWDA-2009-00045.

Table A2-5: Inventories Adjusted for New Analytical Detection Limits

Type I		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
I-129	Ci	9.0E-05	9.0E-05	9.0E-05	9.0E-05	2.2E-03	3.0E-03	9.0E-05	9.0E-05
Tc-99	Ci	6.3E+01	1.7E+01	1.4E+01	1.7E+01	1.0E-01	1.7E+00	2.0E+00	4.7E+00
Type IIIA		**25**	**26**	**27**	**28**	**44**	**45**	**46**	**47**
I-129	Ci	1.2E-04	1.2E-04	1.2E-04	1.2E-04	1.2E-04	1.2E-04	1.2E-04	1.2E-04
Tc-99	Ci	2.2E-01	3.9E-01	1.8E-01	3.9E-01	3.9E-01	3.9E-01	3.9E-01	3.9E-01
Type III		**33**	**34**						
I-129	Ci	1.2E-05	1.2E-05						
Tc-99	Ci	5.1E+00	2.2E+01						

5) *For non-risk significant radionuclides, any inventories less than one curie were increased to one curie.*

The radionuclides shown in Table A2-6 were considered non-risk significant at an inventory of one curie and, if below one curie, the inventory was adjusted accordingly. Inventories for I-129 was not adjusted during this step, while Tc-99 was adjusted.

Table A2-6: Radionuclides Considered Non-Risk Significant at an Inventory of One Curie

Ac-227	C-14	Cs-135	Nb-94	Se-79
Al-26	Cf-249	Eu-152	Ni-59	Sm-151
Am-242m	Cm-243	Eu-154	Ni-63	Tc-99
Ba-137m	Co-60	H-3	Pu-241	Y-90

Table A2-7: Inventories Adjusted for Non-Risk Significant Radionuclides

Type I		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
I-129	Ci	9.0E-05	9.0E-05	9.0E-05	9.0E-05	2.2E-03	3.0E-03	9.0E-05	9.0E-05
Tc-99	Ci	6.3E+01	1.7E+01	1.4E+01	1.7E+01	1.0E-01	1.7E+00	2.0E+00	4.7E+00
Type IIIA		**25**	**26**	**27**	**28**	**44**	**45**	**46**	**47**
I-129	Ci	1.2E-04	1.2E-04	1.2E-04	1.2E-04	1.2E-04	1.2E-04	1.2E-04	1.2E-04
Tc-99	Ci	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Type III		**33**	**34**						
I-129	Ci	1.2E-05	1.2E-05						
Tc-99	Ci	5.1E+00	2.2E+01						

6) *For each tank the most recent tank farm inventory and volume estimate contained in "Information on the Radiological and Chemical Characterization of the Savannah River Site Tank Waste, As of July 5, 2011", SRR-LWE-2011-00201, was reviewed to determine whether significant differences exist between the previous tank farm inventory basis and the most recent estimates. Concentration adjustments were made if significant differences existed.*

For Type III tanks, adjustments were made to I-129. No significant difference was observed in the updated basis with respect to Tc-99 in any of the tank types. In addition to the I-129 adjustments shown, adjustments were made for Pu-238, Pu-239, Pu-240, and Pu-241 in Tanks 7 and 8. Also, in the Type IIIA tanks adjustments were made for Am-241.

Table A2-8: Inventories Adjusted for Recent Estimates in SRR-LWE-2011-00201

Type I		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
I-129	Ci	9.0E-05	9.0E-05	9.0E-05	9.0E-05	2.2E-03	3.0E-03	9.0E-05	9.0E-05
Tc-99	Ci	6.3E+01	1.7E+01	1.4E+01	1.7E+01	1.0E-01	1.7E+00	2.0E+00	4.7E+00
Type IIIA		**25**	**26**	**27**	**28**	**44**	**45**	**46**	**47**
I-129	Ci	1.2E-04	1.2E-04	1.2E-04	1.2E-04	1.2E-04	1.2E-04	1.2E-04	1.2E-04
Tc-99	Ci	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Type III		**33**	**34**						
I-129	Ci	3.2E-05	1.7E-04						
Tc-99	Ci	5.1E+00	2.2E+01						

7) *For Tc-99, estimates were lowered based on the significant difference observed between the Tanks 5 and 6 final inventories and the FTF Performance Assessment, Revision 1, estimate.*

For Type I tanks, the tank inventories were adjusted based on the final Tank 6 Tc-99 concentration and an assumed volume of 1,700 gallons. For Type III and IIIA tanks the Tc-99 estimates were adjusted based on a ratio of the Tank 6 FTF Performance Assessment, Revision 1, Tc-99 inventory versus the Tank 6 final Tc-99 inventory. The Type III and IIIA inventory assignments to this point for Tc-99 estimates were multiplied by the new ratio. This step was not specifically noted in SRR-CWDA-2009-00045.

Table A2-9: Inventories Adjusted for Tank 5 and 6 Tc-99 Results

Type I		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
I-129	Ci	9.0E-05	9.0E-05	9.0E-05	9.0E-05	2.2E-03	3.0E-03	9.0E-05	9.0E-05
Tc-99	Ci	9.6E-01	9.6E-01	9.6E-01	9.6E-01	1.0E-01	1.7E+00	9.6E-01	9.6E-01
Type IIIA		**25**	**26**	**27**	**28**	**44**	**45**	**46**	**47**
I-129	Ci	1.2E-04	1.2E-04	1.2E-04	1.2E-04	1.2E-04	1.2E-04	1.2E-04	1.2E-04
Tc-99	Ci	2.2E-02	2.2E-02	2.2E-02	2.2E-02	2.2E-02	2.2E-02	2.2E-02	2.2E-02
Type III		**33**	**34**						
I-129	Ci	3.2E-05	1.7E-04						
Tc-99	Ci	1.1E-01	4.9E-01						

8) *For the Type I and IIIA tank groups, the maximum concentration for each radionuclide within the group was assumed for all the tanks within the group.*

For the tank groups (Type I and IIIA), the maximum concentration for each radionuclide was applied to all tanks within the group. In regards to I-129 and Tc-99, this step only impacted I-129 inventories in the Type I tanks. For the Type I tanks, Tank 5 had the highest I-129 concentration (1.2E-06 Ci/gal) and was used to estimate inventory for others within the group utilizing a volume of 1,700 gallons. The Tc-99 inventories for the Type I tanks were adjusted in the previous step to align with the Tank 6 Tc-99 inventory and therefore no additional adjustment was necessary. The Type IIIA tank inventories for I-129 and Tc-99 were equal for all the tanks, therefore, no adjustments were necessary.

Table A2-10: Inventories Adjusted for Maximum Inventory

Type I		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
I-129	Ci	2.0E-03	2.0E-03	2.0E-03	2.0E-03	2.2E-03	3.0E-03	2.0E-03	2.0E-03
Tc-99	Ci	9.6E-01	9.6E-01	9.6E-01	9.6E-01	1.0E-01	1.7E+00	9.6E-01	9.6E-01
Type IIIA		**25**	**26**	**27**	**28**	**44**	**45**	**46**	**47**
I-129	Ci	1.2E-04	1.2E-04	1.2E-04	1.2E-04	1.2E-04	1.2E-04	1.2E-04	1.2E-04
Tc-99	Ci	2.2E-02	2.2E-02	2.2E-02	2.2E-02	2.2E-02	2.2E-02	2.2E-02	2.2E-02
Type III		**33**	**34**						
I-129	Ci	3.2E-05	1.7E-04						
Tc-99	Ci	1.1E-01	4.9E-01						

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