

# Saltstone Production and Disposal Facility Website Data - Third Quarter, Calendar Year 2009

## Consent Order of Dismissal, Section III.7 Z-Area Saltstone Disposal Facility Permit

Permit Condition	Requirement	Estimated Value	Updated Value	Comments
<b>B.5 a)</b>	Cumulative process volume of salt waste disposed to date	Not Applicable	2,967 kgals Vault 4	
<b>b)</b>	Process volume of saltstone grout disposed and vault location (cell identity) for the reporting period	Not Applicable	539 kgals Vault 4, Cell L	
<b>c)</b>	Cumulative process volume of saltstone grout disposed to date	Not Applicable	5,161 kgals Vault 4	
<b>d)</b>	Remaining vault volume	Not Applicable	5.4 x 10 <sup>3</sup> kgals Vault 4	The basis of calculation for Permit Condition B.5 (d) was changed for this quarter. The new method of calculation disregards vault space that must be reserved for clean caps as well as remaining space in inactive cells.
<b>e)</b>	Curies disposed and vault location for the reporting period	84 kCi Vault 4, Cell L	68 kCi Vault 4, Cell L	
<b>f)</b>	Cumulative inventory of curies disposed to date	431 kCi Vault 4, Cells D, E, F, L, K	415 kCi Vault 4, Cells D, E, F, L, K	
<b>g)</b>	Curies of highly radioactive radionuclides disposed and vault location for the reporting period	84 kCi Vault 4, Cell L	68 kCi Vault 4, Cell L	
<b>h)</b>	Cumulative inventory of highly radioactive radionuclides disposed to date	429 kCi Vault 4, Cells D, E, F, L, K	413 kCi Vault 4, Cells D, E, F, L, K	

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### General Condition B.5.a-h Information Consent Order of Dismissal, Section III.7 (1) Chemical and Radiological Composition of Salt Waste

Chemical Name	Estimated Concentration (mg/L)	Updated Concentration (mg/L)
<b>Major Constituent</b>		
Water [H <sub>2</sub> O]	7.69E+05	7.86E+05
<b>Solvated Ions</b>		
Aluminate [Al(OH) <sub>4</sub> ]	1.60E+04	1.54E+04
Carbonate [CO <sub>3</sub> <sup>2-</sup> ]	9.15E+03	9.31E+03
Chloride [Cl <sup>-</sup> ]	3.37E+02	2.79E+02
Fluoride [F <sup>-</sup> ]	3.21E+02	2.68E+02
Hydroxide [OH <sup>-</sup> ]	2.35E+04	2.38E+04
Nitrate [NO <sub>3</sub> <sup>-</sup> ]	1.51E+05	1.38E+05
Nitrite [NO <sub>2</sub> <sup>-</sup> ]	8.27E+03	8.10E+03
Sulfate [SO <sub>4</sub> <sup>2-</sup> ]	8.73E+03	8.13E+03
<b>RCRA Hazardous Metals</b>		
Arsenic [As]	8.41E-01	4.98E-01
Barium [Ba]	3.00E+00	1.88E+00
Cadmium [Cd]	1.73E+00	1.33E+00
Chromium [Cr]	5.54E+01	5.09E+01
Lead [Pb]	2.16E+01	1.30E+01
Mercury [Hg]	1.69E+01	1.35E+01
Selenium [Se]	1.63E+00	9.67E-01
Silver [Ag]	1.03E+01	8.36E+00
<b>Other Metals</b>		
Aluminum [Al]	4.53E+03	4.38E+03
Boron [B]	1.87E+01	1.87E+01
Cobalt [Co]	6.81E-02	6.81E-02
Copper [Cu]	<8.52E-01	<8.52E-01
Iron [Fe]	1.44E+02	1.44E+02
Lithium [Li]	<1.51E+01	<1.51E+01
Manganese [Mg]	1.01E+02	1.01E+02
Molybdenum [Mo]	4.17E+01	4.17E+01
Nickel [Ni]	<1.21E+01	<1.21E+01
Sodium [Na]	9.70E+04	9.49E+04
Strontium [Sr]	<6.05E+01	<6.05E+01
Zinc [Zn]	7.33E+00	7.33E+00
<b>Organic Compounds</b>		
Tetraphenylborate [B(C <sub>6</sub> H <sub>5</sub> ) <sub>4</sub> <sup>-</sup> ]	4.72E+00	4.78E+00
Total Organic Carbon	6.50E+02	4.39E+02
<b>Total Insoluble Solids</b>		
Total Insoluble Solids	2.70E+03	2.16E+03

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## Consent Order of Dismissal, Section III.7 (1) Chemical and Radiological Composition of Salt Waste (continued)

Radionuclide	Estimated Concentration (pCi/mL)	Updated Concentration (pCi/mL)
H-3	8.81E+02	8.66E+02
C-14	1.39E+03	7.72E+02
Co-60	4.38E+00	4.38E+00
Ni-59	<7.03E+00	<7.03E+00
Ni-63	3.99E+02	2.05E+02
Se-79	2.02E+02	2.02E+02
Sr-90	1.46E+05	1.52E+05
Y-90	1.46E+05	1.52E+05
Tc-99	3.52E+04	3.63E+04
Ru-106	<3.49E+00	<3.49E+00
Rh-106	<3.49E+00	<3.49E+00
Sb-125	3.28E+03	3.28E+03
Te-125m	3.28E+03	3.28E+03
I-129	4.21E+01	2.64E+01
Cs-134	<3.03E+03	<3.03E+03
Cs-137	3.26E+07	2.65E+07
Ba-137m	3.09E+07	2.50E+07
Ce-144	<4.39E+00	<4.39E+00
Pr-144	<4.39E+00	<4.39E+00
Pm-147	<7.84E+02	<7.84E+02
Eu-154	1.75E+02	1.75E+02
Np-237 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	1.07E+01	1.07E+01
Pu-238 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	3.56E+03	3.56E+03
Pu-239 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	<2.20E+02	<2.20E+02
Pu-240 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	<2.20E+02	<2.20E+02
Pu-241	2.70E+04	1.57E+04
Pu-242 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	2.36E-01	2.36E-01
Am-241 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	5.05E+02	5.05E+02
Am-242m	3.23E-01	3.23E-01
Cm-242 ( $\alpha$ )	2.67E-01	2.67E-01
Cm-244 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	8.99E+02	8.99E+02
Cm-245 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	1.88E-03	1.88E-03
Total Transuranic Alpha Emitters with ( $t_{1/2}$ ) > 5 years	5.12E+04	9.50E+04

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## Consent Order of Dismissal, Section III.7 (2) Formulation of Grout Used to Treat and Solidify the Salt Waste

The grout formulation is defined by the proportions of dry premix components (Type II Portland cement, Class F flyash, and Grade 120/100 slag) and the ratio of the water content in the salt waste to dry premix. Small quantities of admixtures are added as required for the purposes of set retardant and anti-foam. These have an insignificant effect on the overall grout composition (0.2 wt% of the overall grout composition).

The formulation used for the reporting period is shown below:

### Saltstone Dry Premix Composition

Component	Weight %
Type II Portland cement	10
Class F flyash	45
Grade 120/100 slag	45

**Water to Premix Ratio (by weight) – 0.60**

Utilizing this grout formulation leads to an overall grout composition as shown below:

### Overall Grout Composition

Component	Weight %
Salt Waste	41
Type II Portland cement	6
Grade 120/100 slag	27
Class F flyash	27

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## Consent Order of Dismissal, Section III.7 (3) Chemical and Radiological Composition of Saltstone

Chemical Name	Estimated Concentration (mg/L)	Updated Concentration (mg/L)
<b>Major Constituent</b>		
Water [H <sub>2</sub> O]	5.1E+05	5.0E+05
Portland (II) Cement	1.0E+05	1.0E+05
Class F Flyash	4.6E+05	4.6E+05
Grade 100/120 Slag	4.6E+05	4.6E+05
<b>Solvated Ions</b>		
Aluminate [Al(OH) <sub>4</sub> ]	8.79E+03	8.69E+03
Carbonate [CO <sub>3</sub> <sup>2-</sup> ]	4.27E+03	5.56E+03
Chloride [Cl]	1.97E+02	1.91E+02
Fluoride [F]	1.89E+02	1.85E+02
Hydroxide [OH]	1.17E+04	1.23E+04
Nitrate [NO <sub>3</sub> ]	7.84E+04	8.97E+04
Nitrite [NO <sub>2</sub> ]	3.88E+03	4.78E+03
Sulfate [SO <sub>4</sub> <sup>2-</sup> ]	4.31E+03	4.90E+03
<b>RCRA Hazardous Metals</b>		
Arsenic [As]	5.04E-01	4.17E-01
Barium [Ba]	1.74E+00	1.36E+00
Cadmium [Cd]	8.38E-01	7.14E-01
Chromium [Cr]	3.09E+01	3.00E+01
Lead [Pb]	1.08E+01	8.20E+00
Mercury [Hg]	1.05E+01	1.09E+01
Selenium [Se]	9.66E-01	8.07E-01
Silver [Ag]	4.07E+00	3.26E+00
<b>Other Metals</b>		
Aluminum [Al]	2.50E+03	2.47E+03
Boron [B]	3.24E+00	3.24E+00
Cobalt [Co]	5.17E-02	5.17E-02
Copper [Cu]	<7.27E-01	<7.27E-01
Iron [Fe]	1.14E+02	1.14E+02
Lithium [Li]	7.97E-01	7.97E-01
Manganese [Mg]	7.27E+01	7.27E+01
Molybdenum [Mo]	3.76E+01	3.76E+01
Nickel [Ni]	1.01E+01	1.01E+01
Sodium [Na]	5.84E+04	5.77E+04
Strontium [Sr]	3.36E-01	3.36E-01
Zinc [Zn]	6.51E+00	6.51E+00
<b>Organic Compounds</b>		
Tetraphenylborate [B(C <sub>6</sub> H <sub>5</sub> ) <sub>4</sub> <sup>-</sup> ]	3.14E+00	3.13E+00
Total Organic Carbon	5.07E+02	4.47E+02
<b>Total Insoluble Solids</b>		
Total Insoluble Solids	1.71E+03	1.80E+03

# Saltstone Production and Disposal Facility Website Data - Third Quarter, Calendar Year 2009

## Consent Order of Dismissal, Section III.7 (3) Chemical and Radiological Composition of Saltstone (continued)

Radionuclide	Estimated Concentration (pCi/mL)	Updated Concentration (pCi/mL)
H-3	5.6E+02	5.5E+02
C-14	8.8E+02	4.9E+02
Co-60	2.8E+00	2.8E+00
Ni-59	<4.4E+00	<4.4E+00
Ni-63	2.5E+02	1.3E+02
Se-79	1.3E+02	1.3E+02
Sr-90	9.2E+04	9.6E+04
Y-90	9.2E+04	9.6E+04
Tc-99	2.2E+04	2.3E+04
Ru-106	<2.2E+00	<2.2E+00
Rh-106	<2.2E+00	<2.2E+00
Sb-125	2.1E+03	2.1E+03
Te-125m	2.1E+03	2.1E+03
I-129	2.7E+01	1.7E+01
Cs-134	<1.9E+03	<1.9E+03
Cs-137	2.1E+07	1.7E+07
Ba-137m	2.0E+07	1.6E+07
Ce-144	<2.8E+00	<2.8E+00
Pr-144	<2.8E+00	<2.8E+00
Pm-147	<5.0E+02	<5.0E+02
Eu-154	1.1E+02	1.1E+02
Np-237 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	6.8E+00	6.8E+00
Pu-238 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	2.3E+03	2.3E+03
Pu-239 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	<1.4E+02	<1.4E+02
Pu-240 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	<1.4E+02	<1.4E+02
Pu-241	1.7E+04	9.9E+03
Pu-242 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	1.5E-01	1.5E-01
Am-241 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	3.2E+02	3.2E+02
Am-242m	2.0E-01	2.0E-01
Cm-242 ( $\alpha$ )	1.7E-01	1.7E-01
Cm-244 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	5.7E+02	5.7E+02
Cm-245 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	1.2E-03	1.2E-03
Total Transuranic Alpha Emitters with ( $t_{1/2}$ ) > 5 years	<3.2E+04	<6.0E+04