

# Saltstone Production and Disposal Facility Website Data - Third Quarter, Calendar Year 2014

## Z-Area Saltstone Disposal Facility Permit General Condition B.5.a-h Information and Consent Order of Dismissal, Section III.7

Permit Condition	Requirement	Estimated Value	Updated Value	Comments
B.5 a)	Cumulative process volume of salt waste disposed to date	Not Applicable	9,894 kgal Vault 4, Cells B, D, E, F, H, J, K, L SDU 2, Cells 2A and 2B SDU 5, Cell 5B	
b)	Process volume of saltstone grout disposed and vault/disposal unit location (including cell identity) for the reporting period	Not Applicable	2.96 x 10 <sup>2</sup> kgal SDU 2, Cell 2B  1.19 x 10 <sup>3</sup> kgal SDU 5, Cell 5B	
c)	Cumulative process volume of saltstone grout disposed to date	Not Applicable	1.68 x 10 <sup>4</sup> kgal Vault 4, Cells B, D, E, F, H, J, K, L SDU 2, Cells 2A and 2B SDU 5, Cell 5B	
d)	Remaining vault/disposal unit volume	Not Applicable	4.41 x 10 <sup>3</sup> kgal SDU 5	Report of remaining vault/disposal unit volume will no longer be reported for Vault 4 and SDU 2 based on the following: (1) Vault 4 removed due to the fact that there are no intentions to use it in the future (2) SDU 2 removed due to it being full.
e)	Curies disposed and vault/disposal unit location for the reporting period	2.88 kCi SDU 2, Cell 2B  1.30 x 10 <sup>1</sup> kCi SDU 5, Cell 5B	2.88 kCi SDU 2, Cell 2B  1.30 x 10 <sup>1</sup> kCi SDU 5, Cell 5B	
f)	Cumulative inventory of curies disposed to date	433 kCi Vault 1, Cells A, B, C Vault 4, All Cells SDU 2, Cells 2A and 2B SDU 5, Cell 5B	433 kCi Vault 1, Cells A, B, C Vault 4, All Cells SDU 2, Cells 2A and 2B SDU 5, Cell 5B	
g)	Curies of highly radioactive radionuclides disposed and vault/disposal unit location for the reporting period	2.88 kCi SDU 2, Cell 2B  1.30 x 10 <sup>1</sup> kCi SDU 5, Cell 5B	2.88 kCi SDU 2, Cell 2B  1.30 x 10 <sup>1</sup> kCi SDU 5, Cell 5B	
h)	Cumulative inventory of highly radioactive radionuclides disposed to date	433 kCi Vault 1, Cells A, B, C Vault 4, All Cells SDU 2, Cells 2A and 2B SDU 5, Cell 5B	433 kCi Vault 1, Cells A, B, C Vault 4, All Cells SDU 2, Cells 2A and 2B SDU 5, Cell 5B	

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## 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]	8.92E+05	8.92E+05
<b>Solvated Ions</b>		
Aluminate [Al(OH) <sub>4</sub> ]	1.40E+04	1.40E+04
Carbonate [CO <sub>3</sub> <sup>2-</sup> ]	1.12E+04	1.12E+04
Chloride [Cl <sup>-</sup> ]	1.36E+02	1.36E+02
Fluoride [F <sup>-</sup> ]	< 1.00E+01	< 1.00E+01
Hydroxide [OH <sup>-</sup> ]	2.82E+04	2.82E+04
Nitrate [NO <sub>3</sub> <sup>-</sup> ]	1.33E+05	1.33E+05
Nitrite [NO <sub>2</sub> <sup>-</sup> ]	1.80E+04	1.80E+04
Sulfate [SO <sub>4</sub> <sup>2-</sup> ]	4.98E+03	4.98E+03
<b>RCRA Hazardous Metals</b>		
Arsenic [As]	< 9.45E-02	< 9.45E-02
Barium [Ba]	5.84E-01	5.84E-01
Cadmium [Cd]	< 1.09E+00	< 1.09E+00
Chromium [Cr]	3.15E+01	3.15E+01
Lead [Pb]	2.12E-01	2.12E-01
Mercury [Hg]	5.92E+01	5.92E+01
Selenium [Se]	< 1.89E-01	< 1.89E-01
Silver [Ag]	< 1.08E+00	< 1.08E+00
<b>Other Metals</b>		
Aluminum [Al]	3.98E+03	3.98E+03
Boron [B]	3.72E+01	3.72E+01
Cobalt [Co]	< 1.72E-02	< 1.72E-02
Copper [Cu]	< 6.87E-01	< 6.87E-01
Iron [Fe]	3.64E+00	3.64E+00
Lithium [Li]	9.22E+00	9.22E+00
Manganese [Mn]	< 6.87E-01	< 6.87E-01
Molybdenum [Mo]	4.01E+00	4.01E+00
Nickel [Ni]	< 4.24E+00	< 4.24E+00
Sodium [Na]	4.89 M	4.89 M
Strontium [Sr]	< 1.03E-01	< 1.03E-01
Zinc [Zn]	7.99E+00	7.99E+00
<b>Organic Compounds</b>		
Tetraphenylborate [B(C <sub>6</sub> H <sub>5</sub> ) <sub>4</sub> <sup>-</sup> ]	< 5.00E+00	< 5.00E+00
Total Organic Carbon	2.69E+02	2.69E+02
<b>Total Insoluble Solids</b>		
Total Insoluble Solids	0.00E+00	0.00E+00

**Saltstone Production and Disposal Facility  
Website Data – Third Quarter, Calendar Year 2014**

**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	7.25E+02	7.25E+02
C-14	6.82E+02	6.82E+02
Ni-59	9.10E-02	9.10E-02
Co-60	2.17E-01	2.17E-01
Ni-63	< 4.55E+00	< 4.55E+00
Se-79	< 1.48E+01	< 1.48E+01
Sr-90	2.60E+03	2.60E+03
Y-90	2.60E+03	2.60E+03
Tc-99	1.71E+04	1.71E+04
Rh-106	< 3.11E+00	< 3.11E+00
Ru-106	< 3.11E+00	< 3.11E+00
Sb-125	1.09E+01	1.09E+01
Te-125m	1.09E+01	1.09E+01
I-129	1.11E+01	1.11E+01
Cs-134	3.51E-01	3.51E-01
Cs-137	2.59E+06	2.59E+06
Ba-137m	2.45E+06	2.45E+06
Ce-144	2.01E-02	2.01E-02
Pr-144	2.01E-02	2.01E-02
Pm-147	<4.59E+01	<4.59E+01
Eu-154	8.60E-01	8.60E-01
Np-237 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	< 1.21E+01	< 1.21E+01
Pu-238 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	3.39E+02	3.39E+02
Pu-239 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	1.73E+01	1.73E+01
Pu-240 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	1.73E+01	1.73E+01
Pu-241	1.17E+02	1.17E+02
Pu-242 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	< 6.56E+01	< 6.56E+01
Am-241 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	2.82E+00	2.82E+00
Am-242m	< 7.70E-02	< 7.70E-02
Cm-242 ( $\alpha$ )	2.01E-02	2.01E-02
Cm-244 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	2.18E+01	2.18E+01
Cm-245 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	< 2.39E+00	< 2.39E+00
Total Transuranic Alpha Emitters with ( $t_{1/2}$ ) > 5 years	< 3.94E+02	< 3.94E+02

# Saltstone Production and Disposal Facility Website Data – Third Quarter, Calendar Year 2014

## 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 (cement, thermally beneficiated flyash, and 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 %
Cement	10
Thermally Beneficiated Flyash	45
Slag	45

### Water to Premix Ratio (by weight) – 0.628

The water to premix ratio reflects the pounds of free water added to the process for each pound of dry premix fed to the saltstone mixer averaged for the quarter.

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

### Overall Grout Composition

Component	Weight %
Salt Waste	45.4
Cement	5.46
Slag	24.57
Thermally Beneficiated Flyash	24.57

# Saltstone Production and Disposal Facility Website Data – Third Quarter, Calendar Year 2014

## 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]	5.60E+05	5.60E+05
Cement	9.34E+04	9.34E+04
Thermally Beneficiated Flyash	4.20E+05	4.20E+05
Slag	4.20E+05	4.20E+05
<b>Solvated Ions</b>		
Aluminate [Al(OH) <sub>4</sub> ]	8.79E+03	8.79E+03
Carbonate [CO <sub>3</sub> <sup>2-</sup> ]	7.03E+03	7.03E+03
Chloride [Cl <sup>-</sup> ]	8.54E+01	8.54E+01
Fluoride [F <sup>-</sup> ]	6.28E+00	6.28E+00
Hydroxide [OH <sup>-</sup> ]	1.77E+04	1.77E+04
Nitrate [NO <sub>3</sub> <sup>-</sup> ]	8.35E+04	8.35E+04
Nitrite [NO <sub>2</sub> <sup>-</sup> ]	1.13E+04	1.13E+04
Sulfate [SO <sub>4</sub> <sup>2-</sup> ]	3.13E+03	3.13E+03
<b>RCRA Hazardous Metals</b>		
Arsenic [As]	5.94E-02	5.94E-02
Barium [Ba]	3.67E-01	3.67E-01
Cadmium [Cd]	6.85E-01	6.85E-01
Chromium [Cr]	1.98E+01	1.98E+01
Lead [Pb]	1.33E-01	1.33E-01
Mercury [Hg]	3.72E+01	3.72E+01
Selenium [Se]	1.19E-01	1.19E-01
Silver [Ag]	6.78E-01	6.78E-01
<b>Other Metals</b>		
Aluminum [Al]	2.50E+03	2.50E+03
Boron [B]	2.34E+01	2.34E+01
Cobalt [Co]	1.08E-02	1.08E-02
Copper [Cu]	4.31E-01	4.31E-01
Iron [Fe]	2.29E+00	2.29E+00
Lithium [Li]	5.79E+00	5.79E+00
Manganese [Mn]	4.31E-01	4.31E-01
Molybdenum [Mo]	2.52E+00	2.52E+00
Nickel [Ni]	2.66E+00	2.66E+00
Sodium [Na]	7.06E+04	7.06E+04
Strontium [Sr]	6.47E-02	6.47E-02
Zinc [Zn]	5.02E+00	5.02E+00
<b>Organic Compounds</b>		
Tetraphenylborate [B(C <sub>6</sub> H <sub>5</sub> ) <sub>4</sub> <sup>-</sup> ]	3.14E+00	3.14E+00
Total Organic Carbon	1.69E+02	1.69E+02
<b>Total Insoluble Solids</b>		
Total Insoluble Solids	0.00E+00	0.00E+00

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

<u>Radionuclide</u>	<u>Estimated Concentration (pCi/mL)</u>	<u>Updated Concentration (pCi/mL)</u>
H-3	4.55E+02	4.55E+02
C-14	4.28E+02	4.28E+02
Ni-59	5.72E-02	5.72E-02
Co-60	1.36E-01	1.36E-01
Ni-63	2.86E+00	2.86E+00
Se-79	9.30E+00	9.30E+00
Sr-90	1.63E+03	1.63E+03
Y-90	1.63E+03	1.63E+03
Tc-99	1.07E+04	1.07E+04
Rh-106	1.95E+00	1.95E+00
Ru-106	1.95E+00	1.95E+00
Sb-125	6.85E+00	6.85E+00
Te-125m	6.85E+00	6.85E+00
I-129	6.97E+00	6.97E+00
Cs-134	2.20E-01	2.20E-01
Cs-137	1.63E+06	1.63E+06
Ba-137m	1.54E+06	1.54E+06
Ce-144	1.26E-02	1.26E-02
Pr-144	1.26E-02	1.26E-02
Pm-147	2.88E+01	2.88E+01
Eu-154	5.40E-01	5.40E-01
Np-237 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	7.60E+00	7.60E+00
Pu-238 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	2.13E+02	2.13E+02
Pu-239 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	1.09E+01	1.09E+01
Pu-240 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	1.09E+01	1.09E+01
Pu-241	7.35E+01	7.35E+01
Pu-242 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	4.12E+01	4.12E+01
Am-241 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	1.77E+00	1.77E+00
Am-242m	4.84E-02	4.84E-02
Cm-242 ( $\alpha$ )	3.97E-02	3.97E-02
Cm-244 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	1.37E+01	1.37E+01
Cm-245 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	2.26E-02	2.26E-02
Total Transuranic Alpha Emitters with ( $t_{1/2}$ ) > 5 years	2.47E+02	2.47E+02