

# Saltstone Production and Disposal Facility Website Data - Fourth Quarter, Calendar Year 2015

## 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	10,744 kgal SDU 4, Cells B, D, E, F, H, J, K, L SDU 2, Cells A and B SDU 5, Cells A and B	
b)	Process volume of saltstone grout disposed and vault/disposal unit location (including cell identity) for the reporting period	Not Applicable	3.30 x 10 <sup>1</sup> kgal SDU 5, Cell A	
c)	Cumulative process volume of saltstone grout disposed to date	Not Applicable	1.83 x 10 <sup>4</sup> kgal SDU 4, Cells B, D, E, F, H, J, K, L SDU 2, Cells A and B SDU 5, Cells A and B	
d)	Remaining vault/disposal unit volume	Not Applicable	2.87 x 10 <sup>3</sup> kgal SDU 5, Cells A and B  5.66 x 10 <sup>3</sup> kgal SDU 3, Cells A and B	
e)	Curies disposed and vault/disposal unit location for the reporting period	0.08 kCi SDU 5, Cell A	0.08 kCi SDU 5, Cell A	
f)	Cumulative inventory of curies disposed to date	459 kCi SDU 4, Cells B, D, E, F, H, J, K, L SDU 2, Cells A and B SDU 5, Cells A and B	459.7 kCi SDU 4, Cells B, D, E, F, H, J, K, L SDU 2, Cells A and B SDU 5, Cells A and B	SDU 1, Cells A, B, and C and SDU 4, Cells C, I and G removed from the cumulative inventory of curies (insignificant contribution to total from these Cells) since disposal occurred prior to Interim Salt Processing which started in March 2007.
g)	Curies of highly radioactive radionuclides disposed and vault/disposal unit location for the reporting period	0.08 kCi SDU 5, Cell A	0.08 kCi SDU 5, Cell A	
h)	Cumulative inventory of highly radioactive radionuclides disposed to date	459 kCi SDU 4, Cells B, D, E, F, H, J, K, L SDU 2, Cells A and B SDU 5, Cells A and B	459.7 kCi SDU 4, Cells B, D, E, F, H, J, K, L SDU 2, Cells A and B SDU 5, Cells A and B	SDU 1, Cells A, B, and C and SDU 4, Cells C, I and G removed from the cumulative inventory of curies (insignificant contribution to total from these Cells) since disposal occurred prior to Interim Salt Processing which started in March 2007.

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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]	8.86E+05	8.86E+05
<b>Solvated Ions</b>		
Aluminate [Al(OH) <sub>4</sub> ]	1.01E+04	1.01E+04
Carbonate [CO <sub>3</sub> <sup>2-</sup> ]	1.53E+04	1.53E+04
Chloride [Cl <sup>-</sup> ]	2.18E+02	2.18E+02
Fluoride [F <sup>-</sup> ]	< 1.00E+02	< 1.00E+02
Hydroxide [OH <sup>-</sup> ]	2.59E+04	2.59E+04
Nitrate [NO <sub>3</sub> <sup>-</sup> ]	1.28E+05	1.28E+05
Nitrite [NO <sub>2</sub> <sup>-</sup> ]	2.40E+04	2.40E+04
Sulfate [SO <sub>4</sub> <sup>2-</sup> ]	6.21E+03	6.21E+03
<b>RCRA Hazardous Metals</b>		
Arsenic [As]	< 1.13E-01	< 1.13E-01
Barium [Ba]	< 5.84E-01	< 5.84E-01
Cadmium [Cd]	< 2.63E+00	< 2.63E+00
Chromium [Cr]	3.04E+01	3.04E+01
Lead [Pb]	1.68E-01	1.68E-01
Mercury [Hg]	9.32E+01	9.32E+01
Selenium [Se]	4.43E-02	4.43E-02
Silver [Ag]	< 1.93E+00	< 1.93E+00
<b>Other Metals</b>		
Aluminum [Al]	2.88E+03	2.88E+03
Boron [B]	4.47E+01	4.47E+01
Cobalt [Co]	< 2.06E-02	< 2.06E-02
Copper [Cu]	< 1.91E+00	< 1.91E+00
Iron [Fe]	6.81E+00	6.81E+00
Lithium [Li]	< 1.46E+01	< 1.46E+01
Manganese [Mn]	1.41E+00	1.41E+00
Molybdenum [Mo]	< 5.82E+00	< 5.82E+00
Nickel [Ni]	< 1.83E+01	< 1.83E+01
Sodium [Na]	4.77 M	4.77 M
Strontium [Sr]	< 1.73E-01	< 1.73E-01
Zinc [Zn]	7.40E+00	7.40E+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	3.39E+02	3.39E+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 (1)  
Chemical and Radiological Composition of Salt Waste (continued)**

Radionuclide	Estimated Concentration (pCi/mL)	Updated Concentration (pCi/mL)
H-3	3.43E+02	3.43E+02
C-14	5.29E+02	5.29E+02
Ni-59	3.06E+00	3.06E+00
Co-60	4.80E+00	4.80E+00
Ni-63	< 1.53E+02	< 1.53E+02
Se-79	3.85E+01	3.85E+01
Sr-90	1.11E+03	1.11E+03
Y-90	1.11E+03	1.11E+03
Tc-99	1.54E+04	1.54E+04
Rh-106	< 1.15E+00	< 1.15E+00
Ru-106	< 1.15E+00	< 1.15E+00
Sb-125	6.62E+00	6.62E+00
Te-125m	6.62E+00	6.62E+00
I-129	1.11E+01	1.11E+01
Cs-134	2.51E-01	2.51E-01
Cs-137	5.14E+05	5.14E+05
Ba-137m	4.86E+05	4.86E+05
Ce-144	8.25E-03	8.25E-03
Pr-144	8.25E-03	8.25E-03
Pm-147	< 4.28E+01	< 4.28E+01
Eu-154	< 2.61E-01	< 2.61E-01
Np-237 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	< 1.45E+01	< 1.45E+01
Pu-238 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	3.71E+02	3.71E+02
Pu-239 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	1.45E+01	1.45E+01
Pu-240 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	1.45E+01	1.45E+01
Pu-241	< 1.04E+02	< 1.04E+02
Pu-242 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	< 7.83E+01	< 7.83E+01
Am-241 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	2.59E+00	2.59E+00
Am-242m	1.44E-01	1.44E-01
Cm-242 ( $\alpha$ )	1.19E-01	1.19E-01
Cm-244 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	1.31E+01	1.31E+01
Cm-245 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	< 1.35E+00	< 1.35E+00
Total Transuranic Alpha Emitters with ( $t_{1/2}$ ) > 5 years	< 3.59E+02	< 3.59E+02

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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 (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) – 0.638

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	45.5
Cement	5.45
Slag	24.51
Thermally Beneficiated Flyash	24.51

# Saltstone Production and Disposal Facility Website Data – Fourth Quarter, Calendar Year 2015

## 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]	5.65E+05	5.65E+05
Cement	9.42E+04	9.42E+04
Thermally Beneficiated Flyash	4.24E+05	4.24E+05
Slag	4.24E+05	4.24E+05
<b>Solvated Ions</b>		
Aluminate [Al(OH) <sub>4</sub> ]	6.44E+03	6.44E+03
Carbonate [CO <sub>3</sub> <sup>2-</sup> ]	9.76E+03	9.76E+03
Chloride [Cl <sup>-</sup> ]	1.39E+02	1.39E+02
Fluoride [F <sup>-</sup> ]	6.38E+01	6.38E+01
Hydroxide [OH <sup>-</sup> ]	1.65E+04	1.65E+04
Nitrate [NO <sub>3</sub> <sup>-</sup> ]	8.16E+04	8.16E+04
Nitrite [NO <sub>2</sub> <sup>-</sup> ]	1.53E+04	1.53E+04
Sulfate [SO <sub>4</sub> <sup>2-</sup> ]	3.96E+03	3.96E+03
<b>RCRA Hazardous Metals</b>		
Arsenic [As]	7.21E-02	7.21E-02
Barium [Ba]	3.72E-01	3.72E-01
Cadmium [Cd]	1.68E+00	1.68E+00
Chromium [Cr]	1.94E+01	1.94E+01
Lead [Pb]	1.07E-01	1.07E-01
Mercury [Hg]	5.94E+01	5.94E+01
Selenium [Se]	2.83E-02	2.83E-02
Silver [Ag]	1.23E+00	1.23E+00
<b>Other Metals</b>		
Aluminum [Al]	1.84E+03	1.84E+03
Boron [B]	2.85E+01	2.85E+01
Cobalt [Co]	1.31E-02	1.31E-02
Copper [Cu]	1.22E+00	1.22E+00
Iron [Fe]	4.34E+00	4.34E+00
Lithium [Li]	9.31E+00	9.31E+00
Manganese [Mn]	8.99E-01	8.99E-01
Molybdenum [Mo]	3.71E+00	3.71E+00
Nickel [Ni]	1.17E+01	1.17E+01
Sodium [Na]	6.99E+04	6.99E+04
Strontium [Sr]	1.10E-01	1.10E-01
Zinc [Zn]	4.72E+00	4.72E+00
<b>Organic Compounds</b>		
Tetraphenylborate [B(C <sub>6</sub> H <sub>5</sub> ) <sub>4</sub> <sup>-</sup> ]	3.19E+00	3.19E+00
Total Organic Carbon	2.16E+02	2.16E+02
<b>Total Insoluble Solids</b>		
Total Insoluble Solids	0.00E+00	0.00E+00

**Saltstone Production and Disposal Facility  
Website Data – Fourth Quarter, Calendar Year 2015**

**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	2.19E+02	2.19E+02
C-14	3.37E+02	3.37E+02
Ni-59	1.95E+00	1.95E+00
Co-60	3.06E+00	3.06E+00
Ni-63	9.76E+01	9.76E+01
Se-79	2.46E+01	2.46E+01
Sr-90	7.08E+02	7.08E+02
Y-90	7.08E+02	7.08E+02
Tc-99	9.82E+03	9.82E+03
Rh-106	7.33E-01	7.33E-01
Ru-106	7.33E-01	7.33E-01
Sb-125	4.22E+00	4.22E+00
Te-125m	4.22E+00	4.22E+00
I-129	7.08E+00	7.08E+00
Cs-134	1.60E-01	1.60E-01
Cs-137	3.28E+05	3.28E+05
Ba-137m	3.10E+05	3.10E+05
Ce-144	5.26E-03	5.26E-03
Pr-144	5.26E-03	5.26E-03
Pm-147	2.73E+01	2.73E+01
Eu-154	1.66E-01	1.66E-01
Np-237 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	9.25E+00	9.25E+00
Pu-238 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	2.37E+02	2.37E+02
Pu-239 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	9.25E+00	9.25E+00
Pu-240 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	9.25E+00	9.25E+00
Pu-241	6.63E+01	6.63E+01
Pu-242 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	4.99E+01	4.99E+01
Am-241 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	1.65E+00	1.65E+00
Am-242m	9.18E-02	9.18E-02
Cm-242 ( $\alpha$ )	7.59E-02	7.59E-02
Cm-244 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	8.35E+00	8.35E+00
Cm-245 ( $\alpha$ ) ( $t_{1/2}$ ) > 5 yr	8.61E-01	8.61E-01
Total Transuranic Alpha Emitters with ( $t_{1/2}$ ) > 5 years	2.29E+02	2.29E+02