Saltstone Production Facility and Saltstone Disposal Facility
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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	12,666 kgal SDU 4, Cells B, D, E, F, H, J, K, L SDU 2, Cells A and B SDU 5, Cells A and B SDU 3, Cell A SDU 6	
b)	Process volume of saltstone grout disposed and vault/disposal unit location (including cell identity) for the reporting period	Not Applicable	66 kgal SDU 3, Cell A 1,312 kgal SDU 6	The process volume of saltstone grout disposed reported for SDU 6 is non-radioactive grout (i.e., clean cap) that was placed into SDU 6 during start-up testing outside of this reporting period (i.e., March 2017). It is being reported here as this is the initial reporting period for SDU 6. No radioactive or non-radioactive grout was placed into SDU 6 during this reporting period.
c)	Cumulative process volume of saltstone grout disposed-to-date	Not Applicable	2.3×10^4 kgal SDU 4, Cells B, D, E, F, H, J, K, L SDU 2, Cells A and B SDU 5, Cells A and B SDU 3, Cell A SDU 6	
d)	Remaining vault/disposal unit volume	Not Applicable	6.597×10^1 kgal SDU 5, Cells A and B 4.98×10^3 kgal SDU 3, Cells A and B 3.15×10^4 kgal SDU 6	The remaining vault/disposal unit volume shown for SDU 3 is based on a fill height of 21.5 feet and SDU 6 is based on 41 feet. Currently, due to Saltstone Safety Basis assumptions, the fill height of SDU 3 and 6 is restricted to 6 feet.
e)	Curies disposed and vault/disposal unit location for the reporting period	0.483 kCi SDU 3, Cell A 0.000 kCi SDU 6		
f)	Cumulative inventory of curies disposed-to-date	471.4 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 3, Cell A SDU 6		
g)	Curies of highly radioactive radionuclides disposed and vault/disposal unit location for the reporting period	0.475 kCi SDU 3, Cell A 0.000 kCi SDU 6		
h)	Cumulative inventory of highly radioactive radionuclides disposed-to-date	471.1 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 3, Cell A SDU 6		

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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)
Major Constituent		
Water [H_2O]	8.971E+05	
Solvated Ions		
Aluminate [$Al(OH)_4$]	1.58E+04	
Carbonate [CO_3^{2-}]	1.55E+04	
Chloride [Cl^-]	5.21E+02	
Fluoride [F^-]	9.92E+01	
Hydroxide [OH^-]	3.55E+04	
Nitrate [NO_3^-]	1.21E+05	
Nitrite [NO_2^-]	2.65E+04	
Sulfate [SO_4^{2-}]	4.18E+03	
RCRA Hazardous Metals		
Arsenic [As]	1.77E-01	
Barium [Ba]	7.62E-01	
Cadmium [Cd]	3.35E+00	
Chromium [Cr]	5.33E+01	
Lead [Pb]	2.44E+00	
Mercury [Hg]	6.85E+01	
Selenium [Se]	1.67E-01	
Silver [Ag]	4.04E+00	
Other Metals		
Aluminum [Al]	4.50E+03	
Boron [B]	4.64E+01	
Cobalt [Co]	< 3.04E-02	
Copper [Cu]	< 1.32E+01	
Iron [Fe]	3.88E+01	
Lithium [Li]	< 8.93E+00	
Manganese [Mn]	< 5.10E-01	
Molybdenum [Mo]	2.02E+01	
Nickel [Ni]	< 2.56E+01	
Sodium [Na]	5.38 M	
Strontium [Sr]	< 2.57E-01	
Zinc [Zn]	7.55E+00	
Organic Compounds		
Tetraphenylborate [$B(C_6H_5)^{4-}$]	5.05E+00	
Total Organic Carbon	2.84E+02	
Total Insoluble Solids		
Total Insoluble Solids	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	1.48E+03	
C-14	6.54E+02	
Ni-59	3.18E-01	
Co-60	4.24E-01	
Ni-63	1.59E+01	
Se-79	4.56E+01	
Sr-90	6.97E+04	
Y-90	1.68E+04	
Tc-99	5.00E+04	
Rh-106	< 4.77E+00	
Ru-106	< 4.77E+00	
Sb-125	8.87E+00	
Te-125m	8.87E+00	
I-129	3.77E+01	
Cs-134	9.19E-02	
Cs-137	1.60E+06	
Ba-137m	8.61E+05	
Ce-144	5.75E-04	
Pr-144	5.75E-04	
Pm-147	< 4.18E+01	
Eu-154	1.61E+00	
Np-237 (α) $(t_{1/2})$ > 5 yr	< 1.07E+01	
Pu-238 (α) $(t_{1/2})$ > 5 yr	2.84E+04	
Pu-239 (α) $(t_{1/2})$ > 5 yr	6.81E+02	
Pu-240 (α) $(t_{1/2})$ > 5 yr	6.81E+02	
Pu-241	1.04E+04	
Pu-242 (α) $(t_{1/2})$ > 5 yr	< 5.80E+01	
Am-241 (α) $(t_{1/2})$ > 5 yr	2.10E+01	
Am-242m	< 4.64E-02	
Cm-242 (α)	< 3.83E-02	
Cm-244 (α) $(t_{1/2})$ > 5 yr	1.56E+01	
Cm-245 (α) $(t_{1/2})$ > 5 yr	< 1.59E+00	
Total Transuranic Alpha Emitters with $(t_{1/2})$ > 5 years	3.18E+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 (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) – 0.633
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	45.3
Cement	5.47
Slag	24.63
Thermally Beneficiated Flyash	24.63

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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)
Major Constituent		
Water [H_2O]	5.68E+05	
Cement	9.47E+04	
Thermally Beneficiated Flyash	4.26E+05	
Slag	4.26E+05	
Solvated Ions		
Aluminate [$Al(OH)_4$]	1.00E+04	
Carbonate [CO_3^{2-}]	9.81E+03	
Chloride [Cl^-]	3.30E+02	
Fluoride [F^-]	6.28E+01	
Hydroxide [OH^-]	2.25E+04	
Nitrate [NO_3^-]	7.66E+04	
Nitrite [NO_2^-]	1.68E+04	
Sulfate [SO_4^{2-}]	2.65E+03	
RCRA Hazardous Metals		
Arsenic [As]	1.12E-01	
Barium [Ba]	4.83E-01	
Cadmium [Cd]	2.12E+00	
Chromium [Cr]	3.38E+01	
Lead [Pb]	1.55E+00	
Mercury [Hg]	4.34E+01	
Selenium [Se]	1.06E-01	
Silver [Ag]	2.56E+00	
Other Metals		
Aluminum [Al]	2.85E+03	
Boron [B]	2.94E+01	
Cobalt [Co]	1.92E-02	
Copper [Cu]	8.36E+00	
Iron [Fe]	2.46E+01	
Lithium [Li]	5.65E+00	
Manganese [Mn]	3.23E-01	
Molybdenum [Mo]	1.28E+01	
Nickel [Ni]	1.62E+01	
Sodium [Na]	7.83E+04	
Strontium [Sr]	1.63E-01	
Zinc [Zn]	4.78E+00	
Organic Compounds		
Tetraphenylborate [$B(C_6H_5)^{4-}$]	3.20E+00	
Total Organic Carbon	1.80E+02	
Total Insoluble Solids		
Total Insoluble Solids	0.00E+00	

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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	9.37E+02	
C-14	4.14E+02	
Ni-59	2.01E-01	
Co-60	2.68E-01	
Ni-63	1.01E+01	
Se-79	2.89E+01	
Sr-90	4.41E+04	
Y-90	1.06E+04	
Tc-99	3.17E+04	
Rh-106	3.02E+00	
Ru-106	3.02E+00	
Sb-125	5.62E+00	
Te-125m	5.62E+00	
I-129	2.39E+01	
Cs-134	5.82E-02	
Cs-137	1.01E+06	
Ba-137m	5.45E+05	
Ce-144	3.64E-04	
Pr-144	3.64E-04	
Pm-147	2.65E+01	
Eu-154	1.02E+00	
Np-237 (α) $(t_{1/2}) > 5$ yr	6.78E+00	
Pu-238 (α) $(t_{1/2}) > 5$ yr	1.80E+04	
Pu-239 (α) $(t_{1/2}) > 5$ yr	4.31E+02	
Pu-240 (α) $(t_{1/2}) > 5$ yr	4.31E+02	
Pu-241	6.59E+03	
Pu-242 (α) $(t_{1/2}) > 5$ yr	3.67E+01	
Am-241 (α) $(t_{1/2}) > 5$ yr	1.33E+01	
Am-242m	2.94E-02	
Cm-242 (α)	2.43E-02	
Cm-244 (α) $(t_{1/2}) > 5$ yr	9.88E+00	
Cm-245 (α) $(t_{1/2}) > 5$ yr	1.01E+00	
Total Transuranic Alpha Emitters with $(t_{1/2}) > 5$ years	2.01E+04	