Saltstone Production and Disposal Facility
Website Data - Fourth Quarter, Calendar Year 2013

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	8,770 kgals Vault 4, Cells B, D, E, F, H, J, K, L SDU 2, Cells 2A and 2B SDU 5, Cell 5B	Cumulative salt waste disposed volume updated to 8,770 kgals from 8,767 kgals previously reported. One transfer inadvertently omitted in previous report.
b)	Process volume of saltstone grout disposed and vault/disposal unit location (including cell identity) for the reporting period	Not Applicable	9.9×10^{1} kgals SDU 2, Cell 2A 0.00×10^{0} kgals SDU 2, Cell 2B 0.00×10^{0} kgals SDU 5, Cell 5B	Grout height recorded as 0.25 feet before and after salt solution being disposed of in SDU 5, Cell 5B. Therefore, amount of grout disposed in SDU 5, Cell 5B to small too record.
c)	Cumulative process volume of saltstone grout disposed to date	Not Applicable	1.5×10^{4} kgals 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	9.3×10^{2} kgals Vault 4 9.9×10^{1} kgals SDU 2 4.9×10^{3} kgals SDU 5	Grout height recorded as 0.25 feet before and after salt solution being disposed of in SDU 5, Cell 5B. Therefore, amount of grout disposed in SDU 5, Cell 5B to small too record.
e)	Curies disposed and vault/disposal unit location for the reporting period	0.357 kCi SDU 2, Cell 2A 0.024 kCi SDU 5, Cell 5B	0.539 kCi SDU 2, Cell 2A 0.056 kCi SDU 5, Cell 5B	
f)	Cumulative inventory of curies disposed to date	414 kCi Vault 1, Cells A, B, C Vault 4, All Cells SDU 2, Cells 2A and 2B SDU 5, Cell 5B	414 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	0.357 kCi SDU 2, Cell 2A 0.024 kCi SDU 5, Cell 5B	0.539 kCi SDU 2, Cell 2A 0.056 kCi SDU 5, Cell 5B	
h)	Cumulative inventory of highly radioactive radionuclides disposed to date	414 kCi Vault 1, Cells A, B, C Vault 4, All Cells SDU 2, Cells 2A and 2B SDU 5, Cell 5B	414 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)
Major Constituent		
Water [H_2O]	8.81E+05	8.87E+05
Solvated Ions		
Aluminate [$Al(OH)_4$]	1.43E+04	1.62E+04
Carbonate [CO_3^{2-}]	1.21E+04	1.31E+04
Chloride [Cl^-]	5.00E+02	1.71E+02
Fluoride [F^-]	5.00E+02	1.00E+02
Hydroxide [OH^-]	3.29E+04	3.59E+04
Nitrate [NO_3^-]	1.36E+05	1.43E+05
Nitrite [NO_2^-]	2.13E+04	2.27E+04
Sulfate [SO_4^{2-}]	5.12E+03	5.44E+03
RCRA Hazardous Metals		
Arsenic [As]	1.04E+01	9.11E-02
Barium [Ba]	4.99E+01	1.16E+00
Cadmium [Cd]	1.32E+00	2.31E+00
Chromium [Cr]	3.43E+01	3.44E+01
Lead [Pb]	1.05E+00	2.26E-01
Mercury [Hg]	7.29E+01	6.30E+01
Selenium [Se]	2.08E-01	1.82E-01
Silver [Ag]	9.98E-01	2.24E+00
Other Metals		
Aluminum [Al]	4.05E+03	4.60E+03
Boron [B]	4.28E+01	4.20E+01
Cobalt [Co]	8.38E-01	8.28E-02
Copper [Cu]	2.59E+00	4.42E+01
Iron [Fe]	5.01E+00	1.05E+01
Lithium [Li]	1.01E+01	3.42E+01
Manganese [Mg]	9.12E-01	2.06E+00
Molybdenum [Mo]	7.81E+00	2.48E+01
Nickel [Ni]	2.53E+00	1.98E+01
Sodium [Na]	1.19E+05	1.25E+05
Strontium [Sr]	9.41E-02	2.46E+01
Zinc [Zn]	6.18E+00	7.62E+00
Organic Compounds		
Tetraphenylborate [$B(C_6H_5)^{4-}$]	5.00E+00	5.00E+00
Total Organic Carbon	4.31E+02	2.75E+02
Total Insoluble Solids		
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	6.07E+02	5.46E+02
C-14	4.70E+02	5.68E+02
Co-60	2.56E-01	3.16E-01
Ni-59	1.78E-01	2.40E-01
Ni-63	8.92E+00	1.20E+01
Se-79	3.28E+01	1.49E+01
Sr-90	1.93E+03	3.33E+03
Y-90	1.93E+03	3.33E+03
Tc-99	1.93E+04	1.65E+04
Ru-106	2.57E+00	4.02E+00
Rh-106	2.57E+00	4.02E+00
Sb-125	1.76E+01	1.41E+01
Te-125m	1.76E+01	1.41E+01
I-129	1.43E+01	1.18E+01
Cs-134	1.14E+02	1.41E+02
Cs-137	1.21E+06	1.79E+06
Ba-137m	1.14E+06	1.69E+06
Ce-144	4.87E-02	2.01E-02
Pr-144	4.87E-02	2.01E-02
Pm-147	4.47E+01	4.04E+01
Eu-154	7.70E-01	4.18E+00
Np-237 (α) ($t_{1/2}$) > 5 yr	6.63E+01	1.17E+01
Pu-238 (α) ($t_{1/2}$) > 5 yr	7.66E+02	9.35E+02
Pu-239 (α) ($t_{1/2}$) > 5 yr	7.33E+01	6.70E+01
Pu-240 (α) ($t_{1/2}$) > 5 yr	7.33E+01	6.70E+01
Pu-241	2.89E+02	2.87E+02
Pu-242 (α) ($t_{1/2}$) > 5 yr	7.19E+01	6.33E+01
Am-241 (α) ($t_{1/2}$) > 5 yr	3.49E+00	1.16E+01
Am-242m	5.00E-02	2.41E-02
Cm-242 (α)	4.10E-02	1.98E-02
Cm-244 (α) ($t_{1/2}$) > 5 yr	1.22E+01	2.72E+01
Cm-245 (α) ($t_{1/2}$) > 5 yr	3.60E-02	3.60E-02
Total Transuranic Alpha Emitters with ($t_{1/2}$) > 5 years	3.50E+02	5.27E+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 (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) – 0.59
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

(Due to rounding, numbers may not add to 100%)

Component	Weight %
Salt Waste	45
Type II Portland cement	5.5
Grade 120/100 slag	25
Class F flyash	25

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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]	5.50E+05	5.54E+03
Portland (II) Cement	1.02E+05	9.41E+04
Class F Flyash	4.20E+05	4.28E+05
Grade 100/120 Slag	4.20E+05	4.28E+05
Solvated Ions		
Aluminate [$Al(OH)_4$]	8.91E+03	1.01E+04
Carbonate [CO_3^{2-}]	7.56E+03	8.19E+03
Chloride [Cl^-]	3.12E+02	1.07E+02
Fluoride [F^-]	3.12E+02	6.25E+01
Hydroxide [OH^-]	2.06E+04	2.24E+04
Nitrate [NO_3^-]	8.50E+04	8.94E+04
Nitrite [NO_2^-]	1.33E+04	1.42E+04
Sulfate [SO_4^{2-}]	3.20E+03	3.40E+03
RCRA Hazardous Metals		
Arsenic [As]	6.50E+00	5.69E-02
Barium [Ba]	3.12E+01	7.25E-01
Cadmium [Cd]	8.25E-01	1.44E+00
Chromium [Cr]	2.14E+01	2.15E+01
Lead [Pb]	6.56E-01	1.41E-01
Mercury [Hg]	4.55E+01	3.94E+01
Selenium [Se]	1.30E-01	1.14E-01
Silver [Ag]	6.24E-01	1.40E+00
Other Metals		
Aluminum [Al]	2.53E+03	2.88E+03
Boron [B]	2.67E+01	2.63E+01
Cobalt [Co]	5.24E-01	5.18E-02
Copper [Cu]	1.62E+00	2.76E+01
Iron [Fe]	3.13E+00	6.56E+00
Lithium [Li]	6.31E+00	2.14E+01
Manganese [Mg]	5.70E-01	1.29E+00
Molybdenum [Mo]	4.88E+00	1.55E+01
Nickel [Ni]	1.58E+00	1.24E+01
Sodium [Na]	7.45E+04	7.82E+04
Strontium [Sr]	5.88E-02	1.54E+01
Zinc [Zn]	3.86E+00	4.76E+00
Organic Compounds		
Tetraphenylborate [$B(C_6H_5)^{4-}$]	3.12E+00	3.13E+00
Total Organic Carbon	2.69E+02	1.72E+02
Total Insoluble Solids		
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)

Radionuclide	Estimated Concentration (pCi/mL)	Updated Concentration (pCi/mL)
H-3	3.79E+02	3.41E+02
C-14	2.94E+02	3.55E+02
Co-60	1.60E-01	1.98E-01
Ni-59	1.11E-01	1.50E-01
Ni-63	5.57E+00	7.50E+00
Se-79	2.05E+01	9.31E+00
Sr-90	1.21E+03	2.08E+03
Y-90	1.21E+03	2.08E+03
Tc-99	1.21E+04	1.03E+04
Ru-106	1.61E+00	2.51E+00
Rh-106	1.61E+00	2.51E+00
Sb-125	1.10E+01	8.81E+00
Te-125m	1.10E+01	8.81E+00
I-129	8.93E+00	7.38E+00
Cs-134	7.12E+01	8.81E+01
Cs-137	7.56E+05	1.12E+06
Ba-137m	7.12E+05	1.06E+06
Ce-144	3.04E-02	1.25E-02
Pr-144	3.04E-02	1.25E-02
Pm-147	2.79E+01	2.53E+01
Eu-154	4.81E-01	2.61E+00
Np-237 (α) $(t_{1/2})$ > 5 yr	4.14E+01	7.31E+00
Pu-238 (α) $(t_{1/2})$ > 5 yr	4.79E+02	5.84E+02
Pu-239 (α) $(t_{1/2})$ > 5 yr	4.58E+01	4.19E+01
Pu-240 (α) $(t_{1/2})$ > 5 yr	4.58E+01	4.19E+01
Pu-241	1.81E+02	1.79E+02
Pu-242 (α) $(t_{1/2})$ > 5 yr	4.49E+01	3.96E+01
Am-241 (α) $(t_{1/2})$ > 5 yr	2.18E+00	7.25E+00
Am-242m	3.12E-02	1.51E-02
Cm-242 (α)	2.56E-02	1.24E-02
Cm-244 (α) $(t_{1/2})$ > 5 yr	7.62E+00	1.70E+01
Cm-245 (α) $(t_{1/2})$ > 5 yr	2.25E-02	2.25E-02
Total Transuranic Alpha Emitters with $(t_{1/2})$ > 5 years	2.19E+02	3.29E+02