

APPENDIX B-2

Process Effluent Data

TABLE B-2A
Comparison of 2010 Lagoon 3 (WNSP001) Liquid Effluent Radioactivity Concentrations
With U.S. Department of Energy Guidelines

<i>Isotope</i> ^a	<i>Discharge Activity</i> ^b (Ci)	<i>Radioactivity</i> ^c (Becquerels)	<i>Average Concentration</i> (μ Ci/mL)	<i>DCG</i> ^d (μ Ci/mL)	<i>Ratio of Concentration to DCG</i>
Gross Alpha	9.88±0.89E-04	3.65±0.33E+07	2.53±0.23E-08	NA ^e	NA
Gross Beta	1.68±0.03E-02	6.21±0.11E+08	4.29±0.08E-07	NA ^e	NA
H-3	2.84±0.08E-02	1.05±0.03E+09	7.25±0.21E-07	2E-03	0.0004
C-14	2.43±5.46E-04	0.90±2.02E+07	<0.62±1.40E-08	7E-05	<0.0002
K-40	-4.85±8.00E-04	-1.80±2.96E+07	-1.24±2.05E-08	NA ^f	NA
Co-60	1.78±3.08E-05	0.66±1.14E+06	<4.55±7.87E-10	5E-06	<0.0002
Sr-90	7.29±0.11E-03	2.70±0.04E+08	1.86±0.03E-07	1E-06	0.186
Tc-99	5.76±0.41E-04	2.13±0.15E+07	1.47±0.10E-08	1E-04	0.0001
I-129	3.00±1.61E-05	1.11±0.60E+06	7.67±4.12E-10	5E-07	0.0015
Cs-137	1.69±0.08E-03	6.24±0.31E+07	4.31±0.21E-08	3E-06	0.0144
U-232 ^g	2.50±0.11E-04	9.26±0.41E+06	6.40±0.28E-09	1E-07	0.064
U-233/234 ^g	1.85±0.09E-04	6.84±0.34E+06	4.73±0.24E-09	5E-07	0.0095
U-235/236 ^g	1.23±0.25E-05	4.54±0.93E+05	3.13±0.64E-10	5E-07 ^h	0.0006
U-238 ^g	1.34±0.08E-04	4.94±0.29E+06	3.41±0.20E-09	6E-07	0.0052
Pu-238	4.86±1.22E-06	1.80±0.45E+05	1.24±0.31E-10	4E-08	0.0031
Pu-239/240	3.50±1.02E-06	1.30±0.38E+05	8.95±2.60E-11	3E-08	0.003
Am-241	6.21±1.26E-06	2.30±0.47E+05	1.59±0.32E-10	3E-08	0.0053
Sum of Ratios					0.29

NA - Not applicable

^a Half-lives are listed in Table UI-4.

^b Total volume released: 3.91E+10 mL (1.03E+07 gal)

^c 1 curie (Ci) = 3.7E+10 becquerels (Bq); 1Bq = 2.7E-11 Ci

^d DOE-derived concentration guides (DCGs) are listed for reference only. DCGs are applicable at the point at which water is available for ingestion by the public (i.e., at the site boundary), but not to release point concentrations, as might be inferred from their inclusion in this table.

^e DOE DCGs do not exist for indicator parameters gross alpha and gross beta.

^f The DCG is not applied to potassium-40 (K-40) activity because of its natural origin.

^g Total U (g) = 4.40±0.04E+02; Average U (μ g/mL) = 1.13±0.01E-02

^h DCG for U-236 is used for this comparison.

TABLE B-2B
2010 SPDES Results for Outfall 001 (WNSP001): Water Quality

Permit Limit	Ammonia (as NH ₃) (mg/L)		BOD ₅ day (mg/L)		Discharge Rate (MGD)		Nitrate (as N) (mg/L)	
	Monitor		10.0 mg/L daily maximum		Monitor		Monitor	
Month	Avg	Max	Avg	Max	Avg	Max	Avg	Max
January	0.032	0.040	<2.1	2.2	0.238	0.254	0.568	0.577
February	0.085	0.085	<2.0	<2.0	0.245	0.282	1.06	1.16
March ^a	--	--	--	--	--	--	--	--
April	0.130	0.153	<2.0	<2.0	0.272	0.280	0.695	0.744
May ^a	--	--	--	--	--	--	--	--
June	<0.022	0.035	<2.0	<2.0	0.245	0.262	<0.011	<0.011
July ^a	--	--	--	--	--	--	--	--
August	<0.009	<0.009	3.3	3.7	0.183	0.204	<0.016	0.021
September ^a	--	--	--	--	--	--	--	--
October ^a	--	--	--	--	--	--	--	--
November	0.154	0.162	<2.0	<2.0	0.195	0.292	0.18	0.18
December ^a	--	--	--	--	--	--	--	--

Permit Limit	Nitrite (as N) (mg/L)		Oil & Grease (mg/L)		pH (standard units)		Solids, Settleable (mL/L)	
	0.1 mg/L daily maximum		15.0 mg/L daily maximum		6.5 to 8.5		0.3 mL/L daily maximum	
Month	Avg	Max	Avg	Max	Min	Max	Avg	Max
January	<0.02	<0.02	<1.5	<1.5	7.4	7.4	<0.1	<0.1
February	0.04	0.04	<1.4	<1.4	6.8	6.8	<0.1	<0.1
March ^a	--	--	--	--	--	--	--	--
April	<0.03	0.04	<1.5	<1.5	7.6	7.6	<0.1	<0.1
May ^a	--	--	--	--	--	--	--	--
June	<0.02	<0.02	<1.5	<1.5	7.2	7.2	<0.1	<0.1
July ^a	--	--	--	--	--	--	--	--
August	<0.02	<0.02	<1.4	<1.4	7.6	7.6	<0.1	<0.1
September ^a	--	--	--	--	--	--	--	--
October ^a	--	--	--	--	--	--	--	--
November	<0.02	<0.02	<1.5	<1.5	7.3	7.3	<0.1	<0.1
December ^a	--	--	--	--	--	--	--	--

MGD - Million gallons per day

^a No discharge this month

TABLE B-2B (concluded)
2010 SPDES Results for Outfall 001 (WNSP001): Water Quality

Permit Limit	Solids, Total Dissolved (mg/L) Monitor		Solids, Total Suspended (mg/L) 45 mg/L daily maximum; 30 mg/L daily average		Sulfate (as S) (mg/L) Monitor		Sulfide (as S) Dissolved (mg/L) 0.4 mg/L daily maximum	
	Avg	Max	Avg	Max	Avg	Max	Avg	Max
January	853	857	<4.6	5.2	53	53	<0.02	<0.02
February	776	804	<4.0	<4.0	48	49	<0.02	<0.02
March ^a	--	--	--	--	--	--	--	--
April	753	763	<4.0	<4.0	46	47	<0.05	<0.05
May ^a	--	--	--	--	--	--	--	--
June	911	918	<4.0	<4.0	61	65	<0.05	<0.05
July ^a	--	--	--	--	--	--	--	--
August	1,050	1,069	<6.0	8.0	78	83	<0.05	<0.05
September ^a	--	--	--	--	--	--	--	--
October ^a	--	--	--	--	--	--	--	--
November	914	958	<6.0	8	63	63	<0.05	<0.05
December ^a	--	--	--	--	--	--	--	--

^a No discharge this month

TABLE B-2C
2010 SPDES Results for Outfall 001 (WNSP001): Metals

Permit Limit	Aluminum Total (mg/L) 14.0 mg/L daily maximum; 7.0 mg/L daily average		Arsenic Dissolved (mg/L) 0.15 mg/L daily maximum		Cobalt Total Recoverable (mg/L) 0.005 mg/L daily maximum		Iron Total (mg/L) Monitor	
	Month	Avg	Max	Avg	Max	Avg	Max	Avg
January	0.201	0.201	0.0011	0.0011	<0.0006	<0.0006	0.155	0.171
February	0.536	0.536	0.00090	0.00090	0.0007	0.0007	0.330	0.384
March ^a	--	--	--	--	--	--	--	--
April	1.22	1.22	0.0010	0.0010	<0.0006	<0.0006	0.658	0.804
May ^a	--	--	--	--	--	--	--	--
June	0.473	0.473	0.0019	0.0019	<0.0006	<0.0006	0.433	0.457
July ^a	--	--	--	--	--	--	--	--
August	0.177	0.177	0.0024	0.0024	<0.0006	<0.0006	0.637	0.841
September ^a	--	--	--	--	--	--	--	--
October ^a	--	--	--	--	--	--	--	--
November	3.1	3.1	0.0015	0.0015	0.0008	0.0008	1.43	1.79
December ^a	--	--	--	--	--	--	--	--

Permit Limit	Mercury, Total (ng/L) 200 ng/L daily maximum		Selenium Total Recoverable (mg/L) 0.004 mg/L daily maximum		Vanadium Total Recoverable (mg/L) 0.014 mg/L daily maximum	
	Month	Avg	Max	Avg	Max	Avg
January	4.39	4.41	<0.0004	<0.0004	<0.0011	<0.0011
February	8.75	9.65	<0.0004	<0.0004	0.0015	0.0015
March ^a	--	--	--	--	--	--
April	4.07	5.01	<0.0004	<0.0004	0.0018	0.0018
May ^a	--	--	--	--	--	--
June	3.44	4.12	<0.0004	<0.0004	<0.0011	<0.0011
July ^a	--	--	--	--	--	--
August	2.27	2.44	<0.0004	<0.0004	<0.0011	<0.0011
September ^a	--	--	--	--	--	--
October ^a	--	--	--	--	--	--
November	5.25	6.03	<0.0004	<0.0004	0.0033	0.0033
December ^a	--	--	--	--	--	--

^a No discharge this month

TABLE B-2D
2010 SPDES Results for Outfall 007 (WNSP007): Water Quality and Iron

Permit Limit	Ammonia (as NH ₃) (mg/L) Monitor		BOD ₅ (mg/L) 10.0 mg/L daily maximum		Chlorine Total Residual (mg/L) 0.1 mg/L daily maximum		Discharge Rate (MGD) Monitor		Iron Total (mg/L) Monitor	
	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
January	0.073	0.082	<2.3	2.6	0.02	0.03	0.016	0.038	0.100	0.173
February	0.054	0.093	<2.3	2.6	0.03	0.05	0.013	0.029	0.255	0.290
March	<0.009	<0.009	<2.4	3.2	0.04	0.07	0.013	0.028	0.148	0.248
April	<0.011	0.016	<2.5	3.5	0.04	0.05	0.006	0.013	<0.024	0.030
May	<0.011	0.016	<2.0	<2.0	0.01	0.01	0.014	0.035	0.044	0.084
June	<0.009	<0.009	<2.0	<2.0	0.03	0.04	0.011	0.029	0.040	0.053
July	<0.013	0.020	<2.2	2.5	0.01	0.02	0.007	0.020	<0.021	0.024
August	<0.012	0.017	<2.0	2.0	0.03	0.07	0.007	0.012	<0.020	0.021
September	<0.027	0.058	<2.3	2.8	0.04	0.08	0.006	0.015	<0.039	0.068
October	0.024	0.026	<2.0	<2.0	0.03	0.09	0.009	0.013	0.021	0.022
November	<0.010	0.012	<2.1	2.2	0.05	0.09	0.007	0.014	0.028	0.035
December	0.021	0.024	<2.0	<2.0	0.04	0.06	0.005	0.018	0.035	0.059

Permit Limit	Nitrite (as N) (mg/L) 0.1 mg/L daily maximum		Oil & Grease (mg/L) 15.0 mg/L daily maximum		pH (standard units) 6.5 to 8.5		Solids Settleable (mL/L) 0.3 mL/L daily maximum		Solids Total Suspended (mg/L) 45 mg/L daily maximum;	
	Avg	Max	Avg	Max	Min	Max	Avg	Max	Avg	Max
January	<0.02	<0.02	<1.5	<1.5	7.7	8.1	<0.1	<0.1	<4.0	<4.0
February	<0.02	0.03	<1.4	1.5	7.5	8.1	<0.1	<0.1	<4.0	<4.0
March	<0.02	<0.02	<2.4	3.3	7.3	7.7	<0.1	<0.1	<4.0	<4.0
April	<0.02	0.03	<1.5	<1.5	7.6	8.0	<0.1	<0.1	<4.0	<4.0
May	<0.02	0.02	<1.4	<1.4	7.4	8.0	<0.1	<0.1	<4.3	4.8
June	<0.02	<0.02	<1.6	1.7	7.3	7.8	<0.1	<0.1	<4.0	<4.0
July	<0.02	<0.02	<1.5	<1.5	7.1	7.7	<0.1	<0.1	<4.0	<4.0
August	<0.03	0.04	<1.5	<1.5	7.6	8.1	<0.1	<0.1	<4.0	<4.0
September	<0.02	<0.02	<1.5	<1.5	7.3	7.8	<0.1	<0.1	<4.0	<4.0
October	<0.02	<0.02	<1.5	<1.5	7.4	7.9	<0.1	<0.1	<4.0	<4.0
November	<0.02	<0.02	<1.5	<1.6	7.7	7.9	<0.1	<0.1	<4.8	6.4
December	<0.02	<0.02	<1.5	<1.6	7.6	7.9	<0.1	<0.1	<4.0	<4.0

TABLE B-2E
2010 SPDES Results for Sums of Outfalls 001, 007, 008, and 116: Water Quality

2010 Results for Sums of Outfalls 001, 007, and 008

Permit Limit	Ammonia ^a (as NH ₃) Flow-Weighted		BOD ₅ Flow-Weighted		Iron Total Net Effluent Limitation	
	1.49 mg/L daily average	2.1 mg/L daily maximum	5.0 mg/L daily average		0.30 mg/L daily maximum	
Month	Avg	Max	Avg	Max	Avg	Max
January	0.043	0.063	<2.3	2.6	0.00	0.00
February	0.073	0.086	<2.2	2.6	0.00	0.00
March	<0.009	<0.009	<2.4	3.2	0.00	0.00
April	<0.088	0.104	<2.0	<2.0	0.00	0.00
May	<0.011	0.016	<2.0	<2.0	0.00	0.00
June	<0.017	<0.034	<2.0	<2.0	0.00	0.00
July	<0.013	0.020	<2.2	<2.5	0.00	0.00
August	<0.012	0.017	<2.8	<3.6	0.00	0.00
September	<0.027	0.058	<2.3	2.8	0.00	0.00
October	0.024	0.026	<2.0	<2.0	0.00	0.00
November	<0.101	0.156	<2.0	<2.0	0.00	0.00
December	0.021	0.024	<2.0	<2.0	0.00	0.00

2010 Results for Outfall 116

Permit Limit	Total Dissolved Solids (mg/L)	
	500 mg/L daily maximum	
Month	Avg	Max
January	310	318
February	341	347
March ^b	--	--
April	321	322
May ^b	--	--
June	320	425
July ^b	--	--
August	415	435
September ^b	--	--
October ^b	--	--
November	314	350
December ^b	--	--

^a Sum of Outfalls 001 and 007 only

^b No discharge this month

TABLE B-2F
2010 Annual, Semiannual, and Quarterly SPDES Results for Outfall 001:
Metals, Organics, and Water Quality

<i>Permit Limit Parameters</i>	<i>Permit Limit</i>	<i>Monitoring Frequency</i>	<i>Reporting Date</i>	<i>Maximum Measured (mg/L)</i>
2-Butanone	0.5 mg/L daily maximum	Annual	January 2011	<0.004
3,3-Dichlorobenzidine	0.01 mg/L daily maximum	Annual	January 2011	<0.0008
Alpha-BHC	0.00001 mg/L daily maximum	Annual	January 2011	<0.000007
Cadmium, Total Recoverable	0.002 mg/L daily maximum	Annual	January 2011	<0.0003
Chromium VI, Total Recoverable	0.011 mg/L daily maximum	Annual	January 2011	<0.006
Chromium, Total Recoverable	0.3 mg/L daily maximum	Semiannual	July 2010 January 2011	<0.0009 <0.0009
Copper, Dissolved	Monitor	Semiannual	July 2010 January 2011	0.0066 0.0026
Copper, Total Recoverable	0.030 mg/L daily maximum	Semiannual	July 2010 January 2011	0.0065 0.0056
Cyanide, Amenable to chlorination	0.022 mg/L daily maximum	Semiannual	July 2010 January 2011	<0.003 <0.003
Dichlorodifluoromethane	0.01 mg/L daily maximum	Annual	January 2011	<0.0003
Heptachlor	0.00001 mg/L daily maximum	Semiannual	July 2010 January 2011	<0.000005 <0.000005
Hexachlorobenzene	0.02 mg/L daily maximum	Annual	January 2011	<0.0003
Lead, Total Recoverable	0.006 mg/L daily maximum	Quarterly	April 2010 July 2010 October 2010 January 2011	0.001 0.0007 0.0003 0.002
Manganese, Total	2.0 mg/L daily maximum	Semiannual	July 2010 January 2011	0.063 0.088
Nickel, Total Recoverable	0.14 mg/L daily maximum	Semiannual	July 2010 January 2011	0.0018 0.0021
Surfactant as LAS	0.4 mg/L daily minimum	Semiannual	July 2010 January 2011	<0.01 0.1
Tributyl phosphate	32 mg/L daily maximum	Annual	January 2011	<0.0008
Trichlorofluoromethane	0.01 mg/L daily maximum	Annual	January 2011	<0.0005
Xylene	0.05 mg/L daily maximum	Annual	January 2011	<0.001
Zinc, Total Recoverable	0.48 mg/L daily maximum	Semiannual	July 2010 January 2011	0.0086 0.0020

Note: No results exceeded the permit limits.

TABLE B-2G
2010 SPDES Action Level Requirement Monitoring Results for Outfalls 001, 007, and 008:
Metals, Organics, and Water Quality

<i>Outfall</i>	<i>Action Level Parameters</i>	<i>Action Level</i>	<i>Monitoring Frequency</i>	<i>Reporting Date</i>	<i>Maximum Measured (mg/L)</i>
001	Antimony, Total	1.0 mg/L daily maximum	Annual	January 2011	<0.0068
	Barium, Total	0.5 mg/L daily maximum	Annual	January 2011	0.02
	Boron, Total	2.0 mg/L daily maximum	Quarterly	April 2010	0.033
				July 2010	0.061
				October 2010	0.054
				January 2011	0.053
Bromide, Total	5.0 mg/L daily maximum	Quarterly	April 2010	1.2	
			July 2010	0.66	
			October 2010	0.82	
			January 2011	0.63	
Chloroform	0.3 mg/L daily maximum	Annual	January 2011	<0.0005	
Titanium, Total	0.65 mg/L daily maximum	Semiannual	July 2011	0.016	
			January 2011	0.0025	
007	Chloroform	0.20 mg/L daily maximum	Annual	January 2011	0.0011
008	Arsenic, Total	0.17 mg/L daily maximum	Annual	^a	--
	Chromium, Total	0.13 mg/L daily maximum	Annual	^a	--
	Silver, Total	0.008 mg/L daily maximum	Annual	^a	--
	Zinc, Total	0.001 mg/L daily maximum	Annual	^a	--

^a No discharge at this outfall, drainage pipe was capped in May 2001.

TABLE B-2H
2010 SPDES Results for Outfall 01B (WNSP01B): Water Quality

Internal process monitoring point did not operate during 2010

TABLE B-2I
2010 SPDES Results for Outfall 008 (WNSP008): Water Quality

No discharge; Drainage pipe was capped in May 2001

TABLE B-2J
2010 Radioactivity Results for Sewage Treatment Outfall (WNSP007)

<i>Isotope^a</i>	<i>N</i>	<i>Discharge Activity^b</i> <i>(Ci)</i>	<i>Radioactivity^c</i> <i>Becquerels</i>	<i>Average Concentration</i> <i>(μCi/mL)</i>	<i>DCG</i> <i>(μCi/mL)</i>	<i>Ratio of Concentration to DCG</i>
Gross Alpha	12	1.55±1.40E-05	5.72±5.18E+05	1.17±1.06E-09	NA ^d	NA
Gross Beta	12	1.73±0.14E-04	6.38±0.50E+06	1.31±0.10E-08	NA ^d	NA
Tritium	12	0.32±1.80E-04	1.19±6.65E+06	0.24±1.36E-08	2E-03	<0.0001
Sr-90	1	0.13±1.35E-05	0.48±4.98E+05	0.10±1.02E-09	1E-06	<0.0010
Cs-137	1	0.85±1.26E-05	3.13±4.65E+05	6.41±9.53E-10	3E-06	<0.0003
Sum of Ratios						<0.0013

N - Number of samples

NA - Not applicable

^a Half-lives are listed in Table UI-4.

^b Total volume released; 3.48E+06 gal (1.32E+10 mL)

^c 1 curie (Ci) = 3.7E+10 becquerels (Bq); 1 Bq = 2.7E-11 Ci

^d DOE derived concentration guides (DCGs) do not exist for indicator parameters gross alpha and beta.

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