2004 Large Ships Sampling Results (2 samples per season)

Federal and State Laws

U.S. Congress enacted Title XIV – Certain Alaskan Cruise Ship Operations on December 21, 2000. Under this federal legislation, large[1] cruise ships may discharge blackwater[2] in Alaska marine waters while underway[3] or continuously[4] while meeting effluent standards. Federal law states that during an underway discharge, blackwater effluent must contain no more than 200 fecal coliform bacteria per 100 milliliters and no more than 150 milligrams per liter of total suspended solids. Large ships must meet more stringent standards to discharge continuously.

Alaska Statute AS 46.03.460-46.03.490 establishes the same standards for blackwater as the federal law and includes graywater[5] discharges. Large ships that discharge blackwater, graywater or other wastewater in Alaska are subject to two unannounced sampling events each season to demonstrate compliance with state and federal standards. Large ships certified by the United States Coast Guard (USCG) to discharge continuously must sample twice per month to maintain their certification. Please refer to the "2004 Large Ship Wastewater Continued Compliance Samples for continuous discharge certification by the USCG" report for more information on continuous compliance samples.

Of the twenty-nine large ships that visited Alaska in 2004, 20 discharged into Alaska waters and were subject to the unannounced sampling requirements. The other nine discharge outside Alaska waters. All ships discharging in Alaska water had continuous discharge approval from the USCG. Three ships (Summit, Sun Princess and Seven Seas Mariner) that were discharging into Alaska waters had some elevated sample results and were required to stop discharging into Alaska water at some point during the season. The Statendam received their USCG certification late in the season (August 5, 2005).

Tables 1 through 3 provide a summary the two unannounced sampling results for all large ships for the 2004 season. Advanced wastewater treatment systems continue to be effective at removing bacteria and suspended solids. Large ships effluent chlorine concentration declined from past seasons to below detection levels. Some large ships wastewater discharges have ammonia, dissolved copper, dissolved nickel and dissolved zinc results that exceed Alaska water quality standards. Most of these standards will be met quickly in the receiving water because the effluent is dispersed and should not pose a risk to the environment. The Department of Environmental Conservation contacted representatives of ships that had results that may pose a risk to the environment. If this trend continues in 2005, ADEC may proceed with enforcement.

Table 1. Summary 2004 Large Ship Unannounced Sampling Results, Excluding Priority Pollutants (20 ships, 42 samples)

	Ammonia as N	pH	Biochemical O2 Demand, 5 day	Chemical Oxygen Demand	Total Suspended Solids	Chlorine, Free	Chlorine, Residual	Fecal Coliform Bacteria by MPN
Alaska Water Quality Standards	20.0[6]	6.5-8.5	none	none	none	0.0075	None	14[7]
Minimum	0.1	6.55	1.00	5	2	ND*	ND	1
Maximum	110.0	8.35	122.00	240	95.8	1.4000	2.30	900
Median	17.5	7.61	5.83	52	2	ND	ND	1

*means not detected.

[1] 500+ overnight passengers
[2] Wastewater from toilets
[3] Traveling at a minimum speed of six knots and at least one nautical mile from shore.
[4] Traveling at less than six knots and within one nautical mile from shore.
[5] Wastewater from galley, sinks and showers and laundry.
[6] Ammonia standards are based on temperature, pH and salinity. This standard is from Table IX in the *Alaska Water Quality Criteria Manual for Toxics and Other Deleterious Organic and Inorganic Substances* using a ph 7.8, salinity of 20 g/kg and temperature between 10-15 degrees Celsius. Large ships while stationary have a minimum dilution factor of 10. Ammonia results greater than 20 mg/L exceed water quality standards in the receiving water.
[7] Standard used for consumption of raw shellfish.

Table 2. Summary 2004 Large Ship Unannounced Sampling Results, Excluding Priority Pollutants (20 ships, 42 samples)

	Conductivity	Oil& Grease	Total Organic Carbon	alkalinity, Total as CaCO3	Total Nitrate	Phosphorus, Total	Nitrogen, Total Kjeldahl	Total Settleable Solids
Alaska Water Quality Standards	None	none	none	none	none	none	none	none
Minimum	39	2.50	1.12	14.1	0.00	0.00	3.17	0.05
Maximum	19200	13.00	71.30	439.0	35.00	17.00	472.00	3.30
Median	795	2.50	17.00	136.0	0.05	1.50	23.35	0.05

*means not detected.

Table 3. Summary of 2004 Large Ship Unannounced Sampling Results for Priority Pollutants (19 ships[8], 21 samples)

	Bromoform	dibromo-chloro methane	Arsenic, dissolved	Copper, dissolved	Selenium, dissolved	Nickel, dissolved	Zinc, dissolved
Alaska Water Quality Standards (WQS)	No WQS	No WQS	36.00	3.10	71.00	8.20	81.00
Minimum	1	1	0.25	0.25	0.25	0.50	1.25
Maximum	21	24	12.90	172.00	32.40	133.00	411.00
Median	1	1	0.25	4.81	0.25	9.44	78.90

Table 4 includes all the 2004 unannounced twice-per-season sampling results. Sample results highlighted in yellow indicate that the parameter exceeded the continuous discharge or underway limits. Sample results highlighted in blue indicate that the parameter exceeded Alaska's water quality standards. Ships that had results that exceeded continuous discharge stopped discharging when they received the sampling results. Ships were allowed to resume discharge once they submitted evidence of corrective actions with sampling results that showed the problem had been corrected.

One unannounced sample per season included testing for 167 priority pollutants: 13 total metals, 12 dissolved metals, 72 volatile organic compounds (VOCs), and 70 bases, neutral, acids (BNAs). Table 5 includes only pollutants with medians that exceeded the reportable limit (PQL) or a pollutant with a maximum that was 10 times the PQL. The pollutants not listed in Table 5 are considered not detected and the statistical analysis of those pollutants is unnecessary. Sample results highlighted in blue indicate that the parameter exceeded Alaska's water quality standards. A list of all the priority pollutants that were analyzed can be found in Table 6.

[8] Summit stopped discharging in Alaska water before sampling for priority pollutants

Table 4. 2004 Large Ships Unannounced Sampling Conventional Results

VESSEL_ID	Sample Date	Ammonia as N	pH	Biochemical O2 Demand, 5 day	Chemical Oxygen Demand	Total Suspended Solids	Chlorine, Free	Chlorine, Residual	Fecal Coliform Bacteria by MPN	Conduct-ivity	Hexane-Extractable Material	Total Organic Carbon	alkalinity, Total as CaCO3	Total Nitrate & Nitrite as N	Phosphorus, Total	Nitrogen, Total Kjeldahl	Total Settleable Solids
	Detection Limit	0.1	0.10	2.00	10	4	0.1000	0.10	2	2	5.00	1	2.00	1.00	0.05	1.00	0.10
		mg/L	s.u.	mg/L	mg/L	mg/L	mg/L	Mg/L	MPN/100 ml	umhos/cm	Mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ALASKA WATER QUALITY STANDARDS		20[9]	6.5-8.5	none	none	none	0.0075	none	14[10]	none	none	none	none	none	none	none	none
Coral Princess	19-May-04	55.0	7.63	14.70	40	2	Not detected	Not detected	1	1020	2.50	17.00	140.0	19.00	6.60	46.40	0.05
Coral Princess	11-Aug-04	33.0	7.60	18.20	55	2	Not detected	Not detected	1	812	2.50	24.80	81.1	18.00	9.00	32.90	0.05
Dawn Princess	13-May-04	7.5	6.60	6.45	120	2	Not detected	0.10	1	2160	2.50	22.00	40.4	35.00	7.10	29.80	0.05
Dawn Princess	16-Jul-04	16.0	7.46	1.00	69	2	Not detected	Not detected	1	1210	2.50	17.00	102.0	11.00	13.00	18.80	0.05
Diamond Princess	17-May-04	71.0	7.87	9.07	120	13.4	Not detected	Not detected	2	19200	2.50	11.00	340.0	0.00	3.30	60.10	0.05
Diamond Princess	12-Jul-04	3.6	8.10	1.00	74	2	Not detected	Not detected	20	19200	2.50	32.60	72.7	0.00	0.31	472.00	0.05
Island Princess	26-May-04	110.0	7.61	1.00	57	2	Not	Not	1	1900	2.50	15.00	439.0	0.00	5.20	110.00	0.05

[9] Ammonia standards are based on temperature, pH and salinity. This standard is from Table IX in the *Alaska Water Quality Criteria Manual for Toxics and Other Deleterious Organic and Inorganic Substances* using a ph 7.8, salinity of 20 g/kg and temperature between 10-15 degrees Celsius.
[10] Standard used for consumption of raw shellfish.

VESSEL_ID	Sample Date	Ammonia as N	pH	Biochemical O2 Demand, 5 day	Chemical Oxygen Demand	Total Suspended Solids	Chlorine, Free	Chlorine, Residual	Fecal Coliform Bacteria by MPN	Conduct-ivity	Hexane-Extractable Material	Total Organic Carbon	alkalinity, Total as CaCO3	Total Nitrate & Nitrite as N	Phosphorus, Total	Nitrogen, Total Kjeldahl	Total Settleable Solids
							detected	detected									
Island Princess	27-Jul-04	63.0	7.77	3.01	92	2	Not detected	Not detected	1	3460	2.50	26.80	202.0	4.40	15.00	59.80	0.05
Norwegian Spirit	08-Jun-04[11]	3.6	6.55	93.10	68	95.8	1.4000	2.30	130	549	2.50	35.00	42.2	0.00	0.80	7.26	3.30
Norwegian Spirit	10-Aug-04	12.0	7.75	14.00	53	2	Not detected	Not detected	2	703	2.50	23.90	82.0	0.00	0.22	29.60	0.05
Norwegian Spirit	10-Aug-04	26.0	7.70	14.00	46	2	Not detected	Not detected	1	703	2.50	22.80	75.3	0.00	0.24	29.10	0.05
Norwegian Star	29-Jun-04	43.0	7.40	3.78	45	2	Not detected	Not detected	1	789	2.50	15.00	126.0	0.69	0.21	42.20	0.05
Norwegian Star	29-Jun-04	36.0	7.36	3.33	51	2	Not detected	Not detected	1	790	2.50	15.00	129.0	0.70	0.34	42.10	0.05
Norwegian Star	10-Aug-04	68.0	7.49	3.00	29	2	Not detected	Not detected	1	1080	2.50	14.40	52.1	0.00	0.11	60.30	0.05
Norwegian Sun	02-Jun-04	20.0	6.60	4.06	41	4	Not detected	Not detected	1	669	2.50	16.00	116.0	0.22	0.17	26.80	0.05
Norwegian Sun	18-Aug-04	51.0	7.44	6.03	45	4.4	Not detected	Not detected	1	1150	2.50	13.80	111.0	0.00	0.25	52.60	0.05
Oosterdam	07-Jun-04	13.0	7.72	8.45	39	2	Not detected	Not detected	1	529	2.50	10.00	171.0	0.00	1.10	15.70	0.05

[11] This sample was taken when the vessel was discharging outside 1 nautical mile going at least 6 knots so it **is in compliance with 200 fecal coliform bacteria/100 ml and 150 mg/L TSS standards**.

VESSEL_ID	Sample Date	Ammonia as N	pH	Biochemical O2 Demand, 5 day	Chemical Oxygen Demand	Total Suspended Solids	Chlorine, Free	Chlorine, Residual	Fecal Coliform Bacteria by MPN	Conduct-ivity	Hexane-Extractable Material	Total Organic Carbon	alkalinity, Total as CaCO3	Total Nitrate & Nitrite as N	Phosphorus, Total	Nitrogen, Total Kjeldahl	Total Settleable Solids
Oosterdam	23-Aug-04	8.7	7.71	12.10	5	2	Not detected	Not detected	1	263	2.50	13.10	61.8	0.00	3.36	11.00	2.70
Regal Princess	20-May-04	24.0	6.84	12.70	90	2	Not detected	Not detected	1	9170	2.50	29.00	59.1	4.10	9.40	38.70	0.05
Regal Princess	18-Jul-04	60.0	7.37	4.43	88	2	Not detected	Not detected	1	1240	2.50	25.50	81.8	34.00		61.40	0.05
Ryndam	18-May-04	0.5	7.93	1.00	48	2	Not detected	Not detected	1	970	2.50	9.80	219.0	0.13	2.00	21.70	0.05
Ryndam	13-Jul-04	17.0	7.77	6.03	59	2	Not detected	Not detected	1	723	2.50	17.60	266.0	0.00	1.50	10.60	0.05
Sapphire Princes	30-Jun-04	100.0	7.61	6.34	57	2	Not detected	Not detected	1	951	2.50	5.50	205.0	23.00	17.00	69.60	0.05
Sapphire Princes	04-Aug-04	23.7	7.45	3.30	62	2	Not detected	Not detected	1	788		20.90	144.0	19.00		23.40	0.05
Seven Seas Mariner	27-Jun-04	18.0	7.24	7.73	49	2	Not detected	Not detected	1	578	2.50	20.00	153.0	0.00	5.00	20.60	0.05
Seven Seas Mariner	29-Aug-04	7.4	7.73	13.70	50	2	Not detected	Not detected	900[12]	455	3.05	19.10	132.0	0.55	9.00	7.48	0.05

[12] Vessel stopped discharging in Alaska waters on 8/30/04.

VESSEL_ID	Sample Date	Ammonia as N	pH	Biochemical O2 Demand, 5 day	Chemical Oxygen Demand	Total Suspended Solids	Chlorine, Free	Chlorine, Residual	Fecal Coliform Bacteria by MPN	Conduct-ivity	Hexane-Extractable Material	Total Organic Carbon	alkalinity, Total as CaCO3	Total Nitrate & Nitrite as N	Phosphorus, Total	Nitrogen, Total Kjeldahl	Total Settleable Solids
Statendam	12-Aug-04	12.0	7.96	13.60	47	2	Not detected	Not detected	1	794		19.60	276.0	0.05		12.50	0.05
Statendam	12-Aug-04	13.0	7.96	9.53	50	2	Not detected	Not detected	1			20.70	280.0	0.05		13.10	0.05
Statendam	09-Sep-04	10.0	8.31	5.63	61	2	Not detected	Not detected	1	1040	13.00	15.00	436.0	0.05	1.50	11.80	0.05
Mercury	21-May-04	3.9	6.87	3.03	5	2	Not detected	Not detected	1	46.6	2.50	2.50	20.7	0.00	0.00	4.84	0.05
Mercury	18-Jul-04	3.0	7.29	3.01	5	2	Not detected	Not detected	1	39	2.50	1.12	14.1	0.00		3.57	0.05
Silver Shadow[13]	19-Aug-04	0.2	6.85	122.00	240	37.5	Not detected	Not detected	1	13700	2.50	71.30	75.7	3.70	0.34	3.17	0.05
Silver Shadow	05-Sep-04	7.5	7.12	41.80	170	2	Not detected	Not detected	17	18600		12.60	61.6	1.00	0.03	8.97	0.05
Summit	28-Jun-04	56.0	7.56	42.50	83	2	Not detected	Not detected	110	768	2.50	25.00	74.5	0.00	0.10	45.80	0.05
Sun Princess	20-May-04	0.1	7.57	5.49	67	2	0.4000	0.60	1	7060	2.50	18.00	176.0	0.00	4.50	47.40	0.05

[13] Vessel stopped discharging continuously on 8/20/04.

VESSEL_ID	Sample Date	Ammonia as N	pH	Biochemical O2 Demand, 5 day	Chemical Oxygen Demand	Total Suspended Solids	Chlorine, Free	Chlorine, Residual	Fecal Coliform Bacteria by MPN	Conduct-ivity	Hexane-Extractable Material	Total Organic Carbon	alkalinity, Total as CaCO3	Total Nitrate & Nitrite as N	Phosphorus, Total	Nitrogen, Total Kjeldahl	Total Settleable Solids
Sun Princess	09-Sep-04	28.0	7.68	6.62	200	2	Not detected	Not detected	137	602		46.10	144.0	0.05		22.00	0.05
Veendam	19-May-04	15.0	7.89	1.00	48	2	Not detected	Not detected	1	795	2.50	14.00	210.0	0.14	2.70	16.40	0.05
Veendam	14-Jul-04	20.0	7.57	1.00	57	2	Not detected	Not detected	1	770	2.50	18.10	275.0	0.00		20.90	0.05
Volendam	21-May-04	13.0	7.64	2.29	5	2	Not detected	Not detected	1	864	2.50	12.00	337.0	0.00	1.30	16.10	0.05
Volendam	16-Jul-04	20.0	7.52	1.00	31	2	Not detected	Not detected	1	779	2.50	12.60	239.0	0.86	1.60	28.60	0.05
Zaandam	24-May-04	10.0	8.18	1.00	17	2	Not detected	Not detected	1	705	2.50	12.00	250.0	0.00	0.42	12.00	0.05
Zaandam	09-Aug-04	20.0	8.35	1.00	34	2	Not detected	Not detected	1	873		16.30	371.0	0.05		23.30	0.05
	Minimum	0.1	6.55	1.00	5	2	Not detected	Not detected	1	39	2.50	1.12	14.1	0.00	0.00	3.17	0.05
	Maximum	110.0	8.35	122.00	240	95.8	1.4000	2.30	900	19200	13.00	71.30	439.0	35.00	17.00	472.00	3.3
	Median	17.5	7.61	5.83	52	2	Not detected	Not detected	1	795	2.50	17.00	136.0	0.05	1.50	23.35	0.05

Table 5. 2004 Large Ships Unannounced Sampling Priority Pollutant Results

VESSEL_ID	Sample Date	Bromoform	dibromo-chloro methane	Arsenic (TR)	chromium (TR)	copper (TR)	nickel (TR)	selenium (TR)	zinc (TR)	Arsenic, dissolved	Copper, dissolved	Selenium, dissolved	Nickel, dissolved	Zinc, dissolved
	PQL	2	2	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
	AKWQS	No WQS	No WQS	No WQS	No WQS	No WQS	No WQS	No WQS	No WQS	36.00	3.10	71.00	8.20	81.00
Coral Princess	11-Aug-04	1	1	2.82	0.25	28.20	9.23	0.25	80.70	2.75	25.40	0.25	9.30	78.90
Dawn Princess	16-Jul-04	1	1	0.25	0.25	12.60	9.23	3.02	119.00	0.25	10.50	0.25	9.44	121.00
Diamond Princess	12-Jul-04	1	1	3.30	0.25	33.10	10.40	4.05	230.00	4.30	33.60	4.48	11.60	233.00
Island Princess	27-Jul-04	1	1	3.38	0.25	20.50	11.30	9.82	73.70	3.37	0.25	9.39	11.20	73.80
Norwegian Spirit	10-Aug-04	1	1	0.25	0.25	0.25	7.66	0.25	54.00	0.25	0.25	0.25	8.16	55.70
Norwegian Spirit	10-Aug-04	1	1	0.25	0.25	0.25	7.66	0.25	57.00	0.25	0.25	0.25	7.24	53.90

VESSEL_ID	Sample Date	Bromoform	dibromo-chloro methane	Arsenic (TR)	chromium (TR)	copper (TR)	nickel (TR)	selenium (TR)	zinc (TR)	Arsenic, dissolved	Copper, dissolved	Selenium, dissolved	Nickel, dissolved	Zinc, dissolved
Norwegian Star	10-Aug-04	1	1	0.25	0.25	3.92	3.11	0.25	150.00	0.25	3.58	0.25	3.11	122.00
Norwegian Sun	18-Aug-04	1	1	0.25	0.25	2.22	7.50	2.84	1.07	0.25	1.76	0.25	7.09	105.00
Oosterdam	23-Aug-04	1	1	0.25	0.25	2.66	18.10	0.25	62.50	0.25	0.25	0.25	10.60	59.00
Regal Princess	18-Jul-04	1	1	0.25	0.25	89.20	10.60	0.25	219.00	0.25	76.30	0.25	9.44	187.00
Ryndam	13-Jul-04	1	1	0.25	0.25	4.75	138.00	0.25	17.40	0.25	4.43	0.25	133.00	20.00
Sapphire Princes	04-Aug-04	1	1	1.25	1.25	15.90	6.98	1.25	1.25	1.25	14.90	1.25	8.51	411.00
Seven Seas Mariner	29-Aug-04	1	1	1.25	1.25	16.30	0.50	1.25	56.80	1.25	10.40	1.25	0.50	55.70
Statendam	12-Aug-04	1	1	1.25	1.25	16.70	40.00	1.25	1.25	1.25	13.00	1.25	39.90	9.77
Statendam	12-Aug-04	1	1	1.25	1.25	18.90	40.40	1.25	1.25	1.25	10.00	1.25	40.90	1.25
Mercury	18-Jul-04	1	1	0.25	0.25	1.42	3.49	0.25	8.96	0.25	1.65	0.25	1.57	4.82

VESSEL_ID	Sample Date	Bromoform	dibromo-chloro methane	Arsenic (TR)	chromium (TR)	copper (TR)	nickel (TR)	selenium (TR)	zinc (TR)	Arsenic, dissolved	Copper, dissolved	Selenium, dissolved	Nickel, dissolved	Zinc, dissolved
Silver Shadow	19-Aug-04	21	24	13.30	9.15	57.90	15.30	36.50	111.00	12.90	172.00	32.40	13.80	125.00
Sun Princess	09-Sep-04	1	1	1.25	1.25	2.89	4.89	1.25	26.30	1.25	1.96	1.25	4.83	22.00
Veendam	14-Jul-04	1	1	0.25	0.25	10.90	21.70	0.25	237.00	0.25	5.44	0.25	22.10	196.00
Volendam	16-Jul-04	1	1	0.25	0.25	4.25	15.00	0.25	167.00	0.25	4.90	0.25	15.30	170.00
Zaandam	09-Aug-04	1	1	1.25	1.25	4.43	4.85	1.25	134.00	1.25	4.71	1.25	5.34	140.00
		No WQS	No WQS	No WQS	No WQS	No WQS	No WQS	No WQS	No WQS	36.00	3.10	71.00	8.20	81.00
	Min	1	1	0.25	0.25	0.25	0.50	0.25	1.07	0.25	0.25	0.25	0.50	1.25
	Max	21	24	13.30	9.15	89.20	138.00	36.50	237.00	12.90	172.00	32.40	133.00	411.00
	Median	1	1	0.25	0.25	10.90	9.23	1.25	62.50	0.25	4.81	0.25	9.44	78.90

Table 6. Priority Pollutants Analyzed

Priority Pollutants	**Method**	**Reportable Limit (PQL)**
Total Recoverable Metals		**Ug/l**
Antimony	200.8	0.5
Arsenic	200.8	0.5
Beryllium	200.8	0.5
Cadmium	200.8	0.5
Chromium	200.8	0.5
Copper	200.8	0.5
Lead	200.8	0.5
Mercury (Total)	245.1	0.5
Nickel	200.8	0.5
Selenium	200.8	0.5
Silver	200.8	0.5
Thallium	200.8	0.5
Zinc	200.8	0.5
Dissolved Metals		
Antimony	200.8	0.5
Arsenic	200.8	0.5
Beryllium	200.8	0.5
Cadmium	200.8	0.5
Chromium	200.8	0.5
Copper	200.8	0.5
Lead	200.8	0.5
Nickel	200.8	0.5
Selenium	200.8	0.5
Silver	200.8	0.5
Thallium	200.8	0.5
Zinc	200.8	0.5
VOCs		
1,1,1,2-Tetrachloroethane	624	2
1,1,1-Trichloroethane	624	2
1,1,2,2-Tetrachloroethane	624	2
1,1,2-Trichloroethane	624	2
1,1-Dichloroethane	624	2
1,1-Dichloroethene	624	2
1,1-Dichloropropene	624	2

1,2,3-Trichlorobenzene	624	2
1,2,3-Trichloropropane	624	2
1,2,4-Trichlorobenzene	624	2
1,2,4-Trimethylbenzene	624	2
1,2-Dibromo-3-Chloropropane	624	10
1,2-Dichlorobenzene	624	2
1,2-Dichloroethane	624	2
1,2-Dichloroethane	624	2
1,2-Dichloropropane	624	2
1,3,5-Trimethylbenzene	624	2
1,3-Dichlorobenzene	624	2
1,3-Dichloropropane	624	2
1,4-Dichlorobenzene	624	2
2,2-Dichloropropane	624	2
2-Butanone	624	50
2-Chloroethyl Vinyl Ether	624	10
2-Chlorotoluene	624	2
2-Hexanone	624	20
4-Chlorotoluene	624	2
4-Isopropyltoluene	624	2
4-Methyl-2-Pentanone	624	20
Acetone	624	50
Acrolein	624	100
Acrylonitrile	624	10
Benzene	624	2
Bromobenzene	624	2
Bromochloromethane	624	2
Bromodichloromethane	624	2
Bromoform	624	2
Bromomethane	624	5
Carbon Disulfide	624	2
Carbon Tetrachloride	624	2
Chlorobenzene	624	2
Chloroethane	624	5
Chloroform	624	2
Chloromethane	624	5
Cis-1,2-Dichloroethene	624	2
Cis-1,3-Dichloropropene	624	2
Dibromochloromethane	624	2
Dibromomethane	624	2

VOCs continued		
Dichlorodifluoromethane	624	5
Ethylbenzene	624	2
Hexachlorobutadiene	624	2
Iodomethane	624	5
Isopropylbenzene	624	2
m&p Xylenes	624	2
Methylene Chloride	624	5
Naphthalene	624	2
n-Butylbenzene	624	2
n-Propylbenzene	624	2
O-Xylene	624	2
sec-Butylbenzene	624	2
Styrene	624	2
tert-Butyl Methyl Ether	624	2
tert-Butylbenzene	624	2
Tetrachloroethene	624	2
Toluene	624	2
Trans 1,2-Dichloroethene	624	2
trans-1,3-Dichloropropene	624	2
trans-1,4-Dichloro-2 Buten	624	10
Trichloroethene	624	2
Trichlorofluoromethane	624	2
Trichlorotrifluoroethane	624	2
Vinyl Acetate	624	5
Vinyl Chloride	624	2
BNAs		
1,2,4-Trichlorobenzene	625	5
1,2-Dichlorobenzene	625	5
1,2-Diphenylhydrazine	625	5
1,3-Dichlorobenzene	625	5
1,4-Dichlorobenzene	625	5
2,4,5-Trichlorophenol	625	5
2,4,6-Trichlorophenol	625	5
2,4-Dichlorophenol	625	5
2,4-Dimethylphenol	625	25
2,4-Dinitrophenol	625	100
2,4-Dinitrotoluene	625	5
2,6-Dinitrotoluene	625	5
2-Chloronaphthalene	625	10

BNAs continued		
2-Chloronapthalene	625	10
2-Chlorophenol	625	5
2-Methylnaphthalene	625	5
2-Methylphenol	625	5
2-Nitroaniline	625	100
2-Nitrophenol	625	5
3&4-Methylphenol	625	5
3,3’-Dichlorobenzidine	625	20
3-Nitroaniline	625	50
4,6-Dinitro-2-methylphenol	625	25
4-Bromophenyl Phenyl ether	625	5
4-chloro-3-methylphenol	625	5
4-Chloroaniline	625	5
4-Chlorophenyl methylsulfone	625	20
4-Chlorophenyl Phenyl ether	625	5
4-Nitroaniline	625	50
4-Nitrophenol	625	100
Acenaphthene	625	5
Acenaphthylene	625	5
Anthracene	625	5
Benzidine	625	200
Benzo (A) Anthracene	625	5
Benzo (A) Pyrene	625	5
Benzo (B) Fluoranthene	625	5
Benzo (g,h,i) Perylene	625	5
Benzo (K) Fluoranthene	625	5
Benzoic Acid	625	130
Benzyl Alcohol	625	10
Bis (2-Chloroethoxy) methane	625	5
Bis (2-chloroethyl) ether	625	5
Bis (2-Chloroisopropyl) ether	625	5
Bis (2-Ethylhexyl) Phthalate	625	5
Butyl Benzyl Phthalate	625	5
Chrysene	625	5
Dibenzo (a,h) Anthracene	625	5
Dibenzofuran	625	5
Diethyl Phthalate	625	5
Dimethyl Phthalate	625	5
Di-N-Butyl Phthalate	625	5

BNAs continued		
Di-N-Octyl Phthalate	625	5
Fluoranthene	625	5
Fluorene	625	5
Hexachlorobenzene	625	5
Hexachlorobutadiene	625	5
Hexachlorocyclopentadiene	625	10
Hexachloroethane	625	5
Indeno (1,2,3-CD) Pyrene	625	5
Isophorone	625	5
Napthalene	625	10
Nitrobenzene	625	5
N-Nitrosodimethylamine	625	5
N-Nitrosodi-N-Propylamine	625	5
N-Nitrosodiphenylamine	625	10
Pentachlorophenol	625	5
Phenanthrene	625	5
Phenol	625	5
Pyrene	625	5
1,2,4-Trichlorobenzene	625	5
1,2-Dichlorobenzene	625	5
1,2-Diphenylhydrazine	625	5