DESCRIPTION OF APPENDIX TABLES 1-1 AND 1-2.

1.0 General

Appendix Table 1-1 includes data collected from various sources. These sources include information compiled in reports by the Florida Water Environment Association Utility Council and by SEFLOE, as well as sampling data sent directly from the Miami-Dade North District Wastewater Treatment Plant and the Brevard County South Beaches Wastewater Treatment Facility. KEMRON Environmental Services, Inc. provided sampling data from the Albert Whitted Water Reclamation Facility in St. Petersburg. The Florida Department of Environmental Protection provided sampling results for the wastewater treatment facility in the City of Cape Canaveral and the Howard Curren Wastewater Treatment Plant in Tampa Bay.

1.1 Florida Water Environment Association Utility Council

The Florida Water Environment Association Utility Council (FWEAUC) report (Englehardt et al., 2001) provided analysis of sampling and monitoring results of effluent that had been treated to different standards (advanced wastewater treatment, secondary treatment, and advanced secondary treatment) as well as "native" ambient water in injection zones and monitoring zones in target aquifers. In all, eight (8) categories of sampling data were summarized in the Florida Utility Council report. The data that we present in Appendix Table 1-1 represents "digested" data that has already been processed by the FWEAUC authors. Those authors include raw concentration data for each of the sampling stations in appendices B and C of their report. For each of the sampling dates for each of the stations, the authors provide two lists of monitoring data; the first list includes the concentrations of all detected constituents and sets each of the "non-detect" values to zero (0), and the second list duplicates the first, but sets "non-detect" values at their detection limit. For Each of these two lists, the average concentration of each parameter was calculated from all of the sampling results at all of the stations within a category (e.g., advanced wastewater treatment), resulting in average values for each constituent with non-detects as zero and non-detects at the detection limit, respectively. Processing the data in this manner has the same effect as assigning values one-half of the detection limit to all non-detects, a standard approach not inconsistent with risk assessment methodologies (US EPA. 1998).

The Florida Utility Council study processed all of the raw data in this manner. The utilities that supplied monitoring data to the authors of the report include:

- City of Hollywood
- City of Boca Raton
- City of Fort Lauderdale
- City of Sunrise
- City of Boynton Beach
- City of West Palm Beach
- Broward County North Regional Wastewater Treatment Plant
- Miami-Dade County North and South District Wastewater Treatment Plants
- Seacoast Utilities

- South Central Regional Wastewater Treatment Plant
- Florida Governmental Utility Authority (FGUA) Sarasota plants (Southgate and Gulf Gate Wastewater Treatment Plants)
- The FGUA Golden Gate Plant

1.2 Miami-Dade North District Wastewater Treatment Facility, Dade County

Sampling results from one round of tests characterizing a full suite of waste contaminants in screen effluent were obtained from the Miami-Dade Water and Sewer (North District) utility directly (Miami-Dade Water/Sewer Submission # 9903001041). This facility provides secondary treatment for wastewater effluent before discharging through an ocean outfall to the Atlantic Ocean. The sampling date for these results is March 19, 1999; this is the same sampling date as the results used in the Florida Utility Council report; a comparison of the raw data sent by the facility to the data in the Florida Utility Council report confirms that this is the same data set. Data from this set were entered into Appendix Table 1-1 directly; no processing of the data was performed except for the conversion of values from mg/L to μg/L (or vice versa). Constituents that were below the detection limit are indicated in Table 11 with a less than (<) sign preceding the reported detection limit.

1.3 South Beaches Wastewater Treatment Facility, Brevard County

Sampling results from one round of tests characterizing a full suite of waste contaminants were obtained from the Brevard County Water Resources Department (South Beaches Wastewater Treatment Facility, 2001) for effluent analyses conducted on December 7 and 28, 2000. This facility discharges effluent via a Class I deep injection well, reuse, or surface water discharge. Wastewater that is discharged through deep well injection receives secondary treatment. Water that is reused receives secondary treatment and high level disinfection with chlorine. Finished water destined for reuse has a concentration of 1 ppm chlorine and is filtered to reduce the concentration of total suspended solids to less than 5 ppm. Effluent is occasionally discharged directly to the Indian River during heavy rain and hurricanes. This effluent receives secondary treatment, plus chlorination and dechlorination as well as nutrient removal to lower the concentration of nitrogen, phosphorus and chlorine (Chuck Caron, personal communication).

These data represent single (not averaged) results. Data from this set were entered into Appendix Table 1-1 directly; no processing of the data was performed except for the conversion of values from mg/L to μg/L (or vice versa). Constituents that were below the detection limit are indicated in Appendix Table 1-1 with a less than (<) sign preceding the reported detection limit.

1.4 City of St. Petersburg, Albert Whitted Water Reclamation Facility, Pinellas County

Sampling results from the Albert Whitted Water Reclamation Facility were obtained by KEMRON Environmental Services, Inc. The records supplied by Kemron include effluent monitoring data from a range of dates, as well as minimum, maximum, and

average concentrations for each constituent; not all constituents were tested for on all the dates. Sampling and analysis occurred on September 16, 1998, January 4, 1999, April 6, 1999, June 29, 1999, July 1, 1999, September 26, 2000, and January 24, 2001.

Volatile organic constituents, synthetic organic constituents, secondary drinking water standard regulated constituents, and inorganic constituents were all sampled in September 1998, January and April 1999, September 2000, and January 2001. Radionuclides were sampled in September 1998, April and June 1999, and September 2000. Trihalomethanes were sampled in September 2000, and microbes were sampled in January 1999 and January 2001. Kemron provided constituent concentration data in two sets: one set of data included data qualifiers to indicate concentrations that were below detection limits, and the other set of data had the qualifiers removed in order to calculate the average concentration of each constituent. The average concentration of each constituent was entered directly into Appendix Table 1-1 from the Kemron table lacking qualifiers. Then, if any of the values used in the calculation had actually been below the detection limit, a "less than" (<) sign was added to the value entered into Appendix Table 1-1. For this reason, a "less than" sign preceding a concentration value **does not** indicate that the numeric value is the detection limit. The "less than" sign simply means that the average concentration of the constituent in question is less than the value reported in the table.

Ammonia, total nitrogen, total Kjeldahl nitrogen, orthophosphate, and water temperature were sampled in November 2000; those results were obtained from a Reclamation Facility Monitor Well and Effluent Study Report dated December 26, 2000 that was also provided by Kemron. These single sampling values were added to Appendix Table 1-1. No processing of the data was performed except for the conversion of values from mg/L to μg/L (or vice versa).

1.5 City of Cape Canaveral

The Cape Canaveral treatment plant serves the City of Cape Canaveral. In the mid 1990s, the plant was upgraded to an advanced wastewater treatment facility. The plant is part of a reclaimed water system that supplements the City of Cocoa Beach's reclaimed water supply. Discharge to the Banana River, a segment of the Indian River Lagoon, occurs during wet weather or other periods when reclaimed water demands are low.

The Florida Department of Environmental Protection, Central District, supplied comprehensive sampling results from a round of sampling at the Cape Canaveral Wastewater Treatment Plant conducted on October 1, 1999. The City of Cape Canaveral provided comprehensive sampling results from analyses conducted on April 3, 2001. These sampling results were entered into Appendix Table 1-1 directly without processing other than conversion of concentration units to be compatible with the other records in the table (i.e., conversion of values from mg/L to μg/L or vice versa).

In addition, the Florida Department of Environmental Protection (DEP) provided weekly, monthly, and annual sampling results for constituents that were monitored as part of Cape Canaveral's compliance with its National Pollution Discharge Elimination System (NPDES) permit. These constituents include total nitrogen, total phosphorus, and total suspended solids. These data were provided for calendar years 1999 through 2001. To

supplement the other sampling results for Cape Canaveral (dated October 1999 and April 2001), the annual average of each of the three constituents were calculated from monthly averages provided in the Florida DEP spreadsheet. Twelve monthly average records were used to calculate the annual average for each constituent in 1999; however, May and June 2001 data were unavailable. For this reason, only ten monthly averages were used to calculate the annual average of each constituent in 2001. Annual averages for each of these three constituents were included in Appendix Table 1-1 in the Cape Canaveral 1999 and 2001 columns; superscripted footnote numbers distinguish these average values from the comprehensive raw data.

1.6 SEFLOE II Data

Concentrations of several parameters in effluent from four wastewater treatment plants (Broward County North Regional Wastewater Treatment Plant, City of Hollywood, Miami-Dade North District WWTP, and Miami-Dade Central District WWTP) were provided in the SEFLOE II report (Appendix Table 1-2) (Hazen and Sawyer, 1994). Data for ammonia, total Kjeldahl nitrogen, total phosphorus, nitrate, nitrite, and oil and grease were supplied in that report as arithmetic averages for each utility. These average values were collected from separate tables and entered into Appendix Table 1-2 in columns labeled with the utility names (SEFLOE data for Miami-Dade North District are in a different column than the monitoring data provided by the utility directly). For the remaining parameters that were analyzed, raw sampling data were provided for each facility. For example, results from one round of sampling were reported for the City of Hollywood, results from two sampling dates were reported for each of the Miami-Dade facilities (February 27, 1991 and February 18, 1992 for North District and February 22, 1991 and September 20, 1991 for Central District), and results from four sampling dates were reported for Broward County (February 13, 1991, September 20, 1991, February 11, 1992, and March 24, 1992). The average concentration for each parameter at each utility was calculated using these concentration data and excluding data points that were identified by the SEFLOE authors as "questionable" (i.e., single values for arsenic, copper, and zinc in Broward County; total silver in the City of Hollywood and Miami-Dade Central; and heptachlor in Miami-Dade North). In instances where the reported concentration was "BDL" (Below Detection Limit), no detection limit was reported; for this reason, a value of zero (0) was used in the calculation of average concentrations.

REFERENCES

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Miami Dade Water/Sewer, North District. 1999. Screen effluent collected 3/19/99. Monitoring results below detection limits are indicated by showing a less than (<) sign preceding the reported detection limit. Submission #9903001041, pp. 47-52.

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Appendix Table 1-1. Drinking Water Standards and Sampling Results for Treated Wastewater and Native Water in South Florida

		Advanced Wastewater Treatment				Reclaimed Water Treatment		Secondary Effluent		Native Water Monitoring Zones				
		Various Counties	**Brevard County**			**Various Counties**	**Pinellas County**	**Various Counties**	**Dade County**	**Florida Utility Council[2] - Various Counties**				
Parameter Name	Drinking Water MCL[1]	Florida Utility Council[2]	South Beaches WWTF[3]	Cape Canaveral WWTP Sample Date 10/1/99[4]	Cape Canaveral WWTP Sample Date 4/3/01[5]	Florida Utility Council[2]	Albert Whitted WRF, St. Petersburg[6]	Florida Utility Council[2]	Miami-Dade North District[7]	Effluent Injection Zone	Lower Monitoring Zone	Upper Monitoring Zone	ASR Injection Zone	Biscayne Monitoring Zone
Inorganic Analysis														
Arsenic (mg/L)	0.050	0.001	< 0.0050	< 0.005	< 0.0045	0.003	<0.00314	0.003	< 0.01	0.010	0.007	0.005	0.002	0.015
Barium (mg/L)	2.000		0.031		0.0070	0.094	<0.0103	0.023	< 0.05	0.184	0.363	0.089	0.404	0.244
Cadmium (mg/L)	0.005	0.000	< 0.0010	< 0.0001	< 0.00005	0.001	<0.0022	0.001	< 0.005	0.004	**0.012**	**0.065**	0.003	0.001
Chromium (mg/L)	0.100	0.001	< 0.0050	< 0.005	< 0.0009	0.003	<0.00625	0.005	< 0.005	0.014	0.023	0.006	0.010	0.004
Cyanide (mg/L)	0.200				< 0.006	0.002	<0.025800	0.015	< 0.004	0.006	0.009	0.004	0.002	0.004
Fluoride (mg/L)	4.000	0.940	0.080		0.505	0.420	0.73700	0.790	0.75	0.700	0.860	1.470	1.580	0.190
Lead (mg/L)	A.L.=0.015	0.000	< 0.0010	< 0.003	0.0014	0.001	<0.00255	0.004	< 0.005	**0.069**	**0.108**	**0.022**	0.002	0.009
Mercury (mg/L)	0.002	0.000	< 0.00020	0.0004	0.00021	0.000	<0.0002	0.000	< 0.001	0.000	0.001	0.001	0.000	0.000
Nickel (mg/L)	0.100	0.002		< 0.03	0.0031	0.005	<0.008	0.011	< 0.005	0.023	0.036	0.025	0.004	0.003
Nitrate (mg/L)	10.00		9.6		0.0620	3.690	0.28000	3.820	0.64	0.420	0.070	0.040	0.030	0.190
Nitrite (mg/L)	1.000				< 0.0035	0.013	0.18000	0.575	< 0.05	0.009	0.025	0.012	0.006	0.005
Selenium (mg/L)	0.050	0.001	< 0.0020	< 0.005	< 0.0026	0.004	<0.00388	0.004	< 0.01	**0.637**	0.007	0.004	0.005	0.001
Sodium (mg/L)	160.0	64.00	**230**		121.0	75.00	28.03500	114.0	181	**8062**	**5514**	**1357**	**1215**	80.0
Antimony (mg/L)	0.006			0.011	0.0034	**0.142**	<0.002175	**0.013**	< 0.005	0.003	**0.019**	**0.010**	0.004	0.001
Beryllium (mg/L)	0.004			< 0.004	< 0.0001	0.004	<0.000525	0.001	< 0.002	0.008	**0.010**	**0.005**	0.001	0.000
Thallium (mg/L)	0.002			< 0.002	< 0.0010	0.001	<0.0012	0.002	< 0.002	**0.305**	**0.013**	**0.007**	0.001	0.001
Secondary Analysis														
Aluminum (mg/L)	0.200				0.0992	0.050	<0.1135	0.074	< 0.1	0.20	**0.917**	**0.744**	0.163	**0.823**
Chloride (mg/L)	250.0	82.20	160		165	116.9	189	151.85	218	**15302.5**	**9897.0**	**2203.3**	**2448.4**	176.2
Copper (mg/L)	A.L.=1.3	0.003	< 0.01	< 0.01	< 0.0005	0.021	0.0086	0.004	< 0.01	0.21	0.032	0.132	0.010	0.005
Iron (mg/L)	0.300	0.000	< 0.040		0.0225	0.177	0.0963333	0.183	0.209	**3.151**	**4.450**	**19.294**	**1.079**	**0.420**
Manganese (mg/L)	0.050		0.0058		0.0185	0.024	0.012567	0.018	< 0.05	0.038	0.046	0.027	0.043	0.013
Silver (mg/L)	0.100		< 0.010	< 0.01	0.0040	0.001	<0.00392	0.002	< 0.001	0.037	0.008	0.005	0.004	0.003
Sulfate (mg/L)	250.0	179.5	110		111	76.20	41.7	56.623	71.9	**2379.2**	**1117.9**	**401.0**	**521.8**	38.80
Zinc (mg/L)	5.000	0.000	0.037	< 0.03	0.0676	0.023	0.036500	0.014	0.02	0.008	0.015	0.059	0.082	0.025
Color (PtCo units)	15.00				5	**33.00**	**30**	**43.91**		7.400	6.300	12.60	12.00	**21.90**
Color (APHA units)									50					
Odor (TON)	3.000				2	2.500	**10**	**10.95**	**75**	1.200	**3.300**	2.100	**13.50**	0.700
pH	6.5-8.5		7.42		6.99	7.000	7.0775	6.863	6.93	7.700	7.900	7.700	7.500	8.100
TDS (mg/L)	500.0		**1200**		648	**528.0**	**557**	**550.71**	**610**	**28682**	**18328**	**4128**	**5240**	**533.0**
TSS (mg/L)				1.066 [9]	0.868 [9]									
Foaming Agents (mg/L)	1.500		0.13			0.143	0.305	**2.518**		0.080	0.253	0.118	0.074	0.193
Trihalomethane Analysis														
Bromodichloromethane (µg/L)				6.4	10.200				< 0.5					
Dibromochloromethane (µg/L)				40.9	10.700				< 0.5					
Tribromomethane (Bromoform; µg/L)				122	< 0.31000				< 0.5					
Trichloromethane (Chloroform; µg/L)				1.2	3.6900				7.18					
Total THMs (µg/L)	80.00		**230**		24.600	26.850	6.7	61.584	7.18	0.167	0.650	0.500	2.607	0.026

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		Various Counties	Brevard County			Various Counties	Pinellas County	Various Counties	Dade County	Florida Utility Council[2] - Various Counties				
Parameter Name	Drinking Water MCL[1]	Florida Utility Council[2]	South Beaches WWTF[3]	Cape Canaveral WWTP Sample Date 10/1/99[4]	Cape Canaveral WWTP Sample Date 4/3/01[5]	Florida Utility Council[2]	Albert Whitted WRF, St. Petersburg[6]	Florida Utility Council[2]	Miami-Dade North District[7]	Effluent Injection Zone	Lower Monitoring Zone	Upper Monitoring Zone	ASR Injection Zone	Biscayne Monitoring Zone
Radiological Analysis														
Gross Alpha (pCi/L)	15				< 1.60	3.167	<6.775 +/-1.4	0.400	< 1+/-0.5	9.675	7.300	4.100	**24.660**	5.550
Gross Alpha excl. radon & uranium (pCi/L)			< 4.0+/-2.3											
Radium-226 (pCi/L)					< 0.30		0.4 +/-0.15							
Radium-228 (pCi/L)					< 0.90		<0.75 +/-0.45							
Radium-226 and Radium-228			0.5+/-0.1											
Microbiological Analysis														
Total Coliform (col/100ml)	1, or 5%[8]							**394.071**		**33.50**	**7.000**	**0.500**	**6.000**	
Fecal Coliform (cfu/100ml)	0						<1							
Miscellaneous Analysis														
Ammonia-N (mg/L)							18.0	8.753		3.766	0.561	0.644	0.575	
Nitrogen, total (mg/L)				0.752 [9]	0.97 [9]	13.30	18.3	17.000		9.350	0.881	1.330		
Nitrogen, organic (mg/L)								1.584		0.998	0.374	0.432	0.307	
Nitrogen, total Kjeldahl (mg/L)						4.075	17.9	9.783		5.528	0.474	0.678	0.830	
Nitrate/Nitrite (as N; mg/L)					0.062		0.426667		0.64					
Ortho-phosphate (mg/L)							2.18	1.431		0.234	0.045	0.023	0.133	
Phosphorus, total (mg/L)				0.152 [9]	0.119 [9]	1.375		1.327		0.271	0.261	0.129	0.255	
BOD (mg/L)								8.300		4.300	5.400	7.000	1.400	
CBOD 5 (mg/L)														
Hormonally Active Agents														
Oil and Grease (mg/L)														
Hazardous Algal Bloom including aerosol dist.														
Water Temperature (°C)							26.6	25.333		22.80	23.50	24.30		24.40
Turbidity (NTU)							2.515		11.59					
MBAS Surfactants (mg/L)					< 0.020				0.063					
Synthetic Organic Constituent and Volatile Organic Constituent Analysis														
1,2-Dibromo-3-Chloropropane (DBCP; µg/L)	0.2				< 0.02000		<0.14		< 0.02					
Ethylene Dibromide (EDB; µg/L)	0.05		< 0.01		< 0.01000		<0.02		< 0.02					
Hexachlorocyclopentadiene (µg/L)	50			< 10	< 0.0200		<1.94		< 0.01					
Hexachlorobenzene (µg/L)	1			< 10	< 0.0100		<0.233		< 0.01					
v-BHC (Lindane; µg/L)	0.2		< 0.023	< 0.05	< 0.0240		<0.01		< 0.01					
Alachlor (µg/L)	2				< 0.0625		<1.17		< 0.01					
Heptachlor (µg/L)	0.4			< 0.05	< 0.0540		<0.045		< 0.01					
Heptachlor epoxide (µg/L)	0.2			< 0.05	< 0.0245		<0.035		< 0.01					
Endrin (µg/L)	2		< 0.023	< 0.1	< 0.0100		<0.13		< 0.01					
Methoxychlor (µg/L)	40		< 0.023	< 0.1	< 0.250		<0.21		< 0.01					
Arochlor 1016 (µg/L)				< 1.0					< 0.01					
Arochlor 1221 (µg/L)				< 1.0					< 0.01					
Arochlor 1232 (µg/L)				< 1.0					< 0.01					
Arochlor 1242 (µg/L)				< 1.0					< 0.01					
Arochlor 1248 (µg/L)				< 1.0					< 0.01					
Arochlor 1254 (µg/L)				< 1.0					< 0.01					

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		Various Counties	Brevard County			Various Counties	Pinellas County	Various Counties	Dade County	Florida Utility Council[2] - Various Counties				
Parameter Name	Drinking Water MCL[1]	Florida Utility Council[2]	South Beaches WWTF[3]	Cape Canaveral WWTP Sample Date 10/1/99[4]	Cape Canaveral WWTP Sample Date 4/3/01[5]	Florida Utility Council[2]	Albert Whitted WRF, St. Petersburg[6]	Florida Utility Council[2]	Miami-Dade North District[7]	Effluent Injection Zone	Lower Monitoring Zone	Upper Monitoring Zone	ASR Injection Zone	Biscayne Monitoring Zone
Arochlor 1260 (µg/L)				< 1.0					< 0.01					
Toxaphene (µg/L)	3		< 0.57	< 1.0	< 0.500		<1.77		< 0.01					
Chlordane (µg/L)	2			< 0.05	< 0.500		<0.64		< 0.01					
Simazine (µg/L)	4				< 0.176		<2.67		< 0.5					
Atrazine (µg/L)	3				< 0.625		<1.4		< 0.2					
Dalapon (µg/L)	200				< 0.802		<1.0		< 1.3					
2,4-D (µg/L)	70		< 0.1		< 0.362		<0.1		< 0.2					
Pentachlorophenol (µg/L)	1			< 50	< 0.0545		<0.04		< 0.2					
Phenols (total; µg/L)														
2,4,5-TP (silvex; µg/L)	50		< 0.2		< 0.0250		<0.2		< 0.2					
Dinoseb (µg/L)	7				< 0.125		<0.2		< 0.2					
Picloram (µg/L)	500				< 0.250		<0.1		< 0.2					
Vinyl Chloride (µg/L)	2		< 1	< 10	< 0.29000		<0.625		< 0.5					
1,1-Dichloroethene (µg/L)	7			< 5	< 0.02000		<0.625		< 0.5					
Methylene Chloride (µg/L)				< 5	< 0.31000				< 0.5					
Trans-1,2-Dichloroethene (µg/L)	100			< 5	< 0.12000		<2.5		< 0.5					
Cis-1,2-Dichloroethene (µg/L)	70				< 0.03000		<0.625		< 0.5					
1,1,1-Trichloroethane (µg/L)	200		< 1	< 5	< 0.21000		<2.5		< 0.5					
Carbon Tetrachloride (µg/L)	5		< 1	< 5	< 0.29000		<0.625		< 0.5					
Benzene (µg/L)	5		< 1	< 5	< 0.05000		<0.625		< 0.5					
1,2-Dichloroethane (µg/L)	5		< 1	< 5	< 0.02000		<0.625		< 0.5					
Trichloroethene (µg/L)	5		< 1	< 5	< 0.02000		<0.875		< 0.5					
1,2-Dichloropropane (µg/L)	5			< 5	< 0.33000		<0.625		< 0.5					
Toluene (µg/L)	1000			< 5	< 0.41000		<2.5		< 0.5					
1,1,2-Trichloroethane (µg/L)	5			< 5	< 0.23000		<0.625		< 0.5					
Tetrachloroethene (µg/L)	5		< 1	< 5	< 0.21000		<0.625		4.66					
Chlorobenzene (µg/L)	100			< 5	< 0.23000		<0.625		< 0.5					
Ethylbenzene (µg/L)	700			< 5	< 0.47000		<2.5		< 0.5					
m & p-Xylene (µg/L)									< 0.5					
o-Xylene (µg/L)									< 0.5					
Xylenes (total; µg/L)	10000				< 0.24000		<0.5							
Styrene (µg/L)	100				< 0.47000		<0.5		< 0.5					
1,4-Dichlorobenzene (para) (µg/L)	75		< 1	< 5	< 0.02000		<0.517		< 0.5					
1,2-Dichlorobenzene (ortho) (µg/L)	600			< 5	< 0.05000		<0.5		< 0.5					
1,2,4-Trichlorobenzene (µg/L)	70			< 10	< 0.22000		<10.9		< 0.5					
Di(2-Ethylhexyl)phthalate (µg/L)	6			< 10	< 1.32		<1.25		< 5					
Di(2-Ethylhexyl)adipate (µg/L)	400				< 0.600		<1.12		< 5					
Benzo(a)pyrene (µg/L)	0.2			< 10	< 0.0400		<0.1		< 0.2					
Carbofuran (µg/L)	40				< 0.900		<2		< 10					
Oxamyl (vydate; µg/L)	200				< 1.13		<2		< 50					
Glyphosate (µg/L)	700				< 2.4		<6		< 10					
Endothall (µg/L)	100				< 3.00		<9.0		< 10					

Appendix Table 1-1. Drinking Water Standards and Sampling Results for Treated Wastewater and Native Water in South Florida

		Advanced Wastewater Treatment				Reclaimed Water Treatment		Secondary Effluent		Native Water Monitoring Zones				
		Various Counties	Brevard County			Various Counties	Pinellas County	Various Counties	Dade County	Florida Utility Council[2] - Various Counties				
Parameter Name	Drinking Water MCL[1]	Florida Utility Council[2]	South Beaches WWTF[3]	Cape Canaveral WWTP Sample Date 10/1/99[4]	Cape Canaveral WWTP Sample Date 4/3/01[5]	Florida Utility Council[2]	Albert Whitted WRF, St. Petersburg[6]	Florida Utility Council[2]	Miami-Dade North District[7]	Effluent Injection Zone	Lower Monitoring Zone	Upper Monitoring Zone	ASR Injection Zone	Biscayne Monitoring Zone
Diquat (µg/L)	20				< 4.00		<0.4		< 0.5					
Paraquat (µg/L)									< 1					
1,1-dichloroethane (µg/L)			< 1	< 5	< 0.10000									
PCB-1242 (mg/L)							<0.00075							
PCB-1254 (mg/L)							<0.00075							
PCB-1221 (mg/L)							<0.00125							
PCB-1232 (mg/L)							<0.00075							
PCB-1248 (mg/L)							<0.00075							
PCB-1260 (mg/L)							<0.00075							
PCB-1016 (mg/L)							<0.00075							
Polychlorinated byphenyls (PCBs; mg/L)	0.0005				< 0.250 mg/L		<0.00023							
2,3,7,8-TCDD (Dioxin; mg/L)	$3x10^{-8}$													
Dichloromethane (mg/L)	0.005						<0.000625							

1 National Primary Drinking Water Regulations, 40 CFR 141 et seq.

2 Englehardt et. al. 2001. Comparative Assessment of Human and Ecological Impacts from Municipal Wastewater Disposal Methods in Southeast Florida, Table 2. Numbers are the average of the means of the measurements calculated with non-detects as zero and non-detects at their detection limit values.

3 South Beaches Wastewater Treatment Facility, Melbourne Beach, FL. 2001. Reclaimed Water or Effluent Analysis Report, Report Period 1/1/2000 - 12/31/2000. If monitoring result below the detection limit, this was indicated by showing a less than (<) sign preceding the detection limit.

4 Florida Department of Environmental Protection. 1999. Annual Reclaimed Water/Effluent Analysis for Primary and Secondary Drinking Water Standards, Cape Canaveral Wastewater Treatment Plant. Samples collected October 1, 1999. Laboratory Order Number B9-10-019.

5 City of Cape Canaveral. 2001. Laboratory Order Number 11926.

6 City of St. Petersburg, Public Utilities Department, Albert Whitted Water Reclamation Facility. Values are the average of sampling results from 9/98, 1/99, 4/99, 9/00, and 1/01, except values for ammonia, total nitrogen, total Kjeldahl nitrogen, orthophosphate, and water temperature, which are actual values measured 11/9/00. Values that were non-detects with a detection limit greater than the MCL were excluded from the calculation of the averages. A "less than" sign preceding a value indicates that at least one of the annual sampling results was below the detection limit. It does not necessarily indicate that all annual sampling results were below the detection limit for any given constituent.

7 Miami Dade Water/Sewer, North District. 1999. Submission #9903001041, pp. 47-52. Screen effluent collected 3/19/99. Monitoring results below detection limits are indicated by showing a less than (<) sign preceding the reported detection limit.

8 For systems that collect >40 samples per month, MCL is 5% monthly samples are positive; for systems that collect <40 samples per month, MCL is 1 positive sample.

9 Annual Average calculated from monthly averages in 1999 and 2001 supplied by Florida Department of Environmental Protection (Cape Canaveral NPDES constituent data). Data from May and June 2001 are unavailable; therefore, annual averages for 2001 are calculated from 10 monthly averages.

Appendix Table 1-2. Summary of Treated Wastewater Effluent Characteristics - Southeast Florida Outfall Experiment (SEFLOE)

	Parameter Name	Broward	Hollywood	Dade-North	Dade-Central
Arithmetic Average	Ammonia (mg/L)	12.48	5.96	10.46	
	Nitrogen, total Kjeldahl (mg/L)	14.31	9.38	13.4	
	Phosphorus, Total (mg/L)	1.66	0.97	1.6	
	Nitrates (mg/L)	0.42	1.70		
	Nitrites (mg/L)	2.01			
	Nitrates + Nitrites (mg/L)	2.07			
	Oil & Grease (mg/L)	2.17	19.24	3.27	2.54

	Broward		Hollywood	Dade-North		Dade-Central	
	Arithmetic Average of data from four sampling dates		Data from one sampling date	Arithmetic Average of data from two sampling dates		Arithmetic Average of data from two sampling dates	
Parameter Name	Average	Average, excluding "questionable" data points	Sampling Data	Average	Average, excluding "questionable" data points	Average	Average, excluding "questionable" data points
1,1,1 Trichloroethane (µg/L)	1.1	1.1					
Antimony Total (mg/L)				0.013	0.013	0.022	0.022
Arsenic Total (mg/L)	0.032	0.001		0.0004	0.0004		
Cadmium Total (mg/L)	0.002	0.002		0.002	0.002	0.005	0.005
Chloroform (µg/L)	1.65	1.65	10	9.01	9.01		
Chromium Total (mg/L)	0.047	0.047					
Copper Total (mg/L)	0.037	0.012		0.018	0.018	0.023	0.023
Cyanide Total (mg/L)				0.008	0.008	0.005	0.005
Dichlorobromomethane (µg/L)	0.615	0.615					
Ethylbenzene (µg/L)				0.25	0.25		
Heptachlor (µg/L)				0.092	0		
Lead Total (mg/L)	0.004	0.004		0.010	0.010	0.02	0.02
Nickel total (mg/L)	0.015	0.015		0.003	0.003	0.003	0.003
Phenols, Total (µg/L)			70			11	11
Selenium Total (mg/L)	0.007	0.007		0.0005	0.0005		
Silver Total (mg/L)	0.0005	0.0005	0.010 (ques)			0.007	0
Tetrachloroethylene (µg/L)						3	3
Thallium Total (mg/L)				0.019	0.019	0.007	0.007
Toluene (µg/L)				1.07	1.07		
Zinc Total (mg/L)	0.054	0.036	0.015	0.015	0.015	0.041	0.041

1 Hazen and Sawyer, Inc. 1994. SEFLOE II Final Report. pp. III-182-185; III-202-205; and III-210-213. Average values represent 7-43 sampling records from Broward County North Regional Wastewater Treatment Plant, the Miami-Dade North District and Central District Wastewater Treatment Plants, and the City of Hollywood Wastewater Treatment Plant.

Appendix Table 1-2. Summary of Treated Wastewater Effluent Characteristics - SEFLOE data[1] Continued

Broward

Parameter	2/13/1991	9/20/1991	2/11/1992	3/24/1992	average	average -ques points
Dichlorobromomethane (µg/L)	**n/a**	**n/a**	0	1.23	0.615	0.615
Chloroform (µg/L)	1.7	0.0	2.72	2.18	1.65	1.65
1,1,1 Trichloroethane (µg/L)	1.5	0.0	2.68	0	1.0525	1.0525
Arsenic Total (µg/L)	0.0	124.0	1.7	2.3	32	1.333333333
Cadmium Total (µg/L)	0.0	8.3	0	0.3	2.15	2.15
Chromium Total (µg/L)	2.8	3.3	3.2	179	47.075	47.075
Copper Total (µg/L)	2.1	20.0	111.3	14.4	36.95	12.16666667
Lead Total (µg/L)	0.0	5.0	4.8	6.7	4.125	4.125
Nickel total (µg/L)	4.2	44.0	6.8	6.7	15.425	15.425
Selenium Total (µg/L)	0.0	23.3	1	2	6.575	6.575
Silver Total (µg/L)	0.0	0.5	0.9	0.5	0.475	0.475
Zinc Total (µg/L)	20.0	52.5	111	34	54.375	35.5

Hollywood

Parameter	sampling point (11/25/91)
Chloroform (µg/L)	10
Silver, Total (µg/L)	10 (ques)
Zinc, Total (µg/L)	15
Phenols, Total (µg/L)	70

Dade-North

Parameter	2/27/1991	2/18/1992	average	ave - ques points
Chloroform (µg/L)	10.01	8.0	9.005	9.005
Ethylbenzene (µg/L)	0.5	0	0.25	0.25
Toluene (µg/L)	2.14	0	1.07	1.07
Heptachlor (µg/L)	0.183	0	0.0915	0
Antimony Total (µg/L)	26.3	0	13.15	13.15
Arsenic Total (µg/L)	0.83	0	0.415	0.415
Cadmium Total (µg/L)	3.0	0	1.5	1.5
Copper Total (µg/L)	19.0	16.0	17.5	17.5
Lead Total (µg/L)	20.2	0	10.1	10.1
Nickel total (µg/L)	5	0	2.5	2.5
Selenium Total (µg/L)	0.91	0	0.455	0.455
Thallium Total (µg/L)	38.9	0	19.45	19.45

Dade-Central

Parameter	2/22/1991	9/20/1991	average	ave - ques points
Tetrachloroethylene (µg/L)	0	6	3	3
Antimony Total (µg/L)	44.8	0	22.4	22.4
Cadmium Total (µg/L)	9	0	4.5	4.5
Copper Total (µg/L)	35	10	22.5	22.5
Lead Total (µg/L)	40	0	20	20
Nickel total (µg/L)	5	0	2.5	2.5
Silver, Total (µg/L)	14	0	7	0
Thallium Total (µg/L)	13	0	6.5	6.5
Zinc Total (µg/L)	82	0	41	41
Cyanide Total (µg/L)	9.6	0	4.8	4.8
Phenols, Total (µg/L)		11	11	11

Appendix Table 1-3. Microbial Standards and Concentrations in Treated Wastewater.

Microbial Standards

Microbial Pathogens and Sewage Indicators	**Drinking Water Maximum Containment Level[1]**	**Florida Department of Environmental Protection Recommended Limits[2]**		**Summary of Requirements For Disinfection Used in South Florida**		
		Average	Maximum	Basic disinfection	Intermediate disinfection	High-Level disinfection
Total Coliform (col/100ml)	1, or 5%					
Fecal Coliform (cfu/100ml)	0			≤ 200	≤ 14	BDL
Enterovirus (mpn/100 L)						
Enterovirus (PFU/100 L)[2a]		0.044	0.165			
Enterovirus (PFU/100 L)[2b]		14	50			
Cryptosporidium (oocysts/100 L)		5.8	22	5	5	5
Giardia lamblia (cysts/100 L)		1.4	5			
Enterococci (cfu/100 mL)						
Clostridium perfringens (cfu/100 mL)						
Coliphages (pfu/100 mL)						
Enterovirus (PFU/100L)						
Coliphages Host E. coli (pFamp) (PFU/100 mL)						
Coliphages Host E. coli C (PFU/100 mL)						

BLD = Below Detection Limit

Microbial Surface Water Concentrations (1)

Microbial Pathogens and Sewage Indicators	**Surface Water**							
	Sarasota County						**Hillsborough County**	
	5 Streams in the vicinity of Sarasota[1]		Sarasota Bay [1]		Phillippi Creek[1]		Tampa Bypass Canal[1]	
	Average	Range	Average	Range	Average	Range	Average	Range
Total Coliform (col/100ml)								
Fecal Coliform (cfu/100ml)								
Enterovirus (mpn/100 L)								
Cryptosporidium (oocysts/100 L)	6.6	ND-157	ND	ND	3.1	ND-11	3.1	ND-11
Giardia lamblia (cysts/100 L)	ND	ND	ND	ND	0.42	ND-2.9	0.42	ND-2.9
Enterococci (cfu/100 mL)								
Clostridium perfringens (cfu/100 mL)								
Coliphages (pfu/100 mL)								
Enterovirus (PFU/100L)								
Coliphages Host E. coli (pFamp) (PFU/100 mL)								
Coliphages Host E. coli C (PFU/100 mL)								

ND= Nondetect

Microbial Surface Waters Concentrations (2)

Microbial Pathogens and Sewage Indicators	**Surface Waters**
	Brevard County
	Duda Ditches[2]
	single sampling date
Total Coliform (col/100ml)	
Fecal Coliform (cfu/100ml)	100.9
Enterovirus (mpn/100 L)	
Cryptosporidium (oocysts/100 L)	
Giardia lamblia (cysts/100 L)	
Enterococci (cfu/100 mL)	
Clostridium perfringens (cfu/100 mL)	
Coliphages (pfu/100 mL)	
Enterovirus (PFU/100L)	
Coliphages Host E. coli (pFamp) (PFU/100 mL)	
Coliphages Host E. coli C (pfu/100 mL)	

Microbial Concentrations in Untreated and Treated Wastewater (1)

Microbial Pathogens and Sewage Indicators	**Raw Wastewater**	**Secondary Treated Wastewater**	**Secondary Treated Wastewater**					
	United States	**Dade County**	**Broward County**					
	Urban Communities within the United States[1]	MDWSD North District IW3[2]	City of Fort Lauderdale[3]	City of Hollywood[3]	Sunrise (IW1 and IW2)[3]	Sunrise (IW3)[3] Sawgrass	Hollywood WTP (reuse filter)[3]	Broward County Regional WWTP (Reuse Composite Sampler)[4]
	sampling dates unknown	sampling date 3/19/99	sampling date 4/25/96	sampling date 4/25/96	sampling date 2/11/00	sampling date unknown	sampling date 7/9/99	average of 30 values taken in September 2001
Total Coliform (col/100ml)	22 x (10^6)	0.0005	2100	0.5	280	180	0.5	0.033
Fecal Coliform (cfu/100ml)	8 x (10^6)							0
Enterovirus (mpn/100 L)								
Cryptosporidium (oocysts/100 L)								
Giardia lamblia (cysts/100 L)								
Enterococci (cfu/100 mL)								
Clostridium perfringens (cfu/100 mL)								
Coliphages (pfu/100 mL)								
Enterovirus (PFU/100L)								
Coliphages Host E. coli (pFamp) (PFU/100 mL)								
Coliphages Host E. coli C (pfu/100 mL)								

Microbial Concentrations in Treated Wastewater (2)

Microbial Pathogens and Sewage Indicators	**Secondary Effluent**				
	Brevard County[5]				
	BCUD/ South Central Regional WWTF[6]	South Beaches WWTF[7]	BCUD/Port St. John WWTF	Barefoot Bay Advanced Wastewater Treatment Facility	BCUD/ Sykes Creek Regional WWTF
	daily sample results	daily sample results	daily sample results	daily sample results-R001 reuse irrigation	daily sample results-reuse
	(mon site EFA-1; avg of monthly)	(mon site EFA-1; avg of monthly)	(mon site EFA-1; avg of monthly)	(mon site EFA-1; avg)	(mon site EFA-2; avg)
Total Coliform (col/100ml)					
Fecal Coliform (cfu/100ml)	0.03	0.04	0.18	0	0
Enterovirus (mpn/100 L)					
Cryptosporidium (oocysts/100 L)					
Giardia lamblia (cysts/100 L)					
Enterococci (cfu/100 mL)					
Clostridium perfringens (cfu/100 mL)					
Coliphages (pfu/100 mL)					
Enterovirus (PFU/100L)					
Coliphages Host E. coli (pFamp) (PFU/100 mL)					
Coliphages Host E. coli C (pfu/100 mL)					

Microbial Concentrations in Treated Wastewater (3)

Microbial Pathogens and Sewage Indicators	**Reclaimed Water**			**Advanced Wastewater Treatment**			
	Pinellas County			**Brevard County**		**Hillsborough County**	
	Albert Whitted WRF, St. Petersburg[8]	St. Petersburg[9]		Cape Canaveral WWTP NPDES database		Howard Curren WWTP[12]	
	Sampling date 11/28/00	Average	Maximum	Annual average 1999[10]	Annual average 2001[11]	Sample date 5/5/00	Sample date 5/16/01
Total Coliform (col/100ml)							
Fecal Coliform (cfu/100ml)				0.125	1.15		
Enterovirus (mpn/100 L)							
Cryptosporidium (oocysts/100 L)	1.85	0.75	5.35			<0.7	2.33
Giardia lamblia (cysts/100 L)	0.26	0.49	3.3			<0.7	<0.29
Enterococci (cfu/100 mL)							
Clostridium perfringens (cfu/100 mL)							
Coliphages (pfu/100 mL)							
Enterovirus (PFU/100L)		0.01	0.133				
Coliphages Host E. coli (pFamp) (PFU/100 mL)							
Coliphages Host E. coli C (pfu/100 mL)							

Microbial Concentrations in Monitoring Wells (1)

Microbial Pathogens and Sewage Indicators	**Deep Injection Monitoring Wells**			
	Pinellas County			
	Well ID AWWRF 757[1]	Well ID AWWRF 758[1]	Well ID AWWRF 779[1]	St Petersburg[1]
	Average of the results from 20 sampling events between 4/98 and 12/00	Average of the results from 20 sampling events between 4/98 and 12/00	Average of the results from 20 sampling events between 4/98 and 12/00	Sampling date 10/13/00[2]
Total Coliform (col/100ml)				<0.058
Fecal Coliform (cfu/100ml)				<0.058
Enterovirus (mpn/100 L)	<1.0	<1.0	<1.0	<0.1
Cryptosporidium (oocysts/100 L)				<0.17
Giardia lamblia (cysts/100 L)				<0.17
Enterococci (cfu/100 mL)				<0.058
Clostridium perfringens (cfu/100 mL)				<0.058
Coliphages (pfu/100 mL)				
Enterovirus (PFU/100L)				
Coliphages Host E. coli (pFamp) (PFU/100 mL)				<5
Coliphages Host E. coli C (pfu/100 mL)				<5

Microbial Concentrations in Ground Water Monitoring Wells (2)

Microbial Pathogens and Sewage Indicators	**Deep Injection Monitoring Wells**				
	Various Counties				
	Native Water Monitoring Zones				
	Effluent Injection Zone	Lower Monitoring Zone	Upper Monitoring Zone	ASR Injection Zone	Biscayne Monitoring Zone
Total Coliform (col/100ml)	33.50	7.00	0.500	6.00	
Fecal Coliform (cfu/100ml)					
Enterovirus (mpn/100 L)					
Cryptosporidium (oocysts/100 L)					
Giardia lamblia (cysts/100 L)					
Enterococci (cfu/100 mL)					
Clostridium perfringens (cfu/100 mL)					
Coliphages (pfu/100 mL)					
Enterovirus (PFU/100L)					
Coliphages Host E. coli (pFamp) (PFU/100 mL)					
Coliphages Host E. coli C (pfu/100 mL)					

Microbial Concentrations in Ground Water Monitoring Wells (3)

Microbial Pathogens and Sewage Indicators	**Deep Injection Monitoring Wells**					
	Pinellas County					
	AWWRF well 779[2]	SWWRF well 765[2]	SWWRF well 768[2]	NWWRF well 798[2]	AWWRF well 758[2]	NEWRF well 784[2]
	Sample date 12/1/99	Sample date 12/1/99	Sample date 12/1/99	Sample date 12/1/99	Sample date 12/1/99	Sample date 12/1/99
Total Coliform (col/100ml)	<0.058	<0.058	<0.058	<0.058	<0.058	<0.058
Fecal Coliform (cfu/100ml)	<0.058	<0.058	<0.058	<0.058	<0.058	<0.058
Enterovirus (mpn/100 L)	<0.071	<0.060	<0.075	<0.05	0.074	<0.080
Cryptosporidium (oocysts/100 L)	1.18	<0.30	0.74	0.36	0.14	<0.11
Giardia lamblia (cysts/100 L)	<0.29	<0.30	<0.15	<0.30	<0.14	<0.11
Enterococci (cfu/100 mL)	<0.058	<0.058	<0.058	<0.058	<0.058	<0.058
Clostridium perfringens (cfu/100 mL)	<0.058	<0.058	<0.058	<0.058	<0.058	<0.058
Coliphages (pfu/100 mL)	<5	<5	<5	<5	<5	<5
Enterovirus (PFU/100L)						
Coliphages Host E. coli (pFamp) (PFU/100 mL)						
Coliphages Host E. coli C (pfu/100 mL)						

FOOTNOTES TO APPENDIX 1-3 (MICROBIAL PATHOGEN TABLE).

Footnotes for Table – Microbial Standards

1 Maximum Contaminant Level (MCL). National Primary Drinking Water Regulations, 40 CFR 141 et seq.

2 York, D.W., P. Menendez, and L. Walker-Coleman. 2002. Pathogens in Reclaimed Water: the Florida Experience. 2002 Water Sources Conference.
2a. Assumes all Enterovirus is highly infective Rotavirus.
2b. Assumes all Enterovirus is moderately infective Echovirus.

Footnotes for Table - Microbial Concentrations in Treated Effluent

1 Geldriech, E.E. 1978 in Wood, I.R. et al. 1993. Ocean Disposal of Wastewater. Advanced Series on Ocean Engineering. Volume 8. World Scientific Publishing Co. Pte. Ltd. Samples taken from several urban communities in the United States.

2 Englehardt al. 2001. Comparative Assessment of Human and Ecological Impacts from Municipal Wastewater Disposal Methods in Southeast Florida. Florida Water and Environment Utility Council.

3 Englehardt al. 2001. Comparative Assessment of Human and Ecological Impacts from Municipal Wastewater Disposal Methods in Southeast Florida. Florida Water and Environment Utility Council.

4 Broward County Office of Environmental Services, Environmental Operations Division, Compliance and Monitoring Section. Facsimile. Contact: Richard Walker.

5 Florida Department of Environmental Protection Discharge Monitoring Reports for Brevard County.

6 Florida Department of Environmental Protection Discharge Monitoring Reports for Brevard County. No detection limit was given; zero was used in calculations where non-detect (ND) was entered on data form. Values are averages from monthly reported values for March, April, and May 2001, except for "created wetlands" value, which is the average of March and April reported values (no discharge to wetlands in May 2001) and for "surface water" value.

7 Florida Department of Environmental Protection Discharge Monitoring Reports for Brevard County. Values are averages from monthly reported values for March, April, and May 2001, calculated by Horsley & Witten, Inc. No detection limit was given; zero was used in calculations where non-detect (ND) was entered on data form.

8 Sampling results provided by Mr. Alfredo Crafa, Environmental Compliance Division, Albert Whitted Wastewater Reclamation Facility, March 18, 2002, City of St. Petersburg, Florida.

9 York, D.W., P. Menendez, and L. Walker-Coleman. 2002. Pathogens in Reclaimed Water: the Florida Experience. 2002 Water Sources Conference.

10 Annual average calculated from monthly averages in 1999 supplied by Florida Department of Environmental Protection (Cape Canaveral National Pollution Discharge Elimination System constituent data). Data from May, June, November, and December are unavailable; therefore, coliforms per 100 mL annual averages for 1999 are calculated from 8 monthly averages. Seven of eight months reported 0 fecal coliforms; one month detected <1 fecal rk. Personal Communication (February 22, 2002). Results are for pathogens in reclaimed wastewater intended for reuse.

11 Annual average calculated from twelve monthly averages in 2001 supplied by Florida Department of Environmental Protection (Cape Canaveral NPDES constituent data). Eleven months reported <1 cfu/100 mL; one month (January) reported 2.8 cfu/100 mL.

12 David York, Ph.D., P.E., Reuse Coordinator, Florida Department of Environmental Protection, personal communication (February 22, 2002). Results are the pathogens in reuse effluent from the Howard Curran Wastewater Treatment Plant.

Footnotes for Table - Microbial Data from Monitoring Wells

1 The Albert Whitted Wastewater Reclamation Facility provided sampling data for microbes from effluent treated to Advanced treatment standards. Values are the average of 20 sampling events for microbial concentrations in three (3) monitoring wells between the period of March 1998 and December 2000.

2 Sampling results provided by Mr. Alfredo Crafa, Environmental Compliance Division, Albert Whitted Wastewater Reclamation Facility, March 18, 2002, City of St. Petersburg, Florida.

3 Rose, J.B., and W. Quintero-Betancourt, J. Jarrel, E. Lipp, S. Farrah, G. Lukasik, and T. Scott. 2001. Deep Injection Monitoring Well: Water Quality Monitoring Report. Report to the Florida Department of Environmental Protection.

Footnotes for Table - Microbial Data from Surface Waters

1 Florida Department of Environmental Protection, Risk Impact Statement, Phase II Revisions to Chapter 62-610, F.A.C., Docket No. 95-08R.

2 Average of samples taken on 3/13/01 at 10 surface water-sampling stations. Florida Department of Environmental Protection Discharge Monitoring Reports.

Footnotes for Table - Microbial Data from Ohio River in the Cincinnati, Ohio Area

1 York, D.W., P. Menendez, and L. Walker-Coleman. 2002. Pathogens in Reclaimed Water: the Florida Experience. 2002 Water Sources Conference. Values are the average of five separate sampling events.

2 York, D.W., P. Menendez, and L. Walker-Coleman. 2002. Pathogens in Reclaimed Water: the Florida Experience. 2002 Water Sources Conference. Values are the average of four separate sampling events.

3 York, D.W., P. Menendez, and L. Walker-Coleman. 2002. Pathogens in Reclaimed Water: the Florida Experience. 2002 Water Sources Conference. Values are the average of two separate sampling events.

Footnotes for Table - SDWTP Monitoring Well Data, Dade County

1 South District Wastewater Treatment Plant, Miami-Dade County, Florida. Monitoring Well Purging Report.

Appendix 1-3. Microbial Pathogens and Description of Data Sources

1.0 General

Appendix Table 1-3 provides data on microbial concentrations in treated effluent and monitoring samples, collected from various sources. These sources include information compiled from:

- The National Pollutant Discharge Elimination System (NPDES) effluent quality database for Cape Canaveral WWTP including years 1999-2001;
- David York (personal communication), regarding microbial concentrations in treated effluent at the Howard Curren WWTP in Hillsborough County;
- Several sets of microbial data from the Alfred Whitted AWT facility, including results for treated effluent and deep injection monitoring wells;
- A Florida Water Environment Association Utility Council (FWEAUC) report, including monitoring data from several groundwater monitoring zones and data from secondary-treated effluent from facilities in Broward and Dade counties;
- A report to the Florida Department of Environmental Protection authored by JB Rose, W. Quintero-Betancourt, J. Jarrel, E. Lipp, S. Farah, G. Lukasic, and T. Scott in 2001, which includes data for six deep injection monitoring well wells in St. Petersburg, Pinellas County;
- Florida Department of Environmental Protection Discharge Monitoring Reports for several wastewater treatment facilities in Brevard County, including:
  - BCUD/South Central Regional WWTF
  - Barefoot Bay WWTF
  - BCUD/Sykes Creek Regional WWTP
  - BCUD/Port St. John WWTF
  - South Beaches WWTF
- The Broward County Office of Environmental Services, which provided water quality data for reclaimed water (including total coliform and fecal coliform values) from the Broward County Regional Wastewater Treatment Plant for the month of September 2001;
- A report by D.W. York, P. Menendez, and L. Walker-Coleman entitled *Pathogens in Reclaimed Water: The Florida Experience* 2002, which includes a review of reclaimed water quality in St. Petersburg as reported by J.B. Rose and R. P. Carnahan; and
- A Risk Impact Statement prepared in 1998 by the Florida Department of Environmental Protection, which includes surface water monitoring data for microbes for Sarasota and Hillsborough Counties.

2.0 The National Pollutant Discharge Elimination System (NPDES)

National Pollutant Discharge Elimination System (NPDES) data for Cape Canaveral for the years 1999-2001were obtained in spreadsheet format from the Florida Department of Environmental Protection. The average annual concentrations of fecal coliform bacteria in treated effluent from this facility were calculated from monthly averages in 1999 and

2001. Data from May, June, November, and December 1999 were unavailable; therefore, the annual average number of fecal coliform colony forming units (cfu) per 100 mL was calculated from 8 monthly averages. Seven of eight months reported zero (0) fecal coliforms; one month detected fewer than 1 cfu per 100 mL of treated effluent. During 2001, eleven of twelve monthly results were less than 1 cfu/100 mL; one month (January) reported 2.8 cfu/100 mL.

3.0 Howard Curren WWTP

David York, Ph.D., Reuse Coordinator for the Florida Department of Environmental Protection, provided results from two sampling events at the Howard Current Wastewater Treatment Plant. These sampling events measured *Giardia* and *Cryptosporidium* in effluent treated to reuse standards. These sampling events occurred on May 5, 2000, and on May 16, 2001.

4.0 Albert Whitted Water Reclamation Facility

The Albert Whitted Wastewater Reclamation Facility provided sampling data for microbes from effluent treated to Advanced Treatment standards (sampling date November 28, 2000) as well as from three deep monitoring wells (sampling date October 13, 2000). The microbial results for the treated effluent sample were obtained from a single sample of 378.5 liters. The deep monitoring well results in the table reflect the data from each of the three wells as well as duplicate samples for each monitoring well; all microbial parameters were below detection limits (indicated by the "less than" (<) sign) in all the monitoring well samples.

5.0 Florida Water Environment Association Utility Council

The Florida Water Environment Association Utility Council (FWEAUC) report (Englehardt et al., 2001) provided analysis of sampling and monitoring results of effluent that had been treated to different standards (advanced wastewater treatment, secondary treatment, and advanced secondary treatment) as well as "native" ambient water in injection zones and monitoring zones in target aquifers. The data that presented in the "Native Water Monitoring Zones" columns in Table X.X represents "digested" data that have already been processed by the FWEAUC authors, who calculated the average concentrations of each parameter from several sampling locations and events. The "digested" data effectively assign a value of one-half the detection limit to non-detects, a standard approach not inconsistent with risk assessment methodologies (US EPA. 1998).

The authors of the FWEAUC report also include raw concentration data for each of the sampling stations in appendices B and C of their report. The concentration of total coliform bacteria for several wastewater treatment facilities in south Florida were obtained from these appendices and entered into Table X.X. Microbial data were only available for facilities treating to secondary treatment standards. Non-detects (for the City of Hollywood treated effluent and reuse filter) were assigned a value of one-half the

detection limit of 1.0 cfu/100 mL (0.5 cfu/100 mL) in the table. Facilities for which total coliform bacteria concentrations were available include:

- City of Hollywood (Broward County);
- City of Sunrise Sawgrass Facility (IW3; Broward County);
- City of Ft. Lauderdale (Broward County);
- Miami-Dade Water and Sewer Department North District (IW3; Dade County);
- City of Hollywood Reuse Filter (Broward County); and
- City of Sunrise (IW1 + IW2; Broward County).

St. Petersburg, Pinellas County

A report to the Florida Department of Environmental Protection authored by JB Rose, W. Quintero-Betancourt, J. Jarrel, E. Lipp, S. Farah, G. Lukasic, and T. Scott in 2001 includes monitoring data for six deep monitoring wells associated with Class I municipal injection wells at four wastewater facilities in St. Petersburg: the Southwest Wastewater Reclamation Facility (SWWRF), the Northwest Wastewater Reclamation Facility (NWWRF), the Northeast Wastewater Reclamation Facility (NEWRF) and the Albert Whitted Wastewater Reclamation Facility (AWWRF). Values entered into Table X.X (monitoring wells) represent results from single sampling events at each monitoring well.

6.0 Florida Department of Environmental Protection Discharge Monitoring Reports

The Florida Department of Environmental Protection provided monthly Discharge Monitoring Reports covering March, April, and May 2001, for several wastewater treatment facilities in Brevard County. Those facilities include:

- BCUD/South Central Regional WWTF
- Barefoot Bay WWTF
- BCUD/Sykes Creek Regional WWTP
- BCUD/Port St. John WWTF
- South Beaches WWTF

For each of the facilities daily monitoring data were provided for Fecal Coliform levels. The values entered in Table XX (treated effluent) are the averages for March, April and May that are then averaged together.

7.0 Broward County Office of Environmental Services

Richard Walker provided monitoring data, via facsimile, from the Broward County Office of Envirnomental Services Analytical Laboratory, for the Broward County Regional WWTP. Daily monitoring data was supplied for the month of September 2001 for advanced secondary treated effluent. The sampling location was the Reuse Composite Sampler. Total and Fecal Coliform levels were reported in counts/100 mL.

The values in Table XX (treated effluent) are the average of the 30 values reported for September 2001.

8.0 Pathogens in Reclaimed Water: The Florida Experience

The paper authored by David York, Ph.D., and Lauren Walker-Coleman of the Florida Department of Environmental Protection and Pepe Menendez, P.E., of the Florida Department of Health outlines Florida's addition of required monitoring for the protozoan pathogens *Cryptosporidium* and *Giardia* in domestic wastewater, to the state's regulations regarding water reuse. The paper contains summarized monitoring data through September 2001 taken in Monterey County, California and St. Petersburg Florida. The data provided in Table XX (treated effluent) represents the average of all data collected through September 2001 and the maximum concentration of pathogens found reclaimed water. The paper also contains fecal and total coliform data from the Ohio River in the Cincinnati, Ohio area. These data were taken over a four month period from September 8, 1975 through December 1, 1975. Three separate sampling stations were monitored and the values in table XY (surface water) are the averages of the combined sampling events at each separate station.

9.0 Risk Impact Statement, Florida Department of Environmental Protection

Surface water monitoring data for microbes for Sarasota and Hillsborough Counties were taken from the Risk Impact Statement, Phase II Revisions prepared by the Florida Department of Environmental Protection. The data provided in Table XX represents the average concentrations and the range of oocysts/100L of water of Giardia and Cryptosporidium in reclaimed water in St. Petersburg and surface waters in Sarasota and Hillsborough Counties. The sampling dates for this study are unknown. The surface waters samples collected in Sarasota County include 24 samples taken in five streams, four samples taken from a high quality estuary within Sarasota Bay, and 16 samples taken from Phillippi Creek, an urban stream within Sarasota. The samples collected in Hillsborough County include seven samples taken from the Tampa Bypass Canal

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BCUD/Port St. John Wastewater Treatment Facility, Brevard County Water Resources Department, Brevard County. Discharge Monitoring Reports March 01, 2001- March 31, 2001.

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City of St. Petersburg, Environmental Compliance Division. Sampling data for October 13, 2000 at the Albert Whitted Wastewater Treatment Facility. Contact Alfredo J. Crafa, Manager.

David York, Ph.D., P.E., Reuse Coordinator, Florida Department of Environmental Protection, 2600 Blair Stone Rd.- MS 3540 Tallahassee, Florida 32399-2400, phone: (850) 922-2034, fax: (850) 921-6385, email: david.york@dep.state.fl.us

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South District Wastewater Treatment Plant, Miami Dade Water and Sewer Department, Miami Dade County, Florida. Monitoring Well Purging Report (Report A.) December 26, 2002.

Appendix Table 1-4. Fecal Coliform Concentrations in Secondary Treated Wastewater Effluent, South Dade Wastewater Treatment Plant, Dade County.

Effluent[1]		
Number of times sampled and range of dates	**Fecal coliform colonies/100 mL**	**Date(s) detected**
44 5/7/91-5/4/93	0	5/7/91
	40,000	5/14/91
	>400	5/21/91
	9,200	5/28/91
	800	6/4/91
	72,000	6/18/91
	152,000	6/25/91
	180,000	8/6/91
	4,000	8/13/91
	80,000	8/20/91
	190,000	8/27/91
	150,000	9/17/91
	260,000	9/24/91
	490,000	10/1/91
	430,000	10/16/90
	300	10/22/91
	300,000	10/29/91
	160,000	11/5/91
	80,000	11/13/91
	50,000	11/19/91
	280,000	11/26/91
	170,000	12/3/91
	18,000	12/10/91
	24,000	12/17/91
	580,000	12/26/91
	17,000,000	1/2/92
	150,000	1/14/92
	0	1/21/91
	20,000	1/28/92
	80,000	2/4/92
	50,000	2/13/92
	30,000	2/18/92
	30,000	2/25/92
	510,000	3/3/92
	50,000	3/10/92
	50,000	3/17/92
	21	3/2/93
	10,000	3/9/93
	50,000	3/16/93
	160,000	3/30/93

Effluent[1]		
Number of times sampled and range of dates	**Fecal coliform colonies/100 mL**	**Date(s) detected**
44 5/7/91 - 5/4/93 (cont.)	10,000	4/6/93
	32,000	4/13/93
	160,000	4/20/93
	124	4/27/93
52 5/11/93-4/4/95	18,000	5/4/93
	29,000	5/11/93
	12,000	5/18/93
	7,000	5/25/93
	4,800	6/3/93
	55,000	6/8/93
	52,000	6/15/93
	16,000	6/21/93
	152,000	6/29/93
	19,400	7/8/93
	13,800	7/13/93
	58,000	7/20/93
	61,000	7/27/93
	39,000	8/5/93
	21,000	8/9/93
	31,000	8/18/93
	6,000	8/25/93
	6,600	9/1/93
	26,000	9/8/93
	22,000	9/14/93
	2,650	9/21/93
	17,400	9/28/93
	32,500	10/5/93
	5,000	10/13/93
	235	10/19/93
	12,000	10/28/93
	900	11/2/93
	40	11/9/93
	48,000	11/16/93
	140,000	11/30/93
	3,000	12/7/93
	210,000	12/21/93
	36,000	12/28/93
	310,000	1/6/94
	760,000	1/11/94
	74,000	1/18/94
	4	1/10/95
	2	1/31/95

Effluent[1]		
Number of times sampled and range of dates	**Fecal coliform colonies/100 mL**	**Date(s) detected**
52 5/11/93-4/4/95	4	2/6/95
	2	2/13/95
	19,800	2/21/95
	9,800	2/28/95
	156	3/8/95
	230,000	3/28/95
	120,000	4/4/95
49 4/18/95-2/4/97	62	4/18/95
	6	5/2/95
	12,000	5/16/95
	46,000	5/23/95
	100,000	5/31/95
	180,000	6/7/95
	8	6/13/95
	154,000	6/20/95
	70,000	6/27/95
	80,300	7/5/95
	120,000	7/18/95
	64,000	7/21/95
	24,000	8/3/95
	58,000	8/8/95
	13,000	8/15/95
	58,000	8/23/95
	14,000	8/29/95
	42,000	9/5/95
	18,500	9/12/95
	56,000	9/19/95
	70,000	9/28/95
	32,000	10/3/95
	29,000	10/11/95
	70,000	10/17/95
	29,000	10/31/95
	42,000	11/7/95
	67,000	10/8/96
	480,000	10/16/96
	140,000	10/22/96
	33,000	10/29/96
	45,500	11/5/96
	45,000	11/12/96
	99,000	11/19/96
	62,500	11/26/96
	93,000	12/3/96
	26,000	12/10/96

Effluent[1]		
Number of times sampled and range of dates	**Fecal coliform colonies/100 mL**	**Date(s) detected**
4/18/95-2/4/97 (cont.)	128,000	12/17/96
	680,000	12/24/96
	780,000	12/31/96
	130,000	1/7/97
	61,000	1/14/97
	780,000	1/21/97
	705,000	1/28/97
	50,000	2/4/97
40 2/11/97- 10/2/97	38,000	2/11/97
	22,500	2/18/97
	38,000	2/25/97
	38,000	3/4/97
	670,000	3/11/97
	92,300	3/18/97
	53,000	3/25/97
	25,500	4/2/97
	23,500	4/8/97
	21,500	4/15/97
	30,000	4/22/97
	150,000	4/29/97
	140,000	5/13/97
	90,000	5/20/97
	42,000	5/27/97
	142,000	6/3/97
	72,500	6/10/97
	25,600	6/17/97
	37,000	6/24/97
	42	7/1/97
	21,500	7/8/97
	176,000	7/15/97
	24,000	7/22/97
	36,000	8/5/97
	64,000	8/12/97
	16	8/19/97
	12,200	8/26/97
	415,000	7/28/98
	380,000	8/4/98
	715,000	8/11/98
	665,000	8/25/98
	2,300,000	9/1/98
	2,400,000	9/8/98
	9,000,000	9/15/98
	400,000	9/29/98

Effluent[1]		
Number of times sampled and range of dates	**Fecal coliform colonies/100 mL**	**Date(s) detected**
2/11/97- 10/2/97 (cont.)	2,400,000	9/8/98
	9,000,000	9/15/98
	400,000	9/29/98
	3,100,000	10/6/98
	7,050,000	10/14/98
	7,050,000	10/20/98
	1,090,000	10/28/98

[1] Reference: South District Wastewater Treatment Plant, Miami Dade Water and Sewer Department, Miami Dade County, Florida. Monitoring Well Purging Report (Report A) December 26, 2002.

Appendix Table 1-5. Fecal Coliform Concentrations From Monitoring Wells, South District Wastewater Treatment Plant, Dade County

Monitoring well[1]	Depth (feet)	Number of times sampled	Number of fecal coliforms detections (>0)	Fecal coliforms, colonies/100 mL	Date(s) detected
FA 1-U	980-1,090	230	7	2	3/1/87
				4	3/1/90
				14	1/1/91
				94	10/1/92
				400	12/8/92
				150	4/13/93
				6	1/10/95
FA 1-L	1,840-1,927	227	3	4	3/1/90
				4	10/1/92
				58	12/8/92
FA 2-U	980-1,020	208	6	2	12/1/90
				>2000	9/24/92
				520	10/1/92
				340	10/8/92
				110	10/14/92
				4	10/20/92
FA 2-L	1,645-1,672	213	1	10	10/1/92
FA 3-U	981-1,050	183	5	6	3/9/93
				2	3/16/93
				8	4/13/93
				200	11/28/94
				4	6/13/95
FA 3-L	1,771-1,892	184	2	2	5/21/91
				4	4/13/93
Zone 4	1,702-1,840	151	1	100	9/24/92
FA 5-U	1,490-1,588	95	1	2	1/10/95
FA 5-L	1,790-1,890	121	1	6	4/4/95
FA 6-U	1,490-1,584	99	1	4	1/10/95

Monitoring well[1]	Depth (feet)	Number of times sampled	Number of fecal coliforms detections (>0)	Fecal coliforms colonies/100 mL	Date(s) detected
FA 6-L	1,790-1,890	101	0	N/A	N/A
FA 7-U	1,488-1,580	105	1	18	4/4/95
FA 7-L	1,805-1,872	116	0	N/A	N/A
FA 8-U	1,490-1,575	103	1	2	6/13/95
FA 8-L	1,790-1,890	103	0	N/A	N/A
FA 9-U	1,490-1,587	94	1	14	6/13/95
FA 9-L	1,790-1,880	84	1	2	6/13/95
FA 10-U	1,490-1,592	67	0	N/A	N/A
FA 10-L	1,790-1,890	84	0	N/A	N/A
FA 11-U	1,490-1,588	42	0	N/A	N/A
FA 11-L	1,790-1,890	75	0	N/A	N/A
FA 12-U	1,495-1,597	87	0	N/A	N/A
FA 12-L	1,790-1,890	78	0	N/A	N/A
FA 13-U	1480-1,585	89	0	N/A	N/A
FA 13-L	1,740-1,845	81	0	N/A	N/A
FA 14-U	1,490-1,575	87	0	N/A	N/A
FA 15-U	1,490-1,575	83	0	N/A	N/A
FA 15-L	1,790-1,890	79	0	N/A	N/A
FA 16-U	1,490-1,590	89	0	N/A	N/A
FA 16-L	1,790-1,890	80	0	N/A	N/A
BZ 1	1,005-1,037	190	33	40	11/1/90
				16	12/1/90
				13	1/1/91
				50	3/31/92
				14	4/7/92
				116	4/21/92
				362	5/5/92
				62	5/12/92

Monitoring well[1]	Depth (feet)	Number of times sampled	Number of fecal coliforms detections (>0)	Fecal coliforms colonies/100 mL	Date(s) detected
				86	5/20/92
				22	5/26/92
				106	6/9/92
				14	6/16/92
				212	6/23/92
				2	6/30/92
BZ 1(cont.)	1,005-1,037	(cont)	33	2	7/7/92
				6	7/14/92
				4	7/21/92
				2	8/11/92
				2	8/18/92
				30	9/24/92
				400	10/1/92
				130	10/8/92
				500	10/14/92
				88	10/20/92
				208	10/27/92
				54	11/3/92
				530	11/10/92
				20	11/17/92
				200	1/8/93
				24	3/9/93
				400	3/16/93
				192	3/30/93
				496	4/6/93
BZ-2	1,577-1,664	97	0	N/A	N/A

[1] Reference: South District Wastewater Treatment Plant, Miami Dade Water and Sewer Department, Miami Dade County, Florida. Monitoring Well Purging Report (Report A) December 26, 2002.

Appendix 1-6. Class 1 Facilities in South Florida.

FACILITY AND WELL DATA

Facility	Injection Wells			
	Active	Inactive	Under Construction	Proposed
Albert Whitted	2	-	-	-
MDW&S South District Regional	13	4	4	-
Seacoast Utilities	1	-	-	-
McKay Creek	2	-	-	-
South Cross Bayou	3	-	-	-
St. Petersburg NE	3	-	-	-
St. Petersburg NW	2	-	-	-
St. Petersburg SW	3	-	-	-
Broward County - North District Regional	4	-	2	2
G.T. Lohmeyer	5	-	-	-
Margate	2	-	-	-
MDW&S North District Regional	-	2	2	-
Palm Beach County - Southern Regional	2	-	-	-
Plantation Regional (Broward County)	2	-	-	-
South Beaches	1	-	-	-
Sunrise	3	-	-	-
Sykes Creek (Merritt Island)	2	-	-	-
Belle Glade	1	-	-	-
Brentwood WWTP (Atlantic Utilities)	1	-	-	-
Coral Springs Improvement District	2	-	-	-
East Port (Charlotte)	2	-	-	-
East-Central Regional	6	-	-	1
Encon	1	-	-	-
Ft. Myers Beach	1	-	-	-
Ft. Pierce Utility Authority	1	-	-	-
Gasparilla Island	1	-	-	-
Immokalee	-	-	1	-
Manatee County SW - Subregional	1	-	-	-
Melbourne - Grant St.	1	-	-	-
Miramar WWTP	2	-	-	-
North Ft. Myers Utilities	1	-	-	-
North Port (Charlotte)	1	-	-	-
Pahokee	1	-	-	-
Palm Bay (GDU-Port Malabar)	1	-	-	-
Palm Beach County System #9	1	-	-	-
Pembroke Pines	2	-	-	-
Port St. Lucie Westport	-	-	-	1
Punta Gorda	-	-	2	-
Rockledge	1	-	-	-
Royal Palm Beach	1	-	-	-
South Collier County	1	-	-	-
South Port St. Lucie	1	-	-	-
Stuart	2	-	-	-
West Melbourne	1	-	-	-
West Port (Charlotte)	1	-	-	-

Appendix Table 1-6. Class I Facility Treatment and Flow Data

Facility	Permitted Treatment Capacity (MGD)	Permitted Injection Rate (Well Capacity) (MGD)		Total Well Capacity (MGD)	Injectate Characteristics/ Current Treatement in Place	Emergency Disposal Practice
Albert Whitted	12.40	24.00	Per 2 wells	48.00	Activated sludge process with chlorinated effluent to a reclaimed water spray irrigation system and back-up/wet weather disposal to wells.	Injection wells used for backup/wet-weather disposal.
MDW&S South District Regional		15.9 17.5 16.9 17.8 10.18 15.00 16.7 15.0 16.9 17.5 17.2 17.2 16.1 14.9 14.9 14.9 14.9 (208)	IW-1 IW-2 IW-3 IW-4 IW-5 IW-6 IW-7 IW-8 IW-9 IW-10 IW-11 IW-12 IW-13 IW-14 IW-15 IW-16 IW-17 (Total 1-13)	269.48	Secondary treated domestic wastewater effluent	
Seacoast Utilities		15.00	IW-1	15.00	Secondary treated domestic wastewater	
McKay Creek	6.00	6.35	Per 2 wells	12.70	Secondary treated municipal effluent from a Type 1 contact stabilization municipal sewage treatment plant with filtered chlorinated effluent.	
South Cross Bayou	24.50	10.20	Per 3 wells	20.40	Filtered and chlorinated effluent from a conventional activated sludge municipal treatment plant.	
St. Petersburg NE	16.00	27.00	Total 3 wells	27.00	Activated sludge process with chlorinated effluent to a reclaimed water spray irrigation system and back-up/wet weather disposal to wells.	
St. Petersburg NW	20.00	16.00	Per 2 wells	32.00	Activated sludge process with chlorinated effluent to a reclaimed water spray irrigation system and back-up/wet weather disposal to wells.	
St. Petersburg SW	20.00	9.00	Per 3 wells	27.00	Municipal effluent from a Type 1 activated sludge plant with chlorinated effluent to a reclaimed water spray irrigation system and backup disposal to wells.	
Broward County - North District Regional		15 18.7	Per 4 wells IW-5, 6	97.40	Secondary treated domestic wastewater (effluent)	
G.T. Lohmeyer		18.3 18.7 (67)	IW-1-4 IW-5 (Pump Cap.)	91.90	Secondary treatment	
Margate		8.15 15	IW- 1 IW- 2	23.15	Secondary treated domestic wastewater.	Excess wastewater from East WWTP discharged to Margate canal and excess from West WWTP discharged to One Mile canal.
MDW&S North District Regional		18.70	Per 2 wells	33.40	Secondary treated domestic wastewater (effluent)	
Palm Beach County - Southern Regional		15.00	Per 2 wells	30.00	Secondary treated domestic wastewater	3.5 MGD and 4.5 MGD diverted to Palm Beach County System #3 and #9, respectively. Remaining effluent will be disinfected and allowed to overflow to on-site stormwater detention ponds.
Plantation Regional (Broward County)		15 (24.00)	IW-1,2 (Pump cap.)	30.00	Secondary treated domestic wastewater.	
South Beaches		9.00		9.00	Secondary treated domestic wastewater (effluent)	Existing percolation ponds for overflow (15 million gallons storage). Ability to store water at Indian River and South Patrick treatment plants. A last option is discharging to the Indian River.
Sunrise		18.70	IW-1,2,3	56.10	Secondary treated domestic wastewater, may include membrane softening concentrate during planned	
Sykes Creek (Merritt Island)		8.2 8.1	Well 1 Well 2	16.30	Minimum to secondary treatment levels - no chlorination is necessary.	

Yellow highlighted denotes facilities reviewed for risk assessment

Source: Florida status reports -January 2002; Florida Discharge Monitoring Reports-February 2002

Appendix 1-6 - Class I Facility Treatment and Flow Data

Facility	Permitted Treatment Capacity (MGD)	Permitted Injection Rate (Well Capacity) (MGD)		Total Well Capacity (MGD)	Injectate Characteristics/ Current Treatement in Place	Emergency Disposal Practice
Belle Glade		10.20		10.20	Secondary treated domestic wastewater	
Brentwood WWTP (Atlantic Utilities)		3.41		3.41	Secondary treated domestic wastewater	
Coral Springs Improvement District		4.87 15	IW-1 IW-2	19.87	Secondary treated domestic wastewater	IW-1 serves as the backup well when IW-2 is out of service.
East Port (Charlotte)		2.04 7.56	IW-1 IW-2	9.60	Domestic wastewater	To existing onsite spray irrigation system, onsite storage pond and discharge to surface waters.
East-Central Regional		15.3 15 17.3 20.7 18.7 18.7 (98.00)	IW-1 IW-2 IW-3 IW-4 IW-5 IW-6 (Pump Cap.)	105.70	Secondary treated domestic wastewater	Treated, chlorinated effluent to remaining injection wells and an equalization basin with capacity of 8 million gallons, and then to the Atlantic Ocean via drainage system.
Encon		18.00		18.00	Secondary treated domestic wastewater	Chlorinated effluent to stabilization pond, overflow to recharge lake to a tributary of the Loxahatchee River.
Ft. Myers Beach		7.92		7.92	Domestic wastewater	Sent to reclaimed water system, then percolation ponds with injection used for excess effluent disposal.
Ft. Pierce Utility Authority	10.00	14.92		14.92	Conventional activated sludge secondary domestic wastewater plant with influent screening, grit removal, aeration, secondary clarification, chlorination, and dechlorination.	Surface water discharge to Indian River Lagoon
Gasparilla Island		0.81		0.81	Back up disposal of secondary treated domestic wastewater following filtration and disinfection	Well is a backup discharge mechanism to golf course irrigation. There is 2.13 million gallon onsite holding pond.
Immokalee		2.50		2.50	Backup disp of secondary treated domestic effluent	If well is out of service, flow directed to existing effluent holding ponds.
Manatee County SW - Subregional		15.00		15.00	Treated municipal effluent receiving min. of secondary treatment	
Melbourne - Grant St.		14.92		14.92	Pretreated domestic wastewaters	Suface water discharge directed to Crane Creek and on to the Indian River.
Miramar WWTP		18.50	per 2 wells	37.00	Secondary treated municipal effluent	Directed to plant's stormwater collection system, which flows into a drainage canal.
North Ft. Myers Utilities		4.00		4.00	Secondary treated domestic wastewater; following filtration and disinfection	Well is back up for plant. Additional disposal is to onsite storage pond.
North Port (Charlotte)		4.75		4.75	Secondary treated domestic wastewater	
Pahokee		4.00		4.00	Secondary treated domestic wastewater	Directed to onsite polishing ponds.
Palm Bay (GDU-Port Malabar)		10.00		10.00	Secondary treated domestic wastewater	Directed to South Harris Ditch to Turkey Creek and on to the Indian River.
Palm Beach County System #9		12.70		12.70	Concentrate rejected waters from low-pressure membrane softening process generated from the water treatment facility	
Pembroke Pines		7.69 15.27 (7.69)	IW-1 IW-2 (Pump Cap.)	22.96		IW-1 is used for emergency disposal. If flows exceed permitted amount, part of flow will be diverted to existing percolation pond.
Port St. Lucie Westport						
Punta Gorda		12.00	For 1 well	12.00	Secondary treated domestic effluent	Directed to existing effluent disposal ponds.
Rockledge		4.50		4.50	Secondary treated effluent	Directed to Indian River via 2934 feet of effluent pipeline.
Royal Palm Beach		6.34		6.34	Secondary treated domestic wastewater	onsite percolation ponds.
South Collier County		18.00		18.00	Secondary treated domestic effluent	
South Port St. Lucie		3.41		3.41	Secondary treated domestic wastewater	
Stuart		3.5 10.00	IW-1 IW-2	13.50	Secondary treated domestic wastewater; IW-1 (emergency back-up well) will inject potable water once a month	Additional emergency flow is diverted to outfall system into the St. Lucie River.
West Melbourne	2.50	4.80		4.80	Secondary treated effluent	Emergency ponds store 3.2 million gallons, additional flow diverted to Crane Creek drainage canal.
West Port (Charlotte)		4.75		4.75	Secondary treated domestic wastewater	Flow directed to 3 existing percolation ponds (capacity 6.3 MGD) and to onsite spray irrigation system.

Source: Florida status reports -January 2002; Florida Discharge Monitoring Reports-February 2002

Appendix 1-6. Injectate Characteristics for Class I Injection Wells.

Facility	Injectate Characteristics/ Current Treatement in Place	Emergency Disposal Practice
Albert Whitted	Activated sludge process with chlorinated effluent to a reclaimed water spray irrigation system and back-up/wet weather disposal to wells.	Injection wells used for backup/wet-weather disposal.
MDW&S South District Regional	Secondary treated domestic wastewater effluent	
Seacoast Utilities	Secondarily treated domestic wastewater	
McKay Creek	Secondary treated municipal effluent from a Type 1 contact stabilization municipal sewage treatment plant with filtered chlorinated effluent.	
South Cross Bayou	Filtered and chlorinated effluent from a conventional activated sludge municipal treatment plant.	
St. Petersburg NE	Activated sludge process with chlorinated effluent to a reclaimed water spray irrigation system and back-up/wet weather disposal to wells.	
St. Petersburg NW	Activated sludge process with chlorinated effluent to a reclaimed water spray irrigation system and back-up/wet weather disposal to wells.	
St. Petersburg SW	Municipal effluent from a Type 1 activated sludge plant with chlorinated effluent to a reclaimed water spray irrigation system and backup disposal to wells.	
Broward County - North District Regional	Secondarily treated domestic wastewater	
G.T. Lohmeyer	Secondary treatment	
Margate	Secondary treated domestic wastewater.	Excess wastewater from East WWTP discharged to Margate canal and excess from West WWTP discharged to One Mile canal.
MDW&S North District Regional	Secondary treated domestic wastewater (effluent)	
Palm Beach County - Southern Regional	Secondarily treated domestic wastewater	3.5 MGD and 4.5 MGD diverted to Palm Beach County System #3 and #9, respectively. Remaining effluent will be disinfected and allowed to overflow to on-site stormwater detention ponds.
Plantation Regional (Broward County)	Secondary treated domestic wastewater.	
South Beaches	Secondarily treated domestic wastewater (effluent)	Existing percolation ponds for overflow (15 million gallons storage). Ability to store water at Indian River and South Patrick treatment plants. A last option is discharging to the Indian River.
Sunrise	Secondary treated domestic wastewater, may include membrane softening concentrate during planned outages of Injection Well CW-1.	
Sykes Creek (Merritt Island)	Minimum to secondary treatment levels - no chlorination is necessary.	
Belle Glade	Secondary treated domestic wastewater	
Brentwood WWTP (Atlantic Utilities)	Secondary treated domestic wastewater	
Coral Springs Improvement District	Secondary treated domestic wastewater	IW-1 serves as the backup well when IW-2 is out of service.
East Port (Charlotte)	Domestic wastewater	To existing onsite spray irrigation system, onsite storage pond and discharge to surface waters.

Appendix 1-6. Injectate Characteristics for Class I Injection Wells.

Facility	Injectate Characteristics/ Current Treatement in Place	Emergency Disposal Practice
East-Central Regional	Secondary treated domestic wastewater	Treated, chlorinated effluent to remaining injection wells and an equalization basin with capacity of 8 million gallons, and then to the Atlantic Ocean via drainage system.
Encon	Secondary treated domestic wastewater	Chlorinated effluent to stabilization pond, overflow to recharge lake to a tributary of the Loxahatchee River.
Ft. Myers Beach	Domestic wastewater	Sent to reclaimed water system, then percolation ponds with injection used for excess effluent disposal.
Ft. Pierce Utility Authority	Conventional activated sludge secondary domestic wastewater plant with influent screening, grit removal, aeration, secondary clarification, chlorination, and dechlorination.	Surface water discharge to Indian River Lagoon
Gasparilla Island	Back up disposal of secondarily treated domestic wastewater following filtration and disinfection	Well is a backup discharge mechanism to golf course irrigation. There is 2.13 million gallon onsite holding pond.
Immokalee	Backup disp of secondarily treated domestic effluent	If well is out of service, flow directed to existing effluent holding ponds.
Manatee County SW - Subregional	Treated municipal effluent receiving min. of secondary treatment	
Melbourne - Grant St.	Pretreated domestic wastewaters	Suface water discharge directed to Crane Creek and on to the Indian River.
Miramar WWTP	Secondary treated municipal effluent	Directed to plant's stormwater collection system, which flows into a drainage canal.
North Ft. Myers Utilities	Secondary treated domestic wastewater; following filtration and disinfection	Well is back up for plant. Additional disposal is to onsite storage pond.
North Port (Charlotte)	Secondary treated domestic wastewater	
Pahokee	Secondary treated domestic wastewater	Directed to onsite polishing ponds.
Palm Bay (GDU-Port Malabar)	Secondary treated domestic wastewater	Directed to South Harris Ditch to Turkey Creek and on to the Indian River.
Palm Beach County System #9	Concentrate rejected waters from low-pressure membrane softening process generated from the water treatment facility	
Pembroke Pines		IW-1 is used for emergency disposal. If flows exceed permitted amount, part of flow will be diverted to existing percolation pond.
Port St. Lucie Westport		
Punta Gorda	Secondary treated domestic effluent	Directed to existing effluent disposal ponds.
Rockledge	Secondary treated effluent	Directed to Indian River via 2934 feet of effluent pipeline.
Royal Palm Beach	Secondarily treated domestic wastewater	Surficial aquifer recharge through rapid rate infiltration in onsite percolation ponds.
South Collier County	Secondarily treated domestic effluent	
South Port St. Lucie	Secondary treated domestic wastewater	
Stuart	Secondary treated domestic wastewater; IW-1 (emergency back-up well) will inject potable water once a month	Additional emergency flow is diverted to outfall system into the St. Lucie River.
West Melbourne	Secondary treated effluent	Emergency ponds store 3.2 million gallons, additional flow diverted to Crane Creek drainage canal.
West Port (Charlotte)	Secondary treated domestic wastewater	Flow directed to 3 existing percolation ponds (capacity 6.3 MGD) and to onsite spray irrigation system.