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FINAL REPORT

**SUMMARY OF CHARACTERISTICS
of
MUNICIPAL SLUDGES
DUMPED AT THE 106-MILE SITE**

September 1989

**U.S. ENVIRONMENTAL PROTECTION AGENCY
Region II
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New York, New York 10278**

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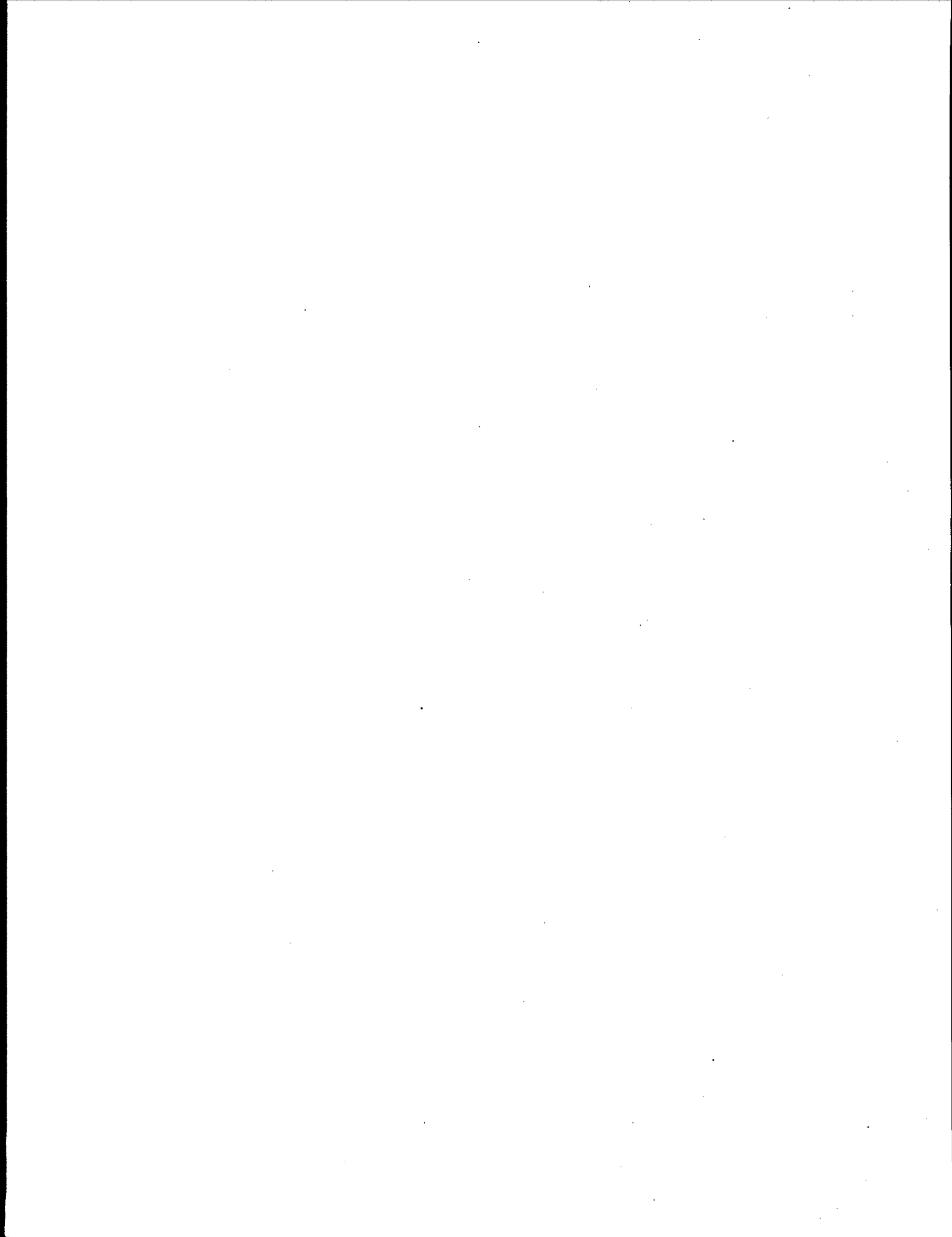


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INTRODUCTION

In the spring of 1988, nine municipalities in the Greater New York Metropolitan Area applied to the U.S. Environmental Protection Agency (EPA) Region II for permits to dump municipal sludge at the 106-Mile Deepwater Municipal Sludge Site (106-Mile Site). As part of the application review, data from the applicants were included in a data management system entitled "Data Management and Reporting for Ocean Dumping of Municipal Sludge." This report, which accompanies the database, summarizes the procedures used to process the data and presents summary statistics on several parameters.

The sludge data incorporated into the database were accumulated as permittee reports on sludges dumped at the 12-Mile Sewage Sludge Site and the 106-Mile Site. Since regulation of the dumping of sludge began in 1976, EPA has required periodic reports on the physical and chemical characteristics of dumped municipal sludges. Ocean dumpers, initially granted permits by EPA to dump at the 12-Mile Sewage Sludge Site and then allowed to continue to dump under court order, are required to submit data periodically on sludge toxicity, metal concentrations, and several other physical and chemical parameters.

Anticipating applications, EPA Region II issued guidance ("Information and Data Requirements under Section 102 of the Marine Protection, Research, and Sanctuaries Act for Municipalities Applying for Special Ocean Dumping Permits to Dump Municipal Sewage Treatment Sludge into Ocean Waters Governed by EPA Region II") indicating what data were required in the applications. In addition to the toxicity results and metal concentrations required under the original dumping permits, additional information was sought on the concentrations of organic compounds and indicators of pathogenic organisms that might be present. The database can accept most of these parameters, however, no historical data are available.

METHODS

Data reports for each permit applicant were obtained from EPA Region II. The reports were of several types: monthly reports, quarterly reports, semi-annual reports, and summaries of periodic reports. Reports contained data for one or more sample dates. See Table 1 for the distribution of sample dates among plants and years. In general, the reports consisted of a summary page (which differed in format among applicants) that presented analytical results as single values without quality control information. However, laboratory records and calculation sheets were included for toxicity tests. One applicant (Middlesex County Utilities Authority, see below) also routinely submitted reports to the EPA that were prepared for the New Jersey Department of Environmental Protection.

The reports were separated into groups, one for each permit applicant. Within each applicant, reports were further grouped by laboratory (for most applicants, two or three laboratories had analyzed sludge samples over the 5-year period). The separation by laboratory made data entry easier by having several data sheets of the same reporting

TABLE 1. NUMBER OF SAMPLES INCLUDED IN THE DATABASE BY PERMITTEE AND PLANT BY YEAR.

Permittee	Plant	1984	1985	1986	1987	Total
Bergen County	Utilities Authority	1	7	10	2	20
New York City	26th Ward	3	3		2	8
New York City	Briery Bay	3	3		2	8
New York City	Coney Island	3	3		2	8
New York City	Flunts Point	3	5		2	10
New York City	Jamaica Bay	3	3		2	8
New York City	Newtown Creek	3	4		2	9
New York City	North River				2	2
New York City	Oakwood Beach	3	3		2	8
New York City	Owls Head	3	4		2	9
New York City	Port Richmond	3	3		2	8
New York City	Red Hook				1	1
New York City	Rockaway	3	3		2	8
New York City	Tallman Island	3	4		2	9
New York City	Ward's Island	3	4		2	9
County of Westchester			4	4		8
Joint Meeting Essex and Union Counties			5	9	2	16
Linden Hill Sewerage Authority			5	5	1	11
Middlesex County Utilities Authority		1	15	12	3	31
Nassau County Department of Public Works		1			1	2
Passaic Valley Sewerage Commission			6	8	4	18
Rahway Valley Sewerage Authority		4		4		8
Total		43	84	52	40	219

format together. The reports were copied, and the parameters and values to be entered into the database were highlighted with a marking pen to further assist in data entry.

All highlighted data were entered into a free-format database twice by two different operators. The resulting computer files were compared electronically, and entry errors were corrected by comparing file values with the original data and changing incorrect values in the file. Thus the data are an accurate representation of the data that were provided.

Once an error-free database was achieved, summary listings and summary statistics were obtained using SAS (v 6.03). The summary listing (by applicant, plant, and parameter) indicated that there were differences in reporting units for several parameters (particularly metals) and that the sample dates for many reports were not sample dates but dates that samples were received by the laboratory or dates they were analyzed.

Known differences in units were resolved by converting all concentration data to mg/L. However, for some reports, the reporting units for many parameters were not listed. In these cases, if reports from the same laboratory were available, the units on those other reports were used. These units were assumed to be correct if the data with unknown units fell within the range of data for the reports with known units. If the units could not be resolved, the data were not included in the database.

Missing sample dates were resolved by reexamining the entire set of original data reports. If no sample date was listed anywhere in those reports, the earliest date appearing on the laboratory report was used (usually the date of receipt of the sample by the laboratory). This date appeared to be within 2 or 3 days of the date that the sample was taken for those cases where it was possible to determine both dates.

Once sample dates were resolved, duplicate entries were removed. Duplicate entries were determined by comparing the time sequence of results for each applicant. If the same values appeared in sequence, the sample dates were rechecked, and obvious duplicates were removed.

Summary statistics were then calculated for all parameters for each applicant. The summary statistics for each plant were based on the lognormal distribution, using the following formulas:

$$\mu = \sum \ln [x_i] / n \quad (1)$$

$$\sigma^2 = \sum (\ln [x_i] - \mu)^2 / (n - 1) \quad (2)$$

$$\text{mean} = e [\mu + \sigma^2/2] \quad (3)$$

$$\text{standard deviation} = \text{sqrt} \{ e [2\mu + \sigma^2] [e^{\sigma^2} - 1] \} \quad (4)$$

$$\text{coefficient of variation} = \mu / \sigma^2 \quad (5)$$

$$95\text{th percentile} = e [\mu + 1.645\sigma] \quad (6)$$

$$5\text{th percentile} = e [\mu - 1.645\sigma] \quad (7)$$

where μ is the mean of the natural logarithm of individual observations, x_i is the value of each observation, n is the number of observations, σ^2 is the variance of the logged individual observations, and e is the base of the natural logarithm.

Once the means, standard deviations, coefficients of variation, and percentiles had been calculated for each parameter for each applicant and plant, the data were summarized in a series of tables, one for each parameter. These tables were then inspected for consistency to determine whether the variability of any parameters for a plant exceeded the expected range of variability for all plants. It was assumed that if the variability of a parameter for any given plant was much greater than the variability of other plants, the reported value for that parameter was probably in error. Values that were based on single observations were also eliminated.

To determine whether the variability of a parameter for a plant was within the expected range, the data for each plant and parameter whose coefficient of variation was greater than 1.0 were inspected. When high CVs were associated with five or more data points, this usually meant that there was one outlying data point. Such data points were removed, and the CV was recalculated. If the resulting CV was less than 1.0, no further action was taken. Otherwise, other apparent outliers were also removed. If a high CV was associated with two data points, both data points were removed. With three data points, if one point was substantially different from the other two and that of other plants for the same parameter, it was removed. Otherwise, all three data points were removed. Data that were eliminated in this way are presented in Table 2. Eliminated data are not included in statistical summaries.

Finally, lognormal means, standard deviations, and coefficients of variation across all plants were calculated in a spreadsheet implemented by Microsoft Works (Macintosh v 1.1). For this analysis, the means, standard deviations, and coefficients of variation were calculated on all data for all plants. The results were used as a guide to setting input range limits for the database.

RESULTS

For the nine applicants, there were a total of 22 individual sewage treatment plants. All except one applicant dump sewage sludge from only one plant. The other applicant (the City of New York) dumps sludges from 14 plants.

For organizational purposes, data are reported in three categories: toxicity tests (for *Menidia menidia* and *Mysidopsis bahia*), metals (concentrations of arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc), and general parameters (specific gravity, pH, COD, oil and grease, petroleum hydrocarbons, total nonfilterable residue, and total residue).

Data Quality

The data that are summarized in this report are of unknown quality. Given the lack of quality control information and the fact that some samples were known to be analyzed

TABLE 2. DATA NOT INCLUDED IN DATABASE

Parameter	Permittee/Plant	Sample Date	Value
Arsenic	City of New York/Coney Island	6/4/85	3.50
Arsenic	City of New York/Coney Island	6/18/87	0.00
Arsenic	City of New York/Coney Island	12/7/87	0.22
Arsenic	City of New York/Rockaway	6/4/85	0.77
Arsenic	City of New York/Rockaway	6/18/87	0.06
Arsenic	City of New York/Rockaway	12/21/87	0.01
Arsenic	Middlesex County Utilities Authority	7/15/86	0.01
Cadmium	City of New York/Coney Island	6/4/85	1.19
Cadmium	City of New York/Coney Island	6/18/87	0.01
Cadmium	City of New York/Coney Island	12/7/87	0.37
Chromium	City of New York/Coney Island	6/4/85	38.00
Chromium	City of New York/Coney Island	6/18/87	0.23
Chromium	City of New York/Coney Island	12/7/87	5.60
Chromium	City of New York/Coney Island	1/15/88	1.62
COD	City of New York/Coney Island	6/4/85	126000.00
COD	City of New York/Coney Island	6/18/87	4950.00
COD	City of New York/Coney Island	12/7/87	37250.00
COD	City of New York/Oakwood Beach	5/20/85	2625.00
COD	City of New York/Oakwood Beach	6/18/87	55000.00
COD	City of New York/Oakwood Beach	12/3/87	10500.00
COD	Joint Meeting Essex and Union Counties	3/9/87	650.00
COD	Middlesex County Utilities Authority	2/15/88	55378.00
Copper	City of New York/Coney Island	6/4/85	185.00
Copper	City of New York/Coney Island	6/18/87	52.00
Copper	City of New York/Coney Island	12/7/87	736.00
Lead	City of New York/North River	6/18/87	31.00
Lead	City of New York/North River	12/7/87	1.80
Mercury	City of New York/Coney Island	6/4/85	0.46
Mercury	City of New York/Coney Island	6/18/87	0.04
Mercury	City of New York/Coney Island	12/7/87	0.25
Mercury	City of New York/Oakwood Beach	5/20/85	0.00
Mercury	City of New York/Oakwood Beach	6/18/87	0.05
Mercury	City of New York/Oakwood Beach	12/3/87	0.07
Mercury	Middlesex County Utilities Authority	7/8/86	0.00
Mysidopsis bahia	Linden Roselle Sewerage Authority	9/8/86	62.00
Mysidopsis bahia	Middlesex County Utilities Authority	1/15/87	550.00
Mysidopsis bahia	Passaic Valley Sewerage Commission	12/5/86	100.00
Nickel	City of New York/Coney Island	6/4/85	27.00
Nickel	City of New York/Coney Island	6/18/87	0.25
Nickel	City of New York/Coney Island	12/7/87	6.20
Nickel	City of New York/North River	6/18/87	1.90
Nickel	City of New York/North River	12/7/87	0.05
Nickel	City of New York/Rockaway	6/4/85	1.90
Nickel	City of New York/Rockaway	6/18/87	0.05
Nickel	City of New York/Rockaway	12/21/87	0.66
Oil and Grease	Bergen County Utilities Authority	5/21/86	39.41
Oil and Grease	City of New York/North River	6/18/87	8880.00
Oil and Grease	City of New York/North River	12/7/87	1390.00
Oil and Grease	City of New York/Port Richmond	6/18/87	19380.00

**TABLE 2. DATA NOT INCLUDED IN DATABASE
(continued)**

Parameter	Permittee/Plant	Sample Date	Value
Petroleum hydrocarbons	Bergen County Utilities Authority	5/21/86	36.79
Petroleum hydrocarbons	City of New York/Ward's Island	5/31/85	420.00
Petroleum hydrocarbons	City of New York/Ward's Island	6/18/87	1.50
Petroleum hydrocarbons	City of New York/Ward's Island	12/21/87	1330.00
pH	Middlesex County Utilities Authority	7/8/86	6.60
Total filterable residue	City of New York/North River	6/18/87	40600.00
Total filterable residue	City of New York/North River	12/7/87	4200.00
Total filterable residue	City of New York/Oakwood Beach	5/20/85	624.00
Total filterable residue	City of New York/Oakwood Beach	6/18/87	16400.00
Total filterable residue	City of New York/Oakwood Beach	12/3/87	5000.00
Zinc	City of New York/Newtown Creek	6/5/85	177.00
Zinc	City of New York/Newtown Creek	6/18/87	0.73
Zinc	City of New York/Newtown Creek	11/30/87	47.00

several months after collection, it is suspected that data quality is poor. Specific problems that prevent a good assessment of data quality are presented in the following paragraphs.

Values for all parameters were seldom reported consistently either over time or among plants. Each of the four laboratories preparing reports had a different format. Applicants often forwarded the laboratory report with only a cover letter, so data were not consistently presented. In many cases, it was not clear what analytical methods were used (except for toxicity tests). Quality control data (such as detection limits, blanks, spiked samples) were not presented for any parameter except toxicity. Thus, it is not clear that the data are accurate or comparable among applicants or plants.

The identity of the waste sampled was also not obvious. In some cases, data sheets were marked as "composite." According to one of the applicants, composite samples (at least for Passaic Valley Sewerage Commission) were taken over a period of 4 days prior to barge loading. Other data sheets were marked as a "barge sample." However, the barge being sampled and other sludges that were present in the sample were not identified. The discrepancies in the data indicate that more than one plant's sludge was probably being sampled. However, many of the data were not labeled. It was thus not possible to determine, on a routine basis, whether a report was for a "barge sample," "composite," or other sample type.

Finally, as mentioned in the Methods section, results were often reported without units. Many of the data were eliminated because the appropriate units could not be determined. For one plant, data for the same parameter were reported in mg/kg, mg/kg-dry, mg/L, µg/L, and with no units on different data sheets. Although it is expected that concentrations of pollutants would be much higher in dried sludge, the ranges of concentrations reported as mg/L and mg/kg overlapped. On a few data sheets where results were reported as mg/kg and mg/L, it was not possible to determine the conversion factor used (even though there were several parameters that would allow converting one to the other). Thus, even though there were many data that might have been used in this analysis, they were ignored because they could not be converted to appropriate units with any certainty.

Statistical Summaries Among Plants

Table 3 presents the lognormal mean, standard deviation, coefficient of variation, and 95th and 5th percentiles for the 20 parameters that were reported consistently by each plant. All of the parameters were reported for the majority of plants (at least 14 of the 22). Some of the data were not included in this table because of excessive variability as described in the previous section. Other parameters that are available in the database were not reported because data exist for only one or two plants. The following paragraphs summarize the data appearing in this table.

Menidia and *Mysidopsis* are similar in their responses (as well as in their variability of response across plants) to the sludges.

TABLE 3. MEANS, STANDARD DEVIATIONS, COEFFICIENTS OF VARIATION, AND 5TH AND 95TH PERCENTILES FOR COMMONLY MEASURED PARAMETERS

Parameter	ND	N	Mean	Standard deviation	Coefficient of variation	5th percentile	95th percentile
Arsenic	7	59	323	529	1.64	26	1,101
Cadmium	4	67	1,877	3,913	2.09	96	6,829
Chromium	0	69	16,925	30,493	1.80	1,136	59,376
Copper	0	70	66,124	65,159	0.99	12,148	182,602
Lead	0	71	22,939	41,355	1.80	1,538	80,490
Mercury	4	60	104.4	93.1	0.89	22.1	274.2
Nickel	0	65	6,795	9,926	1.46	662	22,268
Zinc	0	70	77,676	86,843	1.12	11,772	227,791
<i>Meridia menidia</i>	18	144	22,282	23,720	1.06	3,644	63,867
<i>Mysidopsis bahia</i>	3	159	18,761	24,173	1.29	2,260	58,541
COD	0	66	36,630	19,479	0.53	14,231	73,499
Oil and grease	0	69	3,659	3,397	0.93	733	9,810
Petroleum hydrocarbons	0	69	1,689	1,856	1.10	263	4,913
pH	0	51	6.72	0.90	0.13	5.36	8.29
Specific gravity	0	67	1.009	0.025	0.02	0.969	1.050
Total residue	0	72	31,711	17,009	0.54	12,220	63,906
Total filterable residue	0	66	23,868	15,266	0.64	7,673	52,688

Units for metals: µg/L

Units for toxicity, COD, oil and grease, petroleum hydrocarbons, total residue, and total filterable residue: mg/L

Units for specific gravity: g/cc

Of the metals measured, zinc has the highest average concentration across plants, followed by copper, lead, and chromium. Lead and chromium are the most variable across plants, suggesting industrial sources for these metals.

Of the general parameters, pH and specific gravity are most similar among plants, COD is most variable, and the other parameters (oil and grease, petroleum hydrocarbons, and two forms of residues) are in between.

According to these data, the sewage sludges average about 3.3 percent solids. Total filterable residue was only 2.5 percent of the sludges, on average.

Statistical Summaries Within Plants

Tables 4 - 20 present statistical summaries for each parameter for each plant, including the number of values recorded as nondetectable, less than, or greater than (ND); the number of samples included; the lognormal mean and standard deviation, the coefficient of variation, and the 5th and 95th percentiles for each parameter. Arithmetic means and coefficients of variation for data across all plants are also presented .

There are no data for 13 percent of the cases, and 10 percent of the cases are single values. In total, about 30 percent of the cases are not usable.

DISCUSSION

In general, these data are of acceptable quality to determine trial permit limits for the municipal sludges proposed to be dumped at the 106-Mile Municipal Sludge Dumpsite. The outlier detection routine used for these data was designed to represent the same kind of scheme that would be used once the data management system for these data is available. It is therefore reasonable to assume that it was not biased. With this elimination routine, some of the large variability within plants was reduced, but some was not reduced substantially. Since lognormal means and percentiles are a function of the standard deviation, high variability in a parameter for a plant increases the mean and both increases and decreases the 95th and 5th percentiles, respectively, for that plant. Such variability may substantially decrease the allowable sludge dumping rate for that plant.

Because the Ocean Dumping Regulations require data on all chemicals for which there are marine water quality criteria (see 40 CFR 227), the data in this report are only sufficient for calculating permit limits for most metals and toxicity for most plants. No data are available (in appropriate units) for calculation of permit limits based on the marine water quality criteria for pesticides. Until these data are available, and until sufficient metals data are available for all plants, final permit limits cannot be determined.

TABLE 4. SUMMARY STATISTICS FOR MENIDIA MENIDIA FOR EACH PLANT

	ND*	N	Mean (mg/l)	Standard deviation	Coefficient of variation	5th percentile	95th percentile
Bergen County Utilities Authority	0	14	20,917	8,654	0.41	10,051	37,168
City of New York/26th Ward	2	5	41,076	8,686	0.21	28,489	56,690
City of New York/Bowery Bay	2	5	40,914	15,269	0.37	21,163	69,428
City of New York/Coney Island	0	7	12,090	9,910	0.82	2,875	30,407
City of New York/Hunts Point	1	7	27,203	8,053	0.30	16,193	42,019
City of New York/Jamaica	0	7	38,649	12,936	0.33	21,443	62,645
City of New York/Newtown Creek	0	8	11,030	2,941	0.27	6,926	16,401
City of New York/North River	0	2	27,725	25,452	0.92	5,644	73,907
City of New York/Oakwood Beach	4	3	30,473	28,509	0.94	6,038	82,011
City of New York/Owls Head	1	7	16,283	23,526	1.44	1,616	53,148
City of New York/Port Richmond	2	5	21,717	11,520	0.53	8,457	43,521
City of New York/Red Hook	0	1	30,000	-	-	-	-
City of New York/Rockaway	2	5	41,502	9,061	0.22	28,431	57,825
City of New York/Talman Island	4	4	39,270	7,235	0.18	28,595	52,161
City of New York/Ward's Island	0	8	31,296	9,654	0.31	18,211	49,107
County of Westchester	0	8	20,967	9,360	0.45	9,496	38,602
Joint Meeting Essex and Union Counties	0	14	11,630	8,810	0.76	3,062	28,069
Linden Roselle Sewerage Authority	0	8	14,490	16,725	1.15	2,088	43,113
Middlesex County Utilities Authority	0	9	14,957	11,780	0.79	3,747	36,844
Nassau County Department of Public Works	0	1	21,500	-	-	-	-
Passaic Valley Sewerage Commission	0	12	3,904	2,461	0.63	1,275	8,554
Rahway Valley Sewerage Authority	0	4	12,017	2,907	0.24	7,890	17,291
Sum of ND and N, mean of other values	18	144	24,073	11,672	0.56	11,585	44,946
Arithmetic coefficient of variation across plants			0.47	0.60	0.61	0.80	0.42

*ND, not detected, includes greater than and less than values.

TABLE 5. SUMMARY STATISTICS FOR MYSIDOPSIS BAHIA FOR EACH PLANT

	ND*	N	Mean (mg/l)	Standard deviation	Coefficient of variation	5th percentile	95th percentile
Bergen County Utilities Authority	0	14	16,581	6,644	0.40	8,158	29,037
City of New York/26th Ward	0	7	25,082	23,159	0.92	5,064	67,057
City of New York/Bowery Bay	0	7	26,340	24,233	0.92	5,345	70,292
City of New York/Coney Island	0	7	8,853	3,322	0.38	4,562	15,058
City of New York/Hunts Point	0	8	20,381	11,680	0.57	7,360	42,489
City of New York/Jamaica	0	7	31,504	19,960	0.63	10,235	69,200
City of New York/Newtown Creek	0	8	6,091	1,291	0.21	4,221	8,413
City of New York/North River	0	2	16,000	0		16,000	16,000
City of New York/Oakwood Beach	0	7	35,771	13,591	0.38	18,278	61,177
City of New York/Owls Head	0	8	25,708	23,652	0.92	5,217	68,606
City of New York/Port Richmond	0	7	16,479	9,840	0.60	5,704	35,093
City of New York/Red Hook	0	1	17,750				
City of New York/Rockaway	0	7	25,275	15,896	0.63	8,277	55,303
City of New York/Tailman Island	1	7	23,804	12,123	0.51	9,627	46,735
City of New York/Ward's Island	0	8	19,894	6,967	0.35	10,730	32,855
County of Westchester	0	8	13,124	5,681	0.43	6,091	23,814
Joint Meeting Essex and Union Counties	0	14	12,402	5,099	0.41	5,988	21,974
Linden Roselle Sewerage Authority	0	7	2,506	2,345	0.94	497	6,745
Middlesex County Utilities Authority	2	9	18,134	10,296	0.57	6,610	37,623
Nassau County Department of Public Works	0	1	7,500				
Passaic Valley Sewerage Commission	0	11	2,014	1,162	0.58	722	4,213
Rahway Valley Sewerage Authority	0	4	1,956	1,930	0.99	359	5,405
Sum of ND and N, mean of other values	3	159	16,961	9,944	0.60	6,952	35,854
Arithmetic coefficient of variation across plants			0.55	0.78	0.38	0.64	0.63

*ND, not detected, includes greater than and less than values.

TABLE 6. SUMMARY STATISTICS FOR ARSENIC FOR EACH PLANT

	ND*	N	Mean ($\mu\text{g/l}$)	Standard deviation	Coefficient of variation	5th percentile	95th percentile
Bergen County Utilities Authority	4	5	79	152	1.53	7	263
City of New York/26th Ward	0	3	519	861	1.66	40	1,776
City of New York/Bowery Bay	0	3	647	1,682	2.60	22	2,446
City of New York/Coney Island	0	0	-	-	-	-	-
City of New York/Hunts Point	0	3	412	579	1.40	43	1,331
City of New York/Jamaica	0	3	363	936	2.58	13	1,371
City of New York/Newtown Creek	0	3	837	1,595	1.91	51	2,982
City of New York/North River	0	2	78	28	0.35	42	130
City of New York/Oakwood Beach	0	3	66	118	1.80	5	231
City of New York/Owls Head	0	3	326	240	0.74	89	776
City of New York/Port Richmond	0	3	1,462	2,041	1.40	154	4,709
City of New York/Red Hook	0	1	310	-	-	-	-
City of New York/Rockaway	0	0	-	-	-	-	-
City of New York/Tailman Island	0	3	247	346	1.40	26	797
City of New York/Ward's Island	0	3	467	748	1.60	39	1,581
County of Westchester	1	7	365	448	1.23	48	1,116
Joint Meeting Essex and Union Counties	2	3	115	44	0.38	58	198
Linden Roselle Sewerage Authority	0	0	-	-	-	-	-
Middlesex County Utilities Authority	0	9	169	110	0.65	53	376
Nassau County Department of Public Works	0	1	200	-	-	-	-
Passaic Valley Sewerage Commission	0	1	640	-	-	-	-
Rahway Valley Sewerage Authority	0	0	-	-	-	-	-
Sum of ND and N, mean of other values	7	59	406	662	1.42	46	1,339
Arithmetic coefficient of variation across plants			0.82	0.95	0.47	0.78	0.91

*ND, not detected, includes greater than and less than values.

TABLE 7. SUMMARY STATISTICS FOR CADMIUM FOR EACH PLANT

	ND*	N	Mean (µg/l)	Standard deviation	Coefficient of variation	5th percentile	95th percentile
Bergen County Utilities Authority	0	9	2,176	2,191	1.01	387	6,073
City of New York/26th Ward	0	3	648	410	0.63	211	1,422
City of New York/Bowery Bay	0	3	1,158	1,510	1.30	137	3,632
City of New York/Coney Island	0	0	-	-	-	-	-
City of New York/Hunts Point	0	3	1,390	690	0.50	575	2,695
City of New York/Jamaica	0	3	1,110	7,806	7.03	6	4,061
City of New York/Newtown Creek	0	3	2,976	3,479	1.17	420	8,905
City of New York/North River	0	2	234	240	1.02	41	669
City of New York/Oakwood Beach	0	3	159	189	1.19	22	479
City of New York/Owls Head	0	3	1,251	894	0.71	354	2,927
City of New York/Port Richmond	0	3	299	300	1.00	54	833
City of New York/Red Hook	0	1	8,470	-	-	-	-
City of New York/Rockaway	0	3	469	1,109	2.37	19	1,748
City of New York/Tailman Island	0	3	754	81	0.11	629	893
City of New York/Ward's Island	0	3	932	1,891	2.03	50	3,370
County of Westchester	3	5	609	540	0.89	130	1,596
Joint Meeting Essex and Union Counties	0	5	2,124	892	0.42	1,010	3,799
Linden Roselle Sewerage Authority	0	0	-	-	-	-	-
Middlesex County Utilities Authority	1	10	2,952	1,408	0.48	1,265	5,611
Nassau County Department of Public Works	0	1	300	-	-	-	-
Passaic Valley Sewerage Commission	0	1	4,400	-	-	-	-
Rahway Valley Sewerage Authority	0	0	-	-	-	-	-
Sum of ND and N, mean of other values	4	67	1,706	1,477	1.37	332	3,044
Arithmetic coefficient of variation across plants			1.17	1.29	1.18	1.13	0.76

*ND, not detected, includes greater than and less than values.

TABLE 8. SUMMARY STATISTICS FOR CHROMIUM FOR EACH PLANT

	ND*	N	Mean (µg/l)	Standard deviation	Coefficient of variation	5th percentile	95th percentile
Bergen County Utilities Authority	0	9	25,141	25,650	1.02	4,386	70,612
City of New York/26th Ward	0	3	31,594	56,301	1.78	2,164	110,494
City of New York/Bowery Bay	0	3	45,762	78,603	1.72	3,348	158,324
City of New York/Coney Island	0	0	-	-	-	-	-
City of New York/Hunts Point	0	3	12,614	3,419	0.27	7,857	18,866
City of New York/Jamaica	0	3	6,199	5,741	0.93	1,246	16,598
City of New York/Newtown Creek	0	3	104,617	75,263	0.72	29,352	245,709
City of New York/North River	0	2	16,303	21,681	1.33	1,863	51,531
City of New York/Oakwood Beach	0	3	620	457	0.74	169	1,474
City of New York/Owls Head	0	3	8,241	4,705	0.57	2,987	17,146
City of New York/Port Richmond	0	3	2,467	990	0.40	1,212	4,323
City of New York/Red Hook	0	1	11,000	-	-	-	-
City of New York/Rockaway	0	3	2,413	1,629	0.68	730	5,481
City of New York/Tallman Island	0	3	8,502	1,365	0.16	6,457	10,914
City of New York/Wards Island	0	3	16,533	4,389	0.27	10,402	24,547
County of Westchester	0	8	5,108	3,305	0.65	1,621	11,344
Joint Meeting Essex and Union Counties	0	5	22,693	10,021	0.44	10,368	41,567
Linden Roselle Sewerage Authority	0	0	-	-	-	-	-
Middlesex County Utilities Authority	0	9	4,985	1,177	0.24	3,308	7,116
Nassau County Department of Public Works	0	1	4,300	-	-	-	-
Passaic Valley Sewerage Commission	0	1	53,000	-	-	-	-
Rahway Valley Sewerage Authority	0	0	-	-	-	-	-
Sum of ND and N, mean of other values	0	69	20,110	18,418	0.74	5,467	49,753
Arithmetic coefficient of variation across plants			1.22	1.42	0.65	1.27	1.32

*ND, not detected, includes greater than and less than values.

TABLE 9. SUMMARY STATISTICS FOR COPPER FOR EACH PLANT

	ND*	N	Mean ($\mu\text{g/l}$)	Standard deviation	Coefficient of variation	5th percentile	95th percentile
Bergen County Utilities Authority	0	9	42,187	42,049	1.00	7,621	117,155
City of New York/26th Ward	0	3	58,547	31,512	0.54	22,486	118,196
City of New York/Bowery Bay	0	3	65,882	62,051	0.94	12,929	177,902
City of New York/Coney Island	0	0	-	-	-	-	-
City of New York/Hunts Point	0	3	50,860	7,935	0.16	38,938	64,854
City of New York/Jamaica	0	3	33,506	19,496	0.58	11,913	70,402
City of New York/Newtown Creek	0	3	102,678	36,970	0.36	54,396	171,569
City of New York/North River	0	2	33,614	31,476	0.94	6,652	90,504
City of New York/Oakwood Beach	0	3	17,403	53,503	3.07	433	66,905
City of New York/Owls Head	0	3	45,950	23,984	0.52	18,167	91,336
City of New York/Port Richmond	0	3	37,241	11,342	0.30	21,826	58,148
City of New York/Red Hook	0	1	45,000	-	-	-	-
City of New York/Rockaway	0	3	54,607	35,636	0.65	17,166	121,826
City of New York/Tallman Island	0	3	34,054	3,387	0.10	28,784	39,894
City of New York/Ward's Island	0	3	64,965	10,773	0.17	48,879	84,034
County of Westchester	0	8	93,719	68,708	0.73	25,696	222,317
Joint Meeting Essex and Union Counties	0	5	77,317	41,524	0.54	29,758	155,916
Linden Roselle Sewerage Authority	0	0	-	-	-	-	-
Middlesex County Utilities Authority	0	10	91,948	41,376	0.45	41,373	169,935
Nassau County Department of Public Works	0	1	83,600	-	-	-	-
Passaic Valley Sewerage Commission	0	1	57,000	-	-	-	-
Rahway Valley Sewerage Authority	0	0	-	-	-	-	-
Sum of ND and N, mean of other values	0	70	57,373	32,608	0.69	24,189	113,806
Arithmetic coefficient of variation across plants			0.40	0.57	0.97	0.62	0.45

*ND, not detected, includes greater than and less than values.

TABLE 10. SUMMARY STATISTICS FOR LEAD FOR EACH PLANT

	ND*	N	Mean (µg/l)	Standard deviation	Coefficient of variation	5th percentile	95th percentile
Bergen County Utilities Authority	0	9	4,109	3,483	0.85	934	10,515
City of New York/26th Ward	0	3	39,400	195,954	4.97	401	150,571
City of New York/Bowery Bay	0	3	27,164	70,296	2.59	934	102,665
City of New York/Coney Island	0	3	53,202	46,791	0.88	11,501	138,765
City of New York/Hunts Point	0	3	14,063	6,984	0.50	5,818	27,266
City of New York/Jamaica	0	3	7,292	4,821	0.66	2,259	16,381
City of New York/Newtown Creek	0	3	112,937	60,552	0.54	43,536	227,553
City of New York/North River	0	0	-	-	-	-	-
City of New York/Oakwood Beach	0	3	2,336	1,010	0.43	1,065	4,236
City of New York/Owls Head	0	3	40,292	36,855	0.91	8,245	107,212
City of New York/Port Richmond	0	3	24,718	2,816	0.11	20,374	29,603
City of New York/Red Hook	0	1	25,000	-	-	-	-
City of New York/Rockaway	0	3	8,024	3,680	0.46	3,555	14,965
City of New York/Tailman Island	0	3	6,990	3,404	0.49	2,942	13,424
City of New York/Ward's Island	0	3	20,409	3,139	0.15	15,686	25,940
County of Westchester	0	8	17,405	28,696	1.65	1,370	29,458
Joint Meeting Essex and Union Counties	0	5	26,271	23,584	0.90	5,519	69,242
Linden Roselle Sewerage Authority	0	0	-	-	-	-	-
Middlesex County Utilities Authority	0	10	17,810	21,558	1.21	2,378	54,119
Nassau County Department of Public Works	0	1	8,600	-	-	-	-
Passaic Valley Sewerage Commission	0	1	187,000	-	-	-	-
Rahway Valley Sewerage Authority	0	0	-	-	-	-	-
Sum of ND and N, mean of other values	0	71	33,843	32,101	1.08	7,909	63,870
Arithmetic coefficient of variation across plants			1.29	1.48	1.08	1.36	0.98

*ND, not detected, includes greater than and less than values.

TABLE 11. SUMMARY STATISTICS FOR MERCURY FOR EACH PLANT

	ND*	N	Mean (µg/l)	Standard deviation	Coefficient of variation	5th percentile	95th percentile
Bergen County Utilities Authority	2	7	130	169	1.30	15	407
City of New York/26th Ward	0	3	44	6	0.13	35	53
City of New York/Bowery Bay	0	3	91	59	0.64	29	202
City of New York/Coney Island	0	0	-	-	-	-	-
City of New York/Hunts Point	0	3	51	40	0.79	13	125
City of New York/Jamaica	0	3	43	30	0.71	12	100
City of New York/Newtown Creek	0	3	140	10	0.07	124	157
City of New York/North River	0	2	224	325	1.45	22	732
City of New York/Oakwood Beach	0	0	-	-	-	-	-
City of New York/Owls Head	0	3	115	94	0.82	27	289
City of New York/Port Richmond	0	3	140	80	0.57	51	291
City of New York/Red Hook	0	1	250	-	-	-	-
City of New York/Rockaway	0	3	81	45	0.55	30	165
City of New York/Tailman Island	0	3	60	32	0.54	23	120
City of New York/Ward's Island	0	3	56	78	1.38	6	181
County of Westchester	2	6	135	103	0.76	35	328
Joint Meeting Essex and Union Counties	0	3	174	62	0.36	93	289
Linden Roselle Sewerage Authority	0	0	-	-	-	-	-
Middlesex County Utilities Authority	0	9	78	30	0.39	39	134
Nassau County Department of Public Works	0	1	37	-	-	-	-
Passaic Valley Sewerage Commission	0	1	450	-	-	-	-
Railway Valley Sewerage Authority	0	0	-	-	-	-	-
Sum of ND and N, mean of other values	4	60	128	77	0.70	37	238
Arithmetic coefficient of variation across plants			0.77	1.00	0.58	0.83	0.68

*ND, not detected, includes greater than and less than values.

TABLE 12. SUMMARY STATISTICS FOR NICKEL FOR EACH PLANT

	ND*	N	Mean (µg/l)	Standard deviation	Coefficient of variation	5th percentile	95th percentile
Bergen County Utilities Authority	0	9	12,140	10,625	0.88	2,642	31,586
City of New York/26th Ward	0	3	6,965	13,565	1.95	406	24,944
City of New York/Bowery Bay	0	3	5,731	7,383	1.29	691	17,882
City of New York/Coney Island	0	0	-	-	-	-	-
City of New York/Hunts Point	0	3	3,323	2,119	0.64	1,072	7,324
City of New York/Jamaica	0	3	4,740	39,614	8.36	19	16,796
City of New York/Newtown Creek	0	3	10,456	4,111	0.39	5,215	18,156
City of New York/North River	0	0	-	-	-	-	-
City of New York/Oakwood Beach	0	3	1,284	1,654	1.29	155	4,005
City of New York/Owls Head	0	3	3,655	1,403	0.38	1,855	6,280
City of New York/Port Richmond	0	3	2,815	1,360	0.48	1,193	5,365
City of New York/Red Hook	0	1	2,000	-	-	-	-
City of New York/Rockaway	0	0	-	-	-	-	-
City of New York/Tailman Island	0	3	13,957	5,434	0.39	7,010	24,130
City of New York/Ward's Island	0	3	2,694	1,218	0.45	1,199	4,980
County of Westchester	0	8	6,214	4,329	0.70	1,812	14,348
Joint Meeting Essex and Union Counties	0	5	13,382	9,200	0.69	3,963	30,686
Linden Roselle Sewerage Authority	0	0	-	-	-	-	-
Middlesex County Utilities Authority	0	10	2,431	1,128	0.46	1,066	4,560
Nassau County Department of Public Works	0	1	1,700	-	-	-	-
Passaic Valley Sewerage Commission	0	1	6,000	-	-	-	-
Rahway Valley Sewerage Authority	0	0	-	-	-	-	-
Sum of ND and N, mean of other values	0	65	5,851	7,367	1.31	2,021	15,076
Arithmetic coefficient of variation across plants			0.69	1.32	1.53	0.97	0.63

*ND, not detected, includes greater than and less than values.

TABLE 13. SUMMARY STATISTICS FOR ZINC FOR EACH PLANT

	ND*	N	Mean (µg/l)	Standard deviation	Coefficient of variation	5th percentile	95th percentile
Bergen County Utilities Authority	0	9	34,293	14,628	0.43	16,100	61,802
City of New York/26th Ward	0	3	58,642	50,435	0.86	13,073	151,208
City of New York/Bowery Bay	0	3	144,589	178,636	1.24	18,669	443,254
City of New York/Coney Island	0	3	77,396	32,421	0.42	36,843	138,315
City of New York/Hunts Point	0	3	54,012	2,002	0.04	50,783	57,368
City of New York/Jamaica	0	3	26,434	13,032	0.49	11,007	51,069
City of New York/Newtown Creek	0	0	-	-	-	-	-
City of New York/North River	0	2	49,070	76,958	1.57	4,221	164,897
City of New York/Oakwood Beach	0	3	8,991	7,549	0.84	2,071	22,897
City of New York/Owls Head	0	3	73,777	40,802	0.55	27,600	151,019
City of New York/Port Richmond	0	3	43,718	3,719	0.09	37,882	50,090
City of New York/Red Hook	0	1	57,000	-	-	-	-
City of New York/Rockaway	0	3	29,864	14,309	0.48	12,750	56,892
City of New York/Talman Island	0	3	26,006	1,001	0.04	24,393	27,685
City of New York/Ward's Island	0	3	48,080	11,253	0.23	32,019	68,448
County of Westchester	0	8	50,827	35,317	0.69	14,865	117,206
Joint Meeting Essex and Union Counties	0	5	120,162	76,048	0.63	39,082	263,792
Linden Roselle Sewerage Authority	0	0	-	-	-	-	-
Middlesex County Utilities Authority	0	10	201,461	83,246	0.41	96,897	357,775
Nassau County Department of Public Works	0	1	76,000	-	-	-	-
Passaic Valley Sewerage Commission	0	1	165,000	-	-	-	-
Rahway Valley Sewerage Authority	0	0	-	-	-	-	-
Sum of ND and N, mean of other values	0	70	70,806	40,085	0.56	27,391	136,482
Arithmetic coefficient of variation across plants			0.71	1.12	0.72	0.81	0.87

*ND, not detected, includes greater than and less than values.

TABLE 14. SUMMARY STATISTICS FOR COD FOR EACH PLANT

	ND*	N	Mean (mg/l)	Standard deviation	Coefficient of variation	5th percentile	95th percentile
Bergen County Utilities Authority	0	9	35,432	28,107	0.79	8,796	87,607
City of New York/26th Ward	0	3	32,796	25,156	0.77	8,499	79,673
City of New York/Bowery Bay	0	3	32,138	29,194	0.91	6,640	85,217
City of New York/Coney Island	0	0	-	-	-	-	-
City of New York/Hunts Point	0	3	39,049	8,138	0.21	27,231	53,665
City of New York/Jamaica	0	3	22,679	6,855	0.30	13,348	35,308
City of New York/Newtown Creek	0	3	46,870	20,190	0.43	21,836	84,856
City of New York/North River	0	2	38,276	67,813	1.77	2,649	133,639
City of New York/Oakwood Beach	0	0	-	-	-	-	-
City of New York/Owls Head	0	3	49,118	39,458	0.80	11,995	122,248
City of New York/Port Richmond	0	3	30,027	17,565	0.58	10,618	63,267
City of New York/Red Hook	0	1	26,250	-	-	-	-
City of New York/Rockaway	0	3	30,128	16,295	0.54	11,517	60,974
City of New York/Tallman Island	0	3	23,767	256	0.01	23,348	24,191
City of New York/Ward's Island	0	3	36,862	2,857	0.08	32,358	41,742
County of Westchester	0	8	37,812	17,030	0.45	17,002	69,912
Joint Meeting Essex and Union Counties	0	3	44,503	9,141	0.21	31,203	60,903
Linden Roselle Sewerage Authority	0	0	-	-	-	-	-
Middlesex County Utilities Authority	0	10	41,482	3,052	0.07	36,660	46,686
Nassau County Department of Public Works	0	1	38,977	-	-	-	-
Passaic Valley Sewerage Commission	0	2	63,530	11,540	0.18	46,474	84,071
Rahway Valley Sewerage Authority	0	0	-	-	-	-	-
Sum of ND and N, mean of other values	0	66	37,205	18,915	0.51	19,386	70,872
Arithmetic coefficient of variation across plants			0.26	0.87	0.85	0.62	0.40

*ND, not detected, includes greater than and less than values.

TABLE 15. SUMMARY STATISTICS FOR OIL AND GREASE FOR EACH PLANT

	ND*	N	Mean (mg/l)	Standard deviation	Coefficient of variation	5th percentile	95th percentile
Bergen County Utilities Authority	0	8	2,155	1,571	0.73	595	5,097
City of New York/26th Ward	0	3	7,809	10,675	1.37	852	24,955
City of New York/Bowery Bay	0	3	2,296	1,206	0.53	902	4,580
City of New York/Coney Island	0	3	6,427	2,452	0.38	3,275	11,012
City of New York/Hunts Point	0	3	8,303	14,291	1.72	605	28,745
City of New York/Jamaica	0	3	2,938	1,166	0.40	1,455	5,123
City of New York/Newtown Creek	0	3	6,230	3,001	0.48	2,647	11,900
City of New York/North River	0	0	-	-	-	-	-
City of New York/Oakwood Beach	0	3	3,654	5,695	1.56	318	12,254
City of New York/Owls Head	0	3	7,998	4,073	0.51	3,234	15,703
City of New York/Port Richmond	0	2	1,665	452	0.27	1,035	2,492
City of New York/Red Hook	0	1	2,345	-	-	-	-
City of New York/Rockaway	0	3	5,175	5,320	1.03	893	14,588
City of New York/Tallman Island	0	3	2,885	1,656	0.58	1,018	5,990
City of New York/Ward's Island	0	3	2,878	1,015	0.35	1,546	4,767
County of Westchester	0	8	4,865	3,417	0.70	1,405	11,281
Joint Meeting Essex and Union Counties	0	4	5,157	1,637	0.32	2,953	8,183
Linden Roselle Sewerage Authority	0	0	-	-	-	-	-
Middlesex County Utilities Authority	0	11	1,064	308	0.29	640	1,630
Nassau County Department of Public Works	0	1	2,335	-	-	-	-
Passaic Valley Sewerage Commission	0	1	3,520	-	-	-	-
Rahway Valley Sewerage Authority	0	0	-	-	-	-	-
Sum of ND and N, mean of other values	0	69	4,195	3,621	0.70	1,461	10,519
Arithmetic coefficient of variation across plants			0.53	1.03	0.65	0.66	0.71

*ND, not detected, includes greater than and less than values.

TABLE 16. SUMMARY STATISTICS FOR PETROLEUM HYDROCARBONS FOR EACH PLANT

	ND*	N	Mean (mg/l)	Standard deviation	Coefficient of variation	5th percentile	95th percentile
Bergen County Utilities Authority	0	8	866	424	0.49	363	1,668
City of New York/26th Ward	0	3	3,733	9,363	2.51	136	14,048
City of New York/Bowery Bay	0	3	924	299	0.32	524	1,477
City of New York/Coney Island	0	3	2,720	2,287	0.84	625	6,932
City of New York/Hunts Point	0	3	4,690	14,580	3.11	114	18,043
City of New York/Jamaica	0	3	1,245	1,101	0.88	267	3,256
City of New York/Newtown Creek	0	3	2,518	1,634	0.65	797	5,600
City of New York/North River	0	2	9,335	56,048	6.00	67	34,957
City of New York/Oakwood Beach	0	3	1,978	5,088	2.57	69	7,471
City of New York/Owls Head	0	3	3,203	4,507	1.41	333	10,350
City of New York/Port Richmond	0	3	4,295	12,143	2.83	125	16,398
City of New York/Red Hook	0	1	1,380	-	-	-	-
City of New York/Rockaway	0	3	991	480	0.48	419	1,897
City of New York/Tailman Island	0	3	1,262	862	0.68	377	2,885
City of New York/Ward's Island	0	0	-	-	-	-	-
County of Westchester	0	8	3,324	3,845	1.16	477	9,900
Joint Meeting Essex and Union Counties	0	4	2,486	1,363	0.55	938	5,067
Linden Roselle Sewerage Authority	0	0	-	-	-	-	-
Middlesex County Utilities Authority	0	11	547	151	0.28	337	824
Nassau County Department of Public Works	0	1	896	-	-	-	-
Passaic Valley Sewerage Commission	0	1	869	-	-	-	-
Rahway Valley Sewerage Authority	0	0	-	-	-	-	-
Sum of ND and N, mean of other values	0	69	2,487	7,136	1.55	373	8,798
Arithmetic coefficient of variation across plants			0.82	1.87	0.95	0.66	0.97

*ND, not detected, includes greater than and less than values.

TABLE 17. SUMMARY STATISTICS FOR pH FOR EACH PLANT

	ND*	N	Mean (units)	Standard deviation	Coefficient of variation	5th percentile	95th percentile
Bergen County Utilities Authority	0	3	7.51	0.14	0.02	7.28	7.74
City of New York/26th Ward	0	1	7.27	-	-	-	-
City of New York/Bowery Bay	0	2	7.68	0.46	0.06	6.95	8.46
City of New York/Coney Island	0	2	7.62	0.57	0.08	6.71	8.60
City of New York/Hunts Point	0	2	7.26	0.08	0.01	7.12	7.40
City of New York/Jamaica	0	2	7.44	0.08	0.01	7.30	7.58
City of New York/Newtown Creek	0	2	7.59	0.02	0.00	7.55	7.62
City of New York/North River	0	1	7.35	-	-	-	-
City of New York/Oakwood Beach	0	2	7.22	0.25	0.04	6.81	7.65
City of New York/Owls Head	0	2	5.85	1.18	0.20	4.13	7.96
City of New York/Port Richmond	0	2	7.26	0.06	0.01	7.17	7.35
City of New York/Red Hook	0	0	-	-	-	-	-
City of New York/Rockaway	0	2	7.58	0.03	0.00	7.53	7.63
City of New York/Tailman Island	0	2	7.14	0.19	0.03	6.83	7.45
City of New York/Ward's Island	0	2	7.31	0.15	0.02	7.06	7.55
County of Westchester	0	0	-	-	-	-	-
Joint Meeting Essex and Union Counties	0	2	7.63	0.04	0.01	7.56	7.70
Linden Roselle Sewerage Authority	0	3	7.11	0.39	0.05	6.49	7.77
Middlesex County Utilities Authority	0	19	5.76	0.23	0.04	5.39	6.14
Nassau County Department of Public Works	0	0	-	-	-	-	-
Passaic Valley Sewerage Commission	0	0	-	-	-	-	-
Rahway Valley Sewerage Authority	0	0	-	-	-	-	-
Sum of ND and N, mean of other values	0	51	7.21	0.26	0.04	6.79	7.64
Arithmetic coefficient of variation across plants			0.08	1.14	1.26	0.13	0.07

*ND, not detected, includes greater than and less than values.

TABLE 18. SUMMARY STATISTICS FOR SPECIFIC GRAVITY FOR EACH PLANT

	ND*	N	Mean (units)	Standard deviation	Coefficient of variation	5th percentile	95th percentile
Bergen County Utilities Authority	0	8	1.009	0.011	0.01	0.991	1.027
City of New York/26th Ward	0	2	0.995	0.021	0.02	0.961	1.030
City of New York/Bowery Bay	0	2	1.000	0.000	0.00	1.000	1.000
City of New York/Corney Island	0	2	0.990	0.014	0.01	0.967	1.013
City of New York/Hunts Point	0	2	1.000	0.014	0.01	0.977	1.023
City of New York/Jamaica	0	2	1.000	0.000	0.00	1.000	1.000
City of New York/Newtown Creek	0	2	1.010	0.000	0.00	1.010	1.010
City of New York/North River	0	1	1.010	-	-	-	-
City of New York/Oakwood Beach	0	2	1.010	0.014	0.01	0.987	1.033
City of New York/Owls Head	0	2	1.015	0.007	0.01	1.003	1.027
City of New York/Port Richmond	0	2	0.995	0.007	0.01	0.983	1.007
City of New York/Red Hook	0	0	-	-	-	-	-
City of New York/Rockaway	0	2	1.000	0.000	0.00	1.000	1.000
City of New York/Tallman Island	0	2	1.000	0.000	0.00	1.000	1.000
City of New York/Ward's Island	0	1	0.990	-	-	-	-
County of Westchester	0	8	1.008	0.029	0.03	0.961	1.056
Joint Meeting Essex and Union Counties	0	7	1.035	0.055	0.05	0.948	1.128
Linden Roselle Sewerage Authority	0	3	1.031	0.043	0.04	0.962	1.102
Middlesex County Utilities Authority	0	11	1.003	0.002	0.00	1.000	1.006
Nassau County Department of Public Works	0	0	-	-	-	-	-
Passaic Valley Sewerage Commission	0	6	1.011	0.024	0.02	0.972	1.051
Rahway Valley Sewerage Authority	0	0	-	-	-	-	-
Sum of ND and N, mean of other values	0	67	1.006	0.014	0.01	0.984	1.030
Arithmetic coefficient of variation across plants			0.01	1.10	1.12	0.02	0.03

*ND, not detected, includes greater than and less than values.

TABLE 19. SUMMARY STATISTICS FOR TOTAL NONFILTERABLE RESIDUE FOR EACH PLANT

	ND*	N	Mean (mg/l)	Standard deviation	Coefficient of variation	5th percentile	95th percentile
Bergen County Utilities Authority	0	9	18,999	13,081	0.69	5,617	43,601
City of New York/26th Ward	0	3	15,999	10,132	0.63	5,200	35,134
City of New York/Bowery Bay	0	3	20,504	19,466	0.95	3,978	55,588
City of New York/Coney Island	0	3	52,754	88,162	1.67	4,054	180,984
City of New York/Hunts Point	0	3	13,977	3,079	0.22	9,541	19,527
City of New York/Jamaica	0	3	12,418	2,548	0.21	8,710	16,989
City of New York/Newtown Creek	0	3	26,083	11,326	0.43	12,077	47,399
City of New York/North River	0	0	-	-	-	-	-
City of New York/Oakwood Beach	0	0	-	-	-	-	-
City of New York/Owls Head	0	3	37,465	10,047	0.27	23,458	55,822
City of New York/Port Richmond	0	3	21,484	5,806	0.27	13,401	32,099
City of New York/Red Hook	0	1	19,500	-	-	-	-
City of New York/Rockaway	0	2	20,264	1,063	0.05	18,565	22,058
City of New York/Tallman Island	0	3	14,254	3,549	0.25	9,239	20,706
City of New York/Ward's Island	0	3	17,622	5,378	0.31	10,316	27,537
County of Westchester	0	8	24,022	24,161	1.01	4,281	67,004
Joint Meeting Essex and Union Counties	0	4	32,878	6,886	0.21	22,886	45,249
Linden Roselle Sewerage Authority	0	0	-	-	-	-	-
Middlesex County Utilities Authority	0	11	32,852	3,546	0.11	27,363	38,989
Nassau County Department of Public Works	0	1	13,150	-	-	-	-
Passaic Valley Sewerage Commission	0	0	-	-	-	-	-
Rahway Valley Sewerage Authority	0	0	-	-	-	-	-
Sum of ND and N, mean of other values	0	66	23,190	13,882	0.49	11,912	47,246
Arithmetic coefficient of variation across plants			0.44	1.50	0.87	0.63	0.82

*ND, not detected, includes greater than and less than values.

TABLE 20. SUMMARY STATISTICS FOR TOTAL RESIDUE FOR EACH PLANT

	ND*	N	Mean (mg/l)	Standard deviation	Coefficient of variation	5th percentile	95th percentile
Bergen County Utilities Authority	0	9	27,310	15,802	0.58	9,765	57,216
City of New York/26th Ward	0	3	26,755	17,621	0.66	8,324	59,978
City of New York/Bowery Bay	0	3	26,696	21,597	0.81	6,459	66,686
City of New York/Coney Island	0	3	69,305	96,110	1.39	7,378	222,716
City of New York/Hunts Point	0	3	28,360	3,905	0.14	22,424	35,200
City of New York/Jamaica	0	3	17,648	5,828	0.33	9,871	28,448
City of New York/Newtown Creek	0	3	39,817	13,584	0.34	21,832	65,045
City of New York/North River	0	2	37,548	58,789	1.57	3,239	126,106
City of New York/Oakwood Beach	0	3	27,035	22,974	0.85	6,126	69,281
City of New York/Owls Head	0	3	53,607	48,916	0.91	11,006	142,467
City of New York/Port Richmond	0	3	28,721	10,440	0.36	15,121	48,186
City of New York/Red Hook	0	1	30,000	-	-	-	-
City of New York/Rockaway	0	3	25,525	10,202	0.40	12,582	44,649
City of New York/Tallman Island	0	3	18,264	3,769	0.21	12,784	25,028
City of New York/Ward's Island	0	3	29,199	4,721	0.16	22,131	37,544
County of Westchester	0	8	36,330	21,508	0.59	12,688	77,024
Joint Meeting Essex and Union Counties	0	4	37,712	7,190	0.19	27,148	50,549
Linden Roselle Sewerage Authority	0	0	-	-	-	-	-
Middlesex County Utilities Authority	0	11	36,000	3,373	0.09	30,733	41,802
Nassau County Department of Public Works	0	1	30,961	-	-	-	-
Passaic Valley Sewerage Commission	0	0	-	-	-	-	-
Railway Valley Sewerage Authority	0	0	-	-	-	-	-
Sum of ND and N, mean of other values	0	72	32,989	21,549	0.56	14,095	70,466
Arithmetic coefficient of variation across plants			0.35	1.11	0.74	0.55	0.69

*ND, not detected, includes greater than and less than values.