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Water Resources Division

REPORT ON THE QUALITY OF WATER FROM THE HACKENSACK RIVER PILOT DESALINATION PLANT, AT JERSEY CITY, NEW JERSEY

1935

By
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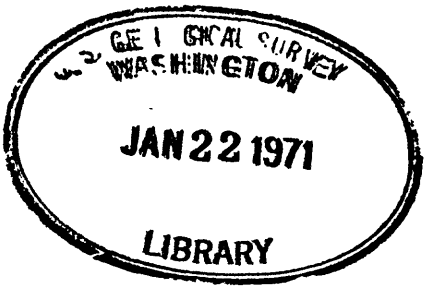

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REPORT ON THE QUALITY OF WATER FROM THE HACKENSACK RIVER PILOT DESALINATION PLANT, AT JERSEY CITY, NEW JERSEY

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ABSTRACT

Chemical, physical, and bacterial analyses of feedwater, blowdown, and distillate samples collected at the Hackensack River pilot desalination plant in Jersey City, N.J., are tabulated in this report. Brief discussions of these analytical results are given to describe the general water-quality characteristics of the Hackensack River at the plant's water intake, to describe the water-quality character of the distillate water, and to determine its potability.

INTRODUCTION

In order to investigate the feasibility of and the economics involved in the operating of a desalting plant in a polluted, estuarine environment, the U.S. Office of Saline Water contracted Aqua-Chem, Inc. of Waukesha, Wis., to construct and install a pilot desalination plant on the Hackensack River. The test program has been conducted under a cooperative agreement between the U.S. Office of Saline Water, the New Jersey State Department of Environmental Protection, Division of Water Policy and Supply, and the Public Service Electric and Gas Company of New Jersey. The pilot plant, which is 50 feet long, produces desalted water in a multi-stage, flash-distillation process (Shiozawa, 1968, p. 738-39). The unit's initial location was at the Public Service Electric and Gas Company of New Jersey's Marion Plant (fig. 1) in Jersey City, N.J. Power, thermal energy, and personnel for the plant's operation was provided by this Company's power-generation facilities at this location. The Division of Water Policy and Supply provided the project engineer to coordinate and evaluate the program.

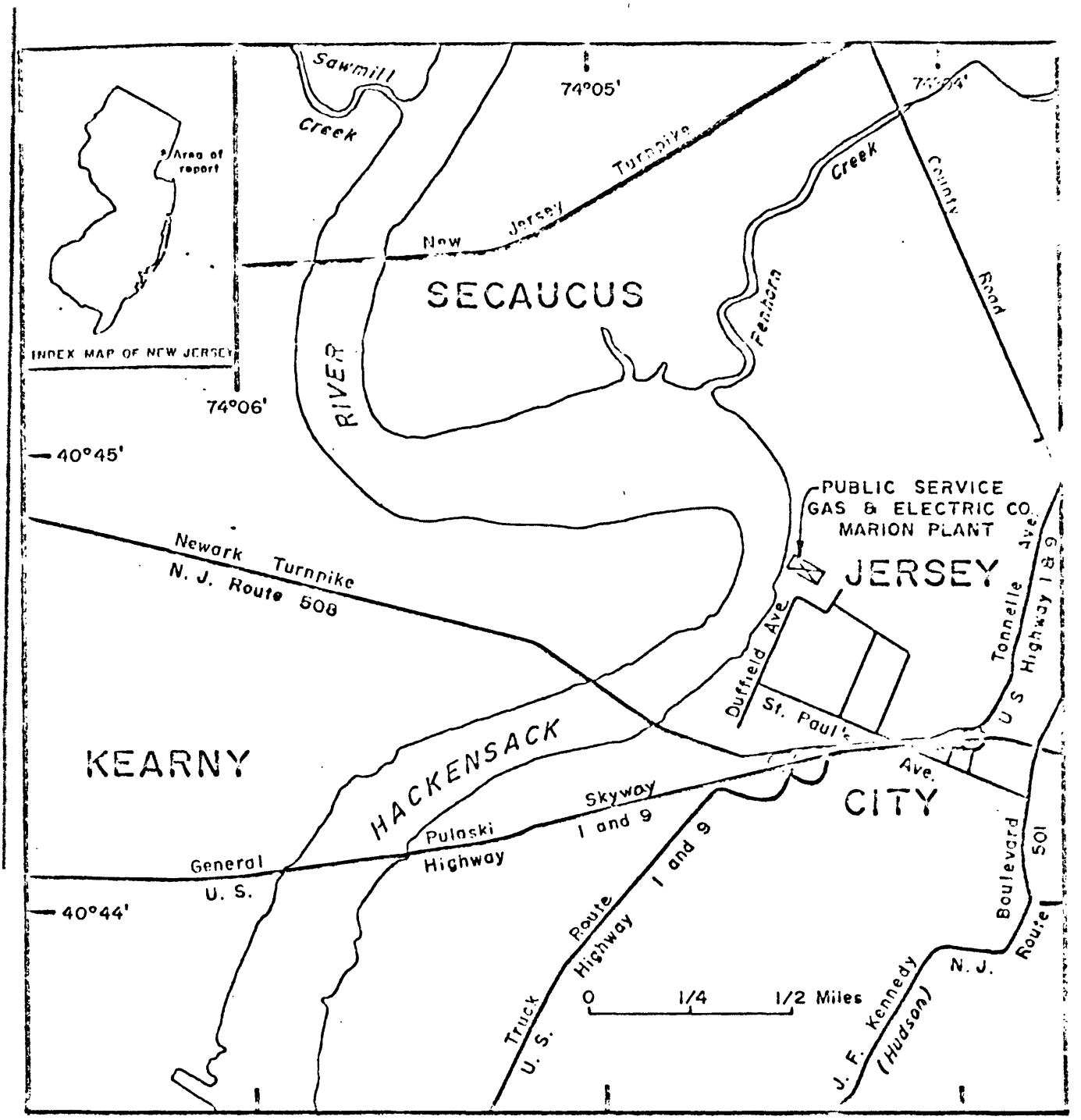

Figure 1.--Location map of the pilot desalination plant on the Hackensack River at Jersey City, N.J.

In order to provide information on the water quality of the Hackensack River during the test period, and to obtain data necessary for evaluating the pilot plant's operation, the State requested the U.S. Geological Survey to undertake a data-collection and analysis program as an extension of their regular cooperative water-resources program. Sampling and analyses for chemical, physical, and bacterial properties of the raw or feed water for the plant were requested to provide information on the water-quality characteristics of the Hackensack River. Similar data were asked on the brine-blowdown water from the plant and on the finished or distillate water. This latter data would be useful to those involved in the design and operation of a commercial plant, in evaluating the overall efficiency of the plant, in determining water quality and the potability of the distillate, in determining whether pre- or post-treatment would be required to meet existing potable-water standards, and in indicating the magnitude of the brine-disposal problem. Such a program was initiated in June 1968 by the Geological Survey in cooperation with the State Department of Environmental Protection, Division of Water Policy and Supply.

The data-collection program was separated into the phases, field and laboratory samples.

Field samples were collected, usually at daily intervals, from three sampling taps on the operational pilot desalter; that is, of the feed, blowdown, and distillate. These samples were analyzed immediately at the field location by employees of the State using reagents, equipment, methods and techniques, and training provided by the Geological Survey. Analytical methods used are referenced in the following section. When the pilot plant was inoperable, samples of feed water were collected for chemical analyses directly from the Hackensack River. Analytical determinations on these field samples included temperature, color, turbidity, pH, bicarbonate, carbonate, chloride, hydrogen sulfide, dissolved oxygen, ammonia, free available and total residual chlorine, cyanide, total iron, and specific conductance. Results of these analyses are tabulated in table 1.

Laboratory samples were collected, usually at weekly intervals, from the same sources by Geological Survey personnel. Analyses for parameters measured in the field sampling program also were conducted immediately after sampling. Split samples were then delivered within 6 hours to the State Department of Health Laboratory in Trenton for analyses of biochemical parameters, and within 24 hours to the Geological Survey Laboratory in Harrisburg, Pa., for chemical and physical analyses.

Determinations by the State included methylene-blue active substances, cyanide, biochemical-oxygen demand, chemical-oxygen demand, nitrogen as ammonia, nitrite, nitrate, and total organic nitrogen, and the coliform, fecal coliform, and fecal streptococci bacterial groups. Results of these analyses are tabulated on table 2.

Analytical determinations by the Geological Survey included silica, iron, manganese, calcium, magnesium, calculated sodium plus potassium, copper, nickel, bicarbonate, carbonate, sulfate, chloride, nitrate, hardness, dissolved solids, specific conductance, pH, color, and, when appropriate, density. In addition, determinations of sodium, potassium, fluoride, phosphate, suspended solids, and oils and greases were made on feed-water or river samples. Results of these analyses are tabulated on table 3.

Occasional special samples were collected for spectrographic analyses (table 4) by the Geological Survey's Denver, Colo., Laboratory for trace elements and for analyses by Rutgers - The State University's Department of Environmental Sciences Laboratory for total phenolic compounds (table 5).

METHODOLOGY

In general, the methods and techniques used in the collection and analyses of water samples from the pilot plant are described in five references. Analytical techniques used by the State Department of Health are found mostly in Standard Methods for the Examination of Water and Wastewaters (Anon., 1965). Those used by the Geological Survey are found in Methods for the Collection and Analysis of Dissolved Minerals and Gases in Water (Brown and others, in press). Spectrographic analytical techniques used by the Geological Survey were described by Barnett and Mallory (written comm., 1970). Analyses of total phenolic compound by Rutgers University's Laboratory were performed by two methods: that described in Standard Methods and that described by Faust and Mikulewicz (1967a, 1967b). Field analyses were performed using methods comparable with those used in Geological Survey laboratories, except for determinations of ammonia, cyanide, and free-available and total-residual chlorine. Methods for the determination of these four parameters are those prescribed in Water and Wastewater Analyses Procedures (Hach Chemical Company, 1969).

ANALYSES OF DATA

Compilations of data reported by the various laboratories for the period of study, July 1968 through December 1969, are

tabulated at the end of this report (tables 1-5). Some interpretations of these data are given in the following discussion.

Feed Water

Water-quality conditions present in the Hackensack River at the time of sampling are characterized by analyses of feed-water samples (USGS station number 01378640). Previous water-quality studies, among which are those by the Interstate Sanitation Commission, the Federal Water Quality Administration, and the State Department of Environmental Protection, indicate that the river's quality at Jersey City varies with tidal fluctuations. Data collected as part of these above mentioned studies are mostly unpublished, but are available in the respective offices located in New York, N.Y., Edison, N.J., and Trenton, N.J. With this knowledge, a random sampling program was designed in which no effort was made to select samples with respect to tidal conditions. This allows an estimation of the probable ranges in particular water-quality parameters with time, given a sufficient sampling of the population.

Specific conductance, which is used as an estimate of the water's dissolved-solids content, of samples of feed water or, in periods when the pilot plant was inoperable, of the river itself usually ranged between 10,000 and 30,000 micromhos per square contimeter at 25°C (Celsius). However, it is interesting to note on figure 2 that the conductance (upper curve) of most water samples collected from August 1968 to late March 1969 almost invariably exceeded 20,000 micromhos, while those in July 1968 and from late March to July 1969 rarely exceeded this value. When conductance values (upper curve) are compared with streamflows (middle curve) as measured at the nearest streamflow-gaging station, an inverse relation can be observed; that is, as streamflows increase, conductances, and therefore, dissolved solids decrease. This phenomenon is most apparent in mid-December 1968, when mean discharges rose from 0 cfs (cubic feet per second) on December 3rd to 200 cfs on the 5th and then again receded to 0 cfs by the 18th, and from late-March to mid-June, when mean discharges rose from 9 cfs on March 23rd to 290 cfs on the 25th and continued to exceed 10 cfs per day until mid-June.

While the flows measured at this gaging station, about 18 miles upstream from Jersey City, are regulated greatly by the Hackensack Water Company, they can be used to estimate the magnitude of fresh-water inflow into the Hackensack estuary, especially during high-flow conditions. It is evident from this illustration (fig. 2) that during such periods of high inflow, the dissolved-solids content in the estuary at Jersey City is reduced or diluted. A similar comparison and conclusion

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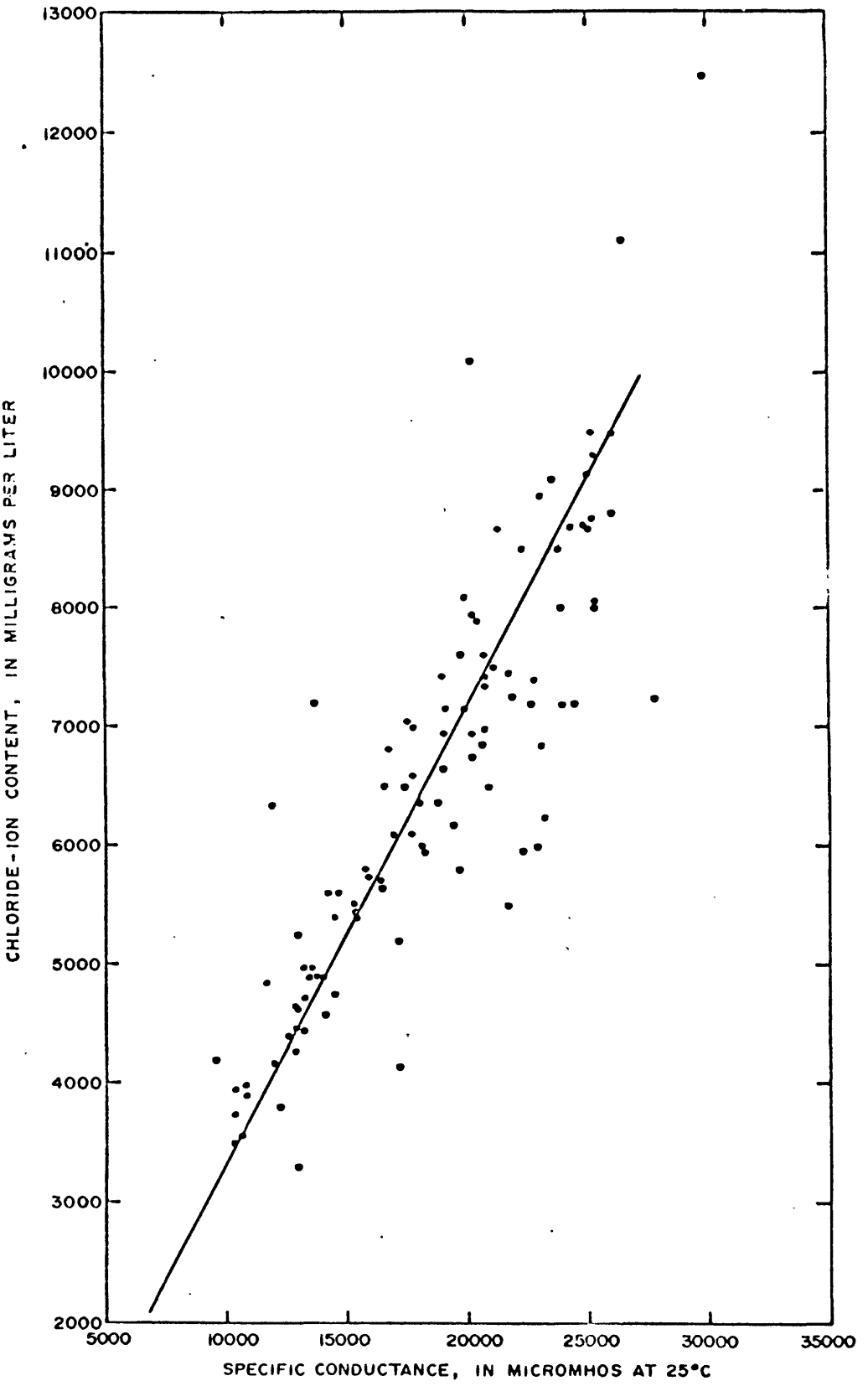

Figure 3.--Relation of specific conductance and chloride content of water samples collected from the Hackensack River at Jersey City, N.J., based on data collected between July 1968 and July 1969.

can be made relative to measurements of chloride-ion content (lower curve) at the pilot plant.

It is also apparent on this illustration (fig. 2) that chloride-ion content and specific conductance are directly related to each other; that is, as one parameter increases, there is a corresponding increase in the other. An estimated relation of these two parameters is presented on figures 3. It is possible, using data presented in table 1, to construct by linear-regression analysis a statistical relation from which to estimate the chloride-ion content when the specific conductance, an easily measured physical property of water, is known. Similar plots can be derived based on data presented herein relating specific conductance with the calcium, magnesium, sodium, potassium, bicarbonate, sulfate, hardness, and dissolved-solids content. Other parameters determined and presented herein, however, have not been found to relate well to measurements of specific conductance.

Results of chemical analyses of 39 samples in the Geological Survey's laboratory (table 3) indicate that chloride ions are the most prevalent of the determined anions, followed by sulfate, bicarbonate, and smaller amounts of nitrate, fluoride and phosphate ions. The ranges of concentration and percentage composition of these anions are listed in the following table:

Anion	Range	
	in milligrams per liter	in percentage of composition
Carbonate (CO_3)	0	0
Bicarbonate (HCO_3)	44-194	<2
Sulfate (SO_4)	486-1,600	5-10
Chloride (Cl)	3,320-12,500	85-95
Fluoride (F)	0.4-2.0	<1
Nitrate (NO_3)	0.1-13	<1
Ortho-Phosphate (PO_4)	0.47-2.4	--

With the exception of nitrate and phosphate ions, the maximum concentrations of determined anions in the feed-water samples do not exceed those reported for sea water (Hem, 1970, p. 11). The excess amounts reported for nitrate and phosphate probably result from industrial and municipal waste-water discharges into the estuary.

Similarly, laboratory results of these analyses indicate that sodium ions are the most prevalent of the determined cations, followed by magnesium, calcium, potassium, and smaller amounts of heavy metal ions, such as iron, manganese, copper,

and nickel. The observed ranges of these cations are listed in the following table:

Cation	Range in milligrams per liter	Range in percentage of composition
Iron (Fe)	0.08-3.5	--
Manganese (Mn)	0.00-1.2	--
Copper (Cu)	0.00-0.49	--
Nickel (Ni)	0.02-0.58	--
Calcium (Ca)	108-250	3-5
Magnesium (Mg)	150-825	10-20
Sodium (Na)	1,760-6,600	75-85
Potassium (K)	84-334	<3

Of these cations, the maximum concentrations of calcium, magnesium, sodium, and potassium do not exceed those reported for sea water. Iron, manganese, copper, and nickel are found in higher concentrations than in sea water and probably result from industrial-waste discharges into the estuary. Spectrographic analyses of nine of these samples for additional dissolved trace-metal ions are given in table 4.

Ranges of laboratory analyses for several other chemical and physical properties are presented in the following table:

Parameter	Range	
Silica (SiO_2)	0.0-7.7	mg/l
Dissolved solids (ROE at 180°C)	6,820-22,900	mg/l
Calcium, magnesium hardness as $CaCO_3$	920-4,020	mg/l
Noncarbonate hardness as $CaCO_3$	820-3,980	mg/l
Alkalinity as $CaCO_3$	36-159	mg/l
Specific conductance	9,600-29,900	micromhos at 25°C
pH	6.2-7.6	pH units
Color[1/]	15-110	Pt-Co units
Turbidity[1/]	4.8-50	mg/l as SiO_2
Density[1/]	1.001-1.012	at 20°C
Suspended solids	6.0-106	mg/l
Oil and grease	3.8-71	mg/l
Temperature[1/]	5-36	°C

1/ Field analyses of laboratory samples only.

Note that the river water varies from slightly acidic to slightly alkaline, is extremely hard, and is high in dissolved solids.

These characteristics are expected for water samples collected from a saline-estuarine environment.

Field analyses of 141 samples for several dissolved gases --dissolved oxygen, ammonia, hydrogen sulfide, free available chlorine and total residual chlorine--are summarized in the following table:

Dissolved gas	Range
Dissolved oxygen (O_2)	0.8-7.9 mg/l
Ammonia (NH_3 as N)	0.0-6.9 mg/l
Hydrogen sulfide (H_2S)	0.0-3.9 mg/l
Free available chlorine (Cl_2)	0.00-.35 mg/l
Total residual chlorine (Cl_2)	0.00-.25 mg/l

In preceding discussions the relatively high concentrations of nitrate, phosphate, and trace-metal ions were attributed to industrial and municipal waste-water discharges into the estuary. Observed concentrations of dissolved oxygen, ammonia, and hydrogen sulfide also indicate the presence of such waste-water discharges. The organic materials in such waste waters usually are decomposable microbiologically in the presence of dissolved oxygen. The decomposition products generally include carbon dioxide, hydrogen sulfide, and ammonia. The low maximum dissolved oxygen observed in the feed-water samples suggests that the rate of oxygen consumption in the biochemical decomposition of organic materials in this river system at this point exceeds the rate at which oxygen is being replenished from the atmosphere. Since more than 0.1 mg/l (milligrams per liter) of ammoniacal nitrogen is reported by Rudolph (1931) to indicate recent organic pollution, observed values of ammonia, which range from 0-7 mg/l, suggest recent waste-water discharge in the vicinity of the pilot plant's water intake. Hydrogen sulfide is found also in concentrations higher than normally found in uncontaminated surface water. Concentrations of this gas in excess of a few tenths of a milligram per liter are reported (Hem, 1970, p. 168-170) to impart a strong characteristic "rotten egg" odor to water. The amount of chlorine residual in a water is related to chlorination processes in the treatment of sewage plant effluents. However, only two of the samples analyzed for chlorine had observable values.

Several other determinations, which often are used by water-quality investigators as indicators of pollution, were made on 24 samples at the State's laboratory and are summarized in the following table:

Parameter	Range	
Biochemical-oxygen demand	0.0-4.0	mg/l
Chemical-oxygen demand	78-1,600	mg/l
Methylene blue active substances	0.00-2.3	mg/l
Ammonia (NH_3 as N)	1.0-6.0	mg/l
Nitrite (NO_2 as N)	0.00-0.27	mg/l
Nitrate (NO_3 as N)	0.00-6.6	mg/l
Total Kjeldahl nitrogen (N)	2.0-9.0	mg/l
Cyanides (CN)	0.00	mg/l
Total phenolic materials (C_6H_5OH)[1/]	<1.7-10.0	µg/l
Coliform bacterial group	25-210,000	colonies/100 ml.
	50-240,000	MPN/100 ml.
Fecal coliform	13-240,000	MPN/100 ml.
Fecal streptococci	<20-1,300	MPN/100 ml.

1/ Analyses by Rutgers Univ.

These observations add further evidence that the water source used for the pilot-desalination plant is polluted, as well as saline.

The values presented in the preceding tabulation for total phenolic materials are those obtained by analytical methods described in Standard Methods. However, recent development of an alternate method, which is reported (Faust and others, 1969) to yield a more quantitative expression of "total" phenol content, suggested that this method should be examined during the course of the investigation. A summary tabulation of all analyses for phenolic materials in the feed water is given in table 5. Method I is that described in Standard Methods. Method II is that developed by Faust. Note that in all but one case, Method II reports higher results. Results are in micrograms per liter (µg/l).

In summary, analyses of water samples collected from the feed water to the pilot-desalination plant characterize the water quality of the Hackensack River at the plant's water intake. These analyses indicate that the river water is saline and is used as a medium for the disposal of municipal and industrial waste waters. Observed variations in the magnitude of the individual water-quality parameters probably can be ascribed primarily to tidal fluctuations and changes in the volume of fresh-water inflow, and to the volume and type of waste-water effluents.

Blowdown Water

Analyses of blowdown-water samples were performed in order to provide data necessary to engineering personnel in the various agencies in their evaluation of operational procedures, in computing material balances, and in evaluation of potential disposal problems. The observed data are tabulated in tables 1-5 at the end of this report (number 01378641). No further discussion of these data will be made, except for two observations. First, that a comparison of analyses of feed water with those of concurrent blowdown water can be used as a criteria of whether or not the plant was functioning during sampling periods. Second, that operations of the pilot plant can be grouped by ranges of pH values. From July to December 1968, the brine blowdown usually exceeded 8.0 pH units; from January to March 1969, was usually less than 6.0 pH units; and subsequent to April 1969, ranged between 6.0 and 8.0 pH units, with few exceptions.

Distillate Water

Samples of distillate water were collected and analyzed to determine the water-quality characteristics of the effluent water, the potability of the effluent water, and what if any treatment would be required to meet existing potable-water standards (U.S. Public Health Service, 1962, N.J. State Dept. of Health, 1967).

Analyses of distillate water are tabulated at the end of this report (identification number 01378642). From a comparison of laboratory analyses of the feed, blowdown and distillate waters, it is evident that not all samples were collected when the pilot plant was in "operational" status. A multi-stage flash distillation unit is "operational" when it delivers a product water containing 50 mg/l or less of dissolved solids (H. L. Sturza, Office of Saline Water, personal communication, 1970). Fourteen of the 23 distillate samples collected for laboratory analyses and listed in tables 2-5 met this criteria. In comparing analyses of feed and distillate water during "operational" periods, a considerable reduction in salinity can be observed. For example, the specific conductance, a measure of dissolved-solids content, of these 14 samples, were reduced from 10,600-26,000 micromhos to 9-91 micromhos. It is also interesting to note in comparing analyses of feed and distillate waters the occurrence of relatively higher concentrations of iron, nickel, copper, phenolic material, cyanide, and hydrogen sulfide in the latter water. Iron, nickel, and

copper concentrations could be accounted for in the distillation process as pickup from metallic parts of the desalting unit, especially as pH values indicate acidic conditions in the blowdown and distillate most of the time. Hydrogen sulfide, cyanide, and phenols in the distillate may result from carry over from the feed water, or be a product of organic compound breakdown under high temperature and acidic conditions in the distillation process. In addition, while nitrogenous species occur in relatively high concentrations in both feed and distillate water, higher concentrations of both ammonia and total nitrogen are found usually in the distillate than in the feed water.

A principal objective of the study was to determine the pilot plant's capability to produce a potable-water supply. For this reason, a comparison is made of water quality of the distillate produced during periods in which the plant was in an "operational" status to the present standards prescribed by the State (N.J. State Department of Health, 1967). The observed range of each parameter for which a standard has been set is compared with said standard in the following table:

Parameter	Standard	Range
	Bacteriological Quality	
Coliform bacteria	<1 colony/100 ml.	<2 colonies/100 ml.
	Physical Quality	
Turbidity	<5 mg/l as SiO_2	1.2-18 mg/l as SiO_2
Color	<6 Pt-Co units	0-25 Pt-Co units
Taste	no objectionable taste	--
Odor	<Intensity III	--
	Chemical Quality	
Arsenic (As)	50 µg/l	<22 µg/l
Barium (Ba)	1,000 µg/l	<5 µg/l
Cadmium (Cd)	10 µg/l	<30 µg/l
Chromium (Cr)	50 µg/l	<10 µg/l
Cyanide (CN)	200 µg/l	0-67 µg/l
Lead (Pb)	50 µg/l	<8 µg/l
Selenium (Se)	10 µg/l	--
Silver (Ag)	50 µg/l	<1 µg/l
Methylene blue active substances	0.5 mg/l	0.0-1.2 mg/l

Parameter	Standard	Range
	Chemical Quality--Cont.	
Chloride (Cl)	250 mg/l	<10 mg/l
Copper (Cu)	1.0 mg/l	0.01-1.1 mg/l
Fluoride (F)	max. 2.0 mg/l min. 1.0 mg/l	--
Hardness (as $CaCO_3$)	max. 150 mg/l min. 50 mg/l	<10 mg/l
Iron (Fe)	0.3 mg/l	0.01-4.3 mg/l
Manganese (Mn)	0.05 mg/l	0.00-.09 mg/l
Nitrate (NO_3)	30 mg/l	<2 mg/l
Phenolic materials (C_6H_5OH)	1 µg/l	0-11 µg/l
Sodium (Na)	50 mg/l	1.6-26 mg/l as Na + K
Sulfate (SO_4)	250 mg/l	<3 mg/l
Dissolved solids	500 mg/l	5-50 mg/l
Zinc (Zn)	500 µg/l	<340 µg/l

Comparison of the data presented in the above tabulation indicated that samples of distillate water collected during periods in which the plant was in an "operational" status, as defined herein, meet the State's potable-water standards, except in the case of coliform bacteria, color, turbidity, cadmium, methylene blue active substances, copper, hardness, iron, manganese, and phenolic materials. These exceptions are discussed in the following paragraphs.

The N.J. Potable-Water Standards require the absence of coliform-bacterial groups, whereas analyses by the State Department of Environmental Protection of distillate-water samples summarized above report values of less than 2 colonies per 100 milliliters. It should be noted, however, that the State requires that all potable-water supplies receive chlorination prior to delivery. Presumably, the delivered water receiving such treatment would be free of coliform bacteria, and thus, meet the Standard.

The Standard for turbidity, less than 5 mg/l as silica dioxide, and color, less than 10 units on the platinum-cobalt scale, is exceeded in many of the summarized samples. This turbidity and color is probably due to the formation of organo-metallic compounds, which by themselves also do not meet the State Standards. But oxidation and filtration as part of a post-treatment process should reduce the color and turbidity values to levels which would meet the existing Standards for these parameters.

Analyses of distillate water during periods of "operational" status indicate that on occasion several metals also exceed the required or recommended, as the case may be, maximum concentrations. Cadmium, which has a required maximum of 10 µg/l is reported in spectrographic analyses to be less than 30 µg/l in all samples. Unfortunately, because of the analytical sensitivity of this technique, it is not possible to be more precise. Copper, iron, and manganese ions often exceed their recommended maximum concentrations of 1.0, 0.3, and 0.05 mg/l, respectively; particularly iron. Post-treatment removal of these trace metals probably would be necessary. Adjustment of pH (range 5.6-8.7) with lime, oxidation, and filtration would be the probable treatment.

In general, the water produced is so soft that it does not even meet the recommended minimum requirement of 50 mg/l (as $CaCO_3$). Presumably, pH adjustment with lime or some similar compound would be the post-treatment process used to increase the hardness concentration. A treatment of this type also would increase the dissolved-solids content, and thus, alleviate the "flat" taste associated with extremely dilute waters.

Phenolic materials, which have a recommended maximum of 1 µg/l, were found generally in amounts which exceed the prescribed Standard.

Recommended maximum concentration for methylene blue active substances, a measure of the magnitude of synthetic detergents present in waters, are 0.5 mg/l. Only two samples exceeded this value. All other results were considerably below the recommended concentration.

Analytical determinations for odor, taste, selenium, and fluoride were not performed. Many of the recommended concentrations in the potable-water standards are based on taste thresholds. Also analyses were performed for several odor producing parameters, among which are phenols, hydrogen sulfide, and ammonia. Thus, indirectly data are available on taste and odor. As concentrations of fluoride ions in the feed water (range 0.4-2.0 mg/l) were sometimes below the recommended minimum range, fluoridation might be considered, at least for short periods, in post-treatment of the distillate water.

Thus, analyses of distillate waters when the plant was in an "operational" status indicate that the product water will meet New Jersey and U.S. Public Health Service Standards after suitable post-treatment.

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Table 1. Field analyses of feed, blowdown, and distillate-water samples, pilot desalination plant, Jersey City, N.J.

DATE	TIME	TEMPERATURE (DEG C)	PH (UNITS)	SPECIFIC CONDUCTANCE (MICROMHOS)	COLOR (PLATINUM-COBALT UNITS)	TURBIDITY (MG/L)	ALKALINITY AS CACO3 (MG/L)	BICARBONATE (HCO3) (MG/L)	CARBONATE (CO3) (MG/L)
01378640 - HACKENSACK R AT JERSEY CITY NJ (LAT 40 44 41 LONG 074 04 30.1)									
JULY, 1968									
15...	1430	28	7.2	17100	--	--	148	180	0
16...	1430	37	7.2	--	--	--	167	204	0
18...	1000	36	7.2	14500	--	--	162	198	0
22...	--	32	7.2	16300	--	--	139	170	0
26...	1330	30	7.4	18100	60	10	139	170	0
29...	1100	29	7.0	25100	24	7.1	108	132	0
AUG.									
06...	1400	29	7.4	18200	80	47	116	142	0
07...	1000	33	7.6	25000	110	50	136	166	0
22...	1330	32	7.1	26500	70	18	144	176	0
22...	1400	34	7.6	25300	60	22	187	228	0
SEP.									
25...	1200	26	6.9	25200	45	9.2	88	107	0
NOV.,									
06...	0930	14	7.2	--	20	4.8	36	44	0
14...	0900	11	7.6	--	50	14	138	168	0
27...	1200	9.0	7.5	19100	45	13	87	106	0
DEC.									
02...	1100	--	7.8	--	40	40	123	150	0
03...	1500	--	7.5	--	45	49	131	160	0
04...	1000	11	7.4	26000	40	32	112	136	0
05...	1600	13	7.8	--	50	13	131	160	0
06...	1100	13	7.6	22800	50	14	115	140	0
09...	1000	9.0	6.6	21800	50	25	98	120	0
10...	1530	8.0	7.0	14200	50	36	102	124	0
11...	1500	8.0	6.9	23500	40	28	81	99	0
12...	1100	10	7.0	19600	50	27	98	120	0
13...	1200	11	6.8	--	50	26	115	140	0
17...	1500	8.0	7.0	14100	50	30	115	140	0
18...	1400	8.0	7.0	17100	50	29	112	136	0
19...	1600	9.0	7.3	14500	50	33	116	141	0
20...	1230	9.0	6.8	23800	50	26	85	104	0
23...	1300	18	6.9	17300	100	33	121	147	0
24...	1200	16	6.7	17700	50	31	110	134	0
30...	1315	20	--	22200	100	32	--	--	--
JAN., 1969									
03...	1600	13	--	--	50	26	--	--	--
07...	1200	12	--	21800	50	38	--	--	--
10...	1100	17	--	23200	100	34	--	--	--
15...	1600	17	--	24300	100	45	--	--	--
17...	1200	15	--	20300	100	52	--	--	--
20...	1000	16	--	20900	100	48	--	--	--
21...	0900	17	--	19400	100	47	--	--	--
22...	1400	16	--	20200	100	58	--	--	--
28...	1200	15	7.0	20800	120	49	112	137	0
29...	1200	9.0	7.2	22700	50	52	89	109	0
FEB.									
05...	1500	8.0	--	24000	120	41	--	--	--
06...	1330	6.0	6.8	27800	40	23	41	50	0
12...	1330	13	6.2	23100	80	24	97	118	0
13...	1415	13	7.2	--	100	29	112	137	0
17...	1615	19	6.8	--	100	37	112	136	0
18...	1115	13	6.8	--	100	39	103	125	0
19...	1330	10	7.2	26000	60	37	108	132	0
21...	1430	16	7.0	21000	80	54	113	138	0
24...	1200	16	7.0	23500	60	68	119	145	0
25...	1030	16	6.9	24900	60	52	105	128	0
26...	0900	7.0	6.8	20700	20	25	121	148	0
27...	1100	14	7.0	24300	80	43	112	136	0
28...	1200	7.0	6.6	20300	20	41	103	126	0
MAR.									
04...	1100	8.0	7.0	25300	20	58	112	137	0
05...	0930	6.0	7.2	23700	20	13	105	128	0
11...	1045	8.0	7.0	--	20	37	120	146	0
12...	0930	5.0	7.2	18700	100	50	130	158	0
12...	1345	7.0	7.0	--	80	53	110	134	0
13...	1045	7.0	7.2	--	40	48	125	152	0
17...	1330	9.0	7.0	18900	40	--	102	124	0
19...	1450	11	7.0	19800	40	--	131	160	0
20...	0900	9.0	7.2	21200	40	13	159	194	0
21...	1030	10	7.2	23000	40	26	112	136	0
25...	1000	11	7.3	18500	40	22	112	136	0
26...	1415	12	7.2	22800	40	30	136	166	0
27...	1400	13	7.3	19800	40	24	121	147	0
28...	1245	11	7.3	12900	40	17	113	138	0
31...	1330	10	7.3	10700	40	17	108	132	0
APR.									
01...	1100	14	7.2	11800	40	23	101	123	0
02...	1130	10	7.2	10800	40	25	89	109	0
07...	1420	11	7.2	15400	40	15	63	77	0
08...	1130	12	7.3	13600	40	13	108	132	0
11...	1345	16	7.3	10400	40	17	89	109	0

Table 1. Field analyses of feed, blowdown, and distillate-water samples, pilot desalination plant, Jersey City, N.J.--Cont.

DATE	CHLORIDE (CL) (MG/L)	AMMONIA NITROGEN (N) (MG/L)	DISSOLVED OXYGEN (MG/L)	HYDROGEN SULFIDE (MG/L)	FREE AVAILABLE CHLORINE (MG/L)	TOTAL RESIDUAL CHLORINE (MG/L)	CYANIDE (CN) (MG/L)	TOTAL IRON (FE) (UG/L)
01378640 - HACKENSACK R AT JERSEY CITY NJ (LAT 40 44 41 LONG 074 04 30.1)								
JULY, 1968								
15...	5200	--	3.3	.0	.00	.00	.00	--
16...	7600	--	3.8	.0	.00	.00	.00	--
18...	4750	--	3.9	.0	.00	.00	.00	--
22...	5650	--	3.6	.0	.00	.00	.00	--
26...	6000	--	3.7	.0	.00	.00	.00	--
29...	8750	--	4.8	.0	.00	.00	.00	--
AUG.								
06...	5950	--	1.8	.0	.35	.25	.00	--
07...	9150	5.1	3.8	.0	.00	.00	.00	--
22...	11200	5.1	3.7	.0	.00	.00	.00	--
22...	8000	--	3.9	.0	.00	.00	.00	--
SEP.								
25...	9300	--	3.3	--	.00	.00	.00	--
NOV.,								
06...	12500	4.0	3.2	.7	.00	.00	.00	--
14...	7500	4.0	5.7	.7	.00	.00	.00	--
27...	6950	4.0	5.5	.3	.00	.00	.00	--
DEC.								
02...	--	--	4.2	.0	.00	.00	.00	--
03...	7000	--	4.5	.0	.00	.00	.00	--
04...	8800	--	7.7	.3	.00	.00	.00	--
05...	6000	--	6.8	.3	.00	.00	.00	--
06...	6000	--	5.0	.0	.00	.00	.00	--
09...	5500	--	5.0	.0	.00	.00	.00	--
10...	5620	--	7.4	.3	.00	.00	.00	--
11...	2920	1.7	5.0	.2	.00	.00	.00	--
12...	5800	1.5	4.9	1.4	.00	.00	.00	--
13...	5900	1.6	5.2	.0	.00	.00	.00	--
17...	4580	1.6	5.2	.2	.00	.00	.00	--
18...	4150	1.7	5.1	.2	.00	.00	.00	--
19...	5400	1.0	5.0	.5	.00	.00	.00	--
20...	8000	1.2	5.1	.7	.00	.00	.00	--
23...	7050	1.6	4.9	.5	.00	.00	.00	--
24...	7000	1.4	5.2	.5	.00	.00	.00	--
30...	5950	1.3	4.7	.4	.00	.00	.00	--
JAN., 1969								
03...	7000	1.2	5.0	.6	.00	.00	.00	--
07...	7450	1.1	5.2	.5	.00	.00	.00	--
10...	6250	1.4	5.1	.5	.00	.00	.00	--
15...	7220	1.2	4.9	.6	.00	.00	.00	--
17...	6950	1.2	5.1	.4	.00	.00	.00	--
20...	6520	1.4	5.0	.6	.00	.00	.00	--
21...	6180	1.4	4.9	.4	.00	.00	.00	--
22...	6720	1.6	4.8	.2	.00	.00	.00	--
28...	6980	1.4	4.8	.6	.00	.00	.00	--
29...	7220	1.7	4.7	.3	.00	.00	.00	--
FEB.								
05...	7180	1.2	4.8	.4	.00	.00	.00	--
06...	7250	4.0	7.5	.0	.00	.00	.00	--
12...	6850	1.8	7.8	.2	.00	.00	.00	--
13...	6550	1.1	4.8	.3	.00	.00	.00	--
17...	6680	1.5	4.8	.2	.00	.00	.00	--
18...	10000	1.0	2.8	.3	.00	.00	.00	--
19...	9480	3.5	7.7	.0	.00	.00	.00	--
21...	10900	.80	6.6	.0	.00	.00	.00	--
24...	9100	1.2	3.3	.6	.00	.00	.00	--
25...	8700	1.4	5.5	.2	.00	.00	.00	--
26...	7350	3.2	7.6	.7	.00	.00	.00	--
27...	8680	--	6.5	.0	.00	.00	.00	--
28...	7950	2.8	6.5	.6	.00	.00	.00	--
MAR.								
04...	8050	--	7.0	1.0	.00	.00	.00	--
05...	11600	2.8	.0	.7	.00	.00	.00	
11...	6750	--	7.3	.3	.00	.00	.00	--
12...	6350	2.7	7.9	.5	.00	.00	.00	--
12...	7450	.00	7.0	.2	.00	.00	.00	--
13...	7820	.80	7.5	.3	.00	.00	.00	1200
17...	7420	.00	7.4	.2	.00	.00	.00	2100
19...	7150	.00	6.4	.3	.00	.00	.00	2300
20...	8680	.70	5.4	.3	.00	.00	.00	700
21...	8950	.00	5.8	.3	.00	.00	.00	600
25...	6650	.30	6.6	.3	.00	.00	.00	400
26...	7420	.40	7.8	.2	.00	.00	.00	400
27...	8100	.10	7.1	.5	.00	.00	.00	400
28...	3720	6.9	6.6	1.4	.00	.00	.00	280
31...	3980	.80	7.8	1.6	.00	.00	.00	470
APR.								
01...	4180	1.6	7.3	.9	.00	.00	.00	600
02...	39	.30	7.7	1.4	.00	.00	.00	510
07...	5450	2.2	7.0	1.0	.00	.00	.00	430
08...	4980	.20	7.1	.7	.00	.00	.00	400
11...	3950	1.9	7.6	.8	.00	.00	.00	430

Table 1. Field analyses of feed, blowdown, and distillate-water samples, pilot desalination plant, Jersey City, N.J.--Cont.

DATE	TIME	TEMPERATURE (DEG C)	PH (UNITS)	SPECIFIC CONDUCTANCE (MICROMHOS)	COLOR (PLATINUM-COBALT UNITS)	TURBIDITY (MG/L)	ALKALINITY AS CACO3 (MG/L)	BICARBONATE (HCO3) (MG/L)	CARBONATE (CO3) (MG/L)
01378640 - HACKENSACK R AT JERSEY CITY NJ (LAT 40 44 41 LONG 074 04 30.1)									
APR., 1969									
15...	1100	15	7.4	12600	40	24	102	124	0
17...	1030	17	7.2	13300	40	40	57	69	0
21...	1530	25	7.4	11900	40	32	108	132	0
22...	1100	20	7.2	12800	40	20	100	122	0
24...	0930	17	7.4	10300	80	21	120	146	0
29...	1030	18	7.4	10300	40	30	108	132	0
MAY									
02...	0815	24	7.3	12900	80	32	100	122	0
06...	0830	20	7.1	10600	60	25	130	158	0
13...	1030	17	7.1	13900	80	32	113	138	0
14...	0800	17	7.4	--	40	28	--	--	0
20...	1100	21	7.5	--	80	29	130	158	0
21...	0800	22	7.5	12400	80	25	156	190	0
22...	1400	20	7.0	--	80	56	113	138	0
26...	1230	25	7.0	9600	80	31	118	144	0
27...	1030	20	7.2	13300	80	50	135	164	0
28...	1030	15	7.0	13000	80	51	128	156	0
29...	1030	21	7.1	14600	80	46	117	143	0
JUNE									
03...	0900	24	7.4	15300	80	25	128	156	0
04...	1100	24	7.1	18000	80	25	111	135	0
10...	0830	25	7.3	20700	40	20	110	134	0
11...	1800	24	7.4	20700	80	26	109	133	0
16...	1800	27	7.4	13200	80	--	100	122	0
17...	1800	27	7.3	15300	80	52	120	146	0
18...	1200	26	7.1	17400	20	32	115	140	0
19...	1800	27	7.3	14000	80	42	137	167	0
23...	0830	26	7.4	15900	60	28	115	140	0
24...	1800	25	7.3	20400	80	31	94	115	0
26...	1800	26	7.0	19100	80	52	112	137	0
27...	1730	27	--	17600	80	57	--	--	--
JULY									
02...	1730	26	--	16300	80	47	--	--	--
08...	1730	27	--	16700	80	37	--	--	--
09...	1030	26	7.2	15800	40	32	141	172	0
16...	0830	28	7.2	16400	40	25	138	168	0
24...	1700	25	7.0	22200	20	38	100	122	0
25...	0900	27	7.0	19700	30	32	131	160	0
29...	1000	27	7.1	17700	40	32	118	144	0
AUG.									
05...	1730	29	7.0	13500	40	42	95	116	0
06...	0800	30	7.0	11600	40	25	123	150	0
06...	1730	30	7.0	13700	40	38	92	112	0
07...	1730	30	7.0	13000	40	36	90	110	0
13...	0845	27	7.1	15500	40	32	98	120	0
20...	1645	29	7.3	17700	40	36	90	110	0
26...	1030	34	7.1	22300	40	25	98	120	0
SEP.									
03...	1730	33	--	--	40	29	--	--	--
04...	0830	34	6.2	15300	40	32	75	92	0
10...	0845	36	7.2	18000	40	28	112	136	0
16...	0930	36	7.1	16400	80	48	120	146	0
22...	1730	23	6.8	22200	80	35	121	148	0
23...	0945	23	7.3	22400	40	25	116	142	0
24...	1730	29	6.8	15900	80	26	107	130	0
30...	1730	--	--	--	--	--	--	--	--
OCT.,									
01...	1730	22	7.2	20000	80	26	84	103	0
02...	1730	21	7.0	19600	80	39	92	112	0
03...	1730	23	6.8	22500	80	32	75	92	0
10...	1730	25	7.3	16500	40	23	97	118	0
14...	1730	25	6.8	19000	80	24	84	102	0
16...	1730	22	6.0	22300	80	25	99	121	0
29...	1000	25	7.3	25700	40	45	135	164	0
NOV.									
06...	0930	25	7.3	21400	40	28	149	182	0
10...	1330	16	6.4	20100	80	38	118	144	0
11...	1730	22	6.8	18200	80	32	104	127	0
12...	1730	16	6.7	19200	80	31	107	130	0
14...	1730	17	6.9	17600	80	37	104	127	0
18...	1730	19	7.0	19000	80	--	93	113	0
25...	1730	17	6.9	19300	80	32	107	130	0
DEC.									
01...	1730	20	7.2	18300	80	59	100	122	0
02...	0945	20	7.5	17000	40	26	143	174	0
02...	1430	18	6.8	20600	80	29	103	125	0
03...	1730	19	6.2	19800	80	33	36	44	0
04...	1730	17	--	21500	80	31	--	--	--

Table 1. Field analyses of feed, blowdown, and distillate-water samples, pilot desalination plant, Jersey City, N.J.--Cont.

DATE	CHLORIDE (CL) (MG/L)	AMMONIA NITROGEN (N) (MG/L)	DISSOLVED OXYGEN (MG/L)	HYDROGEN SULFIDE (MG/L)	FREE AVAILABLE CHLORINE (MG/L)	TOTAL RESIDUAL CHLORINE (MG/L)	CYANIDE (CN) (MG/L)	TOTAL IRON (FE) (UG/L)
01378640 - HACKENSACK R AT JERSEY CITY NJ (LAT 40 44 41 LONG 074 04 30.1)								
APR., 1969								
15...	4400	2.4	6.8	.9	.00	.00	.00	820
17...	4980	.40	4.6	3.3	.00	.00	.00	740
21...	6350	3.0	5.6	1.5	.00	.00	.00	630
22...	4650	2.5	6.2	1.2	.00	.00	.00	600
24...	3500	2.0	7.1	1.0	.00	.00	.00	550
29...	3720	.50	6.6	1.4	.00	.00	.00	--
MAY								
02...	4450	3.0	4.5	.4	.00	.00	.00	--
06...	3350	2.5	4.7	.0	.00	.00	.00	--
13...	4.9	1.5	4.9	.8	.00	.00	.00	440
14...	6100	2.7	5.6	.0	.00	.00	.00	--
20...	6350	1.8	3.7	.6	.00	.00	.00	1300
21...	3800	6.0	4.0	.5	.00	.00	.00	--
22...	7000	.80	4.2	.5	.00	.00	.00	550
26...	4200	1.4	3.4	.5	.00	.00	.00	600
27...	4450	1.1	2.9	.3	.00	.00	.00	600
28...	4620	1.4	3.0	.3	.00	.00	.00	850
29...	5600	1.3	3.2	.1	.00	.00	.00	600
JUNE								
03...	5500	3.0	3.6	.4	.00	.00	.00	--
04...	6380	1.2	.8	.8	.00	.00	.00	1100
10...	7600	3.5	4.0	.0	.00	.00	.00	1200
11...	7420	1.1	3.0	.8	.00	.00	.00	650
16...	4700	.80	1.1	.3	.00	.00	.00	850
17...	5400	1.4	4.2	1.4	.00	.00	.00	580
18...	6500	2.9	3.9	.0	.00	.00	.00	--
19...	4900	1.0	4.0	.6	.00	.00	.00	900
23...	5900	2.6	2.0	.0	.00	.00	.00	--
24...	7900	1.1	3.3	.6	.00	.00	.00	810
26...	7150	1.1	3.0	.5	.00	.00	.00	880
27...	6120	1.2	.8	.6	.00	.00	.00	720
JULY								
02...	5700	1.4	2.3	.3	.00	.00	.00	9500
08...	6780	1.4	2.0	.6	.00	.00	.00	--
09...	5800	2.7	3.6	.0	.00	.00	.00	--
16...	6500	3.4	2.7	.0	.00	.00	.00	--
24...	8480	2.9	1.2	.6	.00	.00	.00	--
25...	7600	.40	2.8	.2	.00	.00	.00	--
29...	6600	2.1	2.9	.0	.00	.00	.00	--
AUG.								
05...	4900	4.4	1.7	.8	.00	.00	.00	--
06...	4250	--	3.3	.5	.00	.00	.00	--
06...	4900	--	2.9	.7	.00	.00	.00	--
07...	5250	--	2.1	.4	.00	.00	.00	--
13...	5550	--	2.7	.9	.00	.00	.00	--
20...	6050	--	3.4	2.9	.00	.00	.00	--
26...	7500	3.2	4.1	.0	.00	.00	.00	--
SEP.								
03...	8780	2.0	4.1	.6	.00	.00	.00	--
04...	5400	3.4	1.9	.3	.00	.00	.00	--
10...	6700	1.1	1.4	.3	.00	.00	.00	--
16...	5600	4.0	3.0	.2	.00	.00	.00	--
22...	8250	1.3	2.2	.0	.00	.00	.00	--
23...	8500	4.0	4.8	.7	.00	.00	.00	--
24...	5800	2.1	3.3	.5	.00	.00	.00	--
30...	--	--	--	--	--	--	--	1400
OCT.,								
01...	--	4.8	2.6	.8	.00	.00	.00	720
02...	--	3.8	2.1	2.7	.00	.00	.00	500
03...	--	4.4	2.4	3.9	.00	.00	.00	550
10...	--	4.2	2.1	.0	.00	.00	.00	800
14...	--	.30	2.3	1.3	.00	.00	.00	1800
16...	--	.30	1.8	1.1	.00	.00	.00	1400
29...	11000	2.4	4.3	.2	.00	.00	.00	1400
NOV.								
06...	8650	2.5	2.8	.7	.00	.00	.00	--
10...	--	5.0	6.0	--	.00	.00	.00	--
11...	--	4.0	5.4	--	.00	.00	.00	--
12...	--	4.0	5.1	--	.00	.00	.00	--
14...	--	4.8	4.7	--	.00	.00	.00	--
18...	--	3.9	4.8	--	.00	.00	.00	--
25...	--	3.2	3.0	--	.00	.00	.00	--
DEC.								
01...	--	.90	3.6	--	.00	.00	.00	--
02...	6000	3.5	5.9	.5	.00	.00	.00	--
02...	--	1.1	5.5	--	.00	.00	.00	--
03...	--	2.1	5.7	--	.00	.00	.00	--
04...	--	2.6	6.1	--	.00	.00	.00	--

Table 1. Field analyses of feed, blowdown, and distillate-water samples, pilot desalination plant, Jersey City, N.J.--Cont.

DATE	TIME	TEMPERATURE (DEG C)	PH (UNITS)	SPECIFIC CONDUCTANCE (MICROMHOS)	COLOR (PLATINUM-COBALT UNITS)	TURBIDITY (MG/L)	ALKALINITY AS CACO3 (MG/L)	BICARBONATE (HCO3) (MG/L)	CARBONATE (CO3) (MG/L)
01370641 - PILOT DESALINATION PLANT BLOWDOWN (LAT 44 04 41 LONG 074 04 30.2)									
JULY, 1968									
15...	1430	28	6.8	16500	--	--	151	186	0
16...	1430	43	8.4	--	--	--	230	260	10
18...	1000	44	8.6	26000	--	--	128	105	24
22...	--	77	8.8	22000	--	--	156	142	24
26...	1300	50	8.6	22400	200	85	151	136	24
29...	1100	42	8.9	33600	144	61	95	54	31
AUG.									
07...	1000	60	8.6	30000	408	310	135	128	18
22...	1330	39	8.4	37100	125	25	108	96	18
22...	1400	44	8.8	38000	120	48	139	96	37
SEP.									
25...	1200	49	8.0	37600	55	150	88	107	0
DEC.,									
02...	1100	--	8.2	--	50	15	66	80	0
03...	1500	--	8.0	--	50	34	33	40	0
04...	1000	31	7.8	44800	50	11	25	30	0
05...	1600	18	7.5	--	30	8.5	49	60	0
06...	1100	30	8.4	--	50	30	--	--	--
FEB., 1969									
17...	1615	35	5.4	--	100	52	3	4	0
19...	1330	38	4.0	47100	280	74	0	0	0
26...	0900	37	4.1	25000	40	52	0	0	0
27...	1100	41	4.2	45500	150	87	0	0	0
28...	1200	31	5.0	35700	40	156	5	6	0
MAR.									
04...	1100	31	5.4	41700	80	168	10	12	0
05...	0930	32	3.6	30700	40	66	0	0	0
11...	1045	46	4.4	--	80	204	0	0	0
12...	0930	49	5.8	24400	160	108	11	14	0
12...	1345	45	4.1	24400	160	210	0	0	0
13...	1045	48	4.6	--	80	144	3	4	0
17...	1330	49	4.6	21800	80	--	3	4	0
19...	1450	55	4.9	24700	400	--	5	6	0
20...	0900	54	3.8	29500	120	--	0	0	0
21...	1030	55	4.8	24800	80	72	3	4	0
APR.									
17...	1030	46	7.2	15400	80	192	38	46	0
MAY									
02...	0815	32	7.2	15000	120	108	44	54	0
06...	0830	49	7.5	14000	80	78	56	68	0
14...	0800	31	7.9	25200	80	60	31	38	0
20...	1100	34	5.8	--	160	76	34	42	0
21...	0800	47	7.5	--	120	108	52	64	0
JUNE									
03...	0900	63	8.2	15000	40	79	138	168	0
04...	1100	64	8.8	20200	120	66	92	112	21
10...	0830	65	7.6	21700	40	42	57	70	0
11...	1800	44	6.1	18800	120	63	30	37	0
16...	1800	62	6.4	15600	120	--	23	28	0
17...	1800	54	5.2	24600	120	90	16	19	0
18...	1200	52	7.0	19000	40	53	36	44	0
19...	1800	54	6.7	17200	120	87	35	43	0
23...	0830	58	6.6	17800	80	93	31	38	0
24...	1800	52	6.0	24700	120	84	20	24	0
26...	1800	57	6.0	21100	120	90	24	29	0
27...	1730	54	--	17600	120	114	--	--	--
AUG.									
26...	1030	39	6.9	21700	40	60	48	58	0
SEP.									
03...	1730	30	--	--	120	78	--	--	--
04...	0830	41	7.1	16700	40	79	143	174	0
10...	0845	76	8.9	17700	40	53	89	68	20
16...	0930	69	8.7	18500	80	79	94	94	10
22...	1730	33	8.8	31200	120	92	100	82	20
23...	0945	48	8.1	63500	80	52	84	102	0
24...	1730	33	5.7	16200	120	84	24	29	0
OCT.,									
16...	1730	40	7.5	17200	120	99	85	104	0
29...	1000	62	8.1	28000	40	53	75	92	0
NOV.									
06...	0930	37	6.1	30300	120	69	28	34	0
10...	1330	32	6.5	42000	80	63	8	10	0
12...	1730	31	5.7	17700	40	72	8	10	0
DEC.									
01...	1730	33	7.6	26300	80	108	26	32	0
02...	0945	39	7.8	27000	40	46	31	38	0
02...	1430	35	6.8	29500	80	63	7	8	0
03...	1730	34	5.4	19300	40	72	2	2	0
04...	1730	34	--	23900	40	20	--	--	--

Table 1. Field analyses of feed, blowdown, and distillate-water samples, pilot desalination plant, Jersey City, N.J.--Cont.

DATE	CHLORIDE (CL) (MG/L)	AMMONIA NITROGEN (N) (MG/L)	DISSOLVED OXYGEN (MG/L)	HYDROGEN SULFIDE (MG/L)	FREE AVAILABLE CHLORINE (MG/L)	TOTAL RESIDUAL CHLORINE (MG/L)	CYANIDE (CN) (MG/L)	TOTAL IRON (FE) (UG/L)
01378641 - PILOT DESALINATION PLANT BLOWDOWN (LAT 44 04 41 LONG 074 04 30.2)								
JULY, 1968								
15...	5100	--	2.6	.0	.00	.00	.00	--
16...	6550	--	5.3	.2	.00	.00	.00	--
18...	8550	--	4.1	.4	.00	.00	.00	--
22...	7400	--	2.7	.6	.00	.00	.00	--
26...	7250	--	4.6	.1	.00	.00	.00	--
29...	13700	--	4.8	.0	.00	.00	.00	--
AUG.								
07...	10800	--	3.7	.0	.00	.00	.00	--
22...	14400	4.0	3.3	.0	.00	.00	.00	--
22...	15100	--	3.8	.0	.00	.00	.00	--
SEP.								
25...	14800	--	4.2	--	.00	.05	.00	--
DEC.,								
02...	--	--	--	.0	.00	.00	.00	--
03...	12000	--	5.5	.0	.00	.00	.00	--
04...	16800	--	5.8	.5	.00	.00	.00	--
05...	6250	--	3.2	.0	.00	.00	.00	--
06...	4750	--	4.5	.0	.00	.00	.00	--
FEB., 1969								
17...	10200	3.3	2.7	.2	.00	.00	.00	--
19...	15400	4.0	--	.9	.00	.00	.00	--
26...	9000	3.0	1.6	.5	.00	.00	.00	--
27...	13400	--	--	.5	.00	.00	.00	--
28...	10100	2.0	5.2	.9	.00	.00	.00	--
MAR.								
04...	11700	--	5.3	1.1	.00	.00	.00	--
05...	11600	2.8	.0	.7	.00	.00	.00	--
11...	8880	--	3.1	1.4	.00	.00	.00	--
12...	8500	2.8	--	.0	.00	.00	.00	--
12...	9750	.00	3.6	.3	.00	.00	.00	--
13...	9480	.40	.2	.5	.00	.00	.00	--
17...	9520	.20	.2	.3	.00	.00	.00	--
19...	9200	.40	.5	.5	.00	.00	.00	--
20...	12000	1.0	--	.3	.00	.00	.00	
21...	11400	.10	--	.5	.00	.00	.00	
APR.								
17...	7800	.00	--	1.8	.00	.00	.00	--
MAY								
02...	6300	2.5	.8	.5	.00	.00	.00	--
06...	4800	2.0	2.1	.0	.00	.00	.00	--
14...	9550	2.6	.8	.0	.00	.00	.00	-
20...	6800	2.0	4.4	.6	.00	.00	.00	--
21...	5550	4.0	1.0	1.0	.00	.00	.00	--
JUNE								
03...	5750	1.5	.9	.4	.00	.00	.00	--
04...	6520	.70	.3	.7	.00	.00	.00	--
10...	9200	3.0	2.0	.0	.00	.00	.00	--
11...	8720	.90	1.0	1.0	.00	.00	.00	--
16...	5350	1.7	.5	.9	.00	.00	.00	--
17...	6900	.70	.4	1.2	.00	.00	.00	--
18...	8700	1.3	.9	.0	.00	.00	.00	--
19...	6200	.70	.7	1.0	.00	.00	.00	--
23...	6850	3.1	1.0	.0	.00	.00	.00	--
24...	8920	.80	.7	.9	.00	.00	.00	--
26...	7720	.80	.4	.7	.00	.00	.00	--
27...	6700	.80	.5	1.0	.00	.00	.00	--
AUG.								
26...	8350	2.6	2.2	.0	.00	.00	.00	--
SEP.								
03...	8900	4.9	3.6	.3	.00	.00	.00	--
04...	6250	3.2	1.7	.0	.00	.00	.00	--
10...	6950	.60	1.4	.0	.00	.00	.00	--
16...	6750	3.3	1.0	.5	.00	.00	.00	--
22...	11800	2.4	.5	.3	.00	.00	.00	--
23...	26200	4.0	.8	.2	.00	.00	.00	--
24...	7950	1.0	5.0	1.7	.00	.00	.00	--
OCT., 1969								
16...	--	2.9	3.1	1.8	.00	.00	.00	--
29...	10900	1.8	1.8	.3	.00	.00	.00	--
NOV.								
06...	12000	1.5	.0	.0	.00	.00	.00	--
10...	--	4.3	--	--	.00	.00	.00	--
12...	--	4.2	--	--	.00	.00	.00	--
DEC.								
01...	--	4.2	3.4	--	.00	.00	.00	--
02...	10000	2.9	1.4	.2	.00	.00	.00	--
02...	--	3.6	1.7	--	.00	.00	.00	--
03...	--	4.6	1.4	--	.00	.00	.00	--
04...	--	.30	2.3	--	.00	.00	.00	--

Table 1. Field analyses of feed, blowdown, and distillate-water samples, pilot desalination plant, Jersey City, N.J.--Cont.

DATE	TIME	TEMPERATURE (DEG C)	PH (UNITS)	SPECIFIC CONDUCTANCE (MICROMHOS)	COLOR (PLATINUM-COBALT UNITS)	TURBIDITY (MG/L)	ALKALINITY AS CACO3 (MG/L)	BICARBONATE (HCO3) (MG/L)	CARBONATE (CO3) (MG/L)
01378642 - PILOT DESALINATION PLANT DISTILLATE (LAT 44 04 41 LONG 074 04 30.3)									
JULY, 1968									
15...	1430	28	4.8	14000	--	--	3	4	0
16...	1430	42	8.4	--	--	--	--	--	--
18...	1000	40	8.8	1550	--	--	46	20	18
22...	--	40	8.7	16000	--	--	130	126	16
26...	1330	42	9.2	6700	200	52	75	32	30
29...	1100	39	8.6	16000	28	10	74	66	12
AUG.									
07...	1000	39	8.0	16400	120	78	79	96	0
22...	1330	37	8.6	14500	30	11	82	60	20
22...	1400	39	9.0	5800	15	7.0	61	16	29
SEP.									
25...	1200	37	8.7	65	0	1.2	22	19	4
DEC.,									
02...	1100	--	8.8	--	20	13	--	--	--
03...	1500	--	--	--	--	21	--	--	--
04...	1000	26	7.0	700	0	3.0	20	24	0
05...	1600	25	9.0	--	5	5.5	--	--	--
06...	1100	25	8.8	--	5	5.5	--	--	--
FEB., 1969									
17...	1615	30	7.0	--	30	12	15	18	0
19...	1330	36	5.6	27	25	14	20	24	0
26...	0900	16	5.3	31	25	18	18	22	0
27...	1100	38	5.4	29	20	11	23	28	0
28...	1200	27	5.8	3200	5	16	4	5	0
MAR.									
04...	1100	29	6.2	450	5	14	9	11	0
05...	0930	28	5.6	83	5	5.0	5	6	0
11...	1045	42	6.0	--	5	14	6	7	0
12...	0930	48	6.0	--	20	3.0	5	6	0
12...	1345	43	6.0	--	10	2.7	7	8	0
13...	1045	47	6.5	--	5	3.2	10	12	0
17...	1330	48	6.2	185	5	--	5	6	0
19...	1450	48	5.6	11100	400	--	8	10	0
20...	0900	51	5.6	340	10	5.0	4	5	0
21...	1030	51	5.9	377	5	4.0	10	12	0
APR.									
17...	1030	30	5.8	1600	5	24	34	42	0
MAY									
02...	0815	31	6.5	79	10	13	28	34	0
06...	0830	20	5.7	107	5	9.0	43	52	0
14...	0800	28	6.8	--	10	7.0	16	20	0
20...	1100	31	5.6	--	10	14	20	24	0
21...	0800	41	6.1	--	40	25	28	34	0
JUNE									
03...	0900	46	6.6	12600	80	32	136	166	0
04...	1100	41	7.0	14700	10	16	111	135	0
10...	0830	53	6.2	244	10	11	39	48	0
11...	1800	42	6.4	260	10	10	25	31	0
16...	1800	53	5.8	290	10	--	43	52	0
17...	1800	41	5.4	150	10	13	25	30	0
18...	1200	49	6.0	260	10	12	26	32	0
19...	1800	49	6.3	250	10	14	44	54	0
23...	0830	49	5.6	212	20	18	26	32	0
24...	1800	48	5.6	168	10	4.5	26	32	0
26...	1800	49	5.6	220	10	14	--	--	0
27...	1730	47	--	270	10	12	--	--	--
AUG.									
26...	1030	38	6.9	5800	100	29	18	22	0
SEP.									
03...	1730	34	--	--	20	9.4	--	--	--
04...	0830	37	7.2	16800	40	23	75	92	0
10...	0845	51	7.2	15600	40	25	85	104	0
16...	0930	48	6.6	11100	45	21	75	92	0
22...	1730	29	7.6	7060	10	12	71	86	0
23...	0945	42	7.0	16300	35	18	34	42	0
24...	1730	32	6.8	2600	10	11	48	59	0
OCT.,									
16...	1730	29	6.4	30500	20	8.0	124	151	0
29...	1000	30	7.3	3400	40	40	74	90	0
NOV.									
06...	0930	36	7.1	24	0	5.5	25	30	0
10...	1330	29	7.5	383	0	4.8	11	14	0
12...	1730	28	8.6	367	0	4.2	--	--	--
DEC.									
01...	1730	32	8.6	250	5	11	--	--	--
02...	0945	37	7.6	242	5	6.7	34	42	0
02...	1430	31	8.2	107	5	8.2	17	21	0
03...	1720	30	8.2	217	5	7.6	10	12	0
04...	1730	32	--	210	5	9.1	--	--	--

Table 1. Field analyses of feed, blowdown, and distillate-water samples, pilot desalination plant, Jersey City, N.J.--Cont.

DATE	CHLORIDE (CL) (MG/L)	AMMONIA NITROGEN (N) (MG/L)	DISSOLVED OXYGEN (MG/L)	HYDROGEN SULFIDE (MG/L)	FREE AVAILABLE CHLORINE (MG/L)	TOTAL RESIDUAL CHLORINE (MG/L)	CYANIDE (CN) (MG/L)	TOTAL IRON (FE) (UG/L)
01378642 - PILOT DESALINATION PLANT DISTILLATE (LAT 44 04 41 LONG 074 04 30.3)								
JULY, 1968								
15...	—	—	—	.0	.00	.00	.00	—
16...	2900	—	—	.1	.00	.00	.00	—
18...	370	—	1.0	.0	.00	.00	.00	—
22...	4800	—	.3	.1	.00	.00	.00	—
26...	1250	—	.0	.1	.00	.00	.00	—
29...	4700	—	.2	.0	.00	.00	.00	—
AUG.								
07...	4700	—	3.2	.0	.00	.00	.00	—
22...	4350	6.3	.3	.0	.00	.00	.00	—
22...	1500	—	.1	.0	.00	.00	.00	—
SEP.								
25...	6.0	—	1.9	—	.00	.00	.00	—
DEC.,								
02...	—	—	3.0	.0	.00	.00	.00	—
03...	500	—	5.5	.0	.00	.00	.00	—
04...	160	—	3.1	.3	.00	.00	.00	—
05...	500	—	7.0	.0	.00	.00	.00	—
06...	250	—	5.5	.0	.00	.00	.00	—
FEB., 1969								
17...	78	1.3	5.4	.2	.00	.00	.00	—
19...	7.0	4.0	1.0	.3	.00	.00	.00	—
26...	7.0	.80	2.2	.3	.00	.00	.00	—
27...	7.5	—	1.3	.2	.00	.00	.00	—
28...	105	.60	.9	1.4	.00	.00	.00	—
MAR.								
04...	88	—	.7	.0	.00	.00	.00	—
05...	84	.40	1.0	.3	.00	.00	.00	—
11...	80	—	.6	.2	.00	.00	.00	—
12...	60	.40	.7	.3	.00	.00	.00	—
12...	50	.40	.7	.2	.00	.00	.00	—
13...	62	.70	.5	.0	.00	.00	.00	—
17...	90	.50	.7	.0	.00	.00	.00	—
19...	4450	1.0	.5	.2	.00	.00	.00	—
20...	70	.10	1.2	.3	.00	.00	.00	—
21...	80	.20	.4	.0	.00	.00	.00	—
APR.								
17...	385	2.8	.5	.9	.00	.00	.00	—
MAY								
02...	30	3.5	2.3	.5	.00	.00	.00	—
06...	45	3.0	2.1	.0	.00	.00	.00	—
14...	60	3.2	1.1	.0	.00	.00	.00	—
20...	1640	.90	1.1	.4	.00	.00	.00	—
21...	1550	1.0	1.4	1.0	.00	.00	.00	—
JUNE								
03...	4650	.80	1.8	.4	.00	.00	.00	—
04...	5120	1.2	1.5	.2	.00	.00	.00	—
10...	330	3.8	3.0	.3	.00	.00	.00	—
11...	52	1.2	1.3	.5	.00	.00	.00	—
16...	50	3.9	.2	.1	.00	.00	.00	—
17...	40	1.9	.6	.6	.00	.00	.00	—
18...	150	3.5	1.2	3.5	.00	.00	.00	—
19...	52	4.4	.9	.0	.00	.00	.00	—
23...	150	4.0	1.2	.0	.00	.00	.00	—
24...	62	2.4	1.0	.0	.00	.00	.00	—
26...	65	4.3	.8	.0	.00	.00	.00	—
27...	45	4.6	.9	.2	.00	.00	.00	—
AUG.								
26...	2150	.50	3.4	.0	.00	.00	.00	—
SEP.								
03...	—	1.0	1.3	1.1	.00	.00	.00	—
04...	6000	3.3	1.4	.3	.00	.00	.00	—
10...	5850	.50	3.9	.3	.00	.00	.00	—
16...	3900	1.3	1.6	.0	.00	.00	.00	—
22...	2550	.50	1.9	.0	.00	.00	.00	—
23...	6150	.80	2.2	.3	.00	.00	.00	—
24...	525	1.8	1.5	.3	.00	.00	.00	—
OCT.,								
16...	—	.80	3.4	.4	.00	.00	.00	—
29...	1150	.90	2.4	.0	.00	.00	.00	—
NOV.								
06...	5.0	4.0	.3	.0	.00	.00	.00	—
10...	26	3.0	1.4	—	.00	.00	.00	—
12...	9.0	2.1	2.8	—	.00	.00	.00	—
DEC.								
01...	2.0	5.6	2.2	—	.00	.00	.00	—
02...	76	3.9	2.4	.0	.00	.00	.00	—
02...	3.0	4.8	2.1	—	.00	.00	.00	—
03...	22	5.8	2.8	—	.00	.00	.00	—
04...	16	2.8	1.3	—	.00	.00	.00	—

Table 2. N.J. State Department of Environmental Protection analyses of feed, blowdown, and distillate-water samples, pilot desalination plant, Jersey City, N.J.

DATE	AMMONIA NITROGEN (N) (MG/L)	NITRITE (N) (MG/L)	NITRATE (N) (MG/L)	TOTAL KJELDAHL NITROGEN (N) (MG/L)	BIOCHEMICAL OXYGEN DEMAND (MG/L)	CHEMICAL OXYGEN DEMAND (MG/L)	METHYLENE BLUE ACTIVE SUBSTANCE (MG/L)	CYANIDE (CN) (MG/L)	COLIFORM (COLONIES PER 100 ML)	COLIFORM (MPN)	FECAL COLIFORM (MPN)	FECAL STREPTOCOCCI (MPN)
01378640 - HACKENSACK R AT JERSEY CITY NJ (LAT 40 44 41 LONG 074 04 30.1)												
AUG., 1968												
07...	--	--	--	--	4.0	--	--	--	90000	24000	--	--
SEP.												
25...	--	.12	--	3.0	4.0	--	--	--	--	240000	160900	--
NOV.												
06...	3.0	.10	.90	3.0	1.0	409	1.1	.00	--	54200	10900	--
14...	4.0	.12	.88	6.0	4.0	132	.90	.00	--	160900	17200	--
DEC.												
04...	2.0	.00	.00	4.0	2.0	128	.90	.00	--	16090	13	--
FEB., 1969												
26...	6.0	.09	.50	8.0	3.0	97	1.7	.00	--	3480	1300	--
MAR.												
05...	4.0	.04	.50	7.0	4.0	94	1.0	.00	--	160900	22100	--
12...	6.0	.04	1.0	9.0	--	86	1.5	.00	--	2400	790	--
20...	4.0	.05	.0	5.0	3.0	87	2.3	.00	--	34800	2400	--
MAY												
02...	3.0	.11	1.0	3.0	1.0	91	.85	.00	23000	240000	240000	--
06...	2.0	.13	6.6	3.0	1.0	99	.82	.00	1800	4900	3480	--
14...	3.0	.13	1.0	3.0	3.0	78	.60	.00	180000	240000	13000	--
21...	5.0	.18	.00	5.0	3.0	83	.52	.00	43000	34200	3300	--
JUNE												
03...	4.0	.13	.00	5.0	1.0	122	.75	.00	--	3480	310	--
10...	2.0	.16	.00	4.0	2.0	158	.40	.00	3300	7900	2400	330
18...	2.0	.11	.00	4.0	--	148	.50	.00	2400	--	--	--
23...	3.0	.16	.00	5.0	1.0	197	1.2	.00	4200	7900	1720	50
AUG.												
13...	1.0	.17	.00	3.0	--	--	1.0	.00	43000	34800	7900	20
26...	1.0	.16	.00	2.0	3.0	1800	.60	.00	3400	34800	1720	330
SEP.												
04...	2.0	.27	.00	4.0	2.0	722	.50	.00	3700	9180	790	790
10...	1.0	.07	.00	3.0	--	953	.00	.00	14600	91800	24000	1300
16...	3.0	.23	.00	4.0	3.0	535	.50	.00	6000	1300	1300	<20
23...	2.0	.19	1.0	3.0	4.0	1200	.60	.00	110000	91800	9400	330
OCT.												
29...	2.0	.15	.00	4.0	1.0	1314	.83	.00	25	50	20	<20
NOV.												
06...	3.0	.15	.00	5.0	2.0	1044	.60	.00	210000	54200	3480	20
DEC.												
02...	3.0	.11	1.0	5.0	1.0	389	.15	.00	2400	2300	230	50
01378641 - PILOT DESALINATION PLANT BLOWDOWN (LAT 44 04 41 LONG 074 04 30.2)												
AUG., 1968												
07...	--	--	--	--	3.0	--	--	--	10	2	--	--
SEP.												
25...		.19	--	2.0	4.0	--	--	--	--	9180	2210	--
DEC.												
04...	2.0	.00	.00	3.0	3.0	468	1.2	.00	--	1609	8	--
FEB., 1969												
26...	6.0	.04	.50	9.0	1.0	180	4.6	.00	--	<2	<2	--
MAR.												
05...	5.0	.03	.50	8.0	1.0	112	1.2	.00	--	172	130	--
12...	7.0	.05	.00	11	--	263	.20	.00	--	49	33	--
20...	5.0	.02	1.0	8.0	--	250	--	.00	--	<2	<2	--
MAY												
02...	2.0	.12	.00	3.0	1.0	114	.85	.00	3900	24000	24000	--
06...	2.0	.15	1.0	5.0	--	119	.85	.00	130	348	130	--
14...	2.0	.20	1.0	3.0	2.0	141	.80	.00	5700	2400	918	--
21...	4.0	.22	1.0	5.0	1.0	115	.52	.00	<2	<2	<2	--
JUNE												
03...	4.0	.13	.00	4.0	--	115	.68	.00	<2	<2	<2	--
10...	1.0	.11	.00	3.0	1.0	155	.42	.00	<2	<2	<2	<20
18...	2.0	.13	.00	4.0	--	374	.50	.00	<2	<2	<2	<20
23...	5.0	.02	.00	6.0	--	12	.00	.00	1	8	8	<20
AUG.												
26...	1.0	.14	.00	2.0	1.0	1486	.40	.00	2300	460	460	50
SEP.												
04...	1.0	.20	.00	3.0	--	1424	.60	.00	60	13	5	<20
10...	1.0	.07	.00	2.0	--	980	.70	.00	0	<2	2	<20
16...	1.0	.20	.00	3.0	1.0	974	.60	.00	0	<2	<2	<20
23...	1.0	.28	.00	4.0	3.0	4470	1.5	.00	0	<2	<2	<20
OCT.												
29...	1.0	.15	.00	3.0	--	1277	.88	.00	0	<2	<2	<20
NOV.												
06...	3.0	.13	.00	4.0	--	2018	1..	.00	3	5	2	<20
DEC.												
02...	1.0	.11	1.0	3.0	1.0	992	.23	.00	4	2	2	<20

Table 2. N.J. State Department of Environmental Protection analyses of feed, blowdown, and distillate-water samples, pilot desalination plant, Jersey City, N.J.--Cont.

DATE	AMMONIA NITROGEN (N) (MG/L)	NITRITE (N) (MG/L)	NITRATE (N) (MG/L)	TOTAL KJELDAHL NITROGEN (N) (MG/L)	BIOCHEMICAL OXYGEN DEMAND (MG/L)	CHEMICAL OXYGEN DEMAND (MG/L)	METHYLENE BLUE ACTIVE SUBSTANCE (MG/L)	CYANIDE (CN) (MG/L)	COLIFORM (COLONIES PER 100 ML)	COLIFORM (MPN)	FECAL COLIFORM (MPN)	FECAL STREPTOCOCCI (MPN)
01378642 - PILOT DESALINATION PLANT DISTILLATE (LAT 44 04 41 LONG 074 04 30.3)												
AUG., 1968												
07...	--	--	--	--	2.0	--	--	--	10	2	--	--
SEP.												
25...	--	.00	--	3.0	--	--	--	--	--	20	20	--
DEC.												
04...	3.0	.00	.00	3.0	--	.0	.00	.00	--	<2	<2	--
FEB., 1969												
26...	2.0	.04	.50	3.0	1.0	41	.60	.07	--	<2	<2	--
MAR.												
05...	.00	.00	.00	3.0	1.0	1.0	.00	.00	--	<2	<2	--
12...	.00	.00	.00	2.0	1.0	.0	.00	.00	--	<2	<20	--
20...	.00	.00	.00	2.0	--	.0	.00	.03	--	<20	<2	--
MAY												
02...	5.0	.02	.00	6.0	--	23	.00	.00	<2	<2	<2	--
06...	10	.01	.00	10	--	.0	.00	.00	0	<2	<2	--
14...	3.0	.01	.00	4.0	--	.0	.00	.00	1	<2	<2	--
21...	5.0	.06	.00	6.0	--	40	.00	.00	0	<2	<2	--
JUNE												
03...	7.0	.11	.00	11	--	100	.42	.00	0	<2	<2	--
10...	8.0	.01	.00	10	--	.0	.00	.00	<2	<2	<2	<20
18...	5.0	.01	.00	6.0	1.0	10	.00	.00	<2	<2	<2	<20
23...	2.0	.10	.00	4.0	--	275	1.2	.00	1	<2	<2	<20
AUG.												
26...	.50	.03	.00	3.0	--	255	.20	.00	--	918	348	20
SEP.												
04...	2.0	.16	.00	4.0	--	546	.60	.00	5	2	<20	<20
10...	2.0	.07	.00	4.0	--	980	.40	.00	0	<2	< 2	<20
16...	4.0	.13	.00	6.0	--	478	.40	.00	2	<2	<20	<20
23...	2.0	.01	.00	2.0	--	.0	.20	.00	8	33	<20	<20
OCT.												
29...	9.0	.02	.00	11	--	56	.00	.00	0	2	<2	<20
NOV.												
06...	2.0	.03	.00	4.0	--	.0	.00	.00	0	<2	<2	<20
DEC.												
02...	5.0	.02	.00	8.0	--	19	.00	.00	0	<2	<2	<2

Table 3. U.S. Geological Survey analyses of feed, blowdown, and distillate-water samples, pilot desalination plant, Jersey City, N.J.

DATE	TIME	SILICA (SIO2) (MG/L)	IRON (FE) (UG/L)	MANGANESE (MN) (UG/L)	COPPER (CU) (UG/L)	NICKEL (NI) (UG/L)	CALCIUM (CA) (MG/L)	MAGNESIUM (MG) (MG/L)	SODIUM (NA) (MG/L)	SODIUM PLUS POTASSIUM (NA+K) (MG/L)	POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)
01378640 - HACKENSACK R AT JERSEY CITY NJ (LAT 40 44 41 LONG 074 04 30.1)												
JULY, 1968												
31...	--	1.0	680	0	0	60	230	640	5400	--	230	126
AUG.												
07...	1000	1.0	2000	350	130	80	200	600	5000	--	238	166
SEP.												
25...	1200	.2	1300	370	50	50	215	640	5400	--	242	107
NOV.												
06...	0930	2.2	410	240	90	130	250	825	6600	--	334	44
14...	0900	3.8	670	700	120	90	187	520	4250	--	210	108
27...	1200	3.6	920	730	50	50	180	475	3880	--	182	106
DEC.												
04...	1000	3.8	1300	220	60	150	214	620	5080	--	226	136
FEB., 1969												
06...	1330	5.6	1500	1100	50	130	172	490	3800	--	176	50
12...	1330	7.0	1400	700	40	130	175	440	3560	--	132	114
19...	1330	3.7	2900	420	490	190	210	588	4960	--	260	132
26...	0900	5.6	1200	920	30	150	182	490	3840	--	190	148
MAR.												
05...	0930	5.3	850	430	40	580	230	565	4400	--	160	128
12...	0930	7.7	3500	1200	350	140	172	420	3240	--	146	158
20...	0900	3.3	700	480	50	170	175	580	4560	--	195	194
APR.												
16...	1230	4.4	450	480	30	80	121	180	1760	--	105	96
24...	0930	5.0	550	620	30	80	108	205	2080	--	115	146
MAY												
02...	0815	4.7	80	410	30	80	121	150	2480	--	144	122
06...	0830	4.7	2000	740	10	100	115	235	1850	--	84	158
14...	0800	3.4	720	320	20	60	160	412	3200	--	139	128
21...	0800	4.1	1100	700	20	40	135	262	2020	--	100	190
JUNE												
03...	0900	3.6	1700	600	70	200	151	400	2800	--	106	156
10...	0830	3.0	690	950	40	130	195	528	3760	--	166	134
18...	1200	3.3	680	950	20	140	152	424	3640	--	120	140
23...	0830	3.6	670	50	20	30	158	400	2950	--	135	140
JULY												
09...	1030	3.0	710	600	20	40	161	406	3080	--	133	172
16...	0830	2.5	440	460	30	70	146	430	3200	--	155	168
25...	0900	3.0	510	340	20	130	173	530	3920	--	180	160
29...	1000	4.0	520	290	40	120	156	480	3440	--	160	144
AUG.												
06...	0800	2.7	480	210	20	60	116	370	2240	--	108	150
13...	0845	1.0	750	220	80	190	145	380	3000	--	127	120
20...	1645	.0	700	220	60	180	160	434	3300	--	190	110
26...	1030	.3	1000	220	90	310	188	452	5200	--	202	120
SEP.												
04...	0830	.6	1200	450	70	50	136	330	2880	--	120	92
10...	0845	3.0	1700	400	20	70	160	470	3720	--	166	136
16...	0930	1.9	2400	500	30	80	136	392	3150	--	120	146
23...	0945	.4	1100	300	130	30	205	750	4550	--	225	142
OCT.												
29...	1000	2.2	1400	350	50	20	222	700	6500	--	280	164
NOV.												
06...	0930	3.7	1300	580	40	20	225	575	4350	--	250	182
DEC.												
02...	0945	4.7	800	600	50	150	161	400	3500	--	164	174

Table 3. U.S. Geological Survey analyses of feed, blowdown, and distillate-water samples, pilot desalination plant, Jersey City, N.J.--Cont.

DATE	CARBONATE (CO3) (MG/L)	SULFATE (SO4) (MG/L)	CHLORIDE (CL) (MG/L)	FLUORIDE (F) (MG/L)	NITRATE (NO3) (MG/L)	PHOSPHATE (PO4) (MG/L)	DISSOLVED SOLIDS (RESIDUE AT 180 C) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	ALKALINITY AS CACO3 (MG/L)
01378640 - HACKENSACK R AT JERSEY CITY NJ (LAT 40 44 41 LONG 074 04 30.1)											
JULY, 1968											
31...	0	1320	9500	.5	.2	.78	18000	17400	3130	3030	103
AUG.											
07...	0	1320	9150	.6	.4	.66	22900	16600	2970	2830	136
SEP.											
25...	0	1290	9300	.7	1.0	1.2	17500	17100	3170	3080	88
NOV.											
06...	0	1600	12500	.7	.4	.89	22900	22100	4020	3980	36
14...	0	1060	7500	.6	.1	.63	14600	13800	2610	2470	138
27...	0	992	6950	.5	.2	.58	13300	12700	2400	2310	87
DEC.											
04...	0	1230	8800	.4	.4	.68	17000	16200	3090	2980	112
FEB., 1969											
06...	0	1010	7250	.6	.0	.80	13300	12900	2470	2430	41
12...	0	924	6850	.6	5.0	.80	12900	12100	2250	2150	97
19...	0	1370	9480	.7	10	.53	18500	16900	2950	2840	108
26...	0	1040	7350	.6	10	.47	14400	13200	2470	2350	121
MAR.											
05...	0	1080	8500	.5	9.0	1.0	16200	15000	2900	2800	105
12...	0	897	6350	.4	6.0	.70	12400	11300	2160	2030	130
20...	0	1290	8650	.5	10	1.1	17400	15600	2820	2670	159
APR.											
16...	0	486	3320	.6	5.7	1.6	6990	6030	1044	965	79
24...	0	661	3500	.6	2.9	1.5	6820	6750	1110	994	120
MAY											
02...	0	648	4280	.6	2.5	1.0	7980	7890	920	820	100
06...	0	569	3550	.5	6.6	1.1	7000	6490	1250	1130	130
14...	0	915	6100	.4	12	.97	12100	11000	2100	1990	105
21...	0	635	3800	.7	13	1.2	7890	7060	1420	1260	156
JUNE											
03...	0	843	5500	.6	3.3	1.3	11300	9880	2020	1900	128
10...	0	569	7600	.6	3.0	1.2	15600	12900	2660	2550	110
18...	0	942	6110	.6	.8	1.8	12500	11800	2130	2010	115
23...	0	876	5720	.7	.6	2.0	11600	10300	2040	1930	115
JULY											
09...	0	915	5800	.6	1.5	2.2	12000	10600	2070	1930	141
16...	0	950	6300	1.2	.4	2.4	11000	11300	2130	2000	138
25...	0	1130	7600	.8	1.2	2.3	13400	13600	2610	2480	131
29...	0	968	6600	.6	.9	1.8	12000	11900	2370	2250	118
AUG.											
06...	0	596	4250	1.0	.9	1.5	8210	7760	1810	1690	123
13...	0	810	5550	1.0	11	1.2	11200	10100	1930	1830	98
20...	0	942	6050	1.2	3.8	.98	12800	11100	2190	2100	90
26...	0	1250	8300	1.2	8.1	.75	16400	15700	2330	2230	98
SEP.											
04...	0	819	5400	.9	9.4	1.4	10900	9740	1700	1620	75
10...	0	1020	6700	1.0	1.3	1.6	13800	12300	2330	2220	112
16...	0	920	5600	.9	.8	1.6	12100	10400	1950	1880	120
23...	0	1320	8500	1.1	3.2	.52	17600	15600	3600	3480	116
OCT.											
29...	0	1430	11000	2.0	2.0	1.0	19700	20200	3440	3310	135
NOV.											
06...	0	1280	8500	1.2	8.0	1.5	16100	15300	2930	2780	149
DEC.											
02...	0	980	6000	2.0	1.9	1.8	12200	12000	2050	1910	143

Table 3. U.S. Geological Survey analyses of feed, blowdown, and distillate-water samples, pilot desalination plant, Jersey City, N.J.--Cont.

DATE	SUSPENDED SOLIDS (MG/L)	OIL AND GREASE (MG/L)	TEMPERATURE (DEG C)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)	COLOR (PLATINUM-COBALT UNITS)	TURBIDITY (MG/L)	DENSITY (GM/ML AT 20 C)
01378640 - HACKENSACK R AT JERSEY CITY NJ (LAT 40 44 41 LONG 074 04 30.1)								
JULY, 1968								
31...	--	--	25	25100	7.0	15	--	1.012
AUG.								
07...	--	--	33	25000	7.6	110	50	1.009
SEP.								
25...	--	--	26	25200	6.9	45	9.2	1.009
NOV.,								
06...	--	--	14	29900	7.2	20	4.8	1.012
14...	--	--	11	21100	7.6	50	14	1.009
27...	--	--	9.0	19100	7.5	45	13	1.005
DEC.								
04...	--	--	11	26000	7.4	40	32	1.009
FEB., 1969								
06...	--	--	6.0	21900	6.8	40	23	1.008
12...	69	--	13	20600	6.2	80	24	1.006
19...	55	--	10	26000	7.2	60	37	1.009
26...	44	--	7.0	20700	6.8	20	25	1.007
MAR.								
05...	49	--	6.0	23700	7.2	20	13	1.011
12...	106	--	5.0	18700	7.2	100	50	1.008
20...	22	--	9.0	25000	7.2	40	13	1.010
APR.								
16...	--	50	16	13000	6.9	25	--	1.004
24...	14	58	17	10300	7.4	80	21	1.003
MAY								
02...	12	57	24	12900	7.3	80	32	1.003
06...	57	6.0	20	10600	7.1	60	25	1.004
14...	67	10	17	16900	7.4	40	28	1.007
21...	20	10.0	22	12400	7.5	80	25	1.004
JUNE								
03...	57	4.4	24	15300	7.4	80	25	1.006
10...	6	17	25	20700	7.3	40	20	1.007
18...	7	--	26	17400	7.1	20	32	1.007
23...	18	48	26	15900	7.4	60	28	1.004
JULY								
09...	15	59	26	15800	7.2	40	32	1.007
16...	7	31	28	16400	7.2	40	25	1.007
25...	16	71	27	19700	7.0	30	32	1.008
29...	17	58	27	17700	7.1	40	32	1.008
AUG.								
06...	19	--	30	11600	7.0	40	25	1.001
13...	25	--	27	16600	7.1	40	32	1.005
20...	6	--	29	17700	7.3	40	36	1.005
26...	8	9.0	34	22300	7.1	40	25	1.008
SEP.,								
04...	19	9.0	34	15300	6.2	40	32	1.004
10...	11	8.0	36	18000	7.2	40	28	1.007
16...	75	9.0	36	16400	7.1	80	48	1.005
23...	44	8.2	23	22400	7.3	40	25	1.009
OCT.,								
29...	19	3.8	25	25700	7.3	40	45	1.010
NOV.								
06...	13	7.0	25	21400	7.3	40	28	1.008
DEC.								
02...	10	5.0	20	17100	7.5	40	26	1.006

Table 3. U.S. Geological Survey analyses of feed, blowdown, and distillate-water samples, pilot desalination plant, Jersey City, N.J.--Cont.

DATE	TIME	SILICA (SIO2) (MG/L)	IRON (FE) (UG/L)	MANGANESE (MN) (UG/L)	COPPER (CU) (UG/L)	NICKEL (NI) (UG/L)	CALCIUM (CA) (MG/L)	MAGNESIUM (MG) (MG/L)	SODIUM (NA) (MG/L)	SODIUM PLUS POTASSIUM (NA+K) (MG/L)	POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)
01378641 - PILOT DESALINATION PLANT BLOWDOWN (LAT 44 04 41 LONG 074 04 30.2)												
AUG., 1968												
07...	1000	2.1	20000	460	1600	130	235	680	5700	--	256	128
SEP.												
25...	1200	2.3	3300	540	310	200	360	1000	--	8310	--	107
DEC.												
04...	1000	4.9	1400	680	250	190	382	1140	--	9470	--	30
FEB., 1969												
19...	1330	11	78000	1800	2000	740	400	1090	--	8700	--	0
26...	0900	7.4	13000	1200	1200	480	209	580	--	5120	--	0
MAR.												
05...	0930	9.3	1200	820	400	390	300	800	--	6540	--	0
12...	0930	9.9	13000	1800	650	440	230	570	--	4880	--	14
20...	0900	6.2	23000	1100	1400	530	265	780	--	6900	--	0
MAY												
02...	0815	6.2	2500	550	600	70	148	174	--	4020	--	54
06...	0830	5.9	2100	550	260	120	150	295	--	2920	--	68
14...	0800	5.2	2900	660	540	190	265	620	--	5450	--	39
21...	0800	5.0	3600	800	340	100	200	362	--	31800	--	64
JUNE												
03...	0900	--	3400	500	600	200	--	--	--	--	--	169
10...	0830	3.6	820	1100	280	150	219	576	--	4960	--	70
18...	1200	4.6	1300	1900	150	180	207	550	--	4960	--	44
23...	0830	3.7	1500	50	80	60	175	480	--	3910	--	38
AUG.												
26...	1030	.5	1500	240	720	310	184	560	--	4790	--	58
SEP.												
04...	0830	1.2	1100	350	390	200	156	410	--	3630	--	174
10...	0845	2.6	700	220	260	70	170	440	--	3970	--	68
16...	0930	4.3	5000	300	640	100	160	460	--	3890	--	94
23...	0945	2.8	4400	720	600	610	700	2000	--	14600	--	102
OCT.												
29...	1000	3.2	2700	410	550	30	244	760	--	6200	--	92
NOV.												
06...	0930	7.4	7100	900	750	40	350	800	--	6940	--	34
DEC.												
02...	0945	6.2	19000	860	4800	510	265	660	--	5800	--	38
01378642 - PILOT DESALINATION PLANT DISTILLATE (LAT 44 04 41 LONG 074 04 30.3)												
AUG., 1968												
07...	1000	1.0	7600	500	1300	160	100	290	2450	--	108	96
SEP.												
*25...	1200	.0	90	20	10	0	.4	.5	--	14	--	19
DEC.												
04...	1000	.3	150	10	110	30	3.2	7.3	67	--	--	24
FEB., 1969												
*19...	1330	.4	4300	90	880	370	2.2	.9	--	4.1	--	6
*26...	0900	.1	1200	30	1100	150	.5	.8	--	7.1	--	7
MAR.												
*05...	0930	.3	400	20	430	80	.2	.4	--	3.7	--	6
*12...	0930	.7	210	10	300	60	.1	.1	--	2.8	--	6
*20...	0900	.0	440	10	440	60	.6	.2	--	1.6	--	5
MAY												
*02...	0815	.3	310	10	200	60	.1	.1	--	13	--	34
*06...	0830	.0	440	0	220	80	.2	.1	--	26	--	52
*14...	0800	.3	490	0	160	0	.1	.1	--	8.5	--	20
21...	0800	1.5	2100	230	360	1000	42	86	--	940	--	34
JUNE												
03...	0900	2.8	3400	30	1200	230	123	308	--	2630	--	166
*10...	0830	.1	730	60	320	40	.1	.1	--	20	--	48
*18...	1200	.0	300	10	200	30	.1	.0	--	13	--	32
*23...	0830	.3	850	10	110	20	.1	.0	--	13	--	32
AUG.												
26...	1030	.0	5200	140	1200	440	42	124	--	1260	--	22
SEP.												
04...	0830	1.2	1200	330	490	170	156	390	--	3060	--	92
10...	0845	2.0	600	150	300	70	145	370	--	3400	--	104
16...	0930	2.3	1600	130	230	100	88	250	--	2280	--	92
23...	0945	.7	1600	170	300	80	125	312	--	3640	--	42
OCT.												
29...	1000	.5	3400	200	1800	40	24	67	--	701	--	90
NOV.												
*06...	0930	.4	50	10	90	0	.1	.2	--	14	--	30
DEC.												
*02...	0945	.3	10	0	240	60	.1	.2	--	1.7	--	42

* SAMPLE CONTAINS 50 mg/l OR LESS DISSOLVED SOLIDS.

Table 3. U.S. Geological Survey analyses of feed, blowdown, and distillate-water samples, pilot desalination plant, Jersey City, N.J.--Cont.

DATE	CARBONATE (CO3) (MG/L)	SULFATE (SO4) (MG/L)	CHLORIDE* (CL) (MG/L)	FLUORIDE (F) (MG/L)	NITRATE (NO3) (MG/L)	PHOSPHATE (PO4) (MG/L)	DISSOLVED SOLIDS (RESIDUE AT 180 C) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	ALKALINITY AS CACO3 (MG/L)
01378641 - PILOT DESALINATION PLANT BLOWDOWN (LAT 44 04 41 LONG 074 04 30.2)											
AUG., 1968											
07...	18	1510	10800	.7	.4	.48	22200	19200	3390	3250	135
SEP.											
25...	0	2040	14800	--	.2	--	27400	--	5010	4920	88
DEC.											
04...	0	2410	16800	--	.4	--	--	--	5650	5620	25
FEB., 1969											
19...	0	2500	15400	--	10	.04	32800	--	5490	5470	0
26...	0	1290	9000	--	10	.14	17500	--	2910	2900	0
MAR.											
05...	0	1820	11600	.6	5.0	1.7	22400	--	4040	4040	0
12...	0	1450	8500	--	8.0	.10	16600	--	2920	2910	11
20...	0	1940	12000	--	4.2	.74	23400	--	3870	3870	0
MAY											
02...	0	858	6300	--	3.0	--	11000	--	1090	1050	44
06...	0	860	4800	--	4.3	--	9600	--	1590	1530	56
14...	0	1490	9550	--	2.7	--	18200	--	3210	3180	31
21...	0	980	6800	--	2.2	--	10900	--	1990	1940	52
JUNE											
03...	0	--	5750	--	--	--	--	--	--	--	138
10...	0	637	9200	--	.9	--	17800	--	2920	2860	57
18...	0	1200	8700	--	.4	--	16400	--	2780	2750	36
23...	0	1160	6850	--	.5	--	14000	--	2410	2380	31
AUG.											
26...	0	1300	8350	--	6.2	--	17000	--	2770	2720	48
SEP.											
04...	0	968	6250	--	1.9	--	12600	--	2080	1930	143
10...	20	924	6950	--	.5	--	14000	--	2240	2150	89
16...	10	1100	6750	--	.7	--	13800	--	2290	2200	94
23...	0	4480	26200	--	2.2	--	58800	--	9970	9890	84
OCT.											
29...	0	1700	10900	--	2.6	--	21700	--	3740	3670	75
NOV.											
06...	0	2140	12000	--	3.4	--	24500	--	4170	4140	28
DEC.											
02...	0	1800	10000	--	3.8	--	20500	--	3400	3370	31
01378642 - PILOT DESALINATION PLANT DISTILLATE (LAT 44 04 41 LONG 074 04 30.3)											
AUG., 1968											
07...	0	649	4700	.3	.3	.02	9430	8340	1440	1370	79
SEP.											
25...	4	2.7	6.0	--	.2	--	26	--	3	0	22
DEC.											
04...	0	17	104	--	.1	--	--	--	38	19	20
FEB., 1969											
19...	0	1.5	8.0	--	.3	.04	27	--	9	4	5
26...	0	.6	10	--	.7	.02	28	--	5	0	6
MAR.											
05...	0	.8	3.0	--	.2	.02	8	--	2	0	5
12...	0	.8	.5	--	.1	.00	8	--	1	0	5
20...	0	.6	1.0	--	.0	.02	5	--	3	0	4
MAY											
02...	0	.2	.5	--	.8	--	36	--	1	0	28
06...	0	1.3	.0	--	1.9	--	5	--	1	0	43
14...	0	.9	1.0	--	.3	--	12	--	1	0	16
21...	0	276	1550	--	.6	--	2930	--	459	431	28
JUNE											
03...	0	681	4650	--	1.8	--	9080	--	1580	1440	136
10...	0	.8	1.3	--	.4	--	50	--	0	0	39
18...	0	1.1	.9	--	.5	--	40	--	0	0	26
23...	0	.7	1.5	--	.4	--	40	--	0	0	26
AUG.											
26...	0	292	2150	--	.2	--	3720	--	616	598	18
SEP.											
04...	0	107	6000	--	2.1	--	11900	--	1990	1920	75
10...	0	898	5850	--	.4	--	11600	--	1890	1800	85
16...	0	615	3900	--	.5	--	8200	--	1250	1170	75
23...	0	777	6150	--	.3	--	10100	--	1600	1560	34
OCT.											
29...	0	155	1150	--	1.6	--	1970	--	336	262	74
NOV.											
06...	0	.4	5.0	--	.2	--	6	--	1	0	25
DEC.											
02...	0	.7	1.8	--	.4	--	9	--	1	0	34

Table 3. U.S. Geological Survey analyses of feed, blowdown, and distillate-water samples, pilot desalination plant, Jersey City, N.J.--Cont.

DATE	SUSPENDED SOLIDS (MG/L)	OIL AND GREASE (MG/L)	TEMPERATURE (DEG C)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)	COLOR (PLATINUM-COBALT UNITS)	TURBIDITY (MG/L)	DENSITY (GM/ML AT 20 C)
01378641 - PILOT DESALINATION PLANT BLOWDOWN (LAT 44 04 41 LONG 074 04 30.2)								
AUG., 1968								
07...	--	--	60	30000	8.6	408	310	1.011
SEP.								
25...	--	--	49	37600	8.0	55	150	1.016
DEC.,								
04...	--	--	31	44800	7.8	50	11	1.019
FEB., 1969								
19...	--	--	38	47100	4.0	280	74	1.020
26...	--	--	37	25000	4.1	40	52	1.009
MAR.								
05...	--	--	32	30700	3.6	40	66	1.017
12...	--	--	49	24400	5.8	160	108	1.012
20...	--	--	54	29500	3.8	120	66	1.014
MAY								
02...	--	--	32	15000	7.3	120	10	1.004
06...	--	--	49	14000	7.5	80	7	--
14...	--	--	31	25100	7.9	80	60	--
21...	--	--	47	16600	7.5	120	108	1.006
JUNE								
03...	--	--	63	15000	8.2	40	79	--
10...	--	--	65	21700	7.6	40	42	1.009
18...	--	--	52	19000	7.0	40	53	1.008
23...	--	--	58	17800	6.6	80	93	1.006
AUG.								
26...	--	--	39	21700	6.9	40	60	1.009
SEP.								
04...	--	--	41	16700	7.1	40	79	1.005
10...	--	--	76	17700	8.9	40	53	1.007
16...	--	--	69	18500	8.7	80	79	1.006
23...	--	--	48	63500	8.1	80	52	1.036
OCT.,								
29...	--	--	62	28000	8.1	40	53	1.012
NOV.								
06...	--	--	37	30300	6.1	120	69	1.015
DEC.								
02...	--	--	39	27000	7.8	40	46	1.011
01378642 - PILOT DESALINATION PLANT DISTILLATE (LAT 44 04 41 LONG 074 04 30.3)								
AUG., 1968								
07...	--	--	39	16400	8.0	120	78	1.003
SEP.								
25...	--	--	37	65	8.7	0	1.2	--
DEC.,								
04...	--	--	26	430	7.0	0	3.0	--
FEB., 1969								
19...	--	--	36	27	6.6	25	14	--
26...	--	--	16	50	5.9	25	18	--
MAR.								
05...	--	--	28	22	5.6	5	5.0	--
12...	--	--	48	9	6.0	20	3.0	--
20...	--	--	51	7	5.6	10	5.0	--
MAY								
02...	--	--	31	57	6.5	10	13	--
06...	--	--	29	91	5.7	5	9.0	--
14...	--	--	28	33	6.8	10	7.0	--
21...	--	--	41	5150	6.1	40	25	--
JUNE								
03...	--	--	46	12600	6.6	80	32	--
10...	--	--	53	83	6.2	10	11	--
18...	--	--	49	50	6.0	10	12	--
23...	--	--	49	61	5.6	20	18	--
AUG.								
26...	--	--	38	5800	6.9	100	29	--
SEP.								
04...	--	--	37	16800	7.2	40	23	1.004
10...	--	--	51	15600	7.2	40	25	1.005
16...	--	--	48	11100	6.6	45	21	1.002
23...	--	--	42	16300	7.0	35	18	1.003
OCT.,								
29...	--	--	30	3400	7.3	40	40	--
NOV.								
06...	--	--	36	24	7.1	0	5.5	--
DEC.								
02...	--	--	37	71	7.6	5	6.7	--

Table 4. U.S. Geological Survey spectrographic analyses of feed, blowdown, and distillate-water samples, pilot desalination plant, Jersey City, N.J.

SPECTROGRAPHIC ANALYSES, MICROGRAMS PER LITER

Date of collection	Mean discharge (cfs)	Aluminum (Al)	Barium (Ba)	Beryllium (Be)	Boron (B)	Chromium (Cr)	Cobalt (Co)	Copper (Cu)	Iron (Fe)	Lead (Pb)	Lithium (Li)	Manganese (Mn)	Molybdenum (Mo)	Nickel (Ni)	Rubidium (Rb)	Silver (Ag)	Strontium (Sr)	Tin (Sn)	Titanium (Ti)	Vanadium (V)	Zinc (Zn)
HACKENSACK RIVER BASIN																					
1-3786.4. HACKENSACK RIVER AT JERSEY CITY, N. J. (lat 40°44'26", long 74°04'56")																					
Sept. 25, 1968		240	-60	-120	1800	ND	ND	46	800	ND	85	320	-120	ND	40	-30	5400	ND	ND	ND	ND
Nov. 6.....		120	54	-140	2200	-320	-320	-69	200	-320	110	-320	-320	-690	-120	-32	5500	-340	-150	-320	-14800
Feb. 28, 1969.		130	47	-1.0	1400	200	-3.0	44	46	6.0	70	610	10	42	20	2.0	5000	-220	.2	-200	120
May 2.....		59	25	1.0	740	190	-2.0	20	76	1.0	35	380	5.0	57	14	.4	2400	-130	4.0	-80	60
May 21.....		80	45	1.0	740	320	-2.0	2.0	160	1.0	45	880	13	110	-40	-.2	2300	-230	1.0	-120	-22
June 10.....		110	19	.7	1000	36	-2.0	150	130	3.0	74	220	14	20	-75	.4	3900	-450	1.0	-230	-22
June 23.....		42	16	1.0	880	58	-2.0	47	130	2.0	60	350	12	30	-57	-.2	2400	-340	2.0	-180	-22
Sept. 4.....		170	35	1.0	780	140	-2.0	29	23	-1.0	55	340	8.0	18	-21	-.2	3200	-320	-.5	-150	-46
Sept. 10.....		130	24	-.4	910	3.0	-1.0	25	14	-1.0	62	250	8.0	12	-27	-.2	3900	-400	2.0	-190	-11
1-3786.41. PILOT DESALINATION PLANT-BLOWDOWN, JERSEY CITY, N. J. (lat 40°44'26", long 74°04'56")																					
Sept. 25, 1968		710	-120	-230	3300	ND	ND	180	2500	ND	160	620	-230	ND	75	-60	12000	ND	ND	ND	ND
Feb. 28, 1969.		170	57	-1.0	1700	48	2.0	370	5400	9.0	85	870	18	120	20	1.0	6000	-300	1.0	-270	210
May 2.....		55	30	.9	960	6.0	-2.0	170	73	-1.0	55	570	8.0	27	23	.5	3100	-150	2.0	-95	44
May 21.....		75	45	-.4	1000	25	3.0	140	26	1.0	60	930	24	88	-55	.3	3400	-320	1.0	-160	-22
June 10.....		46	27	-.4	1500	5.0	-2.0	160	80	2.0	93	330	22	15	-86	-.2	5800	-520	-1.0	-260	-22
June 23.....		34	19	-.4	1100	3.0	-2.0	92	89	1.0	71	360	16	26	-65	-.2	4900	-410	-1.0	-210	-22
Sept. 4.....		140	35	-.4	1000	46	-1.0	91	23	-1.0	63	370	9	16	-25	-.2	3300	-370	4.0	-170	-11
Sept. 10.....		200	40	-.4	940	2.0	-1.0	100	14	-1.0	66	64	10	3	-27	-.2	4100	-410	3.0	-190	-11
1-3786.42. PILOT DESALINATION PLANT-DISTILLATE, JERSEY CITY, N. J. (lat 40°44'26", long 74°04'56")																					
Sept. 25, 1968		29	5.0	-3.0	70	-10	-16	100	390	8.0	2.0	29	-3.0	22	1.0	-0.8	130	-16	-10	-10	-340
Feb. 28, 1969.		24	4.0	-.4	28	1.0	-1.0	270	450	4.0	.8	20	-1.0	41	.3	.2	50	-3.0	.4	-3.0	25
May 2.....		35	3.0	-.3	7.0	-.8	-.3	30	6.0	1.0	.2	7.0	-.2	11	.1	.1	11	-.8	.7	-.5	-32
May 21.....		46	14	-.4	280	2.0	-2.0	200	500	-1.0	18	320	4.0	80	-16	-.2	820	-94	2.0	-50	-22
June 10.....		50	5.0	-.2	4.0	-5.0	-1.0	190	9.0	1.0	.2	37	-1.0	92	-.3	-.2	13	-2.0	-.1	-1.0	-11
June 23.....		17	3.0	-.4	6.0	-10	-2.0	130	7.0	4.0	.1	15	-1.0	69	-.3	-.2	7.0	-1.0	2.0	-1.0	-22
Sept. 4.....		180	30	-1.0	2000	4.0	-2.0	140	8.0	-1.0	60	220	26	7.0	-23	-.2	2900	-240	-.5	-170	-46
Sept. 10.....		190	38	-1.0	1100	-1.0	-2.0	160	10	-1.0	56	110	8.0	30	-24	3.0	3100	-350	-.5	-160	-46

- Less than figure shown.

ND Specifically sought, not detected

Table 5. Rutgers University analyses of phenolic materials in feed, blowdown, and distillate-water samples, pilot desalination plant, Jersey City, N.J.

Date of Collection	Time	Phenols [C_6H_5OH] (µg/l) Method I	Method II
01378640 HACKENSACK RIVER AT JERSEY CITY, N.J.			
11/06/68	0830	5.0	14.0
	0930	6.0	12.0
	1030	7.5	10.0
	1130	6.0	12.5
	1230	7.0	10.0
	1330	4.0	12.5
03/20/69	0900	10.0	27.0
	1130	2.5	67.0
05/06/69	0830	9.5	12.5
	1100	2.5	8.0
05/14/69	0800	7.5	19.0
05/21/69	0800	5.0	10.0
06/03/69	0900	3.0	10.0
	1200	1.7	9.5
06/10/69	0830	1.7	6.5
	1300	1.7	8.0
06/18/69	1200	<1.7	8.0
	1500	4.0	7.0
06/23/69	0830	8.0	15.0
	1130	9.5	10.0
08/26/69	1030	<1.7	<1.3
09/04/69	0830	6.0	10.0
09/10/69	0845	<1.7	4.0
01378641 PILOT DESALINATION PLANT BLOWDOWN			
03/20/69	0900	12.0	2.5
	1130	7.5	2.5
05/06/69	0830	9.5	15.0
	1100	3.0	3.5
05/14/69	0800	6.5	12.5
05/21/69	0800	5.0	16.0
06/03/69	0900	<1.7	4.0
	1200	2.5	9.0
06/10/69	0830	1.7	8.0
	1300	1.7	7.5
06/18/69	1200	4.0	4.5
	1500	3.0	6.0
06/23/69	0830	5.0	7.5
	1130	6.5	8.0