GHQ/SCAP Records (RG 331, National Archives and Records Service)

Description of contents

(1) Box no. 3087

(2) Folder title/number: (4)
Sanitary Engineering - C. Water

(3) Date: Nov. 1945 - Feb. 1951

(4) Subject:

Classification	Type of record
9610, 9751	z

(5) Item description and comment:

i) Kyushu
ii) Includes Contents List

(6) Reproduction: Yes No

(7) Film no. Sheet no.

(Compiled by *National Diet Library*)

WATER SUPPLY

Subject	Date
Civilian Water Supply (GHQ)	5 Nov 45
Chlorinated Municipal Water Supplies	19 Mar 47
Report on standard of Chlorination in Kyushu (May	---------
Report on Chlorine Production in Kyushu (May	---------
Report on Chlorine Production for June	---------
Report on standard of Chlorination in Saga Prefecture	---------
Report on standard of Chlorination in Kyushu for June	---------
Report on standard of Chlorination in Kyushu for Month of July	---------
Report on Chlorine Production for July	---------
Report of Chlorine Production in July (Liason Office)	---------
Relaease of Available bleaching powder for Nagasaki	---------
Report on the standard of Chlorination in Kyushu for the Month of August	---------
Report on Chlorination of the water works in Kyushu for the month of September.	---------
Standards of Chlorination for the Month of October	---------
Standards of Chlorination for the Month of November	---------
Bacteriological Examination of water	---------
Rural water supplies	---------
Municipal water treatment	---------
Cross connections in Domestic water supply systems	12 Dec 47
Contamination of Domestic water supply	---------
Standard of Chlorination for the month of December	---------
Ltr of transmittal above subject	15 Jan 48

Water Works Conf. Aug 30,1948 - List of probable attendants
Blank Form - Reservoir Inspection
Release of EKITAI ENSO (liquid chlorine) for Kumamoto Municipal Water Works
Release of Liquid Chlorine or Bleaching Powder for Fukuoka Water Dept.
Water Supply (to Mayor Nagasaki)
Extension of Beppu Water Works, Water Rights in Toyoka Mura

SCAP 22 apr 50 - Policy regarding price control for chlorine purchased by Water Companies

TB - PH - PREV MED 11

WATER ANALYSIS AND INTERPRETATION

PUBLIC HEALTH AND WELFARE TECHNICAL BULLETIN

PH&W, GHQ, SCAP, APO 500 February 1951

This bulletin presents an explanation of standard procedures relating to water examination. Significant quantities of impurities found in water and the requirements for the measurement of a potable water are discussed.

I. GENERAL

A. All Public Health Officials should be able to interpret laboratory and field reports and records of water analyses and they should have some knowledge of the principles and techniques of the various tests. The water plant officials are required to make physical, chemical and bacteriological tests necessary for control of treatment processes and for providing adequate records of treatment efficiency. The Public Health Section (prefectural and health center) is responsible for performing any tests necessary for ascertaining the potability of water supplies. The Environmental Sanitary Inspector is particularly responsible for the supervision of water analyses to ascertain the following:

1. That the proper tests are performed with sufficient frequency.

2. That sample collection procedures are correct.

3. That all determinations are accurate and dependable.

4. That proper reports are made and adequate records maintained.

B. The above procedures may be conveniently considered in the following five classes:

1. Bacteriological tests to indicate indirectly the presence of pathogenic organisms or any impending threat of their presence.

2. Chemical analysis for the quantitative determination of any poisonous, injurious, or harmful chemical constituent, organic or inorganic.

3. Physical tests to indicate and measure certain physical properties or conditions.

4. Microscopic examinations for the identification and quantitative enumeration of objectionable tastes and odor-producing micro-organisms.

5. The sanitary field survey, for the purpose of providing a physical picture of the entire water cycle in relation to potential sources of pollution.

It is only upon the entire evaluation of all five major examinations rather than upon the basis of any one specific procedure or test, that the quality of water for primary uses can be judged. However, the complete five evaluations are only recommended for advance planning of the necessary treatment facilities of a water supply, specific water problems, or in the case of a serious outbreak of a suspected water-borne disease. All five tests are not routine tests but each has its purpose in obtaining, providing, and maintaining a potable water supply. Usually the chemical content of water at its source remains nearly the same over a period of years. After the chemical content of water is determined to ascertain quality and recommend treatment designs, it is considered sufficient to complete chemical tests every six months for surveillance. Physical tests are usually completed with chemical examinations and when problems occasionally arise from water odors. Microscopic tests determine those microorganisms responsible for certain tastes and odors in water.

Actually, the bacteriological characteristics have come to be recognized generally as of most value in the sanitary examination of water supplies. They are also considered as the most important from the standpoint of public health. Bacterial tests, determining the presence of contamination indicators, are more indicative than chemical analysis. Standard water laboratory practice consider bacteriological tests, as recommended, routine procedures to assure a criteria of pollution or of water safety. The sanitary survey will depend upon reports of unpotable water from the various tests, as well as determining the physical or ground conditions existing prior to the use of any water source.

It is desirable that a person who makes the field investigation of the water supply also collect the samples for bacteriological analysis and interpret the analytical results. Special precautions are necessary in collecting the samples, and training and experience are also necessary in interpreting and evaluating the results. Therefore, the assistance of the prefectural or health center officials should be requested if there is any question concerning the safety of water.

Water for drinking and culinary purposes must be free from pathogenic bacteria, protozoa, and other disease producing organisms, as well as from physiologically harmful chemical or mineral substances. Clearness, softness, freedom from objectionable taste, odor, and low temperature are desired.

II. PRELIMINARY PROCEDURES

A. Sample Collection. Proper technique in sample collection is absolutely essential. Samples will be collected only by competently trained individuals. Some guiding principles are as follows:

1. Sampling taps should be selected providing representative samples. These will usually be in active parts of the water supply system.

2. Taps, especially for bacteriological specimens, should be easily identifiable, should be non-leaking, preferably with small orifices. They should be so located that the specimen can be obtained with ease, avoiding spattering.

3. Only bottles supplied by the laboratory will be used. Sterile 120 ml. bottles are recommended. When water which contains residual chlorine is to be tested the sample bottles should be prepared in advance, with approximately 0.02 to 0.05 gm. of Sodium Thiosulfate added prior to sterilization.

4. Bottles for bacteriological examination must be tightly stoppered, chemically clean, and preferably glass stoppered, covered with a hood of muslin or strong paper, then sterilized either by authoclaving at 15 lbs. pressure (120°C.) for one-half hour, or in dry at 160-170°C. for one hour. For chemical examination, chemically clean 3 or 4 liter bottles will be used.

5. Before collecting samples, the water should be run sufficiently long to flush out the pipe line providing representative samples. Samples for chemical examination should ordinarily be collected as near the source as is practicable; not from dead-end lines or lines having little circulation.

6. For bacteriological examination, the orifice of the tap should be flamed, the water then permitted to flow until a representative sample can be obtained, then collected in the special bottle which is filled to the shoulder (leaving some air space). The lip of the bottle will not be brought in contact with the tap, nor will the stopper be contaminated. The hood is replaced and secured with the fastener.

7. The date, time, and place of collection will be marked on each bottle, and the proper forms requesting laboratory examination will be completely and clearly filled out and accompany the specimen bottle.

8. Specimens should be taken to the laboratory immediately. They should be kept in a refrigerator as long as possible if delay in making analyses is unavoidable.

9. Complete or special chemical analyses will not be made frequently as a matter of routine, but only for the purpose of securing confirmatory evidence concerning pollution and for the purpose of detecting significant changes in mineral content.

10. Bacteriological examination of specimens of drinking water will be made at least once monthly as a routine measure, and more frequently when indicated or directed by health officials. For large water supplies several samples should be analayzed daily or as stated in "Standard Methods".

B. Residual Chlorine Test. It is required that all urban water supplies be adequately chlorinated. It will therefore be necessary that the residual chlorine test be performed frequently and accurately. Water plant operators should daily make residual chlorine tests in the water distribution system to assure continuous chlorination and to check operation of chlorinating equipment.

When chlorine is added to water it is consumed by an unoxidized or inorganic matter present and the bactericidal efficiency thereafter depends upon several factors, such as the amount and nature of the residual chlorine (free or chloramine), pH, and the temperature of the water. Chlorinated water will also lose chlorine quite rapidly when exposed to direct or bright diffuse sunlight. It is therefore necessary to add sufficient chlorine to satisfy the demand of chlorine-consuming materials present, to allow for any quantity which might be lost, and still leave a measurable quantity of chlorine for a period of at least thirty (30) minutes for bactericidal action.

Experience has shown that if the quantity of chlorine added to water is sufficient to yield, after a ten (10) minute contact period, a residual concentration of one (1) part per million, a satisfactory bactericidal concentration will usually be maintained for at least thirty (30) minutes. The residual chlorine test, therefore, as the name implies includes the time factor of contact period between the time of chlorine dosage and the time of testing. Preliminary reports of chlorine residual tests should include statements such as; 10 minutes residual, 30 minutes, or 1-hour residual.

While not specific for chlorine, the orthotolidine test is the most reliable simple quantitative test for measuring small quantities of chlorine in water. The reagent is a colorless 0.1% solution of orthotolidine in approximately 1.2 normal hydrochloric acid and is prepared as follows:

1. Weigh out 1 gram of orthotolidine crystals, transfer to a 6-inch mortar and add 5 ml. "20 per cent" hydrochloric acid (Prepared by adding 100 ml. of concentrated hydrochloric acid, specific gravity 1.18 - 1.19 to 400 ml. of distilled water).

2. Grind to a thin paste and add 150 to 200 ml. of distilled water. The orthotolidine goes into solution immediately.

3. Transfer to 1000 ml. graduate and make up to 505 ml. with distilled water.

4. Make up to the 1000 ml. mark by adding the balance (495 ml.) of the 20 percent hydrochloric acid.

This reagent is commonly used in the proportion of 1 ml. of the reagent to 100 ml. of the sample. This is sufficient to give the correct color reaction in samples containing not more than approximately 3.3 ppm chlorine and approximately 500 ppm alkalinity. For higher concentration of chlorine a higher proportion of orthotolidine is required, and for samples having high alkalinity more of the acid reagent is needed in order to reduce the pH value to below 1.8.

When the ratio by weight of orthotolidine to chlorine in a sample is equal to or exceeds 3 to 1, and if sufficient acid is present to lower the pH value of the sample to below 1.8, the color produced is yellow, and the depth of yellow color (shading into brown) is proportional to the concentration of chlorine in the sample. When the ratio is approximately 2 to 1 an orange red color is produced, and when the ratio is 1 to 1 or less a cherry red color is produced -- the depth of these colors being proportional to actual concentration of orthotolidine and chlorine involved.

One ml. of standard orthotolidine solution contains 1 milligram of orthotolidine or sufficient to form solely a yellow color with 0.33 milligrams of chlorine. This means that if 1 ml. of orthotolidine solution is added to 100 samples (not too highly alkaline) containing from 0.1 to 3.3 ppm chlorine, yellow colors will form with increasing depth of color in proportion to the concentration of chlorine. At concentrations up to approximately 1.5 ppm the yellow color will have a pale green tint, but at concentrations above approximately 1.5 and below 3.3 ppm the samples have a true yellow color becoming moderately deep at 2.0 ppm and only slightly deeper at 3.0 ppm. If one ml. of orthotolidine solution is added to 100 ml. samples containing in excess of approximately 3.5 ppm chlorine the color developed will be orange to orange red to cherry red, with the red color becoming quite pronounced at 5 to 6 ppm.

Unfortunately the orthotolidine reagent is not a specified test for chlorine. The reaction is an oxidation process and certain other materials, sometimes found in water, will produce similar reactions. As small quantities as 0.3 ppm of ferric iron, 0.01 ppm of mangenic manganese, or 0.3 ppm of nitrite nitrogen will give a false indication of the presence of chlorine. The reaction of ferric iron and nitrite nitrogen on orthotolidine is quite slow as compared with the reaction of chlorine, and the color produced is a brownish yellow instead of the typical clear deep yellow produced by chlorine. If samples being tested are placed in the dark for the five minute period for color development iron and nitrites will not produce enough color to interfere seriously with the residual chlorine test. The reaction of manganese is almost identical with that of chlorine on orthotolidine. The color development is rapid and as is the case with the chlorine reaches maximum development within 5 minutes, even in the dark.

It is advisable always to perform a blank orthotolidine test before chlorination to detect the presence of these interfering substances. Manganous manganese or ferrous iron may however be exidized to the -ic form on chlorination. When suspected, a chlorinated sample should be tested before and after thorough aeration or boiling. The difference in values is due to the residual chlorine.

When a water supply is suspected of containing interfering quantities of iron, manganese, or nitrites, the orthotolidine test should be supplemented by the neutral starch-potassium-iodine test. Residual chlorine concentrations greater than 0.1 to 0.2 ppm will produce a positive blue color when a few milliliters of fresh neutral starch solution (0.3 to 0.5% solution) and a few milliliters of neutral potassium iodide solution (5 to 10% aqueous or alcoholic solution) are added to the sample. The ordinary interfering quantities of iron, manganese, and nitrites will not produce the blue color with starch-potassium iodide unless the pH value of the sample is reduced to below 5.0.

III. Bacteriological Tests. - Tests for bacteria of the Coli-Aerogenes Group.

No procedure has been developed for detecting minimum infectious numbers of typhoid or other intestinal disease bacteria in water. It has, however, been observed that almost invariably when water contains infectious quantities of intestinal disease organisms, measurable numbers of colon bacilli are present. Bacteria of the coli-form group (including both B. coli and the A aerogenes, referred to as the coli-aerogenes group) have therefore been chosen as indicator organisms for bacteriological examination of water.

The coli-aerogenes group includes all aerobic and facultative anaerobic gram-negative, nonspore-forming bacilli, which ferment lactose with gas formation. Micro-organisms of this group are not pathogenic, and are not necessarily harmful to the water, but are considered as evidence of fecal contamination, and the potential presence of pathogenic fecal organisms of dysentery-typhoid-Salmonella or Cholera groups which are not so readily detected in routine tests.

The standard procedure for carrying out the test for the presence of bacteria of the coli-aerogenes group on presumable potable water samples includes the following steps:

A. The Presumptive Test. Inoculate a series of lactose broth Durham fermentation tubes with graduated quantities of the water, but not more than 10 ml. in a tube (10 ml., 1.0 ml., 0.1 ml., etc.). Usually 5-10 ml. samples are planted and 1 - 1 ml., and 1 - 0.1 ml. for a single sample to be tested. The quantity of the medium must be at least twice that of the water. Standard sterile lactose broth is used. Incubate these tubes at 37 degrees centigrade for 48 hours. Examine them at 24 hours and 48 hours and record the formation of gas in the small inverted vials.

1. The formation within 24 hours of gas in the inverted vial constitutes a POSITIVE Presumptive Test.

2. If no gas is formed in 24 hours but is formed in 48 hours, the test is doubtful and must be confirmed.

3. If no gas formation occurs within 48 hours this constitutes a NEGATIVE Presumptive Test.

Very few bacteria other than those of the coli-aerogenes group occuring in water will ferment lactose broth within twenty-four hours, but several nonsignificient bacteria, particularly chlorine-resistant spore-forming bacteria may ferment lactose within 48 hours.

B. The Confirmed Test. Make two or more Endo or Eosinmethylene Blue agar plates from the tube which contains the smallest amount of water showing gas. Transfers should be made as soon as possible after the formation of gas. Incubate the plates at 35 - 37 degrees C. for 24 hours. If typical colonies have developed upon the plate within this period, the Confirmed Test may be considered POSITIVE. If no typical colonies develop in 24 hours, the test cannot yet be considered Negative definitely. In such cases the test should be carried on to completion. (Part C)

An alternate CONFIRMED test can be made using a liquid medium such as Brilliant Green Lactose Bile and Durham fermentation tubes as described for the Presumptive test above. The procedure is to transfer from a lactose broth tube showing gas the desired portion tube tested, by wire loop, sterile capillary tube or pipette, and add it to the fermentation tube containing B.G.L.B. Incubate these tubes for 48 hours at 35 - 37 degrees C. and observe the gas formed at the end of 24 and 48 hours.

1. The production of any gas in B.G.L.B. tubes in 24 hours is considered POSITIVE.

2. The development of no gas in 48 hours constitutes a NEGATIVE confirmed test.

C. The Completed Test. From the Endo or E.M.B. plates transfer two or more typical colonies, each to an agar slant and lactose broth fermentation tube. If no typical colonies have appeared after 24 hours incubate for another 24 hours, Then two or more colonies most likely to belong to the coliform group, whether typical or not, are transferred to agar slants and lactose broth fermentation tubes.

The inoculated tubes are incubated until the formation of gas or for 48 hours. The agar slants are incubated for 24 hours. Then at least one culture, corresponding to a tube which shows gas formation, is examined microscopically for identification.

The formation of gas in lactose broth and the demonstration of Gram-negative, non-sporing bacilli in the agar slants are COMPLETE proof of the presence of a member of the Coli-Aerogenes group.

The absence of gas formation or failure to demonstrate such bacilli constitutes a Negative test.

Bacteriological analyses on presumable potable water are almost invariably carried through the confirmed test, and usually through the completed test. An analysis of an individual sample showing a positive presumptive, positive, confirmed, or positive completed test on even one of the five 10-ml. portions tested indicates that the water supply at the point of collection at the time of collection was of unsatisfactory quality. Check samples should be taken at this point and adjustments made in water treatment, until bacteriological tests repeatedly and consistently show the absence of coli-aerogenes organisms in five 10 ml. portions. A water supply receiving proper treatment will not show more than one (1) unsatisfactory sample out of each one hundred (100) samples tested, indicating not more than one (1) bacteria of the coli-aerogenes group per 5000 ml. of water (1/5000 ml. less than 1 per gallon of water.) Many public supplies have a record of two to five years with no more than one unsatisfactory sample out of all samples tested, including three to five samples tested daily.

A laboratory report of a bacteriological analysis of a sample of water should include a brief simple interpretation of the results of the test in terms of the probable potability of the water. The use of one of the following statements is recommended:

1. Potable bacteriologically. No evidence of contamination has been found.

2. Not potable bacteriologically. Tests reveal evidence of contamination.

3. Not potable bacteriologically. Colony count is too high; suggest re-examination.

D. Test for Total Number of Bacteria. The approximate number of bacteria present in a sample of water may be determined by applying the nutrient agar plate count, referred to as the "total colony count". The test includes the following steps: (1) Transferring a portion, usually 1 ml., of the water sample to a sterile Petri dish; (2) pouring melted sterile nutrient agar over the portion of water, mixing and permitting the agar to solidify; (3) incubation at 35°- 37°C for 24 hours; and (4) counting the number of bacterial colonies developed.

The actual number of bacteria per ml. in a sample of water will probably always be greater than the number of colonies which develop on an agar plate from one ml. All bactéria present may not grow, and a colony does not necessarily develop from single bacterium. The test, however, gives a fair indication of total bacterial contents of water and is an excellent control test to measure effectiveness of water treatment processes. The bacterial content of water is progressively reduced by the consecutive treatment processes; sedimentation, filtration, and chlorination. An adequately treated water supply will consistently show an agar plate colony count of lower than 5 per milliliter.

The test for total number of bacteria is of little or no value unless initiated within two or three hours after the samples are collected, or unless the samples are held at low refrigeration temperature. The bacterial content of samples is not altered seriously in twelve to twenty-hours if the temperature is maintained below 40°F. Results reported from delayed tests often lead to erroneous ideas of water quality. Water treatment may render a supply almost completely free of bacteria of the coli-aerogenes group, but does not effect complete sterilization. Soon after a sample is collected any residual chlorine present is soon exhausted and bacterial multiplication starts. The bacterial content may rise to several thousands per milliliter within 24 hours and to millions per milliliter within 48 to 72 hours.

Frequently water supplies have been condemned solely on the basis of a high total bacterial count and no allowance given to the time between collection and testing.

Although the "total colony count" or "plate count" technicque is discussed here, experiences by bacteriologists have found that total counts have so little significance in a water examination that they are being abandoned in favor of the more specific coliform tests. Another method is the value determined by the most probable number interpretation, as found explained in "Standard Methods".

When water samples for bacteriological examination are enroute to laboratories in excess of 24 hours time interval, the possibility as reported by the laboratory should be determined only on the basis of the coliform bacterial content.

The presence therefore of a high count may or may not be of sanitary significance, but the presence of Coli-aerogenes is always important.

Frequently, the bacteriological examination of a sample of water collected prior to the disinfection of a well which has been recently constructed or repaired will show contamination. This is usually because surface contamination is carried into the ground water or well during construction or repair and does not mean that the ground water was contaminated before the well was constructed or repaired. If a well is properly located and constructed the water usually will be bacteriologically satisfactory after the well has been completed and disinfected. Samples of newly developed wells or wells which have been repaired should not be taken for bacteriological analysis until after completion and disinfection of the well.

IV. PHYSICAL CHARACTERISTICS

A. Turbidity

The turbidity or cloudiness of water is due to the presence of suspended matter which obstructs the passage of light through the water. Generally speaking, the degree of turbidity is proportional to the quantity of suspended material, but the size of the particles has an important bearing on the water's behavior during treatment. Coarse turbidity producing particles may settle rapidly, while the fine material may remain suspended for extremely long periods.

Turbidity producing materials usually are not toxic. But the more turbid the water, the higher the chlorine demand and the higher the total bacterial count are likely to be.

Turbidity in water is measured by direct or indirect photometric comparison of a sample with standardized suspensions of Fuller's Earth or finely divided silica. Water having a turbidity of 5 is perceptibly cloudy in a drinking glass, and a turbidity of 20 is definitely objectionable. Turbidity measurements serve as an index of sedimentation and filtration efficiency. Properly executed coagulation, sedimentation and filtration processes will deliver a finished water having a turbidity of less than 5.

In various areas it may be necessary to use water having a turbidity as high as 100 with no other treatment than chlorination. This should be avoided if possible because it is difficult to render such water absolutely safe by chlorination alone and the water is almost certain to have an objectionable taste.

With adequate coagulation, sedimentation, filtration, and chlorination facilities it is possible to convert a highly turbid water (turbidity of 1000 to 10,000) to a crystal clear safe water having only slightly objectionable taste.

B. Color

True color in water originates in the organic matter leaching from swamps and forest-covered areas on watersheds. Sometimes it may be due to pollution from industrial sources. The color of water in itself is harmless, but its presence detracts from the physical appearance of the water and so may affect community complaints. It is not a serious problem from the health viewpoint.

Color in water is measured by direct or indirect colorimetric comparison with standardized platinum-cobalt solutions. A color of 10 is equivalent to the color produced by 10 milligrams of platinum per liter. "Apparent color" in water is that produced by both suspended and dissolved materials, and "true color" is produced only by dissolved materials. "True color", usually produced by dissolved organic matter and colloidial iron, is not particularly objectionable as color unless the color value exceeds approximately 20, but the color producing materials either produce objectionable tastes or are associated with taste producing materials. Natural water having "true color" in the range of 100 or greater should be avoided if possible.

C. Total Solids

The total amount of solids in water is measured by evaporating a measured portion of a sample, and weighing the residue after drying at 103°C. for one hour. A determination on a carefully filtered or centrifuged portion of a sample gives the total dissolved solids. The difference between the total solids and the dissolved solids is reported as total suspended solids. Unless the turbidity of a sample exceeds 10 it is not practicable to make both determinations.

Water containing total solids in excess of approximately 1000 ppm has a perceptible mineralized or salty taste which may be objectionable to individuals accustomed to water of very low mineral content. It may be necessary in various areas to use water containing more than 1000 ppm mineral matter but no adverse physiological difficulties will result unless a major portion of the solids are sulfate salts.

In routine analysis of water from the same source, such determinations are of value in the control of the operation of a water purification plant.

V. CHEMICAL TESTS

A. Alkalinity, Acidity and pH. Hydroxides, carbonates, and bicarbonates, which tend to hold the pH value of water above 7.0 are the common alkaline materials found in water. Mineral acids and carbon dioxide, which tend to keep the pH value below 7.0, are the common acid materials in water. Alkalinity and acidity are measured by titrating samples with standard acids or bases, using methyl orange and phenolphthalein as end-point indicators. Results are commonly reported as parts per million of equivalent calcium carbonate. That is, an analysis report of 150 ppm of bicarbonate alkalinity means that there is a quantity of bicarbonate iron present in the sample that is chemically equivalent of 150 ppm of calcium carbonate. A report of 100 ppm of carbon dioxide acidity means a quantity of carbon dioxide equivalent of 100 ppm of calcium carbonate. A total alkalinity of 300 ppm usually mostly bicarbonate, means a total quantity of the alkaline materials equivalent to 300 ppm of calcium carbonate. Carbon dioxide, however, is sometimes reported as ppm of carbon dioxide.

Hydroxide and carbonate alkalinity seldom occur except in water which has been subjected to lime or lime-soda-ash softening treatment. The presence of a measurable quantity of hydroxide alkalinity indicates that an excessive quantity of lime has been added. The amount of carbonate alkalinity in a lime or lime-soda-ash softened water depends upon the nature and quantity of hardness and alkaline materials originally in the water, and upon the degree of softening effected. In any case carbonate alkalinity seldom exceeds 100 ppm.

Bicarbonate alkalinity occurs in practically all natural waters, ranging from as small quantities as 5 or 10 ppm alkalinity to as much as 1000 to 1200 ppm in waters that are often used for human consumption.

The significant limits of alkalinity in water are less than approximately 50 ppm and more than approximately 500 ppm. A highly turbid natural water containing less than 50 ppm of alkalinity usually responds slowly and incompletely to coagulation treatment. If a heavy dose of coagulant is required for clarification it is necessary to add lime or soda ash to assure that there is sufficient alkalinity for the reaction with the acidic coagulant.

Water containing 500 ppm of alkalinity has a distinct "soda" taste. At a content of 1000 ppm the taste is particularly objectionable to many individuals, but even at this concentration of alkalinity it would produce only a very slight physiological reaction. An alkalinity of 1000 ppm is equivalent to approximately 1 teaspoon of soda per gallon.

Mineral acidity seldom occurs in natural water. Its presence indicates pollution of water with acid industrial wastes. Carbon dioxide is present in varying quantities in most natural waters. It has no significance other than its corrosive action. As small a quantity as 2 to 3 ppm of carbon dioxide in a very soft water may render it quite corrosive, while 10 to 15 ppm of carbon dioxide may not be objectionable in a hard water.

The pH value of a water indicates the degree of acidity or alkalinity but tells little of quantities present. Certain pH values and ranges tell much of the types of alkalinity and acidity materials present in water:

1. Above the pH value of approximately 4.2 (methyl orange end-point) water contains no measurable quantity of mineral acidity; below this point the mineral acid and carbon dioxide content may be very high.

2. In the pH range of 4.2 to 8.3, of the common acid and alkaline materials, only carbon dioxide and bicarbonate are present in measurable quantities.

3. Above the pH value of 8.4 (phenolphthalein end-point) no measurable quantity of carbon dioxide is present in water.

4. Below the pH value of 10.0 a measurable quantity of hydroxide seldom occurs.

5. In the pH range of 8.4 to 10.0 carbonates and bicarbonates may be present but measurable quantities of both bicarbonates and hydroxides cannot be present together.

Knowledge and control of pH are useful to minimize the amount of chemicals needed in water purification, to increase the efficiency of bacterial removal, and to prevent corrosion.

B. Chloride. Chloride comes mainly from dissolved mineral chloride or harmless inorganic substances. A chloride content of 250 ppm gives to a water a perceptibly salty taste, but the taste does not become particularly objectionable unless the chloride content exceeds 600 to 700 ppm. Water having a salt content of 500 to 800 ppm (equivalent to 700 to 800 ppm of sodium chloride) might be advantageous to use for people in tropical areas or during extremely warm weather. A chloride content of 600 to 700 ppm is equivalent to the amount of sodium chloride (0.1%) recommended to be added to ordinary water as an aid in maintaining the proper salt content of body fluids of laborers engaged in activities producing heavy perspiration and resultant serious loss of salt.

The chloride test is precise and may be performed rapidly and reliably. It is therefore often used as an indicator test for changes in mineral content. Surface water, particularly streams, may have frequent and considerable changes in salt content, and such changes may or may not be of significance. Wells and springs, however, should have a uniform chloride content. If an appreciable change in chloride content of a well or spring occurs it is probably due to entrance surface water, or due to "over-pumping", or to defective well casing resulting in encroachment of water from undesirable water strata.

High chlorides indicate a possible pollution with sewage, particulary if the normal chloride is known. Urine contains about 6000 ppm of chlorides. Normal sea water has approximately 34,000 ppm of salt.

C. Sulphate. Water containing approximately 250 ppm of sulfate has a perceptible "Epsom Salts" taste, and may produce considerable temporary physical discomfiture for individuals not accustomed to drinking water of high sulfate content. A sulfate iron content of 250 ppm is equivalent to one teaspoon of Epsom Salts, or Glabers Salt per gallon of water. Water containing in excess of 500 ppm sulfate should be avoided if possible.

Calcium sulphate or gypsum causes hardness in water as it is more soluble in cold water than in hot. It separates from the water on boilers and forms scale on the boiler tubes.

D. Hardness. Most of the hardness in water is produced by calcium and magnesium salts. The total hardness of water can be determined approximately by titrating samples with standard soap solution. Total hardness is reported as ppm of equivalent calcium carbonate.

Hardness in water has no physiological significance but is objectionable because of its soap consuming and boiler incrusting properties. Hardness does not become objectionable unless the total hardness exceeds approximately 100 ppm. In various areas it may be necessary to use water having a hardness of several hundreds ppm but the softest available supply should be selected. Hardness above 300 ppm may be of considerable sanitary significance, because of the serious interference with effective use of soap in laundry, bathing, cooking, and washing facilities.

E. Iron and Manganese. A common and troublesome impurity found in deep-well water is dissolved iron in the form of ferrous bicarbonate. As soon as water containing this impurity is exposed to air, oxygen changes the iron into insoluable oxides which give the water a rust color and cause stains. The fine red particles settle out as a rusty sediment.

Iron in water in excess of approximately 0.3 to 0.5 ppm and manganese in excess of 0.1 to 0.2 ppm are objectionable for the following reasons:

1. Water will have an "inkish" sweet taste becoming quite objectionable when the iron content is as high as 0.3 - 0.5 ppm.

2. The taste of coffee and tea made with the water is seriously impaired.

3. Plumbing fixtures and laundry are objectionably stained.

4. Serious interference with the orthotolidine test for residual chlorine may occur. As small a quantity as 0.01 ppm of manganese will produce a measurable color with orthotolidine.

5. Iron in the process water is most objectionable in certain industries, notably in the textile trades and in paper making.

F. Nitrite. Nitrites in water usually occur through bacterial oxidation of nitrogenous organic matter or bacterial reduction of nitrates. Their presence, therefore, indicates bacterial growth in water. As small a quantity as 0.001 ppm nitrite nitrogen may be of sanitary significance. An adequately treated and chlorinated water will seldom has this quantity. Nitrites in excess of approximately 0.3 ppm nitrite nitrogen may give a false positive test for residual chlorine when the orthotolidine test is used, particularly when the test is being made by an inexperienced individual. This interference with the residual chlorine test is often encountered when inadequate treatment is being applied to heavily polluted water or swimming pool water, or when the test is being used in connection with chlorination of sewage treatment plant effluents.

G. Nitrate. Since nitrates are produced by oxidation of nitrogenous organic matter, their presence in water may be of sanitary significance. The variation in the quantity of nitrate in a water (particularly a ground-water) and not the actual quantity is a significant factor. If the quantity is constant the nitrate is probably coming from the water bearing stratum which may have been formed millions of years before. A variable nitrate content in a ground water is an indication of fairly recent surface pollution.

H. Fluoride. Fluorine is sometimes found in water as fluorides. If present in sufficient amounts, over 1.5 parts per million of fluorine, it causes an incurable injury to teeth known as "mottled enamel" which is very disfiguring to the teeth in these cases where fluoride water has been consumed. The injury is done during the age period from birth to nine years, while calcification of the permanent teeth is in process. No harm is apparently done after that age.

Although a fluoride content of over 1.5 ppm has been found to be detrimental, less than that amount appears to provide protection against dental caries or tooth decay. Inspections of teeth in areas where the fluoride content is naturally 1.0 to 1.5 parts per million show 60% or less dental caries than where the water is fluorine-free. Several ten year studies and other experiments are in progress to increase knowledge of fluoride application.

I. Other Chemical Impurities. Water should not contain an excessive amount of soluable mineral substances, nor excessive amounts of any chemicals employed in treatment. Various amounts of the following chemical substances will constitute grounds for rejection of the supply: lead, arsenic, selenium, vanadium, boron, hexavalent chromium, copper, magnesium, zinc, and phenolic compounds. Ordinarily analysis for these substances need be made only semiannually. If, however, there is some presumption of unfitness because of these elements, periodic determination for the element in question should be made more frequently. Where experience, examination, and available evidence indicate that such substances are not present or likely to be present in the water supplies involved, semiannual examinations are not necessary, unless requested by health authorities.

J. Interpretation of Results of Chemical Analysis. It is impossible to determine the quality of a water from a chemical analysis alone. If chlorides, ammonia, and nitrates were due only to the decomposition of organic matter, water analysis would become an exact means of determining the degree of contamination. But since these various substances usually are not dangerous in themselves, and may be found to be present in a potable water in varying quantities, knowledge of the origin of the water is important in interpreting analyses.

From the public health standpoint the presence of materials which cause a high chlorine demand, which give rise to chlorinous tastes, which make the water difficult to treat, is important. Again it is emphasized that periodic chlorine residual tests throughout the distribution system of a water supply be coordinated by the health center inspectors and the water plant operators to maintain daily surveillance of actual operations and conditions.

Nitrites normally are present in very small amounts or are absent, because nitrites are transitory compounds that are soon converted into Nitrates. The results of the Nitrogen tests, when used collectively, help to show the possible presence of contaminating substances and the probable length of time they have been present in the water. The relative amounts, rather than the actual amounts of the nitrogen compounds indicate the state of pollution. If the organic matter is fresh, nitrites will not have formed; if it is old the nitrites will have turned into nitrates.

In general when a chemical analysis of water shows the presence of large amounts of chlorides, ammonia, nitrites or nitrates, pollution with sewage should be suspected. An examination of the water source should then be carefully made to determine the cause of the trouble, the suitability for treatment, and the type of treatment necessary.

VI. SIGNIFICANT QUANTITIES.

Comparison of American and Japanese maximum allowances for presumably potable water are listed below. These significant quantities are not standards. They are merely guides or rather indicators which are desirable, within limits or less, for a recommended quality of water.

TEST	AMERICAN	JAPANESE
Residual chlorine	0.05 - 0.1 1.0 - 2.0 (chloramines)	0.1 - 0.2 **
Bacteriological:		
Coli-aerogenes group	Gas formation in 10% of tubes planted	Gas formation in 10% of tubes planted
Total bacteria	5 per ml	100 per cc
(See footnote 1)		

TEST	AMERICAN	JAPANESE
Odor	none	none
Taste	not objectionable	not objectionable
Temperature	$50 - 55^{o}$ F.	**
Color	20	1
Turbidity	10	2
Total solids	500 ppm	500 ppm
Alkalinity	120 ppm	**
pH	Less than 7.0 and over 10.6	Less than 5.8 and over 8.0
Hardness	100 ppm	300 ppm
Chloride	250 ppm	30 ppm
Sulphate	250 ppm	**
Nitrite	0.001 ppm	trace
Nitrate	Any measurable variable quantity	10 ppm
(See footnote 2)		
Iron and Manganese (total)	0.3 ppm	0.3 ppm
Fluoride	1.5 ppm	1.5 ppm
Lead	0.1 ppm	0.1 ppm
Arsenic	0.05 ppm	0.05 ppm
Selenium	0.05 ppm	**
Hexavalent chromium	0.05 ppm	0.05 ppm
Copper	3.0 ppm	0.7 ppm
Magnesium	125.0 ppm	**
Zinc	15.0 ppm	1.0 ppm
Vanadium	1.0 ppm	**
Boron	1.0 ppm	**
Phenolic compounds	0.001 ppm	.0x01 ppm
(See footnote 3)		

NOTE: Tests as Dissolved Oxygen, Biochemical Oxygen Demand and Oxygen Consumed are not recommended for routine tests in the maintenance of potable water supplies. However, they are recommended for stream pollution studies, control of purification processes, sewage treatment observations, and specific water problems.

1/ Recommended routine tests are the chlorine residual and the bacteriological tests. Sole reliance in determining the safety of water supplies cannot be placed on the results of infrequent bacteriological analysis; supplies which are potentially hazardous may be erroneously judged to be safe if contamination is not present at the time the samples are collected although there may be faulty location, construction, or operation of the supply. Periodic examinations will provide better control in such cases.

2/ Ordinarily a chemical analysis of a domestic supply will include: the physical tests, total hardness, alkalinity, pH, sulphates, and chlorides. Determination of nitrate nitrogen content should also be made. Iron, manganese, and fluoride may also be determined in some cases.

3/ Mineral analyses have no sanitary significance and are seldom made in routine work. Generally, they are of importance for determining the value of the water as a source for an industrial supply. However, due to their toxicity the above substances should be guarded against in the concentrations exceeding those limits cited.

DAILY FILTER PLANT OPERATING LOG

PLANT HONGOUHI HIGH DATE 9. 4. 1950.

TIME	TOTAL WATER FILTERED 1000's OF GALS.	TOTAL WATER TO DISTRIBUTION SYSTEM 1000's OF GALS.	FILT. WATER RES. LEVEL	CHLORINE						RESIDUAL CHLORINE					
				PRE			POST			BASIN		FILTER		FIN.	FIN.
				WGT. HYPO	WGT. CHL.	P.P.M. EST.	WGT. HYPO	WGT. CHL.	P.P.M. (EST)	INFL.	ENFL.	INFL.	ENF.		
0000															
0200	91		3.31				2.2	1.1	2.19					2.0	
0400	"	108	3.40				"	"	"					"	
0600	90		3.48				"	"	"					"	
0800	"	164	3.41				"	"	"					"	
1000	"		3.36				"	"	"					"	
1200	"	148	3.30				"	"	"					"	
1400	"		3.25				"	"	"					"	
1600	"	158	3.21				"	"	"					"	
1800	"		3.16				"	"	"					"	
2000	"	211	3.12				"	"	"					"	
2200	"		3.13				"	"	"					"	
2400	"	137	3.20				"	"	"					"	
TOTAL	1,082	926					26.4	13.2							

SUMMARY

WATER (GALS.)

RAW 1082,400 FILTERED 1,082,400

TREATED 1082,400 STA. USE 0

WASTE WATER 0 PERCENT 0

FILTER OPERATION

FILTER NO.	1	2	3
ON or OFF	ON	OFF	ON
TOTAL HEAD LOSS	96.0	—	74.0
TOTAL HOURS IDLE	—	24	—
TOTAL WATER FILTERED	475,200	—	607,200
TOTAL WATER WASTED	0		

STATION METERS (READINGS IN THOUSAND GALS.)

	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.
0000	432500									
0400	432930	108								
0800	433550	164								
1200	434110	148								
1600	434710	158								
2000	435510	211								
2400	436030	137								
TOTAL	3,510									

INVENTORY

	ALUM	LIME	CARBON	CHLORINE	AMMONIA		
ON HAND PREV. DAY				659.0		1,088.8	
RECEIVED				—		—	
TOTAL				659.0		1088.8	
USED TODAY				13.2		26.4	
ON HAND				645.8		1,062.4	

CHEMICALS USED

	TOTAL LBS.	LBS. PER M.G.	GRS. PER. GAL	P. P. M.
ALUM				
CARBON				
LIME				
CHL. PRE.	26.4	24.4	0.0425	0.73
CHL. POST	13.2	12.1	0.0816	1.46
CHL. TOTAL	39.6	36.5	0.1242	2.19
AMMONIA				

FILTER #	WIER READING	M 3 PER HR.	GPH	M3 PER DAY	GPD
1		75.0	19.8	1,800	475,200
2		—	—		
3		95.8	25.3	2,300	607,200
TOTAL		170.8	45.1	4,100	1,082,400

PLANT STATISTICS

NO. FILTER UNITS 2 SIZE 113 x 735 TYPE SLOW
TOTAL SQ. FT OF SAND SURFACE 24981.0
RATE OF FILTRATION (CALC.) 8.59 GAL. SQ. FT. / DAY 64.3
PLANT EFFICIENCY 0.270
(ON 4,000,000 MGD)

GENERAL

	0000-0800	0800-1600	1600-2400	AVG.
WEATHER				
WIND DIRECTION				
AIR TEMP.	21.0			
WATER TEMP.	23.0			
STORAGE	900,240	847,440	844,800	
OPERATOR	S YAMAKAMI			

ROUTINE PLANT INSPECTION

SAND MEDIA INSP. good FILT. # good CONDITION good
COND. RAW WATR RES. good
COND. CLEAR WATER STOR. good
REMARKS

REMARKS

SUBMITTED BY D. Mihara
(CHIEF OPERATOR)

APPROVED BY for T. Numaguchi
(LOCAL MANAGER)

DAILY FILTER PLANT OPERATING LOG

PLANT NISHIYAMA HIGH DATE 9. 4. 1950.

TIME	TOTAL WATER FILTERED 1000's OF GALS.	TOTAL WATER TO DISTRIBUTION SYSTEM 1000's OF GALS.	FILT. WATER RES. LEVEL	CHLORINE						RESIDUAL CHLORINE					
				PRE			POST			BASIN		FILTER		FIN.	FIN.
				WGT. HYPO	WGT. CHL.	P.P.M. EST.	WGT. HYPO	WGT. CHL.	P.P.M. (EST)	INFL.	ENFL.	INFL.	ENF.		
0000															
0200	105	80	2.15				1.0	2.09						2.0	
0400	"	"	2.30				"	"						"	
0600	"	91	2.40				2.0	"						"	
0800	"	89	2.28				"	"						"	
1000	"	178	1.75				"	"						"	
1200	"	166	1.41				"	"						"	
1400	"	167	0.96				"	"						"	
1600	"	168	0.50				"	"						"	
1800	"	139	0.25				"	"						"	
2000	"	108	0.23				"	"						"	
2200	"	96	0.30				"	"						"	
2400	106	92	0.40				"	"						"	
TOTAL	1,261	1,454					22.0								

SUMMARY

WATER (GALS.)

RAW 1,261,000 FILTERED 1,261,000

TREATED 1,261,000 STA. USE. 0

WASTE WATER 0 PERCENT 0

FILTER OPERATION

FILTER NO.	1	2	3
ON or OFF	ON	ON	ON
TOTAL HEAD LOSS	1.02	96	90
TOTAL HOURS IDLE			
TOTAL WATER FILTERED	720,000	270,720.	270,720
TOTAL WATER WASTED	0	0	0

STATION METERS (READINGS IN THOUSAND GALS.)

	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.
0000										
0400										
0800		Meter Brocken								
1200										
1600										
2000										
2400										
TOTAL										

INVENTORY

	ALUM	LIME	CARBON	CHLORINE	AMMONIA		
ON HAND PREV. DAY				3.435.0		615.0	
RECEIVED				0		0	
TOTAL				3.435.0		615.0	
USED TODAY				0		22.0	
ON HAND				3.435.0		593.0	

CHEMICALS USED

	TOTAL LBS.	LBS. PER M.G.	GRS. PER. GAL	P. P. M.
ALUM				
CARBON				
LIME				
CHL. PRE.				
CHL. POST				
CHL. TOTAL	22.0	17.4	0.120	2.09
AMMONIA				

FILTER #	WIER READING	M 3 PER HR.	GPH	M3 PER DAY	GPD
1	5 3/4	114	30,000	2.725	720.000
2	3.0	43	11.280	1.025	720.000
3	3.0	43	11.280	1.025	270.720
TOTAL	11 3/4	200	52.560	4.775	1.261.440

PLANT STATISTICS

NO. FILTER UNITS 3 SIZE 128.0x 98.5 TYPE Slow

TOTAL SQ. FT OF SAND SURFACE 37824.0

RATE OF FILTRATION (CALC.) 4.412 GAL. SQ. FT. / DAY 33

PLANT EFFICIENCY 0.315

(ON 4,000,000 MGD)

GENERAL

	0000-0800	0800-1600	1600-2400	AVG.
WEATHER				
WIND DIRECTION				
AIR TEMP.				
WATER TEMP.				
STORAGE	313.2355	68.6920	54.9536	
OPERATOR	M NAKAMURA			

ROUTINE PLANT INSPECTION

SAND MEDIA INSP. good FILT. # good CONDITION good

COND. RAW WATR RES. good

COND. CLEAR WATER STOR. good

REMARKS

REMARKS

SUBMITTED BY D. Mihara
(CHIEF OPERATOR)

APPROVED BY for T. Numaguchi
(LOCAL MANAGER)

DAILY FILTER PLANT OPERATING LOG

PLANT NISHIYAMA Low DATE 9. 4. 1950.

TIME	TOTAL WATER FILTERED 1000's OF GALS.	TOTAL WATER TO DISTRIBUTION SYSTEM 1000's OF GALS.	FILT. WATER RES. LEVEL	CHLORINE PRE WGT. HYPO	CHLORINE PRE WGT. CHL.	CHLORINE PRE P.P.M. EST.	CHLORINE POST WGT. HYPO	CHLORINE POST WGT. CHL.	CHLORINE POST P.P.M. (EST)	RESIDUAL CHLORINE BASIN INFL.	RESIDUAL CHLORINE BASIN ENFL.	RESIDUAL CHLORINE FILTER INFL.	RESIDUAL CHLORINE FILTER ENF.	FIN.	FIN.
0000															
0200	188	106	3.30					2.0	1.5					1.2	
0400	"	107	3.25					"	"					"	
0600	"	125	3.23					"	"					"	
0800	"	125	3.19					"	"					"	
1000	"	176	3.12					"	"					"	
1200	"	177	3.10					"	"					"	
1400	"	182	3.10					"	"					"	
1600	187	182	3.10					"	"					"	
1800	"	190	3.05					"	"					"	
2000	"	190	3.00					"	"					"	
2200	"	159	3.00					"	"					"	
2400	"	160	2.90					"	"					"	
TOTAL	2.251	1.885						24.0							

SUMMARY

WATER (GALS.)
RAW 2.251 FILTERED 2.251
TREATED 2.251 STA. USE 0
WASTE WATER 0 PERCENT 0

FILTER OPERATION

FILTER NO.	1	2	3
ON or OFF	ON	ON	ON
TOTAL HEAD LOSS	22.0	59.0	40.0
TOTAL HOURS IDLE	0	0	
TOTAL WATER FILTERED	606.60	288.8	
TOTAL WATER WASTED	0	0	

STATION METERS (READINGS IN THOUSAND GALS.)

	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.
0000	238.970									
0400	239.780									
0800	240.730									
1200	242.090									
1600	243.470									
2000	244.910									
2400	246.120									
TOTAL	7.150									

INVENTORY

	ALUM	LIME	CARBON	CHLORINE	AMMONIA		
ON HAND PREV. DAY				7,739.0		1,650.0	
RECEIVED				0		~~1.0~~ 0	
TOTAL				7,739.0		1,650	
USED TODAY				0		24	
ON HAND				7,739.0		1626.	

GENERAL

	0000-0800	0800-1600	1600-2400	AVG.
WEATHER				
WIND DIRECTION				
AIR TEMP.				
WATER TEMP.				
STORAGE	1,786.0	1,736.0	1,624.0	
OPERATOR	UMIZUMACHI			

CHEMICALS USED

	TOTAL LBS.	LBS. PER M.G.	GRS. PER. GAL	P. P. M.
ALUM				
CARBON				
LIME				
CHL. PRE.				
CHL. POST	24	16.6	0.087	1.50
CHL. TOTAL	24	16.6	0.087	1.50
AMMONIA				

ROUTINE PLANT INSPECTION

SAND MEDIA INSP. good FILT. # good CONDITION good

COND. RAW WATR RES. good

COND. CLEAR WATER STOR. good

REMARKS

FILTER #	WIER READING	M 3 PER HR.	GPH	M3 PER DAY	GPD
1	5 1/8	95.76	25.20	2,298	606.67
2	3 1/8	45.60	12.00	1,094	288.81
3	8 3/4	214.09	56.34	5,138	1,356.43
TOTAL	17. "	355.45	93.54	8,530	2,251.91

REMARKS

SUBMITTED BY D. Mihara
(CHIEF OPERATOR)

APPROVED BY for T. Numaguchi
(LOCAL MANAGER)

PLANT STATISTICS

NO. FILTER UNITS 3 SIZE 128.0 x 98.5 TYPE Slow

TOTAL SQ. FT OF SAND SURFACE 37824.0

RATE OF FILTRATION (CALC.) 7.90 GAL. SQ. FT. / DAY 59

PLANT EFFICIENCY 0.563
(ON 4,000,000 MGD)

DAILY FILTER PLANT OPERATING LOG

PLANT KOGAKURA DATE 9. 4. 1950.

TIME	TOTAL WATER FILTERED 1000's OF GALS.	TOTAL WATER TO DISTRIBUTION SYSTEM 1000's OF GALS.	FILT. WATER RES. LEVEL	CHLORINE PRE WGT. HYPO	CHLORINE PRE WGT. CHL.	CHLORINE PRE P.P.M. EST.	CHLORINE POST WGT. HYPO	CHLORINE POST WGT. CHL.	CHLORINE POST P.P.M. (EST)	RESIDUAL CHLORINE BASIN INFL.	RESIDUAL CHLORINE BASIN ENFL.	RESIDUAL CHLORINE FILTER INFL.	RESIDUAL CHLORINE FILTER ENF.	FIN.	FIN.
0000															
0200	28	18	2.80				2.2	0.55	2.5					2.1	
0400	"	21	2.60				"	"	"					"	
0600	"	23	2.40				"	"	"					"	
0800	"	20	2.30				"	"	"					2.2	
1000	"	32	2.25				"	"	"					"	
1200	"	29	2.20				"	"	"					"	
1400	"	26	2.15				"	"	"					"	
1600	24	24	2.10				"	"	"					"	
1800	"	26	2.00				"	"	"					"	
2000	"	13	2.15				"	"	"					"	
2200	"	16	2.30				"	"	"					"	
2400	"	16	2.60				"	"	"					"	
TOTAL	316	264					26.4	6.6							

SUMMARY

WATER (GALS.)
RAW 316,000 FILTERED 316,000
TREATED 316,000 STA. USE. 0
WASTE WATER 0 PERCENT 0

FILTER OPERATION

FILTER NO.	1	2	3
ON or OFF	ON	ON	
TOTAL HEAD LOSS	8.0	9.0	
TOTAL HOURS IDLE			
TOTAL WATER FILTERED	184,000	132,000	
TOTAL WATER WASTED	0	0	

STATION METERS (READINGS IN THOUSAND GALS.)

	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.
0000										
0400										
0800										
1200										
1600										
2000										
2400										
TOTAL										

No meter

INVENTORY

	ALUM	LIME	CARBON	CHLORINE	AMMONIA		
ON HAND PREV. DAY				1,580.6			
RECEIVED				0			
TOTAL				1,580.6			
USED TODAY				26.4			
ON HAND				1,554.2			

CHEMICALS USED

	TOTAL LBS.	LBS. PER M.G.	GRS. PER. GAL	P. P. M.
ALUM				
CARBON				
LIME				
CHL. PRE.				
CHL. POST				
CHL. TOTAL	26.4	83.5	0.147	2.5
AMMONIA				

FILTER #	WIER READING	M 3 PER HR.	GPH	M3 PER DAY	GPD
1		29	7,656	700	184,000
2		20	5,280	500	132,000
3					
TOTAL		47	12,936	1,200	316,000

PLANT STATISTICS

NO. FILTER UNITS 2 SIZE 66.99×49.8 TYPE Slow

TOTAL SQ. FT OF SAND SURFACE 6,592

RATE OF FILTRATION (CALC.) 6.2 GAL. SQ. FT. / DAY 47

PLANT EFFICIENCY 0.079
(ON 4,000,000 MGD)

GENERAL

	0000-0800	0800-1600	1600-2400	AVG.
WEATHER				
WIND DIRECTION				
AIR TEMP.				
WATER TEMP.				
STORAGE	17.2160	16.6320	20.5920	
OPERATOR	F SETOGU~~[illegible]~~CHI			

ROUTINE PLANT INSPECTION

SAND MEDIA INSP. good FILT. # good CONDITION good

COND. RAW WATR RES. good

COND. CLEAR WATER STOR. good

REMARKS

REMARKS

SUBMITTED BY D. Mihara
(CHIEF OPERATOR)

APPROVED BY for T. Numaguchi
(LOCAL MANAGER)

DAILY FILTER PLANT OPERATING LOG

PLANT IZUMOMACHI DATE 9. 4. 1950.

TIME	TOTAL WATER FILTERED 1000's OF GALS.	TOTAL WATER TO DISTRIBUTION SYSTEM 1000's OF GALS.	FILT. WATER RES. LEVEL	CHLORINE PRE WGT. HYPO	CHLORINE PRE WGT. CHL.	CHLORINE PRE P.P.M. EST.	CHLORINE POST WGT. HYPO	CHLORINE POST WGT. CHL.	CHLORINE POST P.P.M. (EST)	RESIDUAL CHLORINE BASIN INFL.	RESIDUAL CHLORINE BASIN ENFL.	RESIDUAL CHLORINE FILTER INFL.	RESIDUAL CHLORINE FILTER ENF.	FIN.	FIN.
0000															
0200	286	211	3.90					3.52	1.4					1.0	
0400	〃	224	3.85					〃	〃					〃	
0600	〃	238	3.80					〃	〃					〃	
0800	〃	290	3.75					〃	〃					1.1	
1000	〃	344	3.70					〃	〃					〃	
1200	〃	317	3.65					〃	〃					〃	
1400	〃	343	3.50					〃	〃					〃	
1600	〃	290	3.40					〃	〃					〃	
1800	〃	264	3.35					〃	〃					〃	
2000	〃	251	3.30					〃	〃					〃	
2200	〃	211	3.15					〃	〃					〃	
2400	〃	185	3.10					〃	〃					〃	
TOTAL	3,432	3,168						42.24							

SUMMARY

WATER (GALS.)
RAW 3,432,000 FILTERED 3,432,000
TREATED 3,432,000 STA. USE. 0
WASTE WATER 0 PERCENT 0

FILTER OPERATION

FILTER NO.	1	2	3
ON or OFF	ON	ON	ON
TOTAL HEAD LOSS	11.5	12.5	24.0
TOTAL HOURS IDLE			
TOTAL WATER FILTERED	1,320,000	1,188,000	924,000
TOTAL WATER WASTED	0	0	0

STATION METERS (READINGS IN THOUSAND GALS.)

	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.
0000										
0400										
0800										
1200										
1600										
2000										
2400										
TOTAL										

Meter Brocken

INVENTORY

	ALUM	LIME	CARBON	CHLORINE	AMMONIA		
ON HAND PREV. DAY				594.0		1.464.2	
RECEIVED				0		0.	
TOTAL				594.0		1.464.2	
USED TODAY				0		42.24	
ON HAND				594.0		1.421.96	

CHEMICALS USED

	TOTAL LBS.	LBS. PER M.G.	GRS. PER. GAL	P. P. M
ALUM				
CARBON				
LIME				
CHL. PRE.				
CHL. POST	42.24	12.3	0.060	1.4
CHL. TOTAL	42.24	12.3	0.060	1.4
AMMONIA				

FILTER #	WIER READING	M 3 PER HR.	GPH	M3 PER DAY	GPD
1		208	54,912	5.000	1.320.000
2		187	49,368	4.500	1.188.000
3		145	38.280	3.500	924.000
TOTAL		540	142.560	13.000	3.432.000

PLANT STATISTICS

NO. FILTER UNITS 3 SIZE 1189×99 TYPE SLOW

TOTAL SQ. FT OF SAND SURFACE 3.5313.3

RATE OF FILTRATION (CALC.) 2.03 GAL. SQ. FT. / DAY 90

PLANT EFFICIENCY 0.858

(ON 4,000,000 MGD)

GENERAL

	0000-0800	0800-1600	1600-2400	AVG.
WEATHER				
WIND DIRECTION				
AIR TEMP.				
WATER TEMP.				
STORAGE	1.531.530	1.388587	1.266.064	
OPERATOR	F SETOGUHCH			

ROUTINE PLANT INSPECTION

SAND MEDIA INSP. good FILT. # good CONDITION good

COND. RAW WATR RES. good

COND. CLEAR WATER STOR. good

REMARKS

REMARKS

SUBMITTED BY D. Mihara
(CHIEF OPERATOR)

APPROVED BY for T. Numagachi
(LOCAL MANAGER)

DAILY FILTER PLANT OPERATING LOG

PLANT URAKAMI DATE 9. 4. 1950.

TIME	TOTAL WATER FILTERED 1000's OF GALS.	TOTAL WATER TO DISTRIBUTION SYSTEM 1000's OF GALS.	FILT. WATER RES. LEVEL	CHLORINE PRE WGT. HYPO	CHLORINE PRE WGT. CHL.	CHLORINE PRE P.P.M. EST.	CHLORINE POST WGT. HYPO	CHLORINE POST WGT. CHL.	CHLORINE POST P.P.M. (EST)	RESIDUAL CHLORINE BASIN INFL.	RESIDUAL CHLORINE BASIN ENFL.	RESIDUAL CHLORINE FILTER INFL.	RESIDUAL CHLORINE FILTER ENF.	FIN.	FIN.
0000															
0200	532	498	4.35					8.8	1.9					1.3	
0400	〃	〃	4.45					〃	〃					〃	
0600	〃	〃	4.00					〃	〃					〃	
0800	〃	〃	4.25					〃	〃					〃	
1000	〃	〃	4.20					〃	〃					〃	
1200	〃	〃	4.10					〃	〃					〃	
1400	〃	〃	4.05					〃	〃					〃	
1600	〃	〃	3.65					〃	〃					〃	
1800	〃	〃	3.50					〃	〃					〃	
2000	〃	〃	3.40					〃	〃					〃	
2200	〃	〃	3.50					〃	〃					〃	
2400	538	502	3.85					〃	〃					〃	
TOTAL	6.390	5.980						105.6							

SUMMARY

WATER (GALS.)
RAW 6.390 FILTERED 6.390
TREATED 6.390 STA. USE. 0
WASTE WATER 416 PERCENT 0.065%

FILTER OPERATION

FILTER NO.	1. 2.	4. 5. 6.	3
ON or OFF	ON	ON	
TOTAL HEAD LOSS	—	—	
TOTAL HOURS IDLE	80	240	
TOTAL WATER FILTERED	2.600	3.790	
TOTAL WATER WASTED	104	312	

STATION METERS (READINGS IN THOUSAND GALS.)

	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.
0000										
0400										
0800										
1200			No meters							
1600										
2000										
2400										
TOTAL										

INVENTORY

	ALUM	LIME	CARBON	CHLORINE	AMMONIA		
ON HAND PREV. DAY	5.324			3.520		330	
RECEIVED	33,000			0		0	
TOTAL	38.324			3.520		330	
USED TODAY	5,544			660		330	
ON HAND	32,780			2.860		0	

CHEMICALS USED

	TOTAL LBS.	LBS. PER M.G.	GRS. PER. GAL	P. P. M.
ALUM	792.0	123.9	0.86	14.8
CARBON				
LIME				
CHL. PRE.				
CHL. POST				
CHL. TOTAL	105.6	16.5	0.11	1.9
AMMONIA				

FILTER #	WIER READING	M 3 PER HR.	GPH	M3 PER DAY	GPD
1.2.	3.5	410	108.3660	9.844	2600.7848
4.5.6	"	597	157.9255	14.346	3.790.213.2
3					
TOTAL		1.007	266.2915	24.190	6.390.998.0

PLANT STATISTICS

NO. FILTER UNITS 1 SIZE 19.6x28 TYPE RAPID
TOTAL SQ. FT OF SAND SURFACE 2744
RATE OF FILTRATION (CALC.) 311.25 GAL. SQ. FT. / DAY 2,328
PLANT EFFICIENCY 1.59
(ON 4,000,000 MGD)

GENERAL

	0000-0800	0800-1600	1600-2400	AVG.
WEATHER				
WIND DIRECTION				
AIR TEMP.	22			
WATER TEMP.	26			
STORAGE	1.112.275	974.340	1.041347	
OPERATOR		H HIDAKA		

ROUTINE PLANT INSPECTION

SAND MEDIA INSP. good FILT. # good CONDITION good
COND. RAW WATR RES. good
COND. CLEAR WATER STOR. good
REMARKS

REMARKS

SUBMITTED BY D. Mihara
(CHIEF OPERATOR)

APPROVED BY for T. Numaguchi
(LOCAL MANAGER)

DAILY FILTER PLANT OPERATING LOG

PLANT HONGOUHI HIGH DATE 9. 11. 1950.

TIME	TOTAL WATER FILTERED 1000's OF GALS.	TOTAL WATER TO DISTRIBUTION SYSTEM 1000's OF GALS.	FILT. WATER RES. LEVEL	CHLORINE PRE WGT. HYPO	CHLORINE PRE WGT. CHL.	CHLORINE PRE P.P.M. EST.	CHLORINE POST WGT. HYPO	CHLORINE POST WGT. CHL.	CHLORINE POST P.P.M. (EST)	RESIDUAL CHLORINE BASIN INFL.	RESIDUAL CHLORINE BASIN ENFL.	RESIDUAL CHLORINE FILTER INFL.	RESIDUAL CHLORINE FILTER ENF.	FIN.	FIN.
0000															
0200	109		2.82				0.55	2.80	1.36					1.0	
0400	"	127	2.89				"	"	"					"	
0600	"		2.96				"	"	"					"	
0800	"	198	2.88				"	"	"					"	
1000	"		2.84				"	"	"					"	
1200	"	185	2.81				"	"	"					"	
1400	"		2.81				"	"	"					"	
1600	"	243	2.70				"	"	"					"	
1800	"		2.60				"	"	"					"	
2000	"	240	2.52				"	"	"					"	
2200	108		2.55				"	"	"					"	
2400	"	163	2.63				"	"	"						
TOTAL	1.306	1.156					6.6	33.1							

SUMMARY

WATER (GALS.)

RAW 1.306.800 FILTERED 1.306.800

TREATED 1.306.800 STA. USE 0

WASTE WATER 0 PERCENT 0

FILTER OPERATION

FILTER NO.	1	2	3
ON or OFF	ON	ON	ON
TOTAL HEAD LOSS	96.0	93.0	97.0
TOTAL HOURS IDLE	—	—	—
TOTAL WATER FILTERED	356.400	448.800	501.600
TOTAL WATER WASTED	0	0	0

STATION METERS (READINGS IN THOUSAND GALS.)

	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.
0000	459260									
0400	459740	127								
0800	460490	198								
1200	461190	185								
1600	462110	243								
2000	463020	240								
2400	463640	160								
TOTAL	4,380	1,156								

INVENTORY

	ALUM	LIME	CARBON	CHLORINE	AMMONIA		
ON HAND PREV. DAY				551		945.5	
RECEIVED				0		—	
TOTAL				551		945.5	
USED TODAY				6.6		33.1	
ON HAND				544.4		912.4	

CHEMICALS USED

	TOTAL LBS.	LBS. PER M.G.	GRS. PER. GAL	P. P. M.
ALUM				
CARBON				
LIME				
CHL. PRE.	33.1	25.3	0.0443	0.76
CHL. POST	6.6	5.0	0.0350	0.60
CHL. TOTAL	39.7	30.3	0.0793	1.36
AMMONIA				

FILTER #	WIER READING	M 3 PER HR.	GPH	M3 PER DAY	GPD
1		56.2	14.8	1.350	356.400
2		70.8	18.7	1.700	448.800
3		79.2	20.9	1.900	501.600
TOTAL		206.2	54.4	4.950	1.306.800

PLANT STATISTICS

NO. FILTER UNITS 3 SIZE 113.3×73.5 TYPE SLOW

TOTAL SQ. FT OF SAND SURFACE 24981.0

RATE OF FILTRATION (CALC.) 6.99 GAL. SQ. FT. / DAY 52.3

PLANT EFFICIENCY 0.326

(ON 4,000,000 MGD)

GENERAL

	0000-0800	0800-1600	1600-2400	AVG.
WEATHER				
WIND DIRECTION				
AIR TEMP.	25.0			
WATER TEMP.	25.0			
STORAGE	760.320	712.800	694.320	
OPERATOR	S YAMAKAMI			

ROUTINE PLANT INSPECTION

SAND MEDIA INSP. good FILT. # good CONDITION good

COND. RAW WATR RES. good

COND. CLEAR WATER STOR good

REMARKS

REMARKS

SUBMITTED BY D. Mihara
(CHIEF OPERATOR)

APPROVED BY for T. Numaguchi
(LOCAL MANAGER)

DAILY FILTER PLANT OPERATING LOG

PLANT NISHIYAMA HIGH DATE 9. 11. 1950.

TIME	TOTAL WATER FILTERED 1000's OF GALS.	TOTAL WATER TO DISTRIBUTION SYSTEM 1000's OF GALS.	FILT. WATER RES. LEVEL	CHLORINE						RESIDUAL CHLORINE				FIN.	FIN.
				PRE			POST			BASIN		FILTER			
				WGT. HYPO	WGT. CHL.	P.P.M. EST.	WGT. HYPO	WGT. CHL.	P.P.M. (EST)	INFL.	ENFL.	INFL.	ENF.		
0000															
0200	147	133	3.30					2.0	1.67					1.5[illegible]	
0400	"	"	3.40					"	"					"	
0600	"	155	3.34					"	"					"	
0800	"	156	3.27					"	"					"	
1000	"	163	3.15					"	"					"	
1200	"	164	3.02					"	"					"	
1400	"	171	2.85					"	"					"	
1600	"	164	2.72					"	"					"	
1800	"	158	2.64					"	"					"	
2000	"	136	2.72					"	"					"	
2200	"	"	2.80					"	"					"	
2400	148	134	2.90					3.0	"					"	
TOTAL	1.765	1.803						25.0							

SUMMARY

WATER (GALS.)

RAW 1.265,000 FILTERED 1.265,000

TREATED 1.265,000 STA. USE. 0

WASTE WATER 0 PERCENT 0

FILTER OPERATION

FILTER NO.	1	2	3
ON or OFF	ON	ON	ON
TOTAL HEAD LOSS	94	64	93
TOTAL HOURS IDLE			
TOTAL WATER FILTERED	673.920	673.920	417.600
TOTAL WATER WASTED	0	0	0

STATION METERS (READINGS IN THOUSAND GALS.)

	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.
0000										
0400										
0800										
1200			Meter Brocken							
1600										
2000										
2400										
TOTAL										

INVENTORY

	ALUM	LIME	CARBON	CHLORINE	AMMONIA		
ON HAND PREV. DAY				3.435		434	
RECEIVED				0		0	
TOTAL				3.435		434	
USED TODAY				0		25	
ON HAND				3.435		409	

CHEMICALS USED

	TOTAL LBS.	LBS. PER M.G.	GRS. PER. GAL	P. P. M
ALUM				
CARBON				
LIME				
CHL. PRE.				
CHL. POST				
CHL. TOTAL	25.0	14.1	0.095	1.64
AMMONIA				

FILTER #	WIER READING	M 3 PER HR.	GPH	M3 PER DAY	GPD
1	5 1/2	106	28.080	2.551	673.920
2	5 1/2	106	28.080	2.551	673.920
3	4.0	66	17.400	1.581	417.600
TOTAL	15.0	278	73.560	6.683	1.765.440

PLANT STATISTICS

NO. FILTER UNITS 3 SIZE 128.0x98.5 TYPE Slow
TOTAL SQ. FT OF SAND SURFACE 37824.0
RATE OF FILTRATION (CALC.) 6.28 GAL. SQ. FT. / DAY 47
PLANT EFFICIENCY 0.441
(ON 4,000,000 MGD)

GENERAL

	0000-0800	0800-1600	1600-2400	AVG.
WEATHER				
WIND DIRECTION				
AIR TEMP.				
WATER TEMP.				
STORAGE	449.1400	373.6844	398.4136	
OPERATOR	M NAKAMURA			

ROUTINE PLANT INSPECTION

SAND MEDIA INSP. good FILT. # good CONDITION good
COND. RAW WATR RES. good
COND. CLEAR WATER STOR. good
REMARKS

REMARKS

SUBMITTED BY D. Mihara
(CHIEF OPERATOR)

APPROVED BY for T. Numaguchi
(LOCAL MANAGER)

DAILY FILTER PLANT OPERATING LOG

PLANT NISHIYAMA Low DATE 9. 11. 1950.

TIME	TOTAL WATER FILTERED 1000's OF GALS.	TOTAL WATER TO DISTRIBUTION SYSTEM 1000's OF GALS.	FILT. WATER RES. LEVEL	CHLORINE						RESIDUAL CHLORINE					
				PRE			POST			BASIN		FILTER		FIN.	FIN.
				WGT. HYPO	WGT. CHL.	P.P.M. EST.	WGT. HYPO	WGT. CHL.	P.P.M. (EST)	INFL.	ENFL.	INFL.	ENF.		
0000															
0200	155	121	1.95					2.0	1.56					1.2	
0400	〃	121	1.80					〃	〃					〃	
0600	〃	110	1.60					〃	〃					〃	
0800	〃	110	1.55					〃	〃					〃	
1000	〃	122	1.20					〃	〃					〃	
1200	〃	122	1.00					〃	〃					〃	
1400	〃	130	0.65					〃	〃					〃	
1600	〃	131	0.50					〃	〃					〃	
1800	〃	128	0.40					〃	〃					〃	
2000	〃	130	0.35					〃	〃					〃	
2200	〃	127	0.30					〃	〃					〃	
2400	154	128	0.25					〃	〃					〃	
TOTAL	1859	1.481						24.0							

SUMMARY

WATER (GALS.)

RAW 1.859 FILTERED 1.859

TREATED 1.859 STA. USE. 0

WASTE WATER 0 PERCENT 0

FILTER OPERATION

FILTER NO.	1	2	3
ON or OFF	ON	ON	ON
TOTAL HEAD LOSS	39.0	35.0	57.0
TOTAL HOURS IDLE	0	0	0
TOTAL WATER FILTERED	342.40	676.10	819.10
TOTAL WATER WASTED	0	0	0

STATION METERS (READINGS IN THOUSAND GALS.)

	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.
0000	287.010									
0400	288.110	242								
0800	289.110	220								
1200	290.220	244								
1600	291.410	261								
2000	292.590	259								
2400	293.750	255								
TOTAL	6740	1.481								

INVENTORY

	ALUM	LIME	CARBON	CHLORINE	AMMONIA		
ON HAND PREV. DAY				3,080		1,430	
RECEIVED				0		0	
TOTAL				3,080		1,430	
USED TODAY				0		24	
ON HAND				3,080		1,406	

GENERAL

	0000-0800	0800-1600	1600-2400	AVG.
WEATHER				
WIND DIRECTION				
AIR TEMP.				
WATER TEMP.				
STORAGE	869.395	280.450	140.225	
OPERATOR	UMIZUMACHI			

CHEMICALS USED

	TOTAL LBS.	LBS. PER M.G.	GRS. PER. GAL	P. P. M.
ALUM				
CARBON				
LIME				
CHL. PRE.				
CHL. POST	24.0	12.9	0.081	1.56
CHL. TOTAL	24.0	12.9	0.081	1.56
AMMONIA				

ROUTINE PLANT INSPECTION

SAND MEDIA INSP. good FILT. # good CONDITIONS good

COND. RAW WATR RES. good

COND. CLEAR WATER STOR. good

REMARKS

FILTER #	WIER READING	M 3 PER HR.	GPH	M3 PER DAY	GPD
1	3 1/2	54.03	14.22	1,296.90	342.40
2	5 1/2	106.70	28.08	2,560.90	676.10
3	6 1/4	129.27	34.02	3,184.70	840.80
TOTAL	15 1/4	290.00	76.32	7,042.50	1,859.30

REMARKS

SUBMITTED BY D. Mihara
(CHIEF OPERATOR)

APPROVED BY for T. Numaguchi
(LOCAL MANAGER)

PLANT STATISTICS

NO. FILTER UNITS 3 SIZE 128.5 X 98.5 TYPE Slow

TOTAL SQ. FT OF SAND SURFACE 37,824.0

RATE OF FILTRATION (CALC.) 6.55 GAL. SQ. FT. / DAY 49

PLANT EFFICIENCY 0.465
(ON 4,000,000 MGD)

DAILY FILTER PLANT OPERATING LOG

PLANT IZUMOMACHI DATE 9. 11. 1950.

TIME	TOTAL WATER FILTERED 1000's OF GALS.	TOTAL WATER TO DISTRIBUTION SYSTEM 1000's OF GALS.	FILT. WATER RES. LEVEL	CHLORINE PRE WGT. HYPO	CHLORINE PRE WGT. CHL.	CHLORINE PRE P.P.M. EST.	CHLORINE POST WGT. HYPO	CHLORINE POST WGT. CHL.	CHLORINE POST P.P.M. (EST)	RESIDUAL CHLORINE BASIN INFL.	RESIDUAL CHLORINE BASIN ENFL.	RESIDUAL CHLORINE FILTER INFL.	RESIDUAL CHLORINE FILTER ENF.	FIN.	FIN.
0000															
0200	286	211	2.80					3.52	1.4					1.1	
0400	"	238	2.80					"	"					"	
0600	"	344	2.75					"	"					"	
0800	"	290	2.69					"	"					1.2	
1000	"	343	2.50					"	"					"	
1200	"	317	2.40					"	"					"	
1400	"	290	2.25					"	"					"	
1600	"	264	2.15					"	"					"	
1800	"	251	2.00					"	"					"	
2000	"	224	1.90					"	"					"	
2200	"	211	2.00					"	"					"	
2400	"	185	2.30					"	"					"	
TOTAL	3.432	3.168						42.24							

SUMMARY

WATER (GALS.)

RAW 3,432,000 FILTERED 3,432,000

TREATED 3,432,000 STA. USE. 0

WASTE WATER 0 PERCENT 0

FILTER OPERATION

FILTER NO.	1	2	3
ON or OFF	ON	ON	ON
TOTAL HEAD LOSS	14.0	12.5	24.0
TOTAL HOURS IDLE			
TOTAL WATER FILTERED	1.320.000	1.188.000	924.000
TOTAL WATER WASTED	0	0	0

STATION METERS (READINGS IN THOUSAND GALS.)

	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.
0000										
0400										
0800										
1200										
1600										
2000										
2400										
TOTAL										

Meter brocken

INVENTORY

	ALUM	LIME	CARBON	CHLORINE	AMMONIA		
ON HAND PREV. DAY				594		1,343	
RECEIVED				0		0	
TOTAL				594		1,343	
USED TODAY				0		42.24	
ON HAND				594		1,300.76	

CHEMICALS USED

	TOTAL LBS.	LBS. PER M.G.	GRS. PER. GAL	P. P. M.
ALUM				
CARBON				
LIME				
CHL. PRE.				
CHL. POST	42.24	12.3	0.060	1.4
CHL. TOTAL	42.24	12.3	0.060	1.4
AMMONIA				

FILTER #	WIER READING	M 3 PER HR.	GPH	M3 PER DAY	GPD
1		208	54,912	5.000	1.320.000
2		187	49.368	4.500	1.188.000
3		145	38.280	3.500	924.000
TOTAL		540	142.560	13.000	3.432.000

PLANT STATISTICS

NO. FILTER UNITS 3 SIZE 118.9×99 TYPE Slow

TOTAL SQ. FT OF SAND SURFACE 3,5313.3

RATE OF FILTRATION (CALC.) 12.03 GAL. SQ. FT. / DAY 90

PLANT EFFICIENCY 0.858
(ON 4,000,000 MGD)

GENERAL

	0000-0800	0800-1600	1600-2400	AVG.
WEATHER				
WIND DIRECTION				
AIR TEMP.				
WATER TEMP.				
STORAGE	834.617	878.077	939.338	
OPERATOR	F SETOGUCHI			

ROUTINE PLANT INSPECTION

SAND MEDIA INSP. good FILT. # good CONDITION good

COND. RAW WATR RES good

COND. CLEAR WATER STOR. good

REMARKS

REMARKS

SUBMITTED BY D. Mihara
(CHIEF OPERATOR)

APPROVED BY for T. Numaguchi
(LOCAL MANAGER)

DAILY FILTER PLANT OPERATING LOG

PLANT *KOGAKURA* DATE *9. 11. 1950.*

TIME	TOTAL WATER FILTERED 1000's OF GALS.	TOTAL WATER TO DISTRIBUTION SYSTEM 1000's OF GALS.	FILT. WATER RES. LEVEL	CHLORINE						RESIDUAL CHLORINE					
				PRE			POST			BASIN		FILTER		FIN.	FIN.
				WGT. HYPO	WGT. CHL.	P.P.M. EST.	WGT. HYPO	WGT. CHL.	P.P.M. (EST)	INFL.	ENFL.	INFL.	ENF.		
0000															
0200	24	24	2.85					2.2	0.55	2.5				2.2	
0400	"	26	2.70					"	"	"				"	
0600	"	26	2.60					"	"	"				"	
0800	28	29	2.50					"	"	"				"	
1000	"	32	2.45					"	"	"				2.3	
1200	"	20	2.35					"	"	"				"	
1400	"	23	2.30					"	"	"				"	
1600	24	21	2.20					"	"	"				"	
1800	"	16	2.20					"	"	"				"	
2000	28	18	2.35					"	"	"				"	
2200	"	16	2.40					"	"	"				"	
2400	"	13	2.50					"	"	"				"	
TOTAL	316	264						26.4	6.6						

SUMMARY

WATER (GALS.)

RAW *316,000* FILTERED *316,000*

TREATED *316,000* STA. USE *0*

WASTE WATER *0* PERCENT *0*

FILTER OPERATION

FILTER NO.	1	2	3
ON or OFF	ON	ON	
TOTAL HEAD LOSS	9.0	10.0	
TOTAL HOURS IDLE			
TOTAL WATER FILTERED	184,000	132,000	
TOTAL WATER WASTED	0	0	

STATION METERS (READINGS IN THOUSAND GALS.)

	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.
0000										
0400										
0800										
1200		*No meter.*								
1600										
2000										
2400										
TOTAL										

INVENTORY

	ALUM	LIME	CARBON	CHLORINE	AMMONIA		
ON HAND PREV. DAY				1.395.8			
RECEIVED				0			
TOTAL				1.395.8			
USED TODAY				26.4			
ON HAND				1.369.4			

CHEMICALS USED

	TOTAL LBS.	LBS. PER M.G.	GRS. PER. GAL	P. P. M.
ALUM				
CARBON				
LIME				
CHL. PRE.				
CHL. POST				
CHL. TOTAL	26.4	83.5	0.147	2.5
AMMONIA				

FILTER #	WIER READING	M 3 PER HR.	GPH	M3 PER DAY	GPD
1		29	7.656	700	184.000
2		20	5.280	500	132.000
3					
TOTAL		47	12.936	1.200	316.000

PLANT STATISTICS

NO. FILTER UNITS 2 SIZE 66.99x4.98 TYPE S Cow

TOTAL SQ. FT OF SAND SURFACE 6.592

RATE OF FILTRATION (CALC.) 6.2 GAL. SQ. FT. / DAY 47

PLANT EFFICIENCY 0.079
(ON 4,000,000 MGD)

GENERAL

	0000-0800	0800-1600	1600-2400	AVG.
WEATHER				
WIND DIRECTION				
AIR TEMP.				
WATER TEMP.				
STORAGE	17.5560	15.4392	17.5560	
OPERATOR	F SETOGUHCI			

ROUTINE PLANT INSPECTION

SAND MEDIA INSP. good FILT. # good CONDITION good

COND. RAW WATR RES. good

COND. CLEAR WATER STOR good

REMARKS

REMARKS

SUBMITTED BY D. Mihara
(CHIEF OPERATOR)

APPROVED BY for T. Numaguchi
(LOCAL MANAGER)

DAILY FILTER PLANT OPERATING LOG

PLANT URAKAMI DATE 9. 11. 1950.

TIME	TOTAL WATER FILTERED 1000's OF GALS.	TOTAL WATER TO DISTRIBUTION SYSTEM 1000's OF GALS.	FILT. WATER RES. LEVEL	CHLORINE PRE WGT. HYPO	CHLORINE PRE WGT. CHL.	CHLORINE PRE P.P.M. EST.	CHLORINE POST WGT. HYPO	CHLORINE POST WGT. CHL.	CHLORINE POST P.P.M. (EST)	RESIDUAL CHLORINE BASIN INFL.	RESIDUAL CHLORINE BASIN ENFL.	RESIDUAL CHLORINE FILTER INFL.	RESIDUAL CHLORINE FILTER ENF.	FIN.	FIN.
0000															
0200	540	493	4.00					8.8	1.9					1.4	
0400	"	"	4.40					"	"					"	
0600	"	"	4.35					"	"					"	
0800	"	"	4.50					"	"					"	
1000	"	"	3.65					"	"					"	
1200	"	"	3.55					"	"					"	
1400	"	"	3.45					"	"					"	
1600	"	"	3.25					"	"					"	
1800	"	"	2.90					"	"					"	
2000	"	"	2.80					"	"					"	
2200	"	"	3.75					"	"					"	
2400	543	495	3.55					"	"					"	
TOTAL	6.483	5.918						105.6							

SUMMARY

WATER (GALS.)

RAW 6.483 FILTERED 6.483

TREATED 6.483 STA. USE 0

WASTE WATER 364 PERCENT 0.056

FILTER OPERATION

FILTER NO.	1. 3. 6.	2. 5.	3
ON or OFF	ON	ON	
TOTAL HEAD LOSS	—	—	
TOTAL HOURS IDLE	120	160	
TOTAL WATER FILTERED	3.934	2.549	
TOTAL WATER WASTED	156	208	

STATION METERS (READINGS IN THOUSAND GALS.)

	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.
0000										
0400										
0800										
1200		No Meters								
1600										
2000										
2400										
TOTAL										

INVENTORY

	ALUM	LIME	CARBON	CHLORINE	AMMONIA		
ON HAND PREV. DAY	32.780			2.860		0	
RECEIVED	0			0		4.400	
TOTAL	32.780			2.860		4.400	
USED TODAY	5.984			220		209	
ON HAND	26.796			2.640		4.191	

CHEMICALS USED

	TOTAL LBS.	LBS. PER M.G.	GRS. PER. GAL	P. P. M.
ALUM	880.0	135.7	0.95	16.3
CARBON				
LIME				
CHL. PRE.				
CHL. POST				
CHL. TOTAL	105.6	16.4	0.11	1.9
AMMONIA				

FILTER #	WIER READING	M 3 PER HR.	GPH	M3 PER DAY	GPD
1. 3. 6.	3.5	620	163.936.1	14.892	3.934.466.4
2. 5.	"	402	106.208.4	9.648	2.549.001.6
3					
TOTAL		1.022	270.144.5	24.540	6.483.468.0

PLANT STATISTICS

NO. FILTER UNITS 1 SIZE 18.6×28 TYPE RAPID
TOTAL SQ. FT OF SAND SURFACE 2744
RATE OF FILTRATION (CALC.) 315.79 GAL. SQ. FT. / DAY
PLANT EFFICIENCY 1.62
(ON 4,000,000 MGD)

GENERAL

	0000-0800	0800-1600	1600-2400	AVG.
WEATHER				
WIND DIRECTION				
AIR TEMP.	27			
WATER TEMP.	26			
STORAGE	1242.996	875.822	960.938	
OPERATOR		H HIDAKA		

ROUTINE PLANT INSPECTION

SAND MEDIA INSP. good FILT. # good CONDITION good
COND. RAW WATR RES. good
COND. CLEAR WATER STOR. good
REMARKS

REMARKS

SUBMITTED BY D. Mihara
(CHIEF OPERATOR)

APPROVED BY for T. Numaguchi
(LOCAL MANAGER)

DAILY FILTER PLANT OPERATING LOG

PLANT HONGOUHI HIGH DATE 9. 18. 1950.

TIME	TOTAL WATER FILTERED 1000's OF GALS.	TOTAL WATER TO DISTRIBUTION SYSTEM 1000's OF GALS.	FILT. WATER RES. LEVEL	CHLORINE						RESIDUAL CHLORINE					
				PRE			POST			BASIN		FILTER		FIN.	FIN.
				WGT. HYPO	WGT. CHL.	P.P.M. EST.	WGT. HYPO	WGT. CHL.	P.P.M. (EST)	INFL.	ENFL.	INFL.	ENF.		
0000															
0200	68		2.82					1.28	2.3					2.1	
0400	67	111	2.88					"	"					"	
0600	"		2.90					"	"					"	
0800	"	153	2.85					"	"					"	
1000	"		2.76					"	"					"	
1200	"	150	2.76					"	"					"	
1400	"		2.73					"	"					"	
1600	"	140	2.64					"	"					"	
1800	"		2.45					"	"					"	
2000	"	121	2.33					"	"					"	
2200	"		2.24					"	"					"	
2400	"	114	2.24					"	"					"	
TOTAL	805	789						15.4							

SUMMARY

WATER (GALS.)

RAW 805,200 FILTERED 805,200

TREATED 805,200 STA. USE 0

WASTE WATER 0 PERCENT 0

FILTER OPERATION

FILTER NO.	1	2	3
ON or OFF	ON	ON	OFF
TOTAL HEAD LOSS	10.0	113.0	—
TOTAL HOURS IDLE			18.5
TOTAL WATER FILTERED	368,600	368,600	—
TOTAL WATER WASTED	0	0	

STATION METERS (READINGS IN THOUSAND GALS.)

	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.
0000	485060									
0400	485480	111								
0800	486060	153								
1200	486630	150								
1600	487160	140								
2000	487620	121								
2400	488050	114								
TOTAL	2,990	789								

INVENTORY

	ALUM	LIME	CARBON	CHLORINE	AMMONIA		
ON HAND PREV. DAY				441		826.5	
RECEIVED				—		—	
TOTAL				441		826.5	
USED TODAY				15.4			
ON HAND				425.6		826.5	

GENERAL

	0000-0800	0800-1600	1600-2400	AVG.
WEATHER				
WIND DIRECTION				
AIR TEMP.	21.0			
WATER TEMP.	24.0			
STORAGE	752.400	696.960	591.360	
OPERATOR	S YAMAKAMI			

CHEMICALS USED

	TOTAL LBS.	LBS. PER M.G.	GRS. PER. GAL	P. P. M.
ALUM				
CARBON				
LIME				
CHL. PRE.				
CHL. POST				
CHL. TOTAL	15.4	19.1	0.1335	2.30
AMMONIA				

ROUTINE PLANT INSPECTION

SAND MEDIA INSP. good FILT. # good CONDITION good

COND. RAW WATR RES. good

COND. CLEAR WATER STOR. good

REMARKS

FILTER #	WIER READING	M 3 PER HR.	GPH	M3 PER DAY	GPD
1		58.3	15.4	1.400	369.600
2		58.3	15.4	1.400	36~~9.6~~600
3		14.2	3.7	250	66.000
TOTAL		130.8	34.5	3.050	805.000

REMARKS

PLANT STATISTICS

NO. FILTER UNITS ______ SIZE 1133×735 TYPE SLOW

TOTAL SQ. FT OF SAND SURFACE 24981.0

RATE OF FILTRATION (CALC.) 4.29 GAL. SQ. FT. / DAY 32.2

PLANT EFFICIENCY 0.202
(ON 4,000,000 MGD)

SUBMITTED BY D. Mihara
(CHIEF OPERATOR)

APPROVED BY for T. Numaguchi
(LOCAL MANAGER)

DAILY FILTER PLANT OPERATING LOG

PLANT NISHIYAMA HIGH DATE 9. 18. 1950.

TIME	TOTAL WATER FILTERED 1000's OF GALS.	TOTAL WATER TO DISTRIBUTION SYSTEM 1000's OF GALS.	FILT. WATER RES. LEVEL	CHLORINE PRE WGT. HYPO	CHLORINE PRE WGT. CHL.	CHLORINE PRE P.P.M. EST.	CHLORINE POST WGT. HYPO	CHLORINE POST WGT. CHL.	CHLORINE POST P.P.M. (EST)	RESIDUAL CHLORINE BASIN INFL.	RESIDUAL CHLORINE BASIN ENFL.	RESIDUAL CHLORINE FILTER INFL.	RESIDUAL CHLORINE FILTER ENF.	FIN.	FIN.
0000															
0200	125	98	4.00					1.0	1.75					1.6	
0400	"	"	4.20					"	"					"	
0600	"	114	4.28					"	"					"	
0800	"	256	3.33					"	"					"	
1000	126	147	3.18					"	"					"	
1200	"	152	2.99					"	"					"	
1400	"	141	2.88					"	"					"	
1600	"	135	2.81					"	"					"	
1800	"	129	2.79					"	"					"	
2000	"	131	2.83					"	"					"	
2200	"	117	2.90					"	"					"	
2400	"	112	3.00					"	"					"	
TOTAL	1.508	1.630						23.0							

SUMMARY

WATER (GALS.)
RAW 1.508.000 FILTERED 1.508.000
TREATED 1.508.000 STA. USE. 0
WASTE WATER 0 PERCENT 0

FILTER OPERATION

FILTER NO.	1	2	3
ON or OFF	ON	ON	ON
TOTAL HEAD LOSS	101	80	86
TOTAL HOURS IDLE			
TOTAL WATER FILTERED	341.080	583.200	583.200
TOTAL WATER WASTED	0	0	0

STATION METERS (READINGS IN THOUSAND GALS.)

	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.
0000										
0400										
0800										
1200	Meter Brokens									
1600										
2000										
2400										
TOTAL										

INVENTORY

	ALUM	LIME	CARBON	CHLORINE	AMMONIA		
ON HAND PREV. DAY				3.435.0		310.9	
RECEIVED				0		0	
TOTAL				3.435.0		310.9	
USED TODAY				0		23.0	
ON HAND				3.435.0		287.9	

CHEMICALS USED

	TOTAL LBS.	LBS. PER M.G.	GRS. PER. GAL	P. P. M.
ALUM				
CARBON				
LIME				
CHL. PRE.				
CHL. POST				
CHL. TOTAL	23.0	15.3	0.120	1.75
AMMONIA				

FILTER #	WIER READING	M 3 PER HR.	GPH	M3 PER DAY	GPD
1	3 1/2	54	14.220	1.292	341.280
2	5.0	92	24.300	2.207	583.200
3	5.0	92	24.300	2.207	583.200
TOTAL	13 1/2	238	62.820	5.706	1.507.680

PLANT STATISTICS

NO. FILTER UNITS 3 SIZE 128.0x98.5 TYPE Slow
TOTAL SQ. FT OF SAND SURFACE 37824.0
RATE OF FILTRATION (CALC.) 5.348 GAL. SQ. FT. / DAY 40
PLANT EFFICIENCY 3.77
(ON 4,000,000 MGD)

GENERAL

	0000-0800	0800-1600	1600-2400	AVG.
WEATHER				
WIND DIRECTION				
AIR TEMP.				
WATER TEMP.				
STORAGE	487.7887	386.0490	412.1500	
OPERATOR	M NAKAMURA			

ROUTINE PLANT INSPECTION

SAND MEDIA INSP. good FILT. # good CONDITION good
COND. RAW WATR RES. good
COND. CLEAR WATER STOR. good
REMARKS

REMARKS

SUBMITTED BY D. Mihara
(CHIEF OPERATOR)

APPROVED BY for T. Numaguchi
(LOCAL MANAGER)

DAILY FILTER PLANT OPERATING LOG

PLANT NISHIYAMA Low DATE 9. 18. 1950.

TIME	TOTAL WATER FILTERED 1000's OF GALS.	TOTAL WATER TO DISTRIBUTION SYSTEM 1000's OF GALS.	FILT. WATER RES. LEVEL	CHLORINE						RESIDUAL CHLORINE					
				PRE			POST			BASIN		FILTER		FIN.	FIN.
				WGT. HYPO	WGT. CHL.	P.P.M. EST.	WGT. HYPO	WGT. CHL.	P.P.M. (EST)	INFL.	ENFL.	INFL.	ENF.		
0000															
0200	180	110	2.15					2.0	1.3					1.1	
0400	"	110	2.10					"	"					"	
0600	"	171	2.00					"	"					"	
0800	"	171	2.05					"	"					"	
1000	"	155	1.95					"	"					"	
1200	179	155	1.90					"	"					"	
1400	"	133	1.90					"	"					"	
1600	"	133	1.80					"	"					"	
1800	"	115	1.52					"	"					"	
2000	"	116	1.40					"	"					"	
2200	"	122	1.40					"	"					"	
2400	"	122	1.45					"	"					"	
TOTAL	2.153.	1.613						24.0							

SUMMARY

WATER (GALS.)

RAW 2.153 FILTERED 2.153

TREATED 2.153 STA. USE. 0

WASTE WATER 0 PERCENT 0

FILTER OPERATION

FILTER NO.	1	2	3
ON or OFF	ON	ON	ON
TOTAL HEAD LOSS	65.0	55.0	15.0
TOTAL HOURS IDLE	0	0	0
TOTAL WATER FILTERED	478.0	606.0	1.168.0
TOTAL WATER WASTED	0	0	0

STATION METERS (READINGS IN THOUSAND GALS.)

	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.
0000	339.370									
0400	339.780	220								
0800	342.280	342								
1200	343.690	310								
1600	344.900	266								
2000	346.360	231								
2400	347.470	244								
TOTAL	8.100	1.613								

INVENTORY

	ALUM	LIME	CARBON	CHLORINE	AMMONIA		
ON HAND PREV. DAY				2,970		770	
RECEIVED				0		0	
TOTAL				2,970		770	
USED TODAY				0		24	
ON HAND				2,970		746	

CHEMICALS USED

	TOTAL LBS.	LBS. PER M.G.	GRS. PER. GAL	P. P. M.
ALUM				
CARBON				
LIME				
CHL. PRE.				
CHL. POST	24	11.10	0.075	1.30
CHL. TOTAL	24	11.10	0.075	1.30
AMMONIA				

FILTER #	WIER READING	M 3 PER HR.	GPH	M3 PER DAY	GPD
1	4 3/8	75.46	19.86	1.811	478.10
2	5 1/8	95.76	25.20	2.298	606.67
3	7 7/8	187.85	48.12	4.428	1.168.90
TOTAL	17 3/8	359.07	93.18	8537	2.153.67

PLANT STATISTICS

NO. FILTER UNITS 3 SIZE 128 x 98.5 TYPE SLOW
TOTAL SQ. FT OF SAND SURFACE 37,824
RATE OF FILTRATION (CALC.) 7.61 GAL. SQ. FT. / DAY 57
PLANT EFFICIENCY 0.537
(ON 4,000,000 MGD)

GENERAL

	0000-0800	0800-1600	1600-2400	AVG.
WEATHER				
WIND DIRECTION				
AIR TEMP.				
WATER TEMP.				
STORAGE	1.150.0	1.009.0	813.0	
OPERATOR	U MIZUMACHI			

ROUTINE PLANT INSPECTION

SAND MEDIA INSP. good FILT. # good CONDITION good
COND. RAW WATR RES. good
COND. CLEAR WATER STOR. good
REMARKS

REMARKS

SUBMITTED BY D. Mihara
(CHIEF OPERATOR)

APPROVED BY for T. Numaguchi
(LOCAL MANAGER)

DAILY FILTER PLANT OPERATING LOG

PLANT IZUMOMACHI DATE 9. 18. 1950.

TIME	TOTAL WATER FILTERED 1000's OF GALS.	TOTAL WATER TO DISTRIBUTION SYSTEM 1000's OF GALS.	FILT. WATER RES. LEVEL	CHLORINE						RESIDUAL CHLORINE					
				PRE			POST			BASIN		FILTER		FIN.	FIN.
				WGT. HYPO	WGT. CHL.	P.P.M. EST.	WGT. HYPO	WGT. CHL.	P.P.M. (EST)	INFL.	ENFL.	INFL.	ENF.		
0000															
0200	316	211	2.84				8.25	2.0625	0.84					0.70	
0400	"	224	2.57				"	"	"					"	
0600	344	238	2.49				"	"	"					"	
0800	"	270	2.41				"	"	"					0.75	
1000	264	344	2.28				"	"	"					"	
1200	"	317	2.11				"	"	"					"	
1400	"	343	2.05				"	"	"					"	
1600	"	290	2.00				"	"	"					"	
1800	"	264	1.95				"	"	"					"	
2000	"	251	1.90				"	"	"					"	
2200	"	211	2.10				"	"	"					"	
2400	"	185	2.30				"	"	"					"	
TOTAL	3.432	3.168					99.0	24.75							

SUMMARY

WATER (GALS.)

RAW 3.432.000 FILTERED 3.432.000

TREATED 3.432.000 STA. USE. 0

WASTE WATER 0 PERCENT 0

FILTER OPERATION

FILTER NO.	1	2	3
ON or OFF	ON	ON	ON
TOTAL HEAD LOSS	16.0	19.5	15.5
TOTAL HOURS IDLE			
TOTAL WATER FILTERED	1.188.000	924.000	1.320.000
TOTAL WATER WASTED	0	0	0

STATION METERS (READINGS IN THOUSAND GALS.)

	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.
0000										
0400										
0800										
1200		Meter		Brockers						
1600										
2000										
2400										
TOTAL										

INVENTORY

	ALUM	LIME	CARBON	CHLORINE	AMMONIA		
ON HAND PREV. DAY				594.0		1.100	
RECEIVED				0		0	
TOTAL				594.0		1.100	
USED TODAY				99.0		0	
ON HAND				495.0		1.100	

CHEMICALS USED

	TOTAL LBS.	LBS. PER M.G.	GRS. PER. GAL	P. P. M
ALUM				
CARBON				
LIME				
CHL. PRE.				
CHL. POST				
CHL. TOTAL	99.0	28.8	0.050	0.84
AMMONIA				

FILTER #	WIER READING	M 3 PER HR.	GPH	M3 PER DAY	GPD
1		187	49.368	4.500	1.188.000
2		145	38.280	3.500	924.000
3		208	54.912	5.000	1.320.000
TOTAL		540	142.560	13.000	3.432.000

PLANT STATISTICS

NO. FILTER UNITS 3 SIZE 1189 x 99 TYPE Slow
TOTAL SQ. FT OF SAND SURFACE 3.5313.3
RATE OF FILTRATION (CALC.) 12.96 GAL. SQ. FT. / DAY 97
PLANT EFFICIENCY 0.858
(ON 4,000,000 MGD)

GENERAL

	0000-0800	0800-1600	1600-2400	AVG.
WEATHER				
WIND DIRECTION				
AIR TEMP.				
WATER TEMP.				
STORAGE	984.263	816.816	939.338	
OPERATOR	F SETOGUCHI			

ROUTINE PLANT INSPECTION

SAND MEDIA INSP. good FILT. # good CONDITION good
COND. RAW WATR RES good
COND. CLEAR WATER STOR good
REMARKS

REMARKS

SUBMITTED BY D. Mihara
(CHIEF OPERATOR)

APPROVED BY for T. Numaguchi
(LOCAL MANAGER)

DAILY FILTER PLANT OPERATING LOG

PLANT KOGAKURA DATE 9. 18. 1950.

TIME	TOTAL WATER FILTERED 1000's OF GALS.	TOTAL WATER TO DISTRIBUTION SYSTEM 1000's OF GALS.	FILT. WATER RES. LEVEL	CHLORINE						RESIDUAL CHLORINE					
				PRE			POST			BASIN		FILTER		FIN.	FIN.
				WGT. HYPO	WGT. CHL.	P.P.M. EST.	WGT. HYPO	WGT. CHL.	P.P.M. (EST)	INFL.	ENFL.	INFL.	ENF.		
0000															
0200	24	16	2.60				2.2	0.55	2.5					2.1	
0400	"	16	2.30				"	"	"					"	
0600	"	13	2.15				"	"	"					"	
0800	"	26	2.00				"	"	"					2.2	
1000	"	24	2.10				"	"	"					"	
1200	28	26	2.15				"	"	"					"	
1400	"	29	2.20				"	"	"					"	
1600	"	32	2.25				"	"	"					"	
1800	"	20	2.30				"	"	"					"	
2000	"	23	2.40				"	"	"					"	
2200	"	21	2.60				"	"	"					"	
2400	"	16	2.80				"	"	"					"	
TOTAL	316	264					26.4	6.6							

SUMMARY

WATER (GALS.)
RAW 316,000 FILTERED 316,000
TREATED 316,000 STA. USE. 0
WASTE WATER 0 PERCENT 0

FILTER OPERATION

FILTER NO.	1	2	3
ON or OFF	ON	ON	
TOTAL HEAD LOSS	10.0	11.0	
TOTAL HOURS IDLE			
TOTAL WATER FILTERED	184,000	132,000	
TOTAL WATER WASTED	0	0	

STATION METERS (READINGS IN THOUSAND GALS.)

	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.
0000										
0400										
0800										
1200		No meters								
1600										
2000										
2400										
TOTAL										

INVENTORY

	ALUM	LIME	CARBON	CHLORINE	AMMONIA		
ON HAND PREV. DAY				250			
RECEIVED				0			
TOTAL				250			
USED TODAY				26.4			
ON HAND				223.6			

GENERAL

	0000-0800	0800-1600	1600-2400	AVG.
WEATHER				
WIND DIRECTION				
AIR TEMP.				
WATER TEMP.				
STORAGE	15.8400	17.8200	22.1760	
OPERATOR	F S E TOGUCHI			

CHEMICALS USED

	TOTAL LBS.	LBS. PER M.G.	GRS. PER. GAL	P. P. M.
ALUM				
CARBON				
LIME				
CHL. PRE.				
CHL. POST				
CHL. TOTAL	26.4	83.5	0.147	2.5
AMMONIA				

ROUTINE PLANT INSPECTION

SAND MEDIA INSP. good FILT. # good CONDITION good

COND. RAW WATR RES. good

COND. CLEAR WATER STOR. good

REMARKS

FILTER #	WIER READING	M 3 PER HR.	GPH	M3 PER DAY	GPD
1		2.9	7.656	700	184.000
2		20	5.280	500	132.000
3					
TOTAL		47	12.936	1.200	316.000

REMARKS

SUBMITTED BY D. Mihara
(CHIEF OPERATOR)

PLANT STATISTICS

NO. FILTER UNITS 2 SIZE 66.99×49.8 TYPE SLOW

TOTAL SQ. FT OF SAND SURFACE 6.592

RATE OF FILTRATION (CALC.) 6.2 GAL. SQ. FT. / DAY 47

PLANT EFFICIENCY 0.079
(ON 4,000,000 MGD)

APPROVED BY for T. Numaguchi
(LOCAL MANAGER)

DAILY FILTER PLANT OPERATING LOG

PLANT URAKAMI DATE 9. 18. 1950.

TIME	TOTAL WATER FILTERED 1000's OF GALS.	TOTAL WATER TO DISTRIBUTION SYSTEM 1000's OF GALS.	FILT. WATER RES. LEVEL	CHLORINE PRE WGT. HYPO	CHLORINE PRE WGT. CHL.	CHLORINE PRE P.P.M. EST.	CHLORINE POST WGT. HYPO	CHLORINE POST WGT. CHL.	CHLORINE POST P.P.M. (EST)	RESIDUAL CHLORINE BASIN INFL.	RESIDUAL CHLORINE BASIN ENFL.	RESIDUAL CHLORINE FILTER INFL.	RESIDUAL CHLORINE FILTER ENF.	FIN.	FIN.
0000															
0200	524	491	4.05					8.8	2.0					1.3	
0400	"	"	4.20					"	"					"	
0600	"	"	4.30					"	"					"	
0800	"	"	4.15					"	"					"	
1000	"	"	4.30					"	"					"	
1200	"	"	4.15					"	"					"	
1400	"	"	3.80					"	"					"	
1600	"	"	3.25					"	"					"	
1800	"	"	3.30					"	"					"	
2000	"	"	3.40					"	"					"	
2200	"	"	3.65					"	"					"	
2400	526	497	3.95					"	"					"	
TOTAL	6.290	5.898						105.6							

SUMMARY

WATER (GALS.)
RAW 6.290 FILTERED 6.290
TREATED 6.290 STA. USE 0
WASTE WATER 416 PERCENT 0.066

FILTER OPERATION

FILTER NO.	1.2.3.4.	5.6.	3
ON or OFF*	ON	ON	
TOTAL HEAD LOSS	—		
TOTAL HOURS IDLE	160		
TOTAL WATER FILTERED	4.233		
TOTAL WATER WASTED	208		

STATION METERS (READINGS IN THOUSAND GALS.)

	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.
0000										
0400										
0800										
1200		No	meters							
1600										
2000										
2400										
TOTAL										

INVENTORY

	ALUM	LIME	CARBON	CHLORINE	AMMONIA		
ON HAND PREV. DAY	26,796			2.640		4.191	
RECEIVED	0			0		0	
TOTAL	26.796			2.640		4.191	
USED TODAY	7040			880		275	
ON HAND	19.756			1760		3.916	

GENERAL

	0000-0800	0800-1600	1600-2400	AVG.
WEATHER				
WIND DIRECTION				
AIR TEMP.	24			
WATER TEMP.	26			
STORAGE	4.063	3.315	4.070	
OPERATOR	H. HIDAKA			

CHEMICALS USED

	TOTAL LBS.	LBS. PER M.G.	GRS. PER. GAL	P. P. M.
ALUM	880.0	137.9	0.97	16.7
CARBON				
LIME				
CHL. PRE.				
CHL. POST				
CHL. TOTAL	105.6	16.7	0.11	2.0
AMMONIA				

ROUTINE PLANT INSPECTION

SAND MEDIA INSP. good FILT. # good CONDITION good

COND. RAW WATR RES. good

COND. CLEAR WATER STOR. good

REMARKS

FILTER #	WIER READING	M 3 PER HR.	GPH	M3 PER DAY	GPD
1,2,3,4.	3.5	667	176,397.5	16.024	4,233.5498
2	"	324	85,710.8	7.786	2,057.0612
3					
TOTAL		991	262,108.3	23.810	6,290,600.0

REMARKS

PLANT STATISTICS

NO. FILTER UNITS 1 SIZE 19.6x28 TYPE RAPID

TOTAL SQ. FT OF SAND SURFACE 3292.8

RATE OF FILTRATION (CALC.) 255.36 GAL. SQ. FT. / DAY 1.910

PLANT EFFICIENCY 1.57

(ON 4,000,000 MGD)

SUBMITTED BY D. Mihara
(CHIEF OPERATOR)

APPROVED BY for T. Numaguchi
(LOCAL MANAGER)

DAILY FILTER PLANT OPERATING LOG

PLANT NISHIYAMA LOW DATE 9. 25. 1950.

TIME	TOTAL WATER FILTERED 1000's OF GALS.	TOTAL WATER TO DISTRIBUTION SYSTEM 1000's OF GALS.	FILT. WATER RES. LEVEL	CHLORINE PRE WGT. HYPO	CHLORINE PRE WGT. CHL.	CHLORINE PRE P.P.M. EST.	CHLORINE POST WGT. HYPO	CHLORINE POST WGT. CHL.	CHLORINE POST P.P.M. (EST)	RESIDUAL CHLORINE BASIN INFL.	RESIDUAL CHLORINE BASIN ENFL.	RESIDUAL CHLORINE FILTER INFL.	RESIDUAL CHLORINE FILTER ENF.	FIN.	FIN.
0000															
0200	131	66	1.20					2.0	1.90					1.3	
0400	"	66	1.15					"	"					"	
0600	"	105	1.10					"	"					"	
0800	"	106	1.05					"	"					"	
1000	130	188	0.90					"	"					"	
1200	"	189	0.75					"	"					"	
1400	"	237	0.60					"	"					"	
1600	"	238	0.45					"	"					"	
1800	"	187	0.30					"	"					"	
2000	"	187	0.20					"	"					"	
2200	"	79	0.15					"	"					"	
2400	"	79	0.10					"	"					"	
TOTAL	1,564	1,727						24.0							

SUMMARY

WATER (GALS.)

RAW 1.564 FILTERED 1.564

TREATED 1.564 STA. USE 0

WASTE WATER 0 PERCENT 0

FILTER OPERATION

FILTER NO.	1	2	3
ON or OFF	OFF.	ON	ON
TOTAL HEAD LOSS		540	27.0
TOTAL HOURS IDLE		0	0
TOTAL WATER FILTERED		541.0	1,048.0
TOTAL WATER WASTED		0	0

STATION METERS (READINGS IN THOUSAND GALS.)

	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.
0000	388.330									
0400	388.830	132.0								
0800	388.630	211.0								
1200	391.060	377.0								
1600	392.860	475.0								
2000	393.280	374.0								
2400	393.880	158.0								
TOTAL	5.550	1,727								

INVENTORY

	ALUM	LIME	CARBON	CHLORINE	AMMONIA		
ON HAND PREV. DAY				2.890.0		660	
RECEIVED				0		0	
TOTAL				2.890		660	
USED TODAY				0		24	
ON HAND				2.890		636	

CHEMICALS USED

	TOTAL LBS.	LBS. PER M.G.	GRS. PER. GAL	P. P. M.
ALUM				
CARBON				
LIME				
CHL. PRE.				
CHL. POST	24.0	15.40	0.110	1.90
CHL. TOTAL	24.0	15.40	0.110	1.90
AMMONIA				

FILTER #	WIER READING	M 3 PER HR.	GPH	M3 PER DAY	GPD
1					
2	4 3/4	85.50	22.50	2.052	541.72
3	7 3/8	165.52	43.56	3.972	1.022.93
TOTAL	12 1/8	251.02	66.06	6.024	1.564.45

PLANT STATISTICS

NO. FILTER UNITS 2 SIZE 128X 88.5 TYPE Slow
TOTAL SQ. FT OF SAND SURFACE 37.8240
RATE OF FILTRATION (CALC.) 5.48 GAL. SQ. FT. / DAY 41
PLANT EFFICIENCY 0.391
(ON 4,000,000 MGD)

GENERAL

	0000-0800	0800-1600	1600-2400	AVG.
WEATHER				
WIND DIRECTION				
AIR TEMP.				
WATER TEMP.				
STORAGE	517.0	242.0	56.0	
OPERATOR	UMIZUMACHI			

ROUTINE PLANT INSPECTION

SAND MEDIA INSP. good FILT. # good CONDITION good
COND. RAW WATR RES. good
COND. CLEAR WATER STOR. good
REMARKS

REMARKS

SUBMITTED BY D. Mihara
(CHIEF OPERATOR)

APPROVED BY for T. Numaguchi
(LOCAL MANAGER)

DAILY FILTER PLANT OPERATING LOG

PLANT URAKAMI DATE 9. 25. 1950.

TIME	TOTAL WATER FILTERED 1000's OF GALS.	TOTAL WATER TO DISTRIBUTION SYSTEM 1000's OF GALS.	FILT. WATER RES. LEVEL	CHLORINE PRE WGT. HYPO	CHLORINE PRE WGT. CHL.	CHLORINE PRE P.P.M. EST.	CHLORINE POST WGT. HYPO	CHLORINE POST WGT. CHL.	CHLORINE POST P.P.M. (EST)	RESIDUAL CHLORINE BASIN INFL.	RESIDUAL CHLORINE BASIN ENFL.	RESIDUAL CHLORINE FILTER INFL.	RESIDUAL CHLORINE FILTER ENF.	FIN.	FIN.
0000															
0200	545	499	3.30					8.8	1.9					1.2	
0400	"	"	3.90					"	"					"	
0600	"	"	4.30					"	"					"	
0800	"	"	4.20					"	"					"	
1000	"	"	3.70					"	"					"	
1200	"	"	3.10					"	"					"	
1400	"	"	3.15					"	"					"	
1600	"	"	~~2.95~~ 3.10					"	"					"	
1800	"	"	2.75					"	"					"	
2000	"	"	"					"	"					"	
2200	"	"	2.70					"	"					"	
2400	546	507	3.00					"	"					"	
TOTAL	6.541	5.998						105.6							

SUMMARY

WATER (GALS.)
RAW 6.541 FILTERED 6.541
TREATED 6.541 STA. USE 0
WASTE WATER 572 PERCENT 0.087

FILTER OPERATION

FILTER NO.	1.2.	3.4.6.	5.
ON or OFF	ON	ON	ON
TOTAL HEAD LOSS	—	—	—
TOTAL HOURS IDLE	80	240	120
TOTAL WATER FILTERED	2234	2255	1.052
TOTAL WATER WASTED	104	312	156

STATION METERS (READINGS IN THOUSAND GALS.)

	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.
0000										
0400										
0800										
1200			No meters							
1600										
2000										
2400										
TOTAL										

INVENTORY

	ALUM	LIME	CARBON	CHLORINE	AMMONIA		
ON HAND PREV. DAY	19.756			1.760		3.916	
RECEIVED	0			0		0	
TOTAL	19.756			1.760		3.916	
USED TODAY	6.688			880		220	
ON HAND	13.068			880		3.690	

GENERAL

	0000-0800	0800-1600	1600-2400	AVG.
WEATHER				
WIND DIRECTION				
AIR TEMP.	22			
WATER TEMP.	24			
STORAGE	1.106.131	832.800	804.119	
OPERATOR		H. HIDAKA		

CHEMICALS USED

	TOTAL LBS.	LBS. PER M.G.	GRS. PER. GAL	P. P. M
ALUM	1056.0	161.4	1.12	19.3
CARBON				
LIME				
CHL. PRE.				
CHL. POST				
CHL. TOTAL	105.6	16.1	0.11	1.9
AMMONIA				

ROUTINE PLANT INSPECTION

SAND MEDIA INSP. good FILT. # good CONDITION good

COND. RAW WATR RES. good

COND. CLEAR WATER STOR. good

REMARKS

FILTER #	WIER READING	M 3 PER HR.	GPH	M3 PER DAY	GPD
1. 2.	3.5	352	93.0864	8.456	2.234.075.2
2	"	512	135.633.6	12.321	3.255.208.2
3	"	165	43.846.1	3.983	1.052.308.6
TOTAL		1.030	272.566.1	24.760	6.541.592.0

REMARKS

SUBMITTED BY D. Mihara
(CHIEF OPERATOR)

APPROVED BY for T. Numaguchi
(LOCAL MANAGER)

PLANT STATISTICS

NO. FILTER UNITS 1 SIZE 19.6 x 28 TYPE RAPID

TOTAL SQ. FT OF SAND SURFACE 3292.8

RATE OF FILTRATION (CALC.) 265.5 GAL. SQ. FT. / DAY 1.986

PLANT EFFICIENCY 1.63
(ON 4,000,000 MGD)

DAILY FILTER PLANT OPERATING LOG

PLANT HONGOUHI HIGH DATE 9. 25. 1950.

TIME	TOTAL WATER FILTERED 1000's OF GALS.	TOTAL WATER TO DISTRIBUTION SYSTEM 1000's OF GALS.	FILT. WATER RES. LEVEL	CHLORINE						RESIDUAL CHLORINE					
				PRE			POST			BASIN		FILTER		FIN.	FIN.
				WGT. HYPO	WGT. CHL.	P.P.M. EST.	WGT. HYPO	WGT. CHL.	P.P.M. (EST)	INFL.	ENFL.	INFL.	ENF.		
0000															
0200	75		3.43					1.8	2.94					2.5	
0400	〃	106	3.45					〃	〃					〃	
0600	〃		3.53					〃	〃					〃	
0800	〃	132	3.48					〃	〃					〃	
1000	〃		3.40					〃	〃					〃	
1200	〃	150	3.27					〃	〃					〃	
1400	〃		3.24					〃	〃					〃	
1600	〃	158	3.15					〃	〃					〃	
1800	〃		3.06					〃	〃					〃	
2000	74	143	3.03					〃	〃					〃	
2200	〃		3.02					〃	〃					〃	
2400	〃	116	3.04					〃	〃					〃	
TOTAL	897	805						22.0							

SUMMARY

WATER (GALS.)
RAW 897.600 FILTERED 897.600
TREATED 897.600 STA. USE. 0
WASTE WATER 0 PERCENT 0

FILTER OPERATION

FILTER NO.	1	2	3
ON or OFF	ON	OFF	ON
TOTAL HEAD LOSS	96	—	84.0
TOTAL HOURS IDLE	—	24.0	—
TOTAL WATER FILTERED	343.200		554.400
TOTAL WATER WASTED	0		

STATION METERS (READINGS IN THOUSAND GALS.)

	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.
0000	504970									
0400	505370	106								
0800	505870	132								
1200	506440	150								
1600	507040	158								
2000	507880	143								
2400	508020	116								
TOTAL	3,050	805.0								

INVENTORY

	ALUM	LIME	CARBON	CHLORINE	AMMONIA		
ON HAND PREV. DAY				301.9		747.2	
RECEIVED				—		—	
TOTAL				301.9		747.2	
USED TODAY				22.0		—	
ON HAND				279.9		747.2	

GENERAL

	0000-0800	0800-1600	1600-2400	AVG.
WEATHER				
WIND DIRECTION				
AIR TEMP.	17.5			
WATER TEMP.	23.0			
STORAGE	918.720	831.600	802.560	
OPERATOR		SYAMAKAMI		

CHEMICALS USED

	TOTAL LBS.	LBS. PER M.G.	GRS. PER. GAL	P. P. M
ALUM				
CARBON				
LIME				
CHL. PRE.				
CHL. POST				
CHL. TOTAL	22.0	24.5	0.1708	2.94
AMMONIA				

ROUTINE PLANT INSPECTION

SAND MEDIA INSP. good FILT. # good CONDITION good

COND. RAW WATR RES. good

COND. CLEAR WATER STOR. good

REMARKS

FILTER #	WIER READING	M 3 PER HR.	GPH	M3 PER DAY	GPD
1		54.2	14.3	1.300	343.200
2					
3		87.5	23.1	2.100	554.400
TOTAL		141.7	37.4	3.400	897.600

REMARKS

SUBMITTED BY D. Mihara
(CHIEF OPERATOR)

APPROVED BY for T. Numaguchi
(LOCAL MANAGER)

PLANT STATISTICS

NO. FILTER UNITS ______ SIZE 1133×73.5 TYPE S Low

TOTAL SQ. FT OF SAND SURFACE 16654.0

RATE OF FILTRATION (CALC.) 7.206 GAL. SQ. FT. / DAY 53.9

PLANT EFFICIENCY 0.224
(ON 4,000,000 MGD)

DAILY FILTER PLANT OPERATING LOG

PLANT NISHIYAMA HIGH DATE 9. 25. 1950.

TIME	TOTAL WATER FILTERED 1000's OF GALS.	TOTAL WATER TO DISTRIBUTION SYSTEM 1000's OF GALS.	FILT. WATER RES. LEVEL	CHLORINE PRE WGT. HYPO	CHLORINE PRE WGT. CHL.	CHLORINE PRE P.P.M. EST.	CHLORINE POST WGT. HYPO	CHLORINE POST WGT. CHL.	CHLORINE POST P.P.M. (EST)	RESIDUAL CHLORINE BASIN INFL.	RESIDUAL CHLORINE BASIN ENFL.	RESIDUAL CHLORINE FILTER INFL.	RESIDUAL CHLORINE FILTER ENF.	FIN.	FIN.
0000															
0200	85	71	0.30					1.0	2.39					2.2	
0400	"	"	0.40					"	"					"	
0600	86	91	0.36					"	"					"	
0800	"	109	0.18					"	"					"	
1000	"	107	0.04					2.0	"					"	
1200	"	89	0.02					"	"					"	
1400	"	81	0.06					"	"					"	
1600	"	91	0.02					"	"					"	
1800	"	90	0.05					"	"					"	
2000	"	68	0.18					"	"					"	
2200	"	56	0.40					"	"					"	
2400	"	45	0.70					"	"						
TOTAL	1,030	969						20.0							

SUMMARY

WATER (GALS.)
RAW 1,030,000 FILTERED 1,030,000
TREATED 1,030,000 STA. USE 0
WASTE WATER 0 PERCENT 0

FILTER OPERATION

FILTER NO.	1	2	3
ON or OFF	ON	ON	ON
TOTAL HEAD LOSS	97.0	97.0	101.0
TOTAL HOURS IDLE			
TOTAL WATER FILTERED	270.720	341.080	417.600
TOTAL WATER WASTED	0	0	0

STATION METERS (READINGS IN THOUSAND GALS.)

	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.
0000										
0400										
0800										
1200		Meter Brocken								
1600										
2000										
2400										
TOTAL										

INVENTORY

	ALUM	LIME	CARBON	CHLORINE	AMMONIA		
ON HAND PREV. DAY				3.385.0		110	
RECEIVED				0		0	
TOTAL				3.385.0		110	
USED TODAY				0		20	
ON HAND				3.385.0		90	

CHEMICALS USED

	TOTAL LBS.	LBS. PER M.G.	GRS. PER. GAL	P. P. M.
ALUM				
CARBON				
LIME				
CHL. PRE.				
CHL. POST				
CHL. TOTAL	20.0	19.4	0.139	2.39
AMMONIA				

FILTER #	WIER READING	M 3 PER HR.	GPH	M3 PER DAY	GPD
1	3.0	43	11.280	1.025	270.720
2	3 1/2	54	14.220	1.292	341.280
3	40	66	17.400	1.581	417.600
TOTAL	10 1/2	163	42.900	3.898	1.029.600

PLANT STATISTICS

NO. FILTER UNITS 3 SIZE 128.0x98.5 TYPE S Con

TOTAL SQ. FT OF SAND SURFACE 378240

RATE OF FILTRATION (CALC.) 3.610 GAL. SQ. FT. / DAY 27

PLANT EFFICIENCY 0.258
(ON 4,000,000 MGD)

GENERAL

	0000-0800	0800-1600	1600-2400	AVG.
WEATHER				
WIND DIRECTION				
AIR TEMP.				
WATER TEMP.				
STORAGE	26.0002	2.7477	96.1788	
OPERATOR	M NAKAMURA			

ROUTINE PLANT INSPECTION

SAND MEDIA INSP. good FILT. # good CONDITION good

COND. RAW WATR RES. good

COND. CLEAR WATER STOR. good

REMARKS

REMARKS

SUBMITTED BY D. Mihara
(CHIEF OPERATOR)

APPROVED BY for T. Numaguchi
(LOCAL MANAGER)

DAILY FILTER PLANT OPERATING LOG

PLANT IZUMOMACHI DATE 9. 25. 1950.

TIME	TOTAL WATER FILTERED 1000's OF GALS.	TOTAL WATER TO DISTRIBUTION SYSTEM 1000's OF GALS.	FILT. WATER RES. LEVEL	CHLORINE PRE WGT. HYPO	CHLORINE PRE WGT. CHL.	CHLORINE PRE P.P.M. EST.	CHLORINE POST WGT. HYPO	CHLORINE POST WGT. CHL.	CHLORINE POST P.P.M. (EST)	RESIDUAL CHLORINE BASIN INFL.	RESIDUAL CHLORINE BASIN ENFL.	RESIDUAL CHLORINE FILTER INFL.	RESIDUAL CHLORINE FILTER ENF.	FIN.	FIN.
0000															
0200	297	211	3.18					3.52	1.4					1.0	
0400	285	251	3.04					"	"					"	
0600	"	224	2.91					"	"					"	
0800	"	238	2.88					"	"					1.1	
1000	"	290	2.60					"	"					"	
1200	"	344	2.40					"	"					"	
1400	"	317	2.35					"	"					"	
1600	"	264	2.30					"	"					"	
1800	"	343	2.10					"	"					"	
2000	"	290	2.00					"	"					"	
2200	"	211	2.20					"	"					"	
2400	"	185	2.50					"	"					"	
TOTAL	3.432	3.168						42.24							

SUMMARY

WATER (GALS.)
RAW 3,432,000 FILTERED 3,432,000
TREATED 3,432,000 STA. USE 0
WASTE WATER 0 PERCENT 0

FILTER OPERATION

FILTER NO.	1	2	3
ON or OFF	ON	ON	ON
TOTAL HEAD LOSS	16.5	14.5	15.0
TOTAL HOURS IDLE			
TOTAL WATER FILTERED	924,000	1,320,000	1,188,000
TOTAL WATER WASTED	0	0	0

STATION METERS (READINGS IN THOUSAND GALS.)

	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.
0000										
0400										
0800										
1200										
1600										
2000										
2400										
TOTAL										

meter Brocken

INVENTORY

	ALUM	LIME	CARBON	CHLORINE	AMMONIA		
ON HAND PREV. DAY				198.0		922.24	
RECEIVED				0		0	
TOTAL				198.0		922.24	
USED TODAY				0		42.24	
ON HAND				198.0		880.0	

CHEMICALS USED

	TOTAL LBS.	LBS. PER M.G.	GRS. PER. GAL	P. P. M.
ALUM				
CARBON				
LIME				
CHL. PRE.				
CHL. POST				
CHL. TOTAL	42.24	12.3	0.060	1.4
AMMONIA				

FILTER #	WIER READING	M3 PER HR.	GPH	M3 PER DAY	GPD
1		145	38.280	3.500	924.000
2		208	54.912	5.000	1.320.000
3		187	43.368	4.500	1.188.000
TOTAL		540	142.560	13.000	3.432.000

PLANT STATISTICS

NO. FILTER UNITS 3 SIZE 118.9 x 99 TYPE Slow
TOTAL SQ. FT OF SAND SURFACE 35313.3
RATE OF FILTRATION (CALC.) 12.03 GAL. SQ. FT. / DAY 90
PLANT EFFICIENCY 0.858
(ON 4,000,000 MGD)

GENERAL

	0000-0800	0800-1600	1600-2400	AVG.
WEATHER				
WIND DIRECTION				
AIR TEMP.				
WATER TEMP.				
STORAGE	1.176.215	938.338	1.021.020	
OPERATOR	F SETOGUCHI			

ROUTINE PLANT INSPECTION

SAND MEDIA INSP. good FILT. # good CONDITION good
COND. RAW WATR RES. good
COND. CLEAR WATER STOR good
REMARKS

REMARKS

SUBMITTED BY D. Mihara
(CHIEF OPERATOR)

APPROVED BY for T. Numaguchi
(LOCAL MANAGER)

DAILY FILTER PLANT OPERATING LOG

PLANT KOGAKURA DATE 9. 25. 1950.

TIME	TOTAL WATER FILTERED 1000's OF GALS.	TOTAL WATER TO DISTRIBUTION SYSTEM 1000's OF GALS.	FILT. WATER RES. LEVEL	CHLORINE						RESIDUAL CHLORINE					
				PRE			POST			BASIN		FILTER		FIN.	FIN.
				WGT. HYPO	WGT. CHL.	P.P.M. EST.	WGT. HYPO	WGT. CHL.	P.P.M. (EST)	INFL.	ENFL.	INFL.	ENF.		
0000															
0200	28	13	2.95				2.2	1.55	2.5					2.1	
0400	"	16	2.90				"	"	"					"	
0600	"	16	2.60				"	"	"					"	
0800	"	20	2.45				"	"	"					2.2	
1000	24	21	2.30				"	"	"					"	
1200	"	24	2.30				"	"	"					"	
1400	"	26	2.20				"	"	"					"	
1600	"	29	2.55				"	"	"					"	
1800	"	26	2.60				"	"	"					"	
2000	28	32	2.70				"	"	"					"	
2200	"	28	2.80				"	"	"					"	
2400	"	18	2.85				"	"	"					"	
TOTAL	316	264					26.4	6.6							

SUMMARY

WATER (GALS.)
RAW 316,000 FILTERED 316,000
TREATED 316,000 STA. USE. 0
WASTE WATER 0 PERCENT 0

FILTER OPERATION

FILTER NO.	1	2	3
ON or OFF	ON	ON	
TOTAL HEAD LOSS	9.0	6.0	
TOTAL HOURS IDLE			
TOTAL WATER FILTERED	132,000	184,000	
TOTAL WATER WASTED	0	0	

STATION METERS (READINGS IN THOUSAND GALS.)

	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.
0000										
0400										
0800										
1200		No meter								
1600										
2000										
2400										
TOTAL										

INVENTORY

	ALUM	LIME	CARBON	CHLORINE	AMMONIA		
ON HAND PREV. DAY				297.0			
RECEIVED				0			
TOTAL				297.0			
USED TODAY				26.4			
ON HAND				270.6			

CHEMICALS USED

	TOTAL LBS.	LBS. PER M.G.	GRS. PER. GAL	P. P. M.
ALUM				
CARBON				
LIME				
CHL. PRE.				
CHL. POST				
CHL. TOTAL	26.4	83.5	0.147	2.5
AMMONIA				

FILTER #	WIER READING	M 3 PER HR.	GPH	M3 PER DAY	GPD
1		20	5,280	500	132,000
2		29	7,656	700	184,000
3					
TOTAL		47	12,936	1,200	316,000

PLANT STATISTICS

NO. FILTER UNITS 2 SIZE 66.9 x 49.2 TYPE Slow
TOTAL SQ. FT OF SAND SURFACE 6,572
RATE OF FILTRATION (CALC.) 6.2 GAL. SQ. FT. / DAY 47
PLANT EFFICIENCY 0.079
(ON 4,000,000 MGD)

GENERAL

	0000-0800	0800-1600	1600-2400	AVG.
WEATHER				
WIND DIRECTION				
AIR TEMP.				
WATER TEMP.				
STORAGE	17,2048	17,9071	20,0138	
OPERATOR	F. SETOGUCHI			

ROUTINE PLANT INSPECTION

SAND MEDIA INSP. good FILT. good CONDITION good
COND. RAW WATR RES. good
COND. CLEAR WATER STOR. good
REMARKS

REMARKS

SUBMITTED BY D. Mihara
(CHIEF OPERATOR)

APPROVED BY for T. Numaguchi
(LOCAL MANAGER)

NISHIYAMA HIGH TAP WATER

Day	Place	Air Temp.	Water Temp.	Turbidity	Colour	Odour	Ph Ion	CL′	SO_4''	NO_3'	NO_2'	NH_4'	Absor[illegible] ox[illegible] (k[illegible])
9/Sep	KATAFUCHI 1 CHOME	29.0	18.0	0	0	Normal	6.5	11.4	±	±	—	—	1.[illegible]
	NISHI YAMA 3 CHOME	29.0	18.0	0	0	Normal	6.5	11.4	±	±	—	—	1.[illegible]
	NISHI YAMA 2 CHOME	29.0	18.0	0	0	Normal	6.5	11.4	±	±	—	—	1.[illegible]
	TATEYAMA MACHI	29.0	18.0	0	0	Normal	6.5	11.4	±	±	—	—	1.[illegible]

REMARKS	Hardness : American Hardne[illegible]

SUBMITTED BY

APPROVED BY

A HIGH TAP WATER

...ur	Ph Ion	CL′	SO_4''	NO_3'	NO_2'	NH_4'	Absorption of oxygen (kmn O_4)	Hard-ness	Residuum of Evaporation	Free Cl	Colonie	B. Coli
...al	6.5	11.4	±	±	—	—	1.58	1.47	62.0	0.65	2	—
...al	6.5	11.4	±	±	—	—	1.58	1.47	62.0	0.65	1	—
...al	6.5	11.4	±	±	—	—	1.58	1.47	62.0	0.65	2	—
...al	6.5	11.4	±	±	—	—	1.58	1.47	62.0	0.65	2	—

American Hardness

SUBMITTED BY D. Mihara
Chief Operator

APPROVED BY for T. Numaguchi
Local Manager

Day	Sample	Air Temp.	Water Temp.	Turbidity	Colour	Odour	Ph Ion	CL′	SO_4''	NO_3'	NO_2'	NH_4'	Absorption of oxygen ($kmnO_4$)
4/Sep	Raw water	29.0	18.0	10.0	20.0	Normal	6.6	10.7	±	±	−	−	2.84
	Filtered water	29.0	18.0	0	0	Normal	6.5	10.7	±	±	−	−	1.58
	Supply water	29.0	17.0	0	0	Normal	6.5	11.4	±	±	−	−	1.26
5/Sep	Raw water	29.0	24.0	1.5	5.0	Normal	6.9	9.9	±	±	−	−	2.84
	Filtered water	29.0	24.0	0	0	Normal	6.7	9.9	±	±	−	−	1.58
	Supply water	29.0	23.5	0	0	Normal	6.6	10.7	±	±	−	−	1.26
6/Sep	Raw water	29.0	24.0	12.0	20.0	Normal	6.7	9.6	±	±	−	−	4.11
	Filtered water	29.0	24.0	0	0	Normal	6.5	9.6	±	±	−	−	2.21
	Supply water	29.0	24.5	0	0	Normal	6.4	10.7	±	±	−	−	1.58
7/Sep	Raw water	28.0	24.0	9.0	17.0	Normal	6.8	11.4	±	±	−	−	5.69
	Filtered water	28.0	24.0	0	0	Normal	6.6	11.4	±	±	−	−	1.90
	Supply water	28.0	24.0	0	0	Normal	6.5	12.4	±	±	−	−	1.26
8/Sep	Raw water	28.0	24.0	6.0	16.0	Normal	7.2	10.3	±	±	−	−	3.48
	Filtered water	28.0	24.0	0	0	Normal	7.0	10.3	±	±	−	−	1.90
	Supply water	28.0	25.0	0	0	Normal	6.9	11.4	±	±	−	−	1.58

Day	Tap water	HONGOCHI HIGH			NISHIYAMA HIGH			NISHIYAMA LOW			Co…
		Colonie	B, Coli	Free Cl	Colonie	B, Coli	Free Cl	Colonie	B, Coli	Free Cl	Colonie
4/Sep	Tap water	3	−	0.60	2	−	0.60	5	−	0.40	
5/Sep	Tap water	2	−	0.65	4	−	0.55	4	−	0.50	
6/Sep	Tap water	3	−	0.60	2	−	0.65	4	−	0.55	
7/Sep	Tap water	5	−	0.50	4	−	0.60	3	−	0.65	
8/Sep	Tap water	3	−	0.60	2	−	0.70	4	−	0.55	

REMARKS

SUBMITTED BY D. Mihara
Chief O…

APPROVED BY for T. Num…
Local M…

Cl'	SO_4''	NO_3'	NO_2'	NH_4'	Absorption of oxygen ($KMnO_4$)	Hardness	Residuum of Evaporation	Free Cl	Colonie	B. Coli	Plant
0.7	±	±	–	–	2.84	/	74.0	0.	49	+	NISHIYAMA -HIGH
0.7	±	±	–	–	1.58	/	62.0	0	13	–	
1.4	±	±	–	–	1.26	/	62.0	1.5	0	–	

AMA HIGH		NISHIYAMA LOW			IZUMOMACHI			URAKAMI		
Coli	Free Cl	Colonie	B. Coli	Free Cl	Colonie	B. Coli	Free Cl	Colonie	B. Coli	Free Cl
–	0.60	5	–	0.40	3	–	0.50	4	–	0.55

Cl'	SO_4''	NO_3'	NO_2'	NH_4'	Absorption of oxygen ($KMnO_4$)	Hardness	Residuum of Evaporation	Free Cl	Colonie	B. Coli	Plant
9.9	±	±	–	–	2.84	/	52.0	0	45	+	IZUMO -MACHI
9.9	±	±	–	–	1.58	/	41.0	0	9	–	
10.7	±	±	–	–	1.26	/	41.0	1.0	3	–	

AMA HIGH		NISHIYAMA LOW			IZUMOMACHI			URAKAMI		
Co'i	Free Cl	Colonie	B. Coli	Free Cl	Colonie	B. Coli	Free Cl	Colonie	B. Coli	Free Cl
–	0.55	4	–	0.50	3	–	0.60	3	–	0.70

Cl'	SO_4''	NO_3'	NO_2'	NH_4'	Absorption of oxygen ($KMnO_4$)	Hardness	Residuum of Evaporation	Free Cl	Colonie	B. Coli	Plant
9.6	±	±	–	–	4.11	/	81.0	0	214	+	~~HONGOCHI -HIGH~~
9.6	±	±	–	–	2.21	/	66.0	0	19	–	
10.7	±	±	–	–	1.58	/	66.0	1.5	3	–	

AMA HIGH		NISHIYAMA LOW			IZUMOMACHI			URAKAMI		
Coli	Free Cl	Colonie	B. Coli	Free Cl	Colonie	B. Coli	Free Cl	Colonie	B. Coli	Free Cl
–	0.65	4	–	0.55	3	–	0.50	2	–	0.70

Cl'	SO_4''	NO_3'	NO_2'	NH_4'	Absorption of oxygen ($KMnO_4$)	Hardness	Residuum of Evaporation	Free Cl	Colonie	B. Coli	Plant
11.4	±	±	–	–	5.69	/	80.0	0	181	+	NISHIYAMA -LOW.
11.4	±	±	–	–	1.90	/	65.0	0	14	–	
12.4	±	±	–	–	1.26	/	65.0	1.2	3	–	

AMA HIGH		NISHIYAMA LOW			IZUMOMACHI			URAKAMI		
Coli	Free Cl	Colonie	B. Coli	Free Cl	Colonie	B. Coli	Free Cl	Colonie	B. Coli	Free Cl
–	0.60	3	–	0.65	3	–	0.55	4	–	0.60

Cl'	SO_4''	NO_3'	NO_2'	NH_4'	Absorption of oxygen ($KMnO_4$)	Hardness	Residuum of Evaporation	Free Cl	Colonie	B. Coli	Plant
10.3	±	±	–	–	3.48	/	87.0	0	125	+	URAKAMI
10.3	±	±	–	–	1.90	/	73.0	0	36	–	
11.4	±	±	–	–	1.58	/	73.0	2.0	2	–	

YAMA HIGH		NISHIYAMA LOW			IZUMOMACHI			URAKAMI		
B. Coli	Free Cl	Colonie	B. Coli	Free Cl	Colonie	B. Coli	Free Cl	Colonie	B. Coli	Free Cl
–	0.70	4	–	0.55	1	–	0.70	2	–	0.75

SUBMITTED BY D. Mihara
Chief Operator

APPROVED BY for T. Numaguchi
Local Manager

Day	Sample	Air Temp.	Water Temp.	Turbidity	Colour	Odour	Ph Ion	CL′	SO_4''	NO_3'	NO_2'	NH_4'	Absorption of oxygen ($KMnO_4$)	Har
28/Aug	Raw water	28.0	15.0	11.0	19.0	Normal	6.8	11.4	±	±	–	–	3.79	
	Filtered water	28.0	15.0	0	0	Normal	6.7	11.4	±	±	–	–	1.90	
	Supply water	28.0	15.5	0	0	Normal	6.5	12.4	±	±	–	–	1.26	
29/Aug	Raw water	28.0	24.0	11.0	16.0	Normal	6.7	9.6	±	±	–	–	3.16	
	Filtered water	28.0	24.0	0	0	Normal	6.5	9.6	±	±	–	–	1.58	
	Supply water	28.0	24.0	0	0	Normal	6.5	11.4	±	±	–	–	1.58	
30/Aug	Raw water	28.0	24.0	2.0	4.0	Normal	6.9	9.9	±	±	–	–	1.80	
	Filtered water	28.0	24.0	0	0	Normal	6.7	9.9	±	±	–	–	0.95	
	Supply water	28.0	24.0	0	0	Normal	6.6	11.0	±	±	–	–	0.95	
1/Sep	Raw water	30.0	24.0	7.0	16.0	Normal	6.7	14.4	±	±	–	–	6.00	
	Filtered water	30.0	24.0	0	0	Normal	6.5	11.4	±	±	–	–	1.58	
	Supply water	30.0	23.5	0	0	Normal	6.4	12.1	±	±	–	–	1.26	
	Raw water													
	Filtered water													
	Supply water													

Day	Tap water	HONGOCHI HIGH			NISHIYAMA HIGH			NISHIYAMA LOW			
		Colonie	B, Coli	Free Cl	Colonie	B, Coli	Free Cl	Colonie	B, Coli	Free Cl	Colonie
28/Aug	Tap water	2	–	0.75	4	–	0.60	4	–	0.55	2
29/Aug	Tap water	2	–	0.55	3	–	0.60	5	–	0.40	2
30/Aug	Tap water	3	–	0.50	2	–	0.60	4	–	0.45	3
1/Sep	Tap water	1	–	0.70	4	–	0.45	2	–	0.60	3
	Tap water										

REMARKS	

SUBMITTED BY D. Mihara
Chief Oper...

APPROVED BY for T. Numa...
Local Ma...

CL'	SO_4''	NO_3'	NO_2'	NH_4'	Absorption of oxygen ($kmnO_4$)	Hardness	Residuum of Evaporation	Free Cl	Colonie	B, Coli	Plant
11.4	±	±	–	–	3.79		74.0	0	94	+	NISHIYAMA -HIGH
11.4	±	±	–	–	1.90		62.0	0	15	–	
2.4	±	±	–	–	1.26		62.0	1.7	3	–	

AMA HIGH		NISHIYAMA LOW			IZUMOMACHI			URAKAMI		
Coli	Free Cl	Colonie	B. Coli	Free Cl	Colonie	B, Coli	Free Cl	Colonie	B. Coli	Free Cl
–	0.60	4	–	0.55	2	–	0.70	4	–	0.50

CL'	SO_4''	NO_3'	NO_2'	NH_4'	Absorption of oxygen ($kmnO_4$)	Hardness	Residuum of Evaporation	Free Cl	Colonie	B, Coli	Plant
9.6	±	±	–	–	3.16		80.0	0	256	+	HONGOCHI -HIGH
9.6	±	±	–	–	1.58		66.0	0	20	–	
11.4	±	±	–	–	1.58		66.0	1.2	2	–	

AMA HIGH		NISHIYAMA LOW			IZUMOMACHI			URAKAMI		
Coli	Free Cl	Colonie	B, Coli	Free Cl	Colonie	B, Coli	Free Cl	Colonie	B, Coli	Free Cl
–	0.60	5	–	0.40	2	–	0.60	4	–	0.55

CL'	SO_4''	NO_3'	NO_2'	NH_4'	Absorption of oxygen ($kmnO_4$)	Hardness	Residuum of Evaporation	Free Cl	Colonie	B, Coli	Plant
9.9	±	±	–	–	1.80		51.0	0	50	+	~~IZUMO -MACHI~~
9.9	±	±	–	–	0.95		40.0	0	5	–	
11.0	±	±	–	–	0.95		40.0	1.0	2	–	

AMA HIGH		NISHIYAMA LOW			IZUMOMACHI			URAKAMI		
Coli	Free Cl	Colonie	B, Coli	Free Cl	Colonie	B, Coli	Free Cl	Colonie	B, Coli	Free Cl
–	0.60	4	–	0.45	3	–	0.50	5	–	0.40

CL'	SO_4''	NO_3'	NO_2'	NH_4'	Absorption of oxygen ($kmnO_4$)	Hardness	Residuum of Evaporation	Free Cl	Colonie	B, Coli	Plant
11.4	±	±	–	–	6.00		78.0	0	143	+	NISHIYAMA -LOW
11.4	±	±	–	–	1.58		64.0	0	6	–	
12.1	±	±	–	–	1.26		64.0	1.0	1	–	

AMA HIGH		NISHIYAMA LOW			IZUMOMACHI			URAKAMI		
Coli	Free Cl	Colonie	B, Coli	Free Cl	Colonie	B, Coli	Free Cl	Colonie	B, Coli	Free Cl
–	0.45	2	–	0.60	3	–	0.55	2	–	0.75

AMA HIGH		NISHIYAMA LOW			IZUMOMACHI			URAKAMI		
Coli	Free Cl	Colonie	B, Coli	Free Cl	Colonie	B, Coli	Free Cl	Colonie	B, Coli	Free Cl

UBMITTED BY D, Mihara
Chief Operator

PPROVED BY for T, Numaguchi
Local Manager

NISHIYAMA HIGH TAP WATER

Day	Paragraph / Place	Air Temp.	Water Temp.	Turbidity	Colour	Odour	Ph Ion	CL'	SO_4''	NO_3'	NO_2'	NH_4'	Absorption of oxygen ($kmnO_4$)
31/Aug	NISHIYAMA 3 CHOME	29.0	15.5	0	0	Normal	6.6	12.1	±	±	—	—	1.58
	NISHIYAMA 2 CHOME	29.0	15.5	0	0	Normal	6.6	12.1	±	±	—	—	1.58
	ROKASU MACHI	29.0	15.5	0	0	Normal	6.6	12.1	±	±	—	—	1.58
	KAMI NISHI YAMA MACHI	29.0	15.5	0	0	Normal	6.6	12.1	±	±	—	—	1.58

REMARKS: Hardness ; American Hardness

SUBMITTED BY D

APPROVED BY for

HIGH TAP WATER

h en	CL′	SO_4''	NO_3'	NO_2'	NH_4'	Absorption of oxygen ($kmnO_4$)	Hardness	Residuum of Evaporation	Free Cl	Colonie	B, Coli
.6	12.1	±	±	–	–	1.58	1.47	62.0	0.60	2	–
.6	12.1	±	±	–	–	1.58	1.47	62.0	0.60	3	–
.6	12.1	±	±	–	–	1.58	1.47	62.0	0.60	2	–
.6	12.1	±	±	–	–	1.58	1.47	62.0	0.60	2	–
/	/	/	/	/	/	/	/	/	/	/	/

merican Hardness

SUBMITTED BY D. Mihara
Chief Operator

APPROVED BY for T. Numaguchi
Local Manager

NISHIYAMA LOW TAP WATER

Day	Paragraph / Place	Air Temp.	Water Temp.	Turbidity	Colour	Odour	Ph Ion	CL'	SO_4''	NO_3'	NO_2'	NH_4'	Absorption oxygen (kmn O
21/Sep	FURU MACHI	29.0	24.0	0	0	Normal	6.5	12.1	±	±	–	–	1.5
	OKEYA MACHI	29.0	24.0	0	0	Normal	6.5	12.1	±	±	–	–	1.5
	KATSUYAMA MACH	29.0	24.0	0	0	Normal	6.5	12.1	±	±	–	–	1.5
	SAKURA MACHI	29.0	24.0	0	0	Normal	6.5	12.1	±	±	–	–	1.5

REMARKS: Hardness ; American Hardness

SUBMITTED BY

APPROVED BY

LOW TAP WATER

h n	CL′	SO_4''	NO_3'	NO_2'	NH_4'	Absorption of oxygen (kmn O_4)	Hard-ness	Residuum of Evaporation	Free Cl	Colonie	B, Coli
.5	12.1	±	±	—	—	1.58	1.23	64.0	0.55	3	—
.5	12.1	±	±	—	—	1.58	1.23	64.0	0.55	4	—
.5	12.1	±	±	—	—	1.58	1.23	64.0	0.55	3	—
.5	12.1	±	±	—	—	1.58	1.23	64.0	0.55	3	—

American Hardness

SUBMITTED BY D. Mihara
Chief Operator

APPROVED BY for T. Numaguchi
Local Manager

Day	Paragraph / Sample	Air Temp.	Water Temp.	Turbidity	Colour	Odour	Ph Ion	CL′	SO_4''	NO_3'	NO_2'	NH_4'	Absorption of oxygen ($kmnO_4$)
12/Sep	Raw water	32.0	25.0	10.0	20.0	Normal	6.7	10.7	±	±	−	−	2.84
	Filtered water	32.0	25.0	0	0	Normal	6.6	10.7	±	±	−	−	1.90
	Supply water	32.0	24.5	0	0	Normal	6.5	12.1	±	±	−	−	1.58
13/Sep	Raw water	31.0	25.0	13.0	22.0	Normal	6.8	10.7	±	±	−	−	4.74
	Filtered water	31.0	25.0	0	0	Normal	6.6	10.7	±	±	−	−	1.90
	Supply water	31.0	24.5	0	0	Normal	6.5	11.4	±	±	−	−	1.26
14/Sep	Raw water	30.0	24.5	2.0	5.0	Normal	6.8	10.7	±	±	−	−	3.16
	Filtered water	30.0	24.5	0	0	Normal	6.7	10.7	±	±	−	−	1.26
	Supply water	30.0	24.0	0	0	Normal	6.6	11.4	±	±	−	−	0.95
15/Sep	Raw water	29.0	24.0	9.0	19.0	Normal	7.1	10.7	±	±	−	−	4.42
	Filtered water	29.0	24.0	0	0	Normal	7.0	10.7	±	±	−	−	2.21
	Supply water	29.0	24.0	0	0	Normal	6.9	11.4	±	±	−	−	1.58
16/Sep	Raw water	30.0	18.0	12.0	23.0	Normal	6.7	11.4	±	±	−	−	4.42
	Filtered water	30.0	18.0	0	0	Normal	6.6	11.4	±	±	−	−	1.90
	Supply water	30.0	18.5	0	0	Normal	6.5	12.1	±	±	−	−	1.26

Day	Tap water	HONGOCHI HIGH			NISHIYAMA HIGH			NISHIYAMA LOW			Co
		Colonie	B, Coli	Free Cl	Colonie	B, Coli	Free Cl	Colonie	B, Coli	Free Cl	
12/Sep	Tap water	2	−	0.70	3	−	0.60	7	−	0.30	
13/Sep	Tap water	4	−	0.50	3	−	0.60	5	−	0.40	
14/Sep	Tap water	3	−	0.60	3	−	0.60	5	−	0.40	
15/Sep	Tap water	4	−	0.50	3	−	0.60	5	−	0.40	
16/Sep	Tap water	3	−	0.60	2	−	0.70	4	−	0.50	

REMARKS	

SUBMITTED BY D, Mihara
Chief

APPROVED BY for T, Nu
Local

	CL′	SO_4''	NO_3'	NO_2'	NH_4'	Absorption of oxygen ($KMnO_4$)	Hardness	Residuum of Evaporation	Free Cl	Colonie	B, Coli	Plant
7	10.7	±	±	−	−	2.84		80.0	0	251	+	NISHIYAMA -LOW
3	10.7	±	±	−	−	1.90		64.0	0	32	−	
5	12.1	±	±	−	−	1.58		64.0	1.0	6	−	

SHIYAMA HIGH		NISHIYAMA LOW			IZUMOMACHI			URAKAMI		
B, Coli	Free Cl	Colonie	B, Coli	Free Cl	Colonie	B, Coli	Free Cl	Colonie	B, Coli	Free Cl
−	0.60	7	−	0.30	4	−	0.40	3	−	0.70

	CL′	SO_4''	NO_3'	NO_2'	NH_4'	Absorption of oxygen ($KMnO_4$)	Hardness	Residuum of Evaporation	Free Cl	Colonie	B, Coli	Plant
8	10.7	±	±	−	−	4.74		84.0	0	310	+	HONGOCHI -HIGH
6	10.7	±	±	−	−	1.90		68.0	0	23	−	
5	11.4	±	±	−	−	1.26		68.0	1.2	4	−	

SHIYAMA HIGH		NISHIYAMA LOW			IZUMOMACHI			URAKAMI		
B, Coli	Free Cl	Colonie	B, Coli	Free Cl	Colonie	B, Coli	Free Cl	Colonie	B, Coli	Free Cl
−	0.60	5	−	0.40	2	−	0.60	4	−	0.55

	CL′	SO_4''	NO_3'	NO_2'	NH_4'	Absorption of oxygen ($KMnO_4$)	Hardness	Residuum of Evaporation	Free Cl	Colonie	B, Coli	Plant
.8	10.7	±	±	−	−	3.16		53.0	0	62	+	IZUMO -MACHI
.7	10.7	±	±	−	−	1.26		42.0	0	12	−	
.6	11.4	±	±	−	−	0.95		42.0	1.2	2	−	

SHIYAMA HIGH		NISHIYAMA LOW			IZUMOMACHI			URAKAMI		
B, Coli	Free Cl	Colonie	B, Coli	Free Cl	Colonie	B, Coli	Free Cl	Colonie	B, Coli	Free Cl
−	0.60	5	−	0.40	2	−	0.65	4	−	0.55

	CL′	SO_4''	NO_3'	NO_2'	NH_4'	Absorption of oxygen ($KMnO_4$)	Hardness	Residuum of Evaporation	Free Cl	Colonie	B, Coli	Plant
.1	10.7	±	±	−	−	4.42		90.0	0	213	+	URAKAMI
.0	10.7	±	±	−	−	2.21		75.0	0	29	−	
.9	11.4	±	±	−	−	1.58		75.0	1.5	3	−	

SHIYAMA HIGH		NISHIYAMA LOW			IZUMOMACHI			URAKAMI		
B, Coli	Free Cl	Colonie	B, Coli	Free Cl	Colonie	B, Coli	Free Cl	Colonie	B, Coli	Free Cl
−	0.60	5	−	0.40	3	−	0.55	4	−	0.60

	CL′	SO_4''	NO_3'	NO_2'	NH_4'	Absorption of oxygen ($KMnO_4$)	Hardness	Residuum of Evaporation	Free Cl	Colonie	B, Coli	Plant
.7	11.4	±	±	−	−	4.42		76.0	0	123	+	NISHIYAMA -HIGH
.6	11.4	±	±	−	−	1.90		63.0	0	12	−	
.5	12.1	±	±	−	−	1.26		63.0	1.2	2	−	

SHIYAMA HIGH		NISHIYAMA LOW			IZUMOMACHI			URAKAMI		
B, Coli	Free Cl	Colonie	B, Coli	Free Cl	Colonie	B, Coli	Free Cl	Colonie	B, Coli	Free Cl
−	0.70	4	−	0.50	3	−	0.60	5	−	0.55

SUBMITTED BY D, Mihara
Chief Operator

APPROVED BY for T, Numaguchi
Local Manager

IZUMOMACHI TAP WATER

Day	Paragraph / Place	Air Temp.	Water Temp.	Tur-bility	Colour	Odour	Ph Ion	CL'	SO_4''	NO_3'	NO_2'	NH_4'	Abs
11/Sep	DEJIMA MACHI	32.0	26.0	0	0	Normal	6.6	10.7	±	±	−	−	1
	NAKAKOSHIMA MACHI	32.0	26.0	0	0	Normal	6.6	10.7	±	±	−	−	1
	UMEGASAKI MACHI	32.0	26.0	0	0	Normal	6.6	10.7	±	±	−	−	1
	YORIAI MACHI	32.0	26.0	0	0	Normal	6.6	10.7	±	±	−	−	1

REMARKS	Hardness ; American Hardnes

SUBMITTED BY

APPROVED BY

MACHI TAP WATER

our	Ph Ion	CL′	SO_4''	NO_3'	NO_2'	NH_4'	Absorption of oxygen (kmn O_4)	Hard-ness	Residuum of Evaporation	Free Cl	Colonie	B, Coli
mal	6.6	10.7	±	±	–	–	1.26	1.23	41.0	0.70	1	–
mal	6.6	10.7	±	±	–	–	1.26	1.23	41.0	0.70	2	–
mal	6.6	10.7	±	±	–	–	1.26	1.23	41.0	0.70	4	–
mal	6.6	10.7	±	±	–	–	1.26	1.23	41.0	0.70	1	–

American Hardness

SUBMITTED BY D, Mihara
Chief Operator

APPROVED BY for T, Numaguchi
Local Manager

KYUSHU CIVIL AFFAIRS REGION
GHQ SCAP
Fukuoka, Kyushu, Japan

APO 24 Unit 5
30 September 1950

PH 671.1

SUBJECT: Sasebo City Water System

TO: Colonel J. H. Burgheim
Chief, Kyushu Civil Affairs Region

Upon receipt of a telephone call from KCAR, a visit was made to the Sasebo Area by Louis G. Halla, SCAR Sanitary Engineer. Purpose of the visit was to check the existing public water supplies in Sasebo.

The problems or complaints as received from sources are listed below.

1. The public water system, used by the Occupation Forces and the Japanese people, was not producing a potable water, nor supplying enough water.

2. The chlorination equipment used in the water treatment plants was dirty and faulty in operation.

3. Weeds and grass growing on top of the concrete reservoirs.

After a brief discussion with the city water-works officials, a visit was made to the Yamanata and Ono water treatment plants.

It was noted that both plants appeared to be well operated, and the plant operators had good knowledge of water treatment techniques. Both plants appeared to be in good repair, and were kept clean. Yamanata water treatment plant had 13 slow sand filters, with sufficient gas chlorine to give chlorine residuals of 1.0 +ppm at Comp Mower. Ono water treatment plant consisted of 8 rapid sand filters. The operator at Ono appeared to have good training in the operation of rapid sand filters. Chemicals used in Ono water treatment plant were alum, for coagulation, and gas chlorine for disinfection purposes. City officials said that there was an ample supply of water, during the months of March to November, but a slight water shortage exists during the Winter months. A new water reservoir is now under construction, and this will supplement the present supply. All the water treatment plants are cross-connected, and thereby should any breakdown occur in a plant, a reduced quantity of water can be supplied to the needed area. Bacteriological records and chlorine residual records are kept by the water treatment plants.

The second complaint or problem was regarding dirty chlorination apparatus. It was found at the water plants that the old, concrete bucket type calcium hypochlorinators were coated with a deposit of lime. The units are not used, and now serve as stand by equipment to be used if needed. All the water is disinfected with the pedestal type gas chlorinator.

It was found the grass and weeds were growing on top of the reservoir. The reservoirs appeared to be well constructed, vented, and having sod on the concrete lid. Using sod is a common practice in stateside water treatment plants.

From the information received by KCAR, Sasebo is not an approved water supply to be used by the Occupation Forces, and therefore 8th Army Circular 85, dated 17 November 1949, does not apply to the Sasebo Water Supply. However the water supply system can be approved if all provisions are met as per Circular 85.

LOUIS G. HALLA

DAILY FILTER PLANT OPERATING LOG

PLANT HONGOCHI HIGH DATE 7 - 3 1950

TIME	TOTAL WATER FILTERED 1000's OF GALS.	TOTAL WATER TO DISTRIBUTION SYSTEM 1000's OF GALS.	FILT. WATER RES. LEVEL	CHLORINE PRE WGT. HYPO	CHLORINE PRE WGT. CHL.	CHLORINE PRE P.P.M. EST.	CHLORINE POST WGT. HYPO	CHLORINE POST WGT. CHL.	CHLORINE POST P.P.M. (EST)	RESIDUAL CHLORINE BASIN INFL.	RESIDUAL CHLORINE BASIN ENFL.	RESIDUAL CHLORINE FILTER INFL.	RESIDUAL CHLORINE FILTER ENF.	FIN.	FIN.
0000			2.87 m				Pound	Pound	~~Pound~~						
0200	125		3.02				1.6	1.4	1.81					1.5	
0400	〃	153	3.22				〃	〃	〃					〃	
0600	〃		3.40				〃	〃	〃					〃	
0800	124	232	3.35				〃	〃	〃					〃	
1000	〃		3.22				〃	〃	〃					〃	
1200	〃	235	3.34				〃	〃	〃					〃	
1400	〃		3.42				〃	〃	〃					〃	
1600	〃	222	3.34				〃	〃	〃					〃	
1800	〃		3.27				〃	〃	〃					〃	
2000	〃	248	3.23				〃	〃	〃					〃	
2200	〃		3.29				〃	〃	〃					〃	
2400	〃	190	3.38				〃	〃	〃					〃	
TOTAL	1.491.	1.280					19.8	17.6							

SUMMARY

WATER (GALS.)

RAW 1.491.600 FILTERED 1.491.600

TREATED 1.491.600 STA. USE.

WASTE WATER 0. PERCENT 0.%

FILTER OPERATION

FILTER NO.	1	2	3
ON or OFF	ON	ON	ON
TOTAL HEAD LOSS	83.0 cm	8.80 cm	96.0 cm
TOTAL HOURS IDLE	—	—	—
TOTAL WATER FILTERED	541.200	396.000	554.400
TOTAL WATER WASTED	0	0	0

STATION METERS (READINGS IN THOUSAND GALS.)

	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.
0000	143960									
0400	144520	153								
0800	145400	232								
1200	146290	235								
1600	147130	222								
2000	148070	248								
2400	148790	190								
TOTAL	4.850	1.280								

INVENTORY

	ALUM	LIME	CARBON	CHLORINE	HYPO ~~AMMONIA~~		
ON HAND PREV. DAY				495.9	1.963.8		
RECEIVED				—	—		
TOTAL				495.9	1.963.8		
USED TODAY				17.6	19.8		
ON HAND				478.3	1.944.0		

CHEMICALS USED

	TOTAL LBS.	LBS. PER M.G.	GRS. PER. GAL	P. P. M.
ALUM				
CARBON				
LIME				
HYPO ~~CHL. PRE.~~	19.8	13.2	0.02330	0.40
CHLORINE ~~CHL. POST~~	17.6	11.8	0.08188	1.41
CHL. TOTAL	37.4	25.0	0.10518	1.81
AMMONIA				

FILTER #	WIER READING	M 3 PER HR.	GPH	M3 PER DAY	GPD
1		85.4	22.5	2.050	541.200
2		62.5	16.5	1.500	396.000
3		87.5	23.1	2.100	554.400
TOTAL		235.4	62.1	5.6500	1.491.6000

PLANT STATISTICS

NO. FILTER UNITS 3 SIZE 113.5'x73.5' TYPE Slow
TOTAL SQ. FT OF SAND SURFACE 24981.0
RATE OF FILTRATION (CALC.) 7.98 GAL. SQ. FT. / DAY 59.7
PLANT EFFICIENCY 0.372
(ON 4,000,000 MGD)

GENERAL

	0000-0800	0800-1600	1600-2400	AVG.
WEATHER				
WIND DIRECTION				
AIR TEMP.	18.0			
WATER TEMP.	19.0			
STORAGE	884.400	881.760	892.320	
OPERATOR	~~N. NAKAMURA~~ S. YAMAGAMI			

ROUTINE PLANT INSPECTION

SAND MEDIA INSP. good FILT. # CONDITION good
COND. RAW WATR RES. good
COND. CLEAR WATER STOR. good
REMARKS

REMARKS

SUBMITTED BY D. Mihara
(CHIEF OPERATOR)

APPROVED BY for T. Numaguchi
(LOCAL MANAGER)

DAILY FILTER PLANT OPERATING LOG

PLANT NISHYAMA HIGH DATE 7-3 1950

TIME	TOTAL WATER FILTERED 1000's OF GALS.	TOTAL WATER TO DISTRIBUTION SYSTEM 1000's OF GALS.	FILT. WATER RES. LEVEL	CHLORINE PRE WGT. HYPO	CHLORINE PRE WGT. CHL.	CHLORINE PRE P.P.M. EST.	CHLORINE POST WGT. HYPO	CHLORINE POST WGT. CHL.	CHLORINE POST P.P.M. (EST)	RESIDUAL CHLORINE BASIN INFL.	RESIDUAL CHLORINE BASIN ENFL.	RESIDUAL CHLORINE FILTER INFL.	RESIDUAL CHLORINE FILTER ENF.	FIN.	FIN.
0000			m				Pound	Pound							
0200	132	-5	2.35				1.0	1.0	1.54					1.3	
0400	"	-5	2.45				"	"	"					"	
0600	"	21	2.53				2.0	"	"					"	
0800	"	-211	2.78				"	"	"					"	
1000	"	118	2.79				"	"	"					"	
1200	"	105	2.81				"	"	"					"	
1400	"	77	2.85				"	"	"					"	
1600	"	50	2.91				"	"	"					"	
1800	"	140	2.90				"	"	"					"	
2000	"	-5	3.00				"	"	"					"	
2200	"	-74	3.15				"	"	"					"	
2400	133	-73	3.30				"	"	"					"	
TOTAL	1,585	144					22.0								

SUMMARY

WATER (GALS.)

RAW 1,585,000 FILTERED 1,585,000

TREATED 1,585,000 STA. USE .

WASTE WATER 0 PERCENT 0

FILTER OPERATION

FILTER NO.	1	2	3
ON or OFF	ON	ON	ON
TOTAL HEAD LOSS	63.0 cm	64.0 cm	25.0 cm
TOTAL HOURS IDLE			
TOTAL WATER FILTERED	540,000	417,600	627,840
TOTAL WATER WASTED	0	0	0

STATION METERS (READINGS IN THOUSAND GALS.)

	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.
0000	960,050									
0400	960,800	-10								
0800	961,600	-190								
1200	962,400	223								
1600	963,650	127								
2000	964,620	-141								
2400	965,390	-147								
TOTAL	5,340	144								

INVENTORY HYPO CHLORINE

	ALUM	LIME	CARBON	~~CHLORINE~~	~~AMMONIA~~		
ON HAND PREV. DAY				2.939.0	747.0		
RECEIVED				0	0		
TOTAL				2.939.0	747.0		
USED TODAY				22.0	15.0		
ON HAND				2.917.0	732.0		

CHEMICALS USED

	TOTAL LBS.	LBS. PER M.G.	GRS. PER. GAL	P. P. M.
ALUM				
CARBON				
LIME				
CHL. PRE.				
HYPO ~~CHL. POST~~	22.0	13.8	0.023	0.40
CHLORINE ~~CHL. TOTAL~~	15.0	9.5	0.066	1.14
AMMONIA	37.0	23.3	0.089	1.54

FILTER #	WIER READING	M 3 PER HR.	GPH	M3 PER DAY	GPD
1	4 3/4 inch	85	22.500	2.044	540.000
2	4.0 "	66	17.400	1.581	417.600
3	5 1/4 "	99	26.160	2.376	627.840
TOTAL	14.0 "	250	66.060	6.001	1.585.440

PLANT STATISTICS

NO. FILTER UNITS 3 SIZE 128.0 x 98.5 TYPE SLOW
TOTAL SQ. FT OF SAND SURFACE 37824.0
RATE OF FILTRATION (CALC.) 5.615 GAL. SQ. FT. / DAY 42
PLANT EFFICIENCY 0.396
(ON 4,000,000 MGD)

GENERAL

	0000-0800	0800-1600	1600-2400	AVG.
WEATHER				
WIND DIRECTION				
AIR TEMP.				
WATER TEMP.				
STORAGE	382.033	399.734	453.367	
OPERATOR	M. NAKAMURA			

ROUTINE PLANT INSPECTION

SAND MEDIA INSP. good FILT. # CONDITION good
COND. RAW WATR RES. good
COND. CLEAR WATER STOR. good
REMARKS

REMARKS

SUBMITTED BY D. Mihara
(CHIEF OPERATOR)

APPROVED BY for T. Numaguchi
(LOCAL MANAGER)

CORRECTION

THIS DOCUMENT
HAS BEEN REPHOTOGRAPHED
TO ASSURE LEGIBILITY

INVENTORY

	ALUM	LIME	CARBON	~~CHLORINE~~ HYPO CHLORINE	AMMONIA		
ON HAND PREV. DAY				2.939.0	747.0		
RECEIVED				0	0		
TOTAL				2.939.0	747.0		
USED TODAY				22.0	15.0		
ON HAND				2.917.0	7320		

CHEMICALS USED

	TOTAL LBS.	LBS. PER M.G.	GRS. PER. GAL	P. P. M.
ALUM				
CARBON				
LIME				
CHL. PRE.				
HYPO ~~CHL. POST~~	22.0	13.8	0.023	0.40
CHLORINE ~~CHL. TOTAL~~	15.0	9.5	0.066	1.14
AMMONIA	37.0	23.3	0.089	1.54

FILTER #	WIER READING	M 3 PER HR.	GPH	M3 PER DAY	GPD
1	4 3/4 inch	85	22.500	2.044	540.000
2	4.0 "	66	17.400	1.581	417.600
3	5 1/4 "	99	26.160	2.376	627.840
TOTAL	14.0 "	250	66.060	6.001	1.585.440

PLANT STATISTICS

NO. FILTER UNITS 3 SIZE 128.0 x 98.5 TYPE SLOW

TOTAL SQ. FT OF SAND SURFACE 37824.0

RATE OF FILTRATION (CALC.) 5.615 GAL. SQ. FT. / DAY 42

PLANT EFFICIENCY 0.396

(ON 4,000,000 MGD)

GENERAL

	0000-0800	0800-1600	1600-2400	AVG.
WEATHER				
WIND DIRECTION				
AIR TEMP.				
WATER TEMP.				
STORAGE	382.033	399.734	453.367	
OPERATOR	M. NAKAMURA			

ROUTINE PLANT INSPECTION

SAND MEDIA INSP. good FILT. # CONDITION good

COND. RAW WATR RES. good

COND. CLEAR WATER STOR. good

REMARKS

REMARKS

SUBMITTED BY D. Mihara
(CHIEF OPERATOR)

APPROVED BY for T. Numaguchi
(LOCAL MANAGER)

DAILY FILTER PLANT OPERATING LOG

PLANT NISHIYAMA LOW DATE 7 - 3 1950

TIME	TOTAL WATER FILTERED 1000's OF GALS.	TOTAL WATER TO DISTRIBUTION SYSTEM 1000's OF GALS.	FILT. WATER RES. LEVEL	CHLORINE						RESIDUAL CHLORINE				FIN.	FIN.
				PRE			POST			BASIN		FILTER			
				WGT. HYPO	WGT. CHL.	P.P.M. EST.	WGT. HYPO	WGT. CHL.	P.P.M. (EST)	INFL.	ENFL.	INFL.	ENF.		
0000							Pond	Pond							
0200	165	.175	3.15				3.0	0.9	1.13					1.0	
0400	"	215	3.35				"	"	"					"	
0600	"	231	3.43				"	"	"					"	
0800	166	225	3.40				"	"	"					"	
1000	"	"	3.40				"	"	"					"	
1200	"	229	3.42				"	"	"					"	
1400	"	233	3.45				2.0	"	"					"	
1600	"	213	3.35				"	"	"					"	
1800	"	183	3.20				"	"	"					"	
2000	"	175	3.16				"	"	"					"	
2200	"	153	3.05				"	1.0	"					"	
2400	"	143	3.00				"	"	"					"	
TOTAL	1.989	2.317					30.0	11.0							

SUMMARY

WATER (GALS.)

RAW 1989.0 FILTERED 1989.0
TREATED 1989.0 STA. USE 0
WASTE WATER 0 PERCENT 0

FILTER OPERATION

FILTER NO.	1	2	3
ON or OFF	ON	ON	ON
TOTAL HEAD LOSS	9.0 cm	49.0 cm	38.0 cm
TOTAL HOURS IDLE	0	0	0
TOTAL WATER FILTERED	606.672	541.728	840.840
TOTAL WATER WASTED	0	.0	0

STATION METERS (READINGS IN THOUSAND GALS.)

	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.
0000	795.660									
0400	796.940	338								
0800	798.320	364								
1200	799.700	364								
1600	801.280	417								
2000	802.860	417								
2400	804.440	417								
TOTAL	8.780	2.317								

INVENTORY

	ALUM	LIME	CARBON	~~CHLORINE~~ HYPO	~~AMMONIA~~ CHLORINE		
ON HAND PREV. DAY				6986.	893.		
RECEIVED				0	0		
TOTAL				6986.	893.		
USED TODAY				30	11.		
ON HAND				6956.	882		

CHEMICALS USED

	TOTAL LBS.	LBS. PER M.G.	GRS. PER. GAL	P. P. M.
ALUM				
CARBON				
LIME				
CHL. PRE.				
CHL. POST	30.0	20.1	0.0423	0.42
CHL. TOTAL	11.0	42	0.0314	0.52
AMMONIA	41.0	2.43	0.0137	0.94

FILTER #	WIER READING	M 3 PER HR.	GPH	M3 PER DAY	GPD
1	5 1/8 INCH	95.760	25.20	2,298	606.672
2	4 3/4 "	85.500	22.50	2.052	541.728
3	6 3/8 "	132.690	24.02	3.184	840.840
TOTAL	16 1/4 INCH	333.956	81.72	7.534	1,989,240

PLANT STATISTICS

NO. FILTER UNITS 3 SIZE 128.0x98.5 TYPE SLOW

TOTAL SQ. FT OF SAND SURFACE 37824.0

RATE OF FILTRATION (CALC.) 6.95 GAL. SQ. FT. / DAY 52

PLANT EFFICIENCY 0.497
(ON 4,000,000 MGD)

GENERAL

	0000-0800	0800-1600	1600-2400	AVG.
WEATHER				
WIND DIRECTION				
AIR TEMP.				
WATER TEMP.				
STORAGE	190.750	1.279.00	1.682.69	
OPERATOR	U. MIZUMACHI			

ROUTINE PLANT INSPECTION

SAND MEDIA INSP. good FILT. # CONDITION good

COND. RAW WATR RES. good

COND. CLEAR WATER STOR. good

REMARKS

REMARKS

SUBMITTED BY D. Mihara
(CHIEF OPERATOR)

APPROVED BY for T. Numaguchi
(LOCAL MANAGER)

DAILY FILTER PLANT OPERATING LOG

PLANT IZUMOMACHI DATE 7 - 3 1950

TIME	TOTAL WATER FILTERED 1000's OF GALS.	TOTAL WATER TO DISTRIBUTION SYSTEM 1000's OF GALS.	FILT. WATER RES. LEVEL	CHLORINE PRE WGT. HYPO	CHLORINE PRE WGT. CHL.	CHLORINE PRE P.P.M. EST.	CHLORINE POST WGT. HYPO	CHLORINE POST WGT. CHL.	CHLORINE POST P.P.M. (EST)	RESIDUAL CHLORINE BASIN INFL.	RESIDUAL CHLORINE BASIN ENFL.	RESIDUAL CHLORINE FILTER INFL.	RESIDUAL CHLORINE FILTER ENF.	FIN.	FIN.
0000							Pond	Pond							
0200	264	211	3.10				3.52	1.4						1.0	
0400	"	224	3.05				"	"						"	
0600	"	343	3.05				"	"						"	
0800	"	317	3.00				"	"						1.1	
1000	"	290	2.90				"	"						"	
1200	"	344	2.75				"	"						"	
1400	"	238	2.60				"	"						"	
1600	"	251	2.50				"	"						"	
1800	344	290	2.35				"	"						"	
2000	"	264	2.20				"	"						"	
2200	316	211	2.10				"	"						"	
2400	"	185	2.20				"	"						"	
TOTAL	3.432	3.168					42.24								

SUMMARY

WATER (GALS.)
RAW 3.432.000 FILTERED 3.432.000
TREATED 3.432.000 STA. USE 0
WASTE WATER 0 PERCENT

FILTER OPERATION

FILTER NO.	1	2	3*
ON or OFF	ON	ON	ON
TOTAL HEAD LOSS	22.5 cm	240 cm	23.0 cm
TOTAL HOURS IDLE			
TOTAL WATER FILTERED	1.320.000	924.000	1.188.000
TOTAL WATER WASTED	0	0	0

STATION METERS (READINGS IN THOUSAND GALS.)

	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.
0000										
0400										
0800	Meter Broken									
1200										
1600										
2000										
2400										
TOTAL										

INVENTORY

	ALUM	LIME	CARBON	CHLORINE	HYPO ~~AMMONIA~~		
ON HAND PREV. DAY				853.82			
RECEIVED				0			
TOTAL				853.82			
USED TODAY				42.24			
ON HAND				811.58	2,112.0		

CHEMICALS USED

	TOTAL LBS.	LBS. PER M.G.	GRS. PER. GAL	P. P. M.
ALUM				
CARBON				
LIME				
CHL. PRE.	42.24	12.3	0.060	1.4
CHL. POST				
CHL. TOTAL				
AMMONIA				

FILTER #	WIER READING	M 3 PER HR.	GPH	M3 PER DAY	GPD
1		208	54.912	5.000	1.320.000
2		145	38.280	3.500	924.000
3		187	49.368	4.500	1.188.000
TOTAL		540	142.560	13.000	3.432.000

PLANT STATISTICS

NO. FILTER UNITS 3 SIZE 118.9x99 TYPE SLOW

TOTAL SQ. FT OF SAND SURFACE 35313.3

RATE OF FILTRATION (CALC.) 2.03 GAL. SQ. FT. / DAY 90

PLANT EFFICIENCY 0.858 (ON 4,000,000 MGD)

GENERAL

	0000-0800	0800-1600	1600-2400	AVG.
WEATHER				
WIND DIRECTION				
AIR TEMP.				
WATER TEMP.				
STORAGE	1225.224	1921.020	898.497	
OPERATOR	F. SETOGUCHI			

ROUTINE PLANT INSPECTION

SAND MEDIA INSP. good FILT. # good CONDITION good

COND. RAW WATR RES. good

COND. CLEAR WATER STOR. good

REMARKS

REMARKS

SUBMITTED BY D. Mihara (CHIEF OPERATOR)

APPROVED BY for T. Numaguchi (LOCAL MANAGER)

DAILY FILTER PLANT OPERATING LOG

PLANT KOGAKURA DATE 7-3 1950

TIME	TOTAL WATER FILTERED 1000's OF GALS.	TOTAL WATER TO DISTRIBUTION SYSTEM 1000's OF GALS.	FILT. WATER RES. LEVEL	CHLORINE PRE WGT. HYPO	CHLORINE PRE WGT. CHL.	CHLORINE PRE P.P.M. EST.	CHLORINE POST WGT. HYPO	CHLORINE POST WGT. CHL.	CHLORINE POST P.P.M. (EST)	RESIDUAL CHLORINE BASIN INFL.	RESIDUAL CHLORINE BASIN ENFL.	RESIDUAL CHLORINE FILTER INFL.	RESIDUAL CHLORINE FILTER ENF.	FIN.	FIN.
0000			m				Pound	Powd							
0200	28	16	2.90				2.2	0.55	2.5					2.1	
0400	"	18	2.90				"	"	"					"	
0600	"	23	2.85				"	"	"					"	
0800	24	32	2.80				"	"	"					2.2	
1000	"	26	2.70				"	"	"					"	
1200	"	29	2.60				"	"	"					"	
1400	"	26	2.55				"	"	"					"	
1600	"	24	2.45				"	"	"					"	
1800	28	21	2.30				"	"	"					"	
2000	"	20	2.20				"	"	"					"	
2200	"	16	2.30				"	"	"					"	
2400	"	13	2.60				"	"	"					"	
TOTAL	316	264					26.4	6.6							

SUMMARY

WATER (GALS.)
RAW 316,000 FILTERED 316,000
TREATED 316,000 STA. USE 0
WASTE WATER PERCENT 0

FILTER OPERATION

FILTER NO.	1	2	3
ON or OFF	ON	ON	
TOTAL HEAD LOSS	5.0 cm	7.0 cm	
TOTAL HOURS IDLE			
TOTAL WATER FILTERED	184,000	132,000	
TOTAL WATER WASTED	0	0	

STATION METERS (READINGS IN THOUSAND GALS.)

	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.
0000										
0400										
0800	No Meter									
1200										
1600										
2000										
2400										
TOTAL										

INVENTORY

	ALUM	LIME	CARBON	CHLORINE	HYPO ~~AMMONIA~~		
ON HAND PREV. DAY					1,016.4		
RECEIVED					0		
TOTAL					1,016.4		
USED TODAY					26.4		
ON HAND					990.0		

CHEMICALS USED

	TOTAL LBS.	LBS. PER M.G.	GRS. PER. GAL	P. P. M.
ALUM				
CARBON				
LIME				
CHL. PRE.				
CHL. POST	26.4	83.5	0.147	2.5
CHL. TOTAL				
AMMONIA				

FILTER #	WIER READING	M 3 PER HR.	GPH	M3 PER DAY	GPD
1		29	7,656	700	184,000
2		20	5,280	500	132,000
3					
TOTAL		49	12,936	1,200	316,000

PLANT STATISTICS

NO. FILTER UNITS 2 SIZE 66.99x49.8 TYPE SLOW

TOTAL SQ. FT OF SAND SURFACE 6.592

RATE OF FILTRATION (CALC.) 6.2 GAL. SQ. FT. / DAY 47

PLANT EFFICIENCY 0.079
(ON 4,000,000 MGD)

GENERAL

	0000-0800	0800-1600	1600-2400	AVG.
WEATHER				
WIND DIRECTION				
AIR TEMP.				
WATER TEMP.				
STORAGE	22.1760	19.4040	20.5920	
OPERATOR	F. SETOGUCHI			

ROUTINE PLANT INSPECTION

SAND MEDIA INSP. good FILT. # CONDITION good

COND. RAW WATR RES. good

COND. CLEAR WATER STOR. good

REMARKS

REMARKS

SUBMITTED BY D. Mihara
(CHIEF OPERATOR)

APPROVED BY for T. Numaguchi
(LOCAL MANAGER)

DAILY FILTER PLANT OPERATING LOG

PLANT URAKAMI DATE 7 - 3 1950

TIME	TOTAL WATER FILTERED 1000's OF GALS.	TOTAL WATER TO DISTRIBUTION SYSTEM 1000's OF GALS.	FILT. WATER RES. LEVEL	CHLORINE						RESIDUAL CHLORINE					
				PRE			POST			BASIN		FILTER		FIN.	FIN.
				WGT. HYPO	WGT. CHL.	P.P.M. EST.	WGT. HYPO	WGT. CHL.	P.P.M. (EST)	INFL.	ENFL.	INFL.	ENF.		
0000								Powd	Powd						
0200	515	493	4.35					10.0	2.3					1.8	
0400	〃	〃	4.40					〃	〃					〃	
0600	〃	〃	4.20					〃	〃					〃	
0800	〃	〃	〃					〃	〃					〃	
1000	〃	〃	〃					〃	〃					〃	
1200	〃	〃	〃					〃	〃					〃	
1400	〃	〃	4.15					〃	〃					〃	
1600	〃	〃	3.95					〃	〃					〃	
1800	〃	〃	3.70					〃	〃					〃	
2000	〃	〃	〃					〃	〃					〃	
2200	〃	〃	4.00					〃	〃					〃	
2400	522	500	4.25					11.0	〃					〃	
TOTAL	6.187	5.923						121.0							

SUMMARY

RAW 6.187 WATER (GALS.) FILTERED 6.187

TREATED 6.187 STA. USE.

WASTE WATER 260 PERCENT 0.042%

FILTER OPERATION

FILTER NO.	1	2	3
ON or OFF	ON	ON	ON
TOTAL MINUTS ~~HEAD LOSS~~	—	—	—
TOTAL HOURS IDLE	0	120	80
TOTAL WATER FILTERED	1.272	3.712	1.202
TOTAL WATER WASTED	0	156	104

STATION METERS (READINGS IN THOUSAND GALS.)

	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.
0000										
0400										
0800										
1200										
1600										
2000										
2400										
TOTAL										

No Meters

INVENTORY

	ALUM	LIME	CARBON	CHLORINE	AMMONIA	
ON HAND PREV. DAY	6.836			2.055.0		1.336.5
RECEIVED	33.000			0		11.110.0
TOTAL	39.836			2.055.0		12.446.5
USED TODAY	9.636			369.6		1.925.0
ON HAND	30200			1.685.4		10.521.5

CHEMICALS USED

	TOTAL LBS.	LBS. PER M.G.	GRS. PER. GAL	P. P. M.
ALUM	1.050.0	169.7	11.9	20.4
CARBON				
LIME				
CHL. PRE.				
CHL. POST				
CHL. TOTAL	121.0	19.5	0.13	2.3
AMMONIA				

FILTER #	WIER READING	M 3 PER HR.	GPH	M3 PER DAY	GPD
1	3.5	200	53.038.1	4.818	1.272.915.6
2. 4. 6	"	585	154.689.1	14.052	3.712.538.4
3	"	189	50.087.0	4.550	1.202.110.0
TOTAL		974	257.814.2	23.420	6.187.564.0

PLANT STATISTICS

NO. FILTER UNITS 5 ~~8~~ SIZE 19.6x28 TYPE Rapid

TOTAL SQ. FT OF SAND SURFACE 2.744

RATE OF FILTRATION (CALC.) 301.35 GAL. SQ. FT. / DAY 2.254

PLANT EFFICIENCY 1.54
(ON 4,000,000 MGD)

GENERAL

	0000-0800	0800-1600	1600-2400	AVG.
WEATHER	Rain			
WIND DIRECTION	South			
AIR TEMP.	21° c			
WATER TEMP.	22° c			
STORAGE	1.105.131	1.068.154	1.102.275	
OPERATOR		M Hidaka		

ROUTINE PLANT INSPECTION

SAND MEDIA INSP. good FILT. # Good CONDITION Good

COND. RAW WATR RES. good

COND. CLEAR WATER STOR. good

REMARKS

REMARKS

SUBMITTED BY D. Mihara
(CHIEF OPERATOR)

APPROVED BY for T. Numaguchi
(LOCAL MANAGER)

DAILY FILTER PLANT OPERATING LOG

PLANT HONGOCHI HIGH DATE 7. 10. 1950

TIME	TOTAL WATER FILTERED 1000's OF GALS.	TOTAL WATER TO DISTRIBUTION SYSTEM 1000's OF GALS.	FILT. WATER RES. LEVEL	CHLORINE PRE WGT. HYPO	CHLORINE PRE WGT. CHL.	CHLORINE PRE P.P.M. EST.	CHLORINE POST WGT. HYPO	CHLORINE POST WGT. CHL.	CHLORINE POST P.P.M. (EST)	RESIDUAL CHLORINE BASIN INFL.	RESIDUAL CHLORINE BASIN ENFL.	RESIDUAL CHLORINE FILTER INFL.	RESIDUAL CHLORINE FILTER ENF.	FIN.	FIN.
			m				lbs	lbs							
0000			3.17												
0200	117		3.29				1.46	1.37	1.79					1.5	
0400	〃	185	3.41				〃	〃	〃					〃	
0600	〃		3.50				〃	〃	〃					〃	
0800	〃	264	3.36				〃	〃	〃					〃	
1000	〃		3.29				〃	〃	〃					〃	
1200	〃	282	3.18				〃	〃	〃					〃	
1400	〃		3.18				〃	〃	〃					〃	
1600	116	248	3.10				〃	〃	〃					〃	
1800	〃		3.01				〃	〃	〃					〃	
2000	〃	259	2.91				〃	〃	〃					〃	
2200	〃		2.99				〃	〃	〃					〃	
2400	〃	214	3.08				〃	〃	〃					〃	
TOTAL	1,399	1,452					17.6	16.5							

SUMMARY

WATER (GALS.)

RAW 1,399,200 FILTERED 1,399,200

TREATED 1,399,200 STA. USE. 0

WASTE WATER 0 PERCENT 0

FILTER OPERATION

FILTER NO.	1	2	3
ON or OFF	on	on	on
TOTAL HEAD LOSS	85.0 cm	97.0 cm	77.0 cm
TOTAL HOURS IDLE	—	—	—
TOTAL WATER FILTERED	475,200	435,600	488,400
TOTAL WATER WASTED	0	0	0

STATION METERS (READINGS IN THOUSAND GALS.)

	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.
0000	178810									
0400	179510	185.								
0800	180510	264.								
1200	181580	282.								
1600	182520	248.								
2000	183500	259.								
2400	184310	214.								
TOTAL	5,500	1,452.								

INVENTORY

	ALUM	LIME	CARBON	CHLORINE	AMMONIA	HYPO	
ON HAND PREV. DAY				475.2		2,104.1	
RECEIVED							
TOTAL				475.2		2,104.1	
USED TODAY				16.5		17.6	
ON HAND				458.7		2,086.5	

CHEMICALS USED

	TOTAL LBS.	LBS. PER M.G.	GRS. PER. GAL	P. P. M.
ALUM				
CARBON				
LIME				
CHL. PRE.	16.5	11.8	0.081358	1.41
Hypo CHL. POST	17.6	12.5	0.022160	0.38
CHL. TOTAL	34.1	24.3	0.~~0~~03518	1.79
AMMONIA				

FILTER #	WIER READING	M3 PER HR.	GPH	M3 PER DAY	GPD
1	——	75.0	19,800	1,800	475,200
2	——	68.7	18,100	1,650	435,600
3	——	77.0	20,300	1,850	488,400
TOTAL		220.7	58,200	5,300	1,399,200

PLANT STATISTICS

NO. FILTER UNITS 3 SIZE 113.3×73.5 TYPE SLOW

TOTAL SQ. FT OF SAND SURFACE 24981.0

RATE OF FILTRATION (CALC.) 7,487 GAL. SQ. FT. / DAY 56.0

PLANT EFFICIENCY 0.34
(ON 4,000,000 MGD)

GENERAL

	0000-0800	0800-1600	1600-2400	AVG.
WEATHER				
WIND DIRECTION				
AIR TEMP.	22.0			
WATER TEMP.	22.0			
STORAGE	887,040	836,880	813,120	
OPERATOR	S. YAMAGAMI			

ROUTINE PLANT INSPECTION

SAND MEDIA INSP. good FILT. # CONDITION good

COND. RAW WATR RES. good

COND. CLEAR WATER STOR. good

REMARKS

REMARKS

SUBMITTED BY D. Mihara
(CHIEF OPERATOR)

APPROVED BY for T. Numaguchi
(LOCAL MANAGER)

DAILY FILTER PLANT OPERATING LOG

PLANT NISHIYAMA HIGH DATE 7. 10 1950

TIME	TOTAL WATER FILTERED 1000's OF GALS.	TOTAL WATER TO DISTRIBUTION SYSTEM 1000's OF GALS.	FILT. WATER RES. LEVEL	CHLORINE						RESIDUAL CHLORINE				FIN.	FIN.
				PRE			POST			BASIN		FILTER			
				WGT. HYPO	WGT. CHL.	P.P.M. EST.	WGT. HYPO	WGT. CHL.	P.P.M. (EST)	INFL.	ENFL.	INFL.	ENF.		
0000			m				lbs								
0200	156	-187	0.70				2.9	1.1	1.42					1.30	
0400	"	-187	0.95				"	"	"					"	
0600	"	-146	1.17				"	"	"					"	
0800	"	238	1.11				"	"	"					"	
1000	"	403	0.93				"	"	"					"	
1200	"	472	0.70				"	"	"					"	
1400	157	803	0.23				"	"	"					"	
1600	"	20	0.33				3.0	"	"					"	
1800	"	20	0.43				"	1.2	"					"	
2000	"	-49	0.58				"	"	"					"	
2200	"	-379	0.97				"	"	"					"	
2400	"	-530	1.47				"	"	"					"	
TOTAL	1,878	477					35.8	13.6							

SUMMARY

WATER (GALS.)
RAW 1,878,000 FILTERED 1,878,000
TREATED 1,878,000 STA. USE. 0
WASTE WATER 0 PERCENT 0

FILTER OPERATION

FILTER NO.	1	2	3
ON or OFF	on	on	on
TOTAL HEAD LOSS	87.0 cm	87.0 cm	86.0 cm
TOTAL HOURS IDLE	—	—	—
TOTAL WATER FILTERED	583,200	378,720	915,840
TOTAL WATER WASTED	0	0	0

STATION METERS (READINGS IN THOUSAND GALS.)

	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.	COUNTER	GALS.
0000	995230									
0400	995870	-374								
0800	996570	92								
1200	997550	875								
1600	998640	823								
2000	999620	-29								
2400	1000350	-909								
TOTAL	5120	477								