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COMMONWEALTH of VIRGINIA

RANDOLPH L. GORDON, M.D., M.P.H.
COMMISSIONER

Department of Health
OFFICE OF WATER PROGRAMS

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SOUTHEAST VIRGINIA ENGINEERING FIELD OFFICE

Notice of Permit Issuance

SUBJECT: ACCOMACK COUNTY
Water - NASA-Wallops Flight Center
Main Base (3001500)

683-2600
X115
737

Mr. William D. Phillips
NASA/GSFC/WFF
Building N-161
Wallops Flight Center
Wallops Island, Virginia 23337

Main Base

MAR 26 1997

Operative Permit

Dear Mr. Phillips:

Enclosed you will find Commonwealth of Virginia, Department of Health, Waterworks Operation Permit No. 3001500 with an effective date of March 24, 1997. This permit is your authorization from the State Health Commissioner to operate the subject public waterworks located in Northampton County, in accordance with Part 2 of the *Waterworks Regulations*. You will note that the permit indicates that this waterworks has a design capacity of 598,400 gpd.

The following entry point and distribution system sample analyses results are required from this water supply. These samples include routine compliance samples. Please keep in mind that these are the standard requirements. If we have reason to question the quality of the water at any time, the Virginia Department of Health is authorized to require additional samples as is deemed appropriate.

1. Bacteriological: 2 distribution samples per month.
2. Nitrate: One entry point sample every calendar year.
3. Volatile Organic Chemical (VOCs): One entry point sample every calendar year.
4. Radiological: One distribution system sample every four years.
5. Metals and Inorganic: One entry point sample every three years.
6. Phase II/V SOCS and IOCs: Refer to the previous correspondence on "Waivers."

As owner of the public water supply, you are responsible for complying with the monitoring requirements of the *Virginia Waterworks Regulations*. You are responsible for collecting all samples on time and for having the results reported to this office, in writing no later than the 10th day of the month following the month during which the sample is due. Any laboratory which has been certified by the State of Virginia to do particular drinking water tests which you are required to report is acceptable to us.

Mr. William D. Phillips

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Both the State and Federal Regulations require that in the event you fail to collect the required samples, whether intentionally or not, you must provide the public with a notice of the violation of the regulations. Please remember that the notice would have to be distributed to each of the consumers served by this waterworks within three months of being notified by this office of violation.

The enclosed Waterworks Operation Permit specifies a maximum volume that this waterworks may produce, stated as a number of gallons over the period of time indicated (i.e., 598,400 gallons per day based on a daily average of any three consecutive months showing the maximum three month production). This capacity is based on public health requirements and the application of engineering principles. Since you have a water withdrawal permit issued by the Department of Environmental Quality (DEQ), Tidewater Regional Office, please be advised that under Virginia law, you are responsible for complying with each permit.

I look forward to your continued cooperation in the operation and maintenance of this public waterworks. If you have any questions concerning the permit, or the contents of your water supply system, please do not hesitate to contact me.

Sincerely,



Satgur Klar
District Engineer
Office of Water Programs

SSK/slh

Enclosure

pc/enc: V.D.H. - Division of Water Supply Engineering

pc: Accomack County Health Department
D.E.Q. - Tidewater Regional Office (Mr. Larry S. McBride, Remediation Manager)



COMMONWEALTH OF VIRGINIA

DEPARTMENT OF HEALTH
DIVISION OF WATER SUPPLY ENGINEERING

WATERWORKS OPERATION PERMIT

National Aeronautics and Space Administration

Is Hereby Granted Permission

To Operate a Community

Waterworks Having a Design Capacity of 598,400 gpd

at NASA-Wallops Flight Center Main Base

Located in Accomack County

(City, Town and/or County)

In Accordance With the Provisions

of Title 32.1, Chapter 6, Article 2, Sections 32.1 - 172 and 173 Code of Virginia as Amended and 12 VAC 5-590-260 of the

Waterworks Regulations of the Virginia Department of Health As Amended. This Permit Is Issued In Accordance with Previously Issued Permits Construction Permit No. 301794 issued to NASA dated June 8, 1994; Construction Permit No. 302790 issued to NASA dated November 28, 1990; and Operation Permit No. 3001500 issued to NASA dated June 30, 1977.

And With The Understanding That This Owner Will Operate the Waterworks in Accordance with Part II "Operation Regulations for Waterworks" of the Waterworks Regulations of the Virginia Department of Health and any Variances and/or Exemptions Noted Below.
Variances and/or Exemptions Granted (x) None () See Attached

An Engineering Description Sheet Is Attached Dated March 24, 1997

PERMIT NO. 3001500

RECOMMENDED

EFFECTIVE DATE March 24, 1997

Director, Division of Water Supply Engineering

EXPIRATION DATE N/A

RECOMMENDED

APPROVED

State Health Commissioner

VIRGINIA DEPARTMENT OF HEALTH
ENGINEERING DESCRIPTION SHEET

DATE: March 24, 1997

WATERWORKS NAME: NASA - Wallops Flight Center Main Base CERTIFIED CLASS: IV

COUNTY/CITY: Accomack County TYPE: Community

LOCATION: Three miles east of Wattsville, on State Route 798, west of Chincoteague

OWNER: National Aeronautics and Space Administration
NASA/GSFC/WFF
Building N-161
Wallops Flight Center
Wallops Island, Virginia 23337
Phone (757) 824-1209

OPERATOR: H & H Consolidated
Bldg. F-20 Utilities Section
Wallops Flight Center
Wallops Island, Virginia 23337
Phone (757) 824-1191

PERMIT NO.: 3001500

DATE ISSUED: March 24, 1997

TYPE OF TREATMENT: Chlorination

SOURCE: Five Wells

DESIGN CAPACITY: 598,400 gpd

DESCRIPTION OF SYSTEM

The system consists of five wells, a gas chlorinator, a 500,000 gallon ground storage tank, three 600 gpm high service pumps, three fire service pumps, one 100,000 gallon elevated storage tank, and the distribution system. The five well pumps are automatically alternated every 20,000 gallons.

Well #1 was drilled starting on August 22, 1992, and was completed on September 24, 1992. The well bore is 260 feet deep. An 18-inch steel casing extends from the surface to a depth of 90 feet, and an 8-inch steel casing extends from the surface to a depth of 187 feet. Type 304 8-inch stainless steel casing extends from 187 to 190 feet, 200 to 210 feet, 220 to 230 feet, and 255 to 260 feet. Type 304 8-inch stainless steel screen (30 slot) extends from 190 to 200 feet, 210 to 220 feet, and 230 to 255 feet. The well is grouted to a depth of 140 feet. The well is equipped with a submersible pump rated at 171 gpm at 193.5 feet TDH driven by a 15 H.P. motor. The pump intake is set at 200 feet. The well has a tested yield of 225 gpm, over a 48-hour period from September 28, 1992 to September 30, 1992, with the water level dropping from 38.83 feet (static condition) to 181.83 feet (dynamic condition).

Well #2 was drilled starting on December 2, 1992, and was completed on March 17, 1993. The well bore is 150 feet deep. An 18-inch steel casing extends from the surface to a depth of 78 feet, and an 8-inch steel casing extends from the surface to a depth of 97 feet. Type 304 8-inch stainless steel casing extends from 97 to 100 feet, and from 145 to 150 feet. Type 304 8-inch stainless steel screen (30 slot) extends from 100 to 145 feet. The well is grouted to a depth of 78 feet. The well is equipped with a submersible pump rated at 55 gpm at 130 feet TDH driven by a 3 H.P. motor. The pump intake is set at 120 feet. The well has a tested yield of 50 gpm, over a 48-hour period from May 4, 1993 to May 6, 1993, with the water level dropping from 27.25 feet (static condition) to 107.25 feet (dynamic condition).

Well #3 was drilled starting on July 22, 1992, and was completed on August 13, 1992. The well bore is 253 feet deep. An 18-inch steel casing extends from the surface to a depth of 90 feet, and an 8-inch steel casing extends from the surface to a depth of 195 feet. Type 304 8-inch stainless steel casing extends from 195 to 198 feet, 218 to 223 feet, and from 248 to 253 feet. Type 304 8-inch stainless steel screen (30 slot) extends from 198 to 218 feet, and from 223 to 248 feet. Gravel pack is installed from 150 feet to 253 feet. The well is grouted to a depth of 153 feet. The well is equipped with a submersible pump rated at 214 gpm at 197 feet TDH driven by a 15 H.P. motor. The pump intake is set at 200 feet. The well has a tested yield of 250 gpm, over a 48-hour period from August 18, 1992 to August 20, 1992, with the water level dropping from 38.83 feet (static condition) to 145.08 feet (dynamic condition).

Well #4 was drilled starting on October 6, 1992, and was completed on November 16, 1992. The well bore is 265 feet deep. An 18-inch steel casing extends from the surface to a depth of 90 feet, and an 8-inch steel casing extends from the surface to a depth of 217 feet. Type 304 8-inch stainless steel casing extends from 217 to 220 feet, and from 260 to 265 feet. An 8-inch screen (30 slot) extends from 220 to 260 feet. Gravel pack is installed from 180 feet to 265 feet. The well is grouted to a depth of 175 feet. The well is equipped with a submersible pump rated at 163 gpm at 202 feet TDH driven by a 15 H.P. motor. The pump intake is set at 220 feet. The well has a tested yield of 200 gpm, over a 48-hour period from November 17, 1992 to November 19, 1992, with the water level dropping from 38.5 feet (static condition) to 188.4 feet (dynamic condition).

Well #5 (H-115) was drilled starting on February 10, 1990, and was completed on February 14, 1990. The well bore is 260 feet deep. An 8-inch steel casing extends from the surface to a depth of 190 feet, and from 250 feet to a depth of 260 feet. An 8-inch stainless steel screen (.030 mesh) extends from 190 to 250 feet. Gravel pack is installed from 180 feet to 260 feet. The well is grouted to a depth of 50 feet. The well is equipped with a submersible pump rated at 167 gpm at 225 feet TDH driven by a 10 H.P. motor. The pump intake is set at 175 feet. The well has a tested yield of 150 gpm, over a 48-hour period from March 5, 1990 to March 7, 1990, with the water level dropping from 29.88 feet (static condition) to 84.38 feet (dynamic condition).

Gaseous chlorination facilities consist of an automatic switchover direct cylinder-mounted gas chlorinator with a vacuum-operated regulator with a maximum capacity of 100 pounds per day (ppd), a digital dual chlorine cylinder scales, an autoflow gas proportioner, and a gas leak detector with automatic exterior alarm. Chlorine injection is flow-paced, based on the raw water flow from the wells. The injector is mounted on the raw water feed line connecting the five production wells to the 500,000 gallon ground water storage tank and is located in the chlorine injection pit. The pit is equipped with a sump pump.

The three high service pumps are horizontal centrifugal pumps, size 8" x 4" driven by 40 HP, 1750 rpm, 3 ph., 230 V motors with a rated capacity of 600 gpm each at 150 feet TDH. The pumps are controlled by the elevated storage tank water level. The level controller at the elevated storage tank signals the pump controls

via telemetry. The two main pumps operate alternately and are set at a cut on level of 17.5 feet and cut off level at 19.5 feet. The third pump is set to cut on at 15.0 feet during periods of high demand.

There are three horizontal, split-case, centrifugal fire service pumps. The pumps are each 10" x 8" and rated at 2,500 gpm at 250 feet TDH. Each pump is connected to a standby diesel engine rated at 100 HP at 1,750 rpm. The discharge of each pump is connected to the distribution system and to a suppressor tank to reduce water surges. The suppressor tanks are 120 gallons each with vessels designed for 275 psi.

The Department of Environmental Quality has issued a Permit to Withdraw Ground Water (No. ES0038900) dated June 24, 1991 for this system at a rate of 8,153,000 gallons per month. NASA - Flight Center Main Base is entrusted with resource use responsibilities via that permit, and is advised to be aware of any compliance requirements of that permit.

EVALUATION OF SYSTEM

This system is evaluated on the basis of equivalent residential connections (ERCs). One ERC will utilize 400 gallons per day. This system's capacity is evaluated as follows:

I. Source Capacity

A. Source Yield

1. Number of Sources

- a. Required = 1 up to 49 ERCs, more than 1 for 50 or more ERCs
- b. Provided = 5 wells

2. Yield:	<u>Well Number</u>	<u>Well Yield (gpm)</u>	<u>Pump Yield (gpm)</u>
	1	225	171
	2	50	55
	3	250	214
	4	200	163
	5 (H-115)	<u>150</u>	<u>167</u>
		Total = 875 gpm	Total = 769 gpm

Taking the lesser of the values of well yield and pump yield for each well, the total source yield is $(171+50+214+163+150) = 748$ gpm.

B. Production Capacity: $\frac{748 \text{ gpm}}{0.5 \text{ gpm/ERC}} = 1496 \text{ ERCs}$

II. High Service Pump Capacity

A. Total Pumping Capacity = $600 + 600 + 600 = 1,800$ gpm

B. Capacity = $\frac{1,200 (1,440)}{400 \text{ gpd/ERC}} = 4,320 \text{ ERCs}$ (largest unit out of service)

III. Storage Capacity

A. Total Storage = 500,000 gal. + 100,000 gal. = 600,000 gallons

B. Storage Capacity = $\frac{600,000 \text{ gallons}}{200 \text{ gal./ERC}} = 3,000 \text{ ERCs}$

IV. Treatment Capacity

A. Maximum Chlorinator Capacity = 100 pounds/day (@ 2 mg/L dosage)

B. Total Capacity = $100 \frac{\text{lbs.}}{\text{day}} \times \frac{1}{2 \text{ mg}} \times \frac{1}{8.31} = 6.02 \text{ MGD}$ or $\frac{6.0 \times 10^6}{400} = 15,000 \text{ ERCs}$

V. Limiting Case

A. Production Capacity = 1,496 ERCs

B. Capacity Equivalent = 1,496 ERCs x 400 gpd/ERC = 598,400 gpd

Therefore, based on the critical values discussed above, this waterworks is issued an operation permit for a design capacity of 598,400 gpd.