



COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
Street address: 629 East Main Street, Richmond, Virginia 23219
Mailing address: P.O. Box 10009, Richmond, Virginia 23240
Fax (804) 698-4500 TDD (804) 698-4021
www.deq.virginia.gov

L. Preston Bryant, Jr.
Secretary of Natural Resources

David K. Paylor
Director

(804) 698-4000
1-800-592-5482

October 1, 2006

TO: The Honorable Timothy M. Kaine
Governor of Virginia

The Honorable Members of the General Assembly

FROM: David K. Paylor
Director, Virginia Department of Environmental Quality

SUBJECT: Annual Status of Virginia's Water Resources Report

A handwritten signature in black ink, appearing to read 'D. Paylor', is written over the 'FROM:' line of the memorandum.

In accordance with Chapter 3.2 of Title 62.1 of the *Code of Virginia*, the Department of Environmental Quality has completed its annual report on the status of the State's water resources, including ground water.

The Department of Environmental Quality is committed to ensuring that adequate and safe drinking water is available to all citizens of the Commonwealth and protecting the beneficial uses of our state waters. The primary objective of this report is to document the status of Commonwealth's waters and to document the Department's water supply and resource planning accomplishments.

This report is being made available at www.deq.virginia.gov/regulations/reports.html. If you need further information or would like a hard copy of this report, please contact Rick Linker at 804-698-4195.

**A REPORT TO
THE HONORABLE TIMOTHY M. KAINE, GOVERNOR,
AND
THE GENERAL ASSEMBLY OF VIRGINIA**



**STATUS OF VIRGINIA'S WATER RESOURCES
A Report on Virginia's Water Supply Planning Activities**

Department of Environmental Quality

COMMONWEALTH OF VIRGINIA

October 2006

(This Page Left Intentionally Blank)

TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
I. Introduction	1
II. Water Resources Data	1
III. Status of Hydrologic Data Gathering in 2005	1
A. Surface Water	2
B. Ground Water	2
IV. Status of Water Use In 2005	2
A. 2005 Water Use	2
B. Historic Trends in Virginia Water Use	4
1. Categories of Water Use	4
a. Agricultural Water Use	4
b. Commercial Water Use	4
c. Manufacturing Water Use	5
d. Mining Water Use	5
e. Public Water Supply Water Use	5
2. Power Generation Water Use	6
a. Fossil Power Generation	6
b. Nuclear Power Generation	6
c. Hydro Power Generation	6
3. Irrigation Water Use	6
4. Average Water Withdrawals	7
a. Average Surface Water Withdrawals	7
b. Average Ground Water Withdrawals	7
c. Average Surface & Ground Water Withdrawals	7
d. Power Generation Water Withdrawals	7
V. Climatological Conditions	8
A. 2001 – 2005 Conditions	8
B. Statewide Drought Conditions – 2005	8
VI. Water Supply Planning Program - Status	9
A. Water Supply Planning Regulation	9
B. Local and Regional Water Supply Planning Efforts	9
1. Water Supply Plan Submittal Dates	9
2. Water Supply Planning Grants	10
3. Water Supply Plan Status	10
4. Water Supply Planning Education Activities	10
C. State Water Resources Plan	11
D. Water Supply Permitting Efforts	12
VII. Conclusions and Recommendations	12
Appendix 1: Virginia’s Water Resources Data	13

TABLE OF TABLES

Table 1. Virginia’s Water Resources Data	3
Table 2. Virginia Water Use Summary (2001-2005)	4
Table 3. Plan Submittal Schedule	10
Table 4. FY 06 Grant Awards	10
Table 5. Top 50 Water Withdrawers During 2004	14

TABLE OF CHARTS

Chart 1. Water Use by Category for 2005	3
Chart 2. Water Use by Category for 2005 (excluding power)	3
Chart 3. Agricultural Water Use by Type (2001-2005)	4
Chart 4. Commercial Water Use by Type (2001-2005)	5
Chart 5. Manufacturing Water Use by Type (2001-2005)	5
Chart 6. Mining Water Use by Type (2001-2005)	5
Chart 7. Public Water Use by Type (2001-2005)	5
Chart 8. Fossil Power Surface Water Use (2001-2005)	6
Chart 9. Nuclear Power Surface Water Use (2001-2005)	6
Chart 10. Hydro Power Surface Water Use (2001-2005)	6
Chart 11. Irrigation Water Use by Type (2001-2005)	7
Chart 12. Average Surface Water Use by Category (2001-2005)	7
Chart 13. Average Ground Water Use by Category (2001-2005)	7
Chart 14. Average Combined Water Use by Category (2001-2005)	7
Chart 15. Average Water Use by Power Category (2001-2005)	8

FIGURES

Figure 1. Map of Virginia with River Basins	1
Figure 2. Drought Impacts 2001 – 2005	8
Figure 3. Drought Impacts 2005	9
Figure 4. Water Supply Plan Due Dates (If Not Regional)	10
Figure 5. Water Supply Plan Due Dates (Recognizing Regional Efforts)	10

**STATUS OF VIRGINIA’S WATER RESOURCES
A REPORT ON VIRGINIA’S WATER SUPPLY PLANNING ACTIVITIES – OCTOBER 2006**

EXECUTIVE SUMMARY

The ability to effectively manage Virginia's Water Resources requires an awareness of the current categories and volumes of water use as well as recognition of the historic trends in water use in the Commonwealth. This report describes the status of the Commonwealth's surface and ground water resources, provides an overview of climatological conditions and impacts on water supplies in the Commonwealth, and provides an update on the Commonwealth's Water Supply Planning & Management Program.

I. Introduction

Virginia's current and future economic growth depends on the availability of quality water resources. We need to assure that water is available in the future for these purposes. We are fortunate that we have historically had abundant water resources in Virginia.

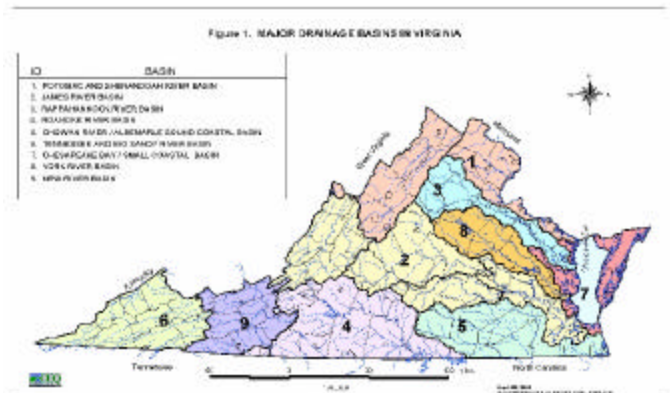
To assure that water resources are available for future generations, we must manage them wisely. With proper planning, our water resources are capable of serving multiple uses in a balanced manner. In the 21st century, sufficient water to meet our needs will not just happen, our resources must be continuously planned for so that they remain available to us and are protected from pollution and over use.

This report, submitted to the Governor and the Virginia General Assembly in accordance with Chapter 3.2 of Title 62.1 of the Code of Virginia, describes the status of the Commonwealth's water resources, both surface and ground water. The report also provides an overview of climatological conditions and impacts on water supplies in the Commonwealth. Section VII entitled "Water Supply Planning Program Status" summarizes the current comprehensive efforts to improve

the water supply planning and permitting process in Virginia.

II. Water Resources Data

Virginia has an estimated 50,537 miles of streams and rivers divided into nine major basins (**Figure 1**). Annual statewide rainfall averages almost 43 inches. The total combined flow of all freshwater streams in the state is estimated at about 25 billion gallons per day. Approximately 9,727 million gallons per day of freshwater flow from Virginia's rivers into the Chesapeake Bay. The 248 publicly owned lakes in the Commonwealth have a combined area of 162,230 acres. Additionally, many thousands of other small privately owned lakes and ponds are distributed throughout the state. Other significant water features of Virginia include approximately 236,900 acres of tidal and coastal wetlands, 808,000 acres of freshwater wetlands, 120 miles of Atlantic Ocean coastline, and more than 2,500 square miles of estuaries. A summary of Virginia's water resources is provided in **Appendix 1**.



III. Status of Hydrologic Data Gathering in 2005

The Department of Environmental Quality (DEQ) and the U.S. Geological Survey (USGS) are the primary agencies responsible for collecting hydrologic data in Virginia. The two

agencies have worked cooperatively since 1925, except for a period between 1957 and 1967 when they operated independently. Individually, the agencies carry out their own agendas in the collection of hydrologic data. Together, they provide a comprehensive picture of hydrologic affairs in the Commonwealth.

III.A. Surface Water

To collect systematic hydrologic data on surface water levels, flow volumes, and other streamflow data, the DEQ operates 72 continuous-record stream gaging stations all of which are real time recording of flows using satellite technology and more than 100 other miscellaneous measurement sites. The continuous-record gages are located primarily on larger, free-flowing streams whereas the DEQ miscellaneous measurement sites are largely in support of the TMDL program. The USGS operates 94 continuous-record gages and more than 100 miscellaneous measurement sites in Virginia. The USGS collects water quality data at 11 continuous-record gaging stations. The USGS also operates 13 gages that provide stage (surface level height) data for lakes and reservoirs. The flow, lake level, water quality, and miscellaneous measurement data are published in *Water Resources Data, Virginia, Volume 1: Surface water and surface-water-quality records*, an annual report cooperatively prepared by the DEQ and the USGS. The gages farthest downstream in each major river basin are used to summarize or index the hydrologic condition of the Commonwealth for any given water year. Water years run from October 1 through September 30.

III.B. Ground Water

The DEQ collects data on ground water levels at 185 wells. 25 of these wells have been converted to real time monitoring with measurements captured once every 15 minutes and uploaded using satellite technology. The USGS collects ground water levels data at 161 wells, with water quality data being collected at 29 of those wells. These

data are published in *Water Resources Data, Virginia, Volume 2: Ground water and ground-water-quality records*, which is cooperatively prepared annually by the DEQ and the USGS. The ground water levels data collected by the DEQ contributes to a long-term Coastal Plain ground water modeling project with the USGS. DEQ continues to cooperate with the USGS on a multi-year effort to update and revise this ground water flow model (expected to be completed in late 2006) to better manage the ground water resources of the Virginia Coastal Plain.

IV. Status of Water Use in 2005

The most recent water use report by the USGS, titled *Estimated Use of Water in the United States in 2000* estimated that 75 percent of Virginia's population is served by public water supply systems and 25 percent is supplied through private wells. Surface water sources supply 88 percent of the public water, and ground water sources supply the remaining 12 percent. The 2000 publication is the latest in print. The publication is updated and re-compiled every five years and new data will be published later this year.

The Virginia Water Withdrawal Reporting Regulation (9 VAC 25-200-10 et seq.) requires that individuals or facilities that withdraw water at volumes greater than 10,000 gallons per day (one million gallons per month for crop irrigators) must measure and report annually to DEQ the monthly volume of water withdrawn. The Virginia Water Use Data System (VWUDS) database contains withdrawal data collected since 1982 under this regulation. The information presented below represents reported water withdrawals by category covered by the water withdrawal reporting regulation. Withdrawals of less than 10,000 gallons per day (gpd) are exempt from the reporting requirements and are not included in this report.

IV.A. 2005 Water Use

Table 1 lists the top 20 individual non-power generating water users, ranked by the amount

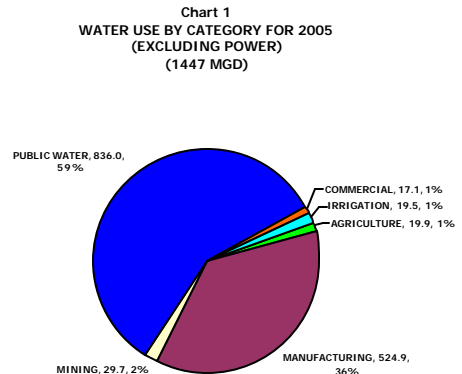
of their 2005 reported withdrawals. Excluding electric power facilities, public water supply systems were the largest consumers of water in the Commonwealth, accounting for 59 percent of the remaining withdrawals. The second largest consumer of water in Virginia is manufacturing, which accounted for 36 percent of withdrawals. **Appendix 2: Table 5** includes a list of the top 50 water users including use by power generating facilities in 2005.

**Table 1
Top 20 Water Users in 2005 (Non-Power)**

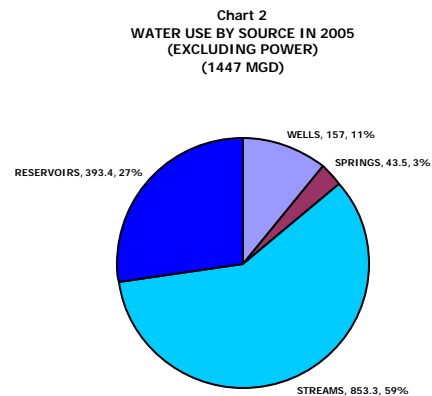
OWNER NAME	SYSTEM	TOTAL (MGD)	CATEGORY
HONEYWELL INTERNATIONAL INC	HOPEWELL PLANT	127.62	MAN
FAIRFAX COUNTY WATER	POTOMAC RIVER	95.11	PWS
RICHMOND, CITY OF	RICHMOND, CITY	74.67	PWS
CINERGY SOLUTIONS OF NARROWS	CELCO PLANT	60.21	MAN
GIANT YORKTOWN, INC.	YORKTOWN REFINERY	59.08	MAN
NORFOLK, CITY OF	NORFOLK	57.01	PWS
FAIRFAX COUNTY WATER	OCCOQUAN	56.23	PWS
MEADWESTVACO CORPORATION	COVINGTON PLANT	41.03	MAN
INTERNATIONAL PAPER CORP	FRANKLIN PLANT	36.07	MAN
APPOMATTOX RIVER WATER AUTHORITY	LAKE CHESDIN	30.88	PWS
NEWPORT NEWS, CITY OF	NEWPORT NEWS	28.75	PWS
DUPONT E I DE NEMOURS & CO	SPRUANCE PLANT	28.01	MAN
UNITED STATES GOVERNMENT	RADFORD AMMUNITIONS PLANT	26.09	MAN
NEWPORT NEWS, CITY OF	NEWPORT NEWS	25.91	PWS
VIRGINIA BEACH, CITY OF	VIRGINIA BEACH	23.94	PWS
HENRICO COUNTY	HENRICO COUNTY WTP	22.74	PWS
HONEYWELL NYLON LLC	CHESTERFIELD PLANT	21.28	MAN
VIRGINIA AMERICAN WATER CO.	HOPEWELL DISTRICT	21.10	PWS
ST LAURENT PAPER PRODUCTS CORP	WEST POINT PLANT	18.48	MAN
PORTSMOUTH, CITY OF	PORTSMOUTH	18.00	PWS
TOTAL		872.21	

Abbreviations Legend: MAN= MANUFACTURING, PWS= PUBLIC WATER SUPPLY

Excluding power, reported 2005 water use increased by nearly 100 million gallons per day (mgd) over that reported in 2004. **Chart 1** on the following page shows the water usage in 2005 for categories excluding power generation. It shows that in 2005, public water supplies accounted for the greatest percentage (59%) of the total ground water and surface water use in Virginia. Manufacturing use in 2005 remained significant as well with 36% of the total ground water and surface water use.



The relative contribution of surface and ground water sources to 2005 non-power generation withdrawals is illustrated in **Chart 2**. The chart shows that large water demands are primarily met by surface water sources. Users of ground water sources outnumber surface water users; however, the amount of ground water withdrawn from aquifers is less than is withdrawn from streams and reservoirs.



IV.B. Historic Trends in Virginia Water Use

A summary of the non-power generation water withdrawal data from the Virginia Water Use Data System (VWUDS) for the years 2001 through 2005 is presented in **Table 2**. The data are aggregated by category of use and by source water type. This time period is used to illustrate the changes in reported water use of both ground water and surface water resources during significant dry and wet rainfall years. Virginia experienced record drought in 2001-2002 and record rainfall in 2003-2004. The chart illustrates that reported ground water use by commercial, public water supplies, and irrigation peaked during the 2002 drought. Ground water use by manufacturing reached its lowest point during the period during 2002 and its highest point during 2005. The use of surface water by public water supplies reached its lowest point in 2003 and peaked in 2005. Surface water withdrawals by power generating facilities are not included in this table as approximately 90-95% of their withdrawal is returned to the source. Newer power plants, however, usually use cooling towers that consume more water than the older plants. Ground water is not a significant source for power generation.

Table 2
Virginia Water Use Summary (2001-2005)
(in Million Gallons per Day – MGD)

	Category	2001	2002	2003	2004	2005
Ground Water	AGR	13.1	13.2	16.2	15.0	14.2
	COM	8.5	9.7	6.2	7.6	6.7
	MAN	95.2	93.1	99.9	97.4	100.3
	MIN	6.1	1.4	2.3	1.1	2.5
	PWS	68.4	76.1	68.4	73.3	72.2
	IRR	10.8	18.5	10.5	3.5	4.7
	TOTAL (GW)	202.0	211.9	203.5	196.9	200.5
Surface Water	AGR	4.5	4.6	5.2	3.9	5.7
	COM	10.8	10.4	5.1	8.1	10.4
	MAN	390.63	436.7	398.8	407.6	424.6
	MIN	32.2	31.2	29.0	38.0	27.3
	PWS	737.6	756.3	662.9	687.2	763.8
	IRR	10.5	9.6	5.4	6.5	14.9
	TOTAL (SW)	1186.3	1248.8	1106.5	1151.2	1246.7

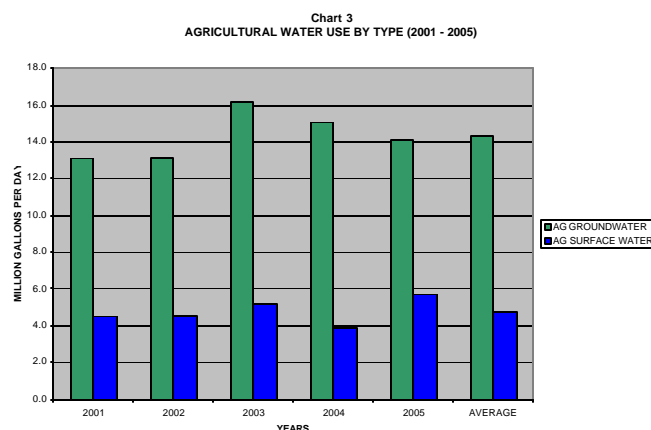
Abbreviations Legend: AGR= AGRICULTURE, COM= COMMERCIAL, MAN= MANUFACTURING, MIN= MINING, PWS= PUBLIC WATER SUPPLY, IRR= IRRIGATION

IV.B.1 Categories of Water Use

The next series of bar and pie charts have been included to illustrate the water use for individual categories over the last 5 years (2001 – 2005).

IV.B.1.a Agricultural Water Use

Agricultural (**Chart 3**) withdrawals include operations such as commodity farms, fish farms and hatcheries. Ground water withdrawals accounted for the majority of agricultural water use over the period of 2001 through 2005. Ground water use averaged approximately 14 mgd while surface water use for agriculture averaged approximately 5 mgd. For 2005 agricultural use of ground water averaged approximately 14 mgd, while use of surface water averaged approximately 6 mgd.

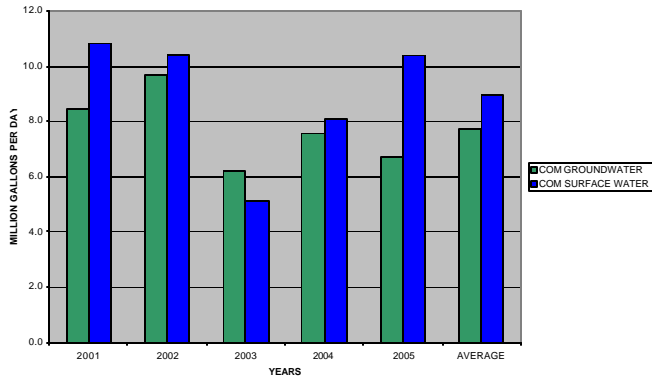


IV.B.1.b Commercial Water Use

Commercial (**Chart 4**) withdrawals include operations such as golf courses, local and federal installations, hotels and laundromats. Commercial use of surface water exceeded the commercial use of ground water for the majority of the period of 2001 through 2005 with the exception of 2003 when ground water accounted for a majority of the use. For this period of use (2001 – 2005) commercial use of groundwater has fluctuated from a low of approximately 6.0 mgd in 2003 to a high of approximately 10.0 mgd in 2002. Commercial use of surface water for this same period also hit its lowest use in 2003 (approximately 5.0 mgd) with its highest use coming in 2001.

Data for 2005 indicates commercial use of ground water at a rate of approximately 7.0 mgd and a rate of surface water use of over 10.0 mgd. Average use for the period was approximately 8.0 mgd for groundwater and approximately 9.0 for surface water.

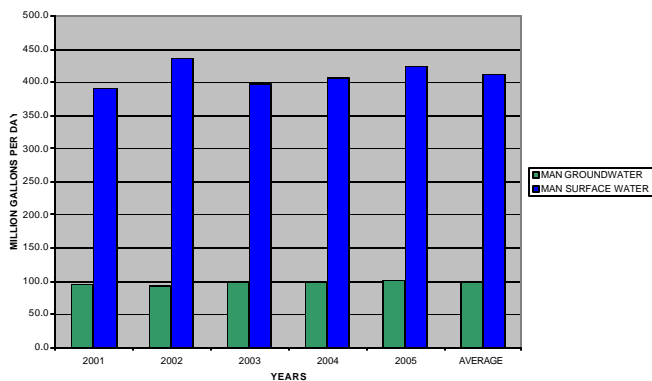
Chart 4
COMMERCIAL WATER USE BY TYPE (2001 - 2005)



IV.B.1.c Manufacturing Water Use

Manufacturing (Chart 5) withdrawals include operations such as paper mills, food processors, drug companies, furniture, and concrete companies. The major source of water for manufacturing has consistently been surface water. Ground water use for the period of 2001 - 2005 averaged slightly less than 100 mgd, while surface water use averaged just over 400 mgd.

Chart 5
MANUFACTURING WATER USE BY TYPE (2001 - 2005)

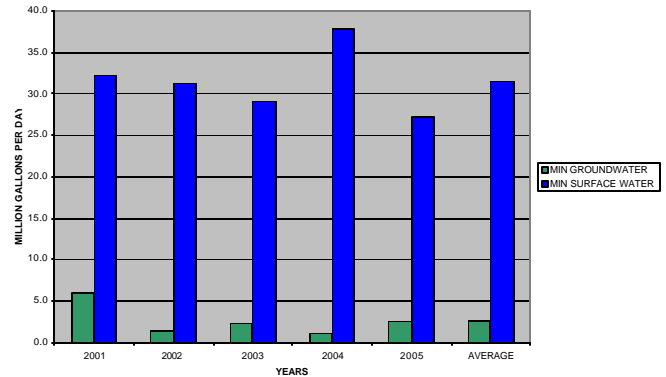


IV.B.1.d Mining Water Use

Mining (Chart 6) withdrawals include operations such as sand, rock and coal companies. Mining withdrawals of ground water normally fall below 5 mgd, except for a

high of approximately 6.0 mgd in 2001, while withdrawals of surface water have ranged well above 25 mgd for the period of 2001 through 2005. Data for 2004 indicates that mining operations accounted for approximately 1 mgd of ground water and a high for the period of in excess of 35 mgd for surface water use. Data for 2005 indicates mining operations withdrew approximately 2.5 mgd of ground water and approximately 27 mgd of surface water.

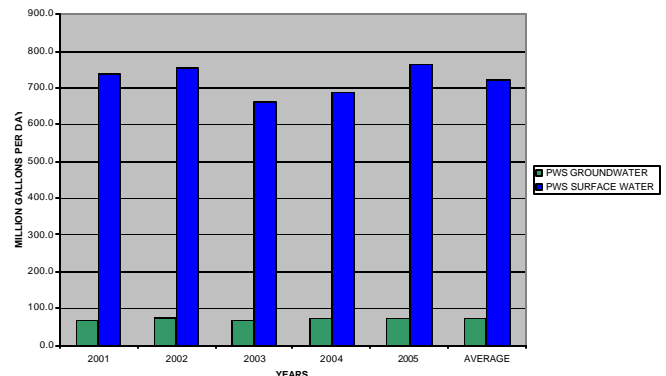
Chart 6
MINING WATER USE BY TYPE (2001 - 2005)



IV.B.1.e Public Water Supply Water Use

Public water supply (Chart 7) includes municipal and private water purveyors. Use of ground water sources for public water supply averaged less than 100 mgd for the period of 2001 through 2005. Use of surface water sources for public water supply in this 5 year period has averaged over 700 mgd, with highs in excess of 700 mgd being reported for every year except for 2003 and 2004. Data for 2005 indicates that ground water use averaged less than 100 mgd, while surface water use was approached 765 mgd.

Chart 7
PUBLIC WATER SUPPLY WATER USE BY TYPE (2001 - 2005)

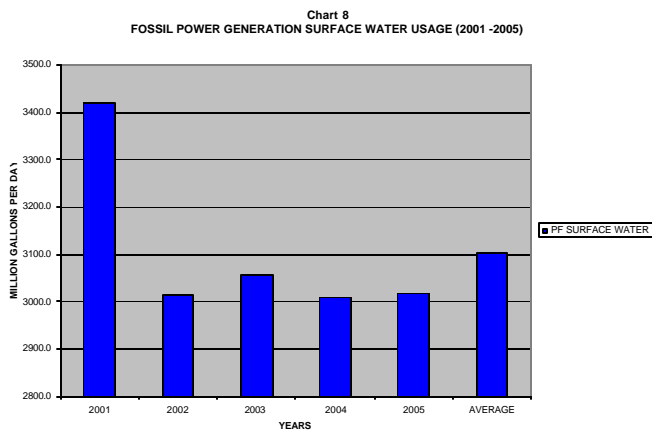


IV.B.2 Power Generation Water Use

Power generators (**Charts 8-10**) use surface water sources to cool the generators or pass through the turbines to produce the electric power.

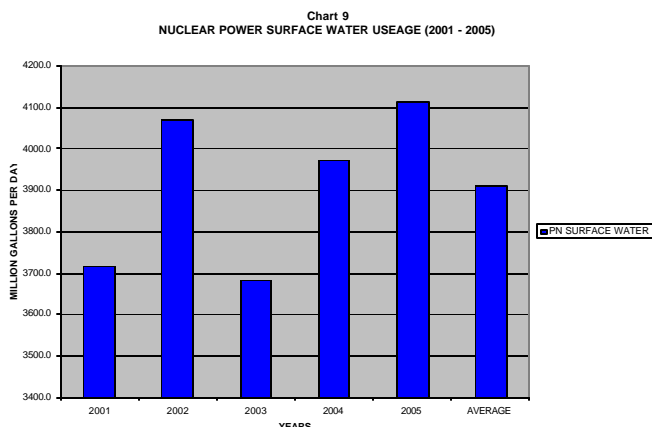
IV.B.2.a Fossil Power Generation

Chart 8 provides information on the use of surface water for fossil power generation. During this period (2001 – 2005) use of surface water for fossil power generation has averaged at or in excess of 3,100 mgd. Data for 2005 indicates a use of just over 3,000 mgd of surface water for fossil power generation.



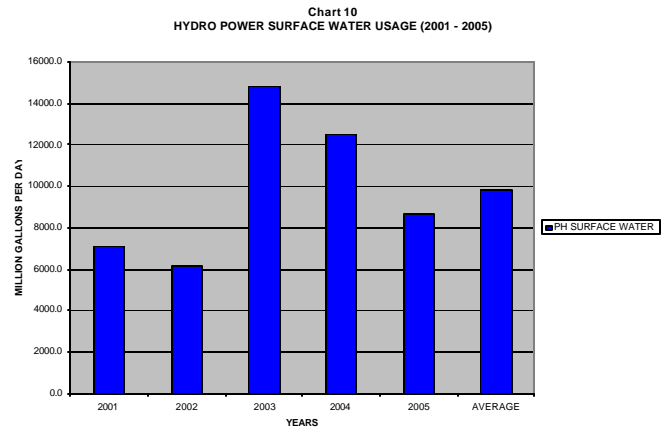
IV.B.2.b Nuclear Power Generation

Chart 9 illustrates the extent of use of surface water for the generation of nuclear power. Use of surface water in this category for the period of 2001 through 2005 has gone from a low of just over 3,650 mgd in 2003 to a high in excess of 4,100 mgd in 2005 of surface water for the generation of nuclear power.



IV.B.2.c Hydro Power Generation

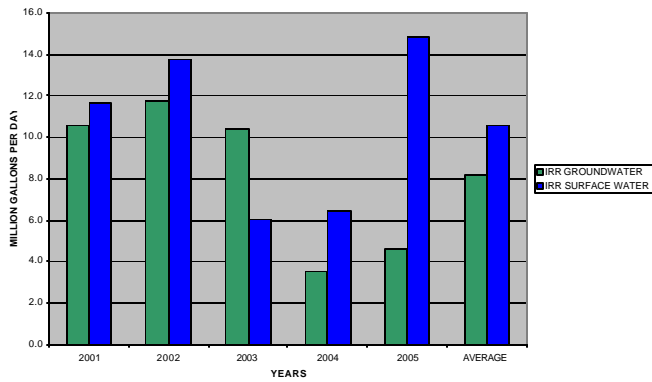
Chart 10 provides an illustration of the variations in use of surface water for the generation of hydro power over the period of record. Use of surface water in this category has fluctuated greatly over the period with a high of approximately 15,000 mgd in 2003 to a low of just over 6,000 mgd in 2002. Use in 2005 was approximately 8,700 mgd.



IV.B.3 Irrigation Water Use

Irrigation (**Chart 11**) withdrawals are used to promote growth in such crops as tobacco, corn and soybeans for example. Over the reporting period the use of surface water for irrigation normally exceeded the use of ground water. However, the records show that in 2003 the use of ground water exceeded that of surface water by just over 4 mgd. Ground water use in this category has gone from a low of approximately 3 mgd in 2004 to a high approaching 12 mgd in 2002. Surface water use in this category has gone from a high in excess of 14 mgd in 2005 to a low of approximately 6 mgd in 2003. Irrigation withdrawals for 2005 included approximately 5 mgd of ground water and approximately 15 mgd of surface water.

Chart 11
IRRIGATION WATER USE BY TYPE (2001 - 2005)



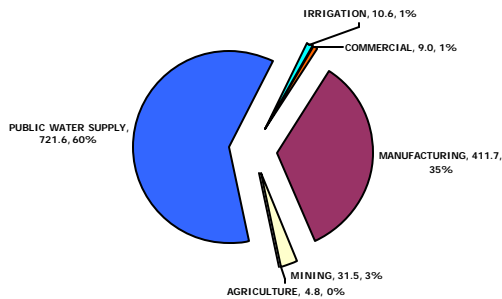
IV.B.4 Average Water Withdrawals

The following charts provide information on the average surface water withdrawals and ground water withdrawals by category in mgd for the reporting period of 2001 through 2005.

IV.B.4.a Average Surface Water Withdrawals

Chart 12 shows the average surface water withdrawals by category in mgd for 2001-2005. Use categories included public water supply (721.6 mgd); manufacturing (411.7 mgd); mining (31.5 mgd); irrigation (10.6 mgd); commercial (9.0 mgd); and agriculture (4.8 mgd) for a total usage of surface water of 1,189 mgd for the period.

Chart 12
AVERAGE SURFACE WATER USE FOR 2001-2005 BY CATEGORY
IN MILLION GALLONS PER DAY (1189 MGD)

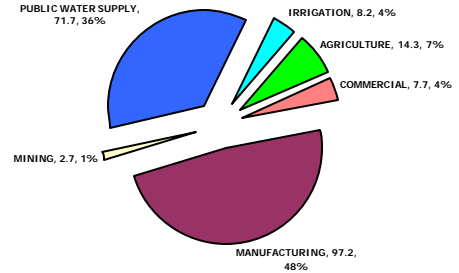


IV.B.4.b Average Ground Water Withdrawals

Chart 13 shows the average ground water withdrawals by category in mgd for the reporting period. Use categories, ranked by use, included: manufacturing (97.2 mgd);

public water supply (71.7 mgd); agricultural (14.3 mgd); irrigation (8.2 mgd); commercial (7.7 mgd); and mining (2.7 mgd).

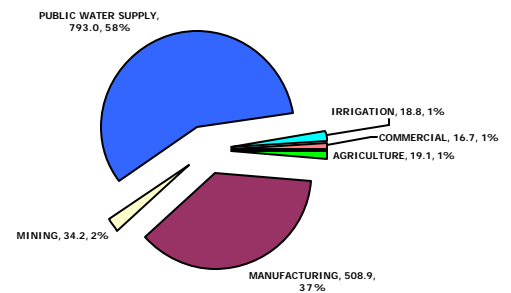
Chart 13
AVERAGE GROUND WATER USE FOR 2001-2005 BY CATEGORY
IN MILLION GALLONS PER DAY (202 MGD)



IV.B.4.c Average Surface & Ground Water Withdrawals – Excluding Power Generation

Chart 14 serves to illustrate the average water use by category to include both ground water and surface water withdrawals in mgd, excluding power generation. For the period of 2001 through 2005, the average combined ground water and surface water use included the following categories: public water supply (793.0 mgd); manufacturing (508.9 mgd); mining (34.2 mgd); irrigation (18.8 mgd); agriculture (19.1 mgd); and commercial (16.7 mgd).

Chart 14
AVERAGE COMBINED (GW&SW) FOR 2001-2005 WATER USE BY CATEGORY
IN MILLION GALLONS PER DAY EXCLUDING POWER USAGE (1391 MGD)

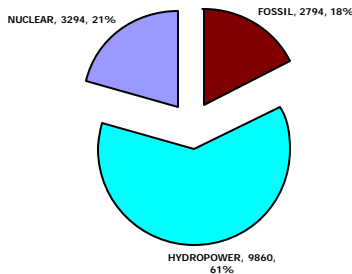


IV.B.4.d Power Generation Water Withdrawals

In addition to the use categories illustrated above, power generation accounted for an additional average use of 15,948 mgd from 2001 through 2005. **Chart 15** shows the

average nuclear and fossil power usage compared to hydroelectrical usage. For the reporting period, hydropower represented 61% of the average water use by power generators, with nuclear power generation accounting for 21% and fossil power generation 18%.

Chart 15
AVERAGE WATER USE BY POWER GENERATORS IN
MILLION GALLONS PER DAY (2001 - 2005)

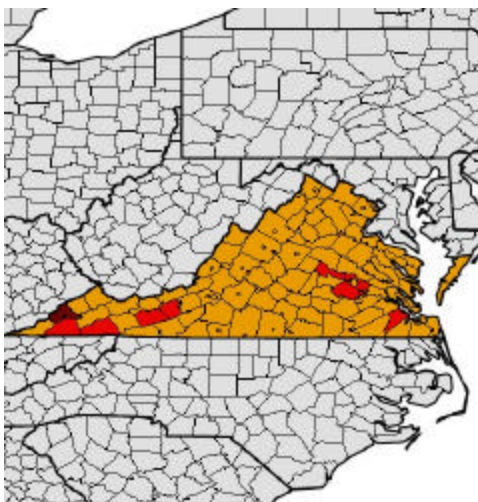


V. Climatological Conditions

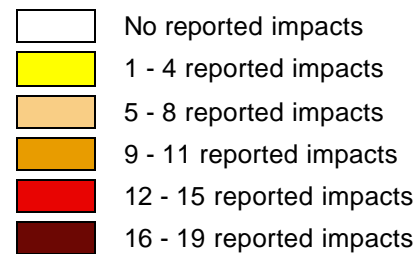
V.A 2001 - 2005 Conditions

The US Drought Monitor indicated that Virginia experienced 41 reported drought impacts in the period of 2001 through 2005. Figure 2 shows the number and distribution of drought impacts that occurred in the Commonwealth during the reporting period.

Figure 2. Drought Impacts 2001 -2005



Legend

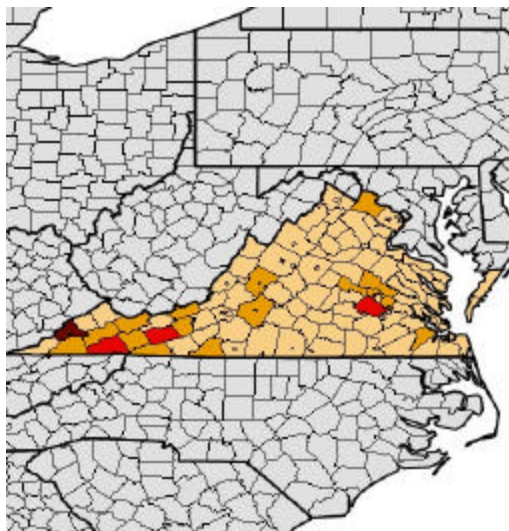


Drought impacts in Virginia over the past 5 years have occurred in the following impact categories: Agriculture (e.g., damage to crop quality, reduced productivity of cropland); Fire (e.g., increase in risk of fire); Water/Energy (e.g., lower water levels in reservoirs, lakes and ponds, reduced streamflow); Environment (e.g., loss of biodiversity of plants and wildlife, lack of feed and drinking water); and, Other (e.g., impacts that don't fit into any of the other categories).

V.B Statewide Drought Conditions - 2005

Significant precipitation deficits were experienced across the Commonwealth from mid-August through the first week of October 2005. This relatively short period of significant precipitation deficit resulted in noteworthy short-term drought impacts in many areas of the State. Figure 3 illustrates the number and distribution of short-term drought impacts experienced throughout the Commonwealth in 2005. Drought impacts in 2005 occurred primarily in the categories of agriculture (e.g., damage to crop quality, reduced crop yields) and water/energy (e.g., lower water levels in reservoirs, lakes and ponds, reduced streamflow).

Figure 3. Drought Impacts - 2005



Legend

	No reported impacts
	1 - 4 reported impacts
	5 - 8 reported impacts
	9 - 11 reported impacts
	12 - 15 reported impacts
	16 - 19 reported impacts

During 2005, approximately forty Virginia localities requested agricultural drought disaster designations due to losses in major commodities. Water supplies across the Commonwealth were relatively unaffected by the precipitation deficits.

The Drought Monitoring Task Force continues to monitor precipitation deficits, stream flows, ground water levels, and reservoir levels across the Commonwealth in order to identify any significant hydrologic drought impacts.

VI. Water Supply Planning Program - Status

VI.A Water Supply Planning Regulations

Informed management of Virginia’s water resources is crucial to the health and welfare of Virginia’s citizens and environment and continued economic prosperity.

The Local and Regional Water Supply Planning regulation details information to be

reported in a locality’s water supply plan regarding existing water sources, existing water uses, and existing resource information. The regulation requires water supply plans to address conservation and drought response as part of the plan’s water management actions. Contingency plans are required to be developed in accordance with the proposed regulation. Finally, all local and regional water supply plans are required to include a statement of need based on the adequacy of existing water sources to meet current and projected water demand over the planning horizon. In the event that existing sources are determined to be inadequate to meet demand over the planning period, water supply plans are required to include an analysis conducted in accordance with the requirements of this regulation that identifies alternative ways of meeting the shortfall in water supply.

The program is envisioned as a state and local partnership with the localities having the lead role in identifying their future demands and the state providing technical support and oversight.

Implementation of this program will result in a statewide understanding of local water needs and potential alternatives for at least 30 years into the future. It will also allow for improved preparation for future drought, earlier identification of resource and inter-jurisdictional conflicts, increased opportunities for public input and the potential to reduce conflicts in future permit processes.

VI.B Local and Regional Water Supply Planning Efforts

As a result of Title 9 VAC 25-780, all counties, cities and towns in the Commonwealth must develop local or regional water supply plans.

VI.B.1 Water Supply Plan Submittal Dates

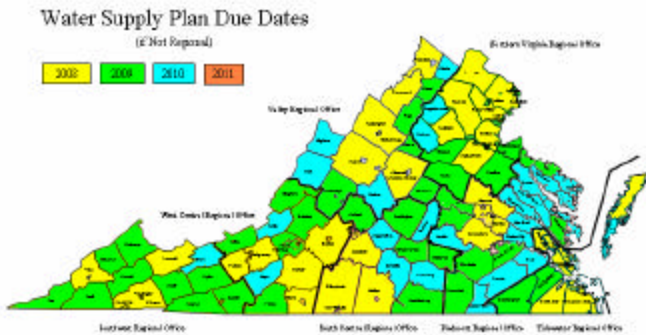
The regulation establishes a schedule for submittal of these water supply plans based on the latest U.S. Census data as indicated in Table 3.

Table 3. Plan Submittal Schedule

Category	Plan Due Date
Population In Excess of 35,000	November 2, 2008
Population In Excess of 15,000 But No More Than 35,000	November 2, 2009
Population Less Than or Equal to 15,000	November 2, 2010
Election to Participate in a Regional WS Plan	November 2, 2008
Regional WS Plan	November 2, 2011

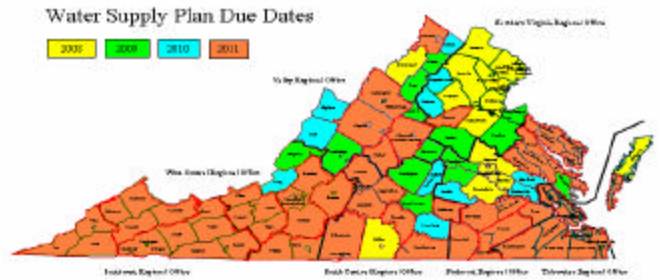
Figure 4 illustrates the distribution of these due dates across the localities in Virginia if no regional designations are made.

Figure 4. Water Supply Plan Due Dates (If Not Regional)



Based on the current local activities related to the development of the required water supply plans it appears that a large majority of Virginia's local governments will be pursuing a regional approach to their water supply planning efforts. Figure 5 illustrates the current extent of the interest in participating in regional water supply planning efforts.

Figure 5. Water Supply Plan Due Dates (Recognizing Regional Efforts)



VI.B.2 Water Supply Planning Grants

In order to assist with the cost of implementation of these regulations, the DEQ has established a competitive grant process for proposals from local governments for development of their local or regional plans. These grant funds were supplemented by local funds to address the regulation requirements.

For Fiscal Year 2006, a total of \$300,000 was available for this program. DEQ awarded these funds to 10 local governing entities (see Table 4: FY 06 Grant Awards) to develop local and regional water supply plans.

Table 4. FY 06 Grant Awards

Local Government	Grant Amount
City of Bristol – Bristol Virginia Utilities	\$10,000
Central Shenandoah Planning District Commission	\$9,000
Charlotte County	\$50,000
Hampton Roads Planning District Commission	\$25,000
New River Valley Planning District Commission	\$50,000
Northern Shenandoah Planning District Commission	\$9,000
Orange County	\$50,000
Region 2000 Local Government Council	\$42,500
Southside Planning District Commission	\$37,918
Stafford County	\$15,000

VI.B.3 Water Supply Plan Status

Next year's report will provide a status of the development of the local or regional water supply plans for these localities as well as provide a summary of the FY 2007 grant cycle where a total of \$500,000 was distributed to 14 local government entities through a competitive grant process.

VI.B.4 Water Supply Planning Education Activities

In addition to monetary assistance, DEQ has provided water supply planning program education sessions to local government officials, state agency personnel, and trade/professional organization members through informational meetings, PowerPoint presentations, and workshops. The purpose of these educational activities is to describe the water supply planning process and criteria outlined in the regulation, the benefits of proactive, comprehensive planning, and answer any questions regarding the new program.

DEQ also maintains a water supply planning program webpage that is regularly updated to keep localities and stakeholders informed of program news, fact sheets, tools, and information resources to assist with the development of local and regional water supply plans. The website also includes a contact form for submission of questions/comments to program staff.

Since the initiation of the water supply planning efforts, the WSP Staff has participated in both formal presentations and informal informational sessions to approximately 50 different audiences, ranging from local government representatives, boards of supervisors, planning district commissions, utility directors, conference attendees and interested citizens in support of the Water Supply Planning Program. Through these educational activities, DEQ is building partnerships and incorporating stakeholders early and continuously in Virginia's water supply planning process. This effort is necessary for tangible results, public

support and program success. DEQ will continue to partner with local governments and other interested parties to assist local and regional water supply plan development.

VI.C State Water Resources Plan

Efforts are also underway to develop a State Water Resources Plan. DEQ's concept for the State Plan is to put local and regional water supply plans together with relevant state water resource information in one place. This State Plan should provide a qualitative and quantitative description of water resources in Virginia based upon readily accessible data and guidance on the use of that information in the decisions that face the State Plan's users.

By doing this, at any point in the future someone can get a statewide snapshot of what the water supply needs are, where they are met, and our best estimate of the resource's ability to meet additional needs. The State Plan will be used as a tool to manage water resources to ensure their continued availability, while also maximizing environmental and economic benefits. An important result of this planning is that DEQ will be able to identify areas of the state where multiple users want the same source for their water needs. The State Plan will also allow DEQ to identify existing areas of the state where water availability may be insufficient now or in the future based on these needs. By knowing these conflicts in advance, users and DEQ can have the opportunity to try and find resolutions to these conflicts through regional solutions, alternative sources, or some other option.

As of this reporting period, two Virginia localities have submitted draft water supply plans for review. DEQ is currently reviewing these submittals to determine compliance with the regulation requirements. DEQ is currently working on guidance for implementation and compliance with the regulation and on how information from the local and regional plans will be incorporated into the State Plan. DEQ expects to have the first complete State Plan in 2011.

The State Plan will be the embodiment of a continuous and repetitive planning process that evolves in response to changing conditions over time. Beginning with next year's report, the primary focus of this annual status report will be to reflect on the progress of the development of the local and regional plans and the progress on incorporating that material into the State Plan.

VI.D Water Supply Permitting Efforts

Improvements continue to be made in the area of water supply permitting. A 2005 technical advisory committee reached consensus on a series of amendments to the Virginia Water Protection Program (VWPP). Substantive changes to the VWPP regulation contained in these amendments include 1) clarification of which water withdrawals are excluded from the permit requirement and under what conditions; 2) the institution of a new pre-application panel and public information meeting process for surface water projects; 3) the creation of an Emergency Virginia Water Protection Permit for public water supplies during drought; 4) the inclusion of new language regarding permit conditions for withdrawals in the Potomac River consistent with the Potomac Low Flow Allocation Agreement; 5) new language defining what information will be considered in the evaluation of cumulative impacts to instream flow; 6) clarification of what information is submitted by the applicant to demonstrate that an alternatives analysis has been conducted; 7) the creation of a new variance provision to address permit conditions during drought; and 8) establishment of a new joint public notice process for surface water projects requiring both a VWPP permit and a Virginia Marine Resources permit. There are also a number of administrative amendments that will allow for a more efficient and understandable application, review and issuance process. In addition, staff is developing a streamlined application and issuance process for small withdrawals which will significantly reduce the cost and administrative burden of obtaining permits for minor water users. These amendments went

through the public comment period and the plan is to submit them for final approval to the SWCB in 2006.

VII. Conclusions and Recommendations

The Virginia Water Supply Program established new priorities for water supply managers. By encouraging regional water supply planning efforts and recognizing the role of local governments in meeting local water supply needs and the DEQ's responsibility to protect and manage water supplies for human and environmental needs, the Program lays the groundwork for managing Virginia's water resources for decades to come.

**Appendix 1:
Virginia's Water Resources Data**

State Population (2005 Estimate) - 7,567,465

State Surface Area – 42,769 square miles

Major River Basins (with Current Estimates of Flow):

Potomac/Shenandoah (5,808 square miles) – 1,842 MGD
Rappahannock (2,891 square miles) – 1,131 MGD
York (2,701 square miles) – 1,099 MGD
James (10,253 square miles) – 5,558 MGD
Chesapeake Bay/Small Coastal (1,712 square miles) – 97 MGD
Chowan River/Albemarle Sound (4,122 square miles) – 1,777 MGD
Roanoke (6,378 square miles) – 2,277 MGD
New (4,703 square miles) - 3,296 MGD
Tennessee/Big Sandy (4,202 square miles) – 2,618 MGD

Perennial River Miles (freshwater) - 50,537 miles

Publicly Owned Lakes and Reservoirs

Larger than 5,000 acres	5	109,838 acres
Smaller than 5,000 acres	<u>243</u>	<u>52,392 acres</u>
Total	248	162,230 acres

Freshwater Wetlands - 808,000 acres

Tidal and Coastal Wetlands - 236,900 acres

Estuary - 2,557 Square Miles

Atlantic Ocean Coastline - 120 Miles

Statewide Average Annual Rainfall - 42.8 inches

Average Freshwater Discharge of All Rivers - Approximately 25 billion gallons per day

Average Freshwater Discharge into the Chesapeake Bay – Approximately 9,727 million gallons per day

Appendix 2: Table 5

TOP 50 WATER WITHDRAWERS DURING 2005

OWNER NAME	SYSTEM	TOTAL (MGD)	CATEGORY*
DOMINION GENERATION	NORTH ANNA NUCLEAR POWER	2226.73	PN
DOMINION GENERATION	SURRY NUCLEAR POWER PLANT	2051.74	PN
DOMINION GENERATION	YORKTOWN FOSSIL POWER PLANT	921.65	PF
DOMINION GENERATION	CHESTERFIELD POWER STATION	917.03	PF
DOMINION GENERATION	CHESAPEAKE ENERGY CENTER	534.45	PF
AMERICAN ELECTRIC POWER CO	GLEN LYN POWER PLANT	247.54	PF
MIRANT POTOMAC RIVER LLC	POTOMAC RIVER GENERATION	235.09	PF
DOMINION GENERATION	BREMO BLUFF POWER PLANT	130.51	PF
HONEYWELL INTERNATIONAL INC	HOPEWELL PLANT	127.62	MAN
FAIRFAX COUNTY WATER	POTOMAC RIVER	95.11	PWS
RICHMOND, CITY OF	RICHMOND, CITY	74.67	PWS
CINERGY SOLUTIONS OF NARROWS	CELCO PLANT	60.21	MAN
GIANT YORKTOWN INC	YORKTOWN REFINERY	59.08	MAN
NORFOLK, CITY OF	NORFOLK	56.23	PWS
FAIRFAX COUNTY WATER	OCCOQUAN	56.23	PWS
MEADWESTVACO CORPORATION	COVINGTON PLANT	41.03	MAN
INTERNATIONAL PAPER CORP	FRANKLIN PLANT	36.07	MAN
APPOMATTOX RIVER WATER AUTH.	LAKE CHESDIN	30.88	PWS
BROADWAY, TOWN OF	BROADWAY	30.34	PWS
DUPONT E I DE NEMOURS & CO	SPRUANCE PLANT	28.01	MAN
UNITED STATES GOVERNMENT	RADFORD AMMUNITIONS PLANT	26.09	MAN
NEWPORT NEWS, CITY OF	NEWPORT NEWS	25.91	PWS
VIRGINIA BEACH, CITY OF	VIRGINIA BEACH	23.94	PWS
HENRICO COUNTY	HENRICO COUNTY WTP	22.74	PWS
HONEYWELL NYLON LLC	CHESTERFIELD PLANT	21.28	MAN
VIRGINIA AMERICAN WATER	HOPEWELL DISTRICT	21.10	PWS
ST LAURENT PAPER PRODUCTS	WEST POINT PLANT	18.48	MAN
PORTSMOUTH, CITY OF	PORTSMOUTH	18.00	PWS
WESTERN VA WATER AUTHORITY	ROANOKE, CITY OF	16.20	PWS
AMERICAN ELECTRIC POWER CO	CLINCH RIVER POWER PLANT	15.16	PF
CHESAPEAKE, CITY OF	CHESAPEAKE	12.86	PWS
SMURFIT-STONE CONTAINER	HOPEWELL PLANT	12.43	MAN
MANASSAS, CITY OF	MANASSAS	11.43	PWS
DOMINION/OLD DOMINION ELECTRIC	CLOVER POWER STATION	10.63	PF
LYNCHBURG, CITY OF	LYNCHBURG	9.86	PWS
VIRGINIA, COMMONWEALTH OF	COURSEY SPRING FISH STATION	9.78	AGR
WESTERN VA WATER AUTHORITY	SPRING HOLLOW RESERVOIR	9.47	PWS
GEORGIA-PACIFIC	BIG ISLAND PLANT	9.31	MAN
CHESTERFIELD COUNTY	CHESTERFIELD COUNTY	9.11	PWS
NEWPORT NEWS SHIPBUILDING	NEWPORT NEWS SHIPBUILDING	8.52	MAN
MERCK & CO	ELKTON PLANT	8.37	MAN
WINCHESTER, CITY OF	WINCHESTER	7.19	PWS
RIVANNA WATER & SEWER AUTH	ALCSA & CHARLOTTESVILLE	7.15	PWS
CHEMICAL LIME COM OF VIRGINIA	KIMBALLTON PLANT 1	6.95	MAN
BLACKSBURG-C'BURG-VPI WTR	BLACKSBURG-CHRISTIANSBURG-VPI	6.91	PWS
SPOTSYLVANIA COUNTY	MOTTS RUN WTP	6.78	PWS
DANVILLE, CITY OF	DANVILLE-MUNICIPAL	6.53	PWS
HARRISONBURG, CITY OF	HARRISONBURG	6.44	PWS
GRIEF RIVERVILLE LLC	RIVERVILLE MILL	6.12	MAN
STAFFORD COUNTY	STAFFORD COUNTY	6.11	PWS
TOTAL		8,341.85	

*PF = FOSSIL POWER, PN = NUCLEAR POWER, PWS = PUBLIC WATER SUPPLY, MAN = MANUFACTURING, MIN = MINING, AGR = AGRICULTURE