

VIRGINIA SOURCE WATER ASSESSMENT PROGRAM



Virginia Department of Health



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I. Introduction

Section 1453 of the 1996 Amendments to the Safe Drinking Water Act (SDWA) requires each State to develop a Source Water Assessment Program (SWAP) that will:

- “delineate the boundaries of the assessment areas in such State from which one or more public water systems in the State receive supplies of drinking water, using all reasonably available hydrogeologic information on the sources of the supply of drinking water in the State and the water flow, recharge, and discharge and any other reliable information as the State deems necessary to adequately determine such areas; and
- identify for contaminants regulated under this title for which monitoring is required under this title (or any unregulated contaminants selected by the State, in its discretion, which the State, for the purposes of this subsection, has determined may present a threat to public health), to the extent practical, the origins within each delineated area of such contaminants to determine the susceptibility of the public water systems in the delineated area to such contaminants.”

In addition, “The State shall make the results of the source water assessments conducted under this subsection available to the public.”

The Virginia Department of Health (VDH) herein describes Virginia’s strategic approach to conducting the assessments including Virginia’s criteria for delineating the boundaries of the source water assessment areas, the significant potential sources of contamination to be inventoried in the delineated area and the methodology for completing susceptibility determinations for each source. Public participation in the development of the SWAP is described as well as how Virginia will make the results of assessments available to the public.

II. Description of Public Participation

VDH developed the SWAP by utilizing three (3) separate committees/teams:

- Waterworks Advisory Committee (WAC) – This was an existing committee (see Addendum B) that offered a wide array of technical and citizen involvement. The WAC had general oversight and input and their conceptual concurrence on the SWAP was obtained prior to submittal.
- Source Water Protection Team (Team) – The Team was made up of VDH representatives and members from the WAC (see Addendum C). Their function was to develop the details of the SWAP with guidance from the other two committees.
- Source Water Assessment Technical and Citizens Committee (TAC) – The TAC was established to meet Section 1428(b) of the SDWA public participation requirements. The membership is shown in Addendum D. Some of the TAC's functions included advice and guidance on the Team's recommendations, responding to EPA's specific Key Issues listed in the guidance and final concurrence on the SWAP. The VDH published a notice in Volume 15 Issue 4 of the Virginia Register seeking participation on the TAC to develop the SWAP. Many state and federal agencies were directly solicited for participation as well as individuals that had expressed interest at the EPA SWAP workshop held in Raleigh, NC on May 29-30, 1997 and at a Chesapeake/Virginia joint AWWA workshop in Falls Church, VA on August 7, 1997. Special efforts were expended to include citizen, environmental group, and sensitive population representatives on the TAC.

The following is a list of dates that each committee/team met relative to the SWAP.

<u>Team</u>	<u>TAC</u>	<u>WAC</u>
January 27, 1998	February 25, 1998	November 19, 1998
February 23, 1998	April 30, 1998	January 21, 1999
April 22, 1998	June 9, 1998	
June 2, 1998	June 30, 1998	
July 7, 1998	September 18, 1998	
August 11, 1998	October 22, 1998	
September 3, 1998	November 5, 1998	
September 30, 1998	November 17, 1998	
October 1, 1998		
October 28, 1998		

Responses to questions from tables 1, 2, 3, 4, 5, and 6 in the EPA final guidance document entitled *State Source Water Assessment And Protection Programs Guidance*, dated August 1997 are found in Appendix E.

III. SWAP Development Approach

A. Goals:

1. Assessments will be conducted for the protection and benefit of waterworks thereby protecting the public's health and for the support of monitoring flexibility.
2. Assessments will provide meaningful information to direct ongoing source water protection efforts and the overall drinking water program in the state.
3. Assessments will be available to the waterworks owner who will be encouraged to proceed with source water protection programs.
4. Assessments will be updated as new data becomes available.
5. Assessments will use relevant data from existing state, federal and other databases.
6. Assessments of all sources will be completed within 42 months of EPA approval of the SWAP.

B. Basis:

1. Section 1453 (a) (6) Use of Other Programs – “to avoid duplication and to encourage efficiency, the program under this section may make use of any of the following: vulnerability assessments, sanitary surveys, and monitoring programs.”
2. Effort will be directed at maximizing the use of existing information. This information may include:
 - Data developed in completing the Groundwater Under Direct Influence of Surface Water (GUDIS) assessments
 - Data compiled to evaluate applications for waivers to Phase II/V monitoring
 - Data from sanitary surveys of waterworks conducted by VDH personnel and consultants
 - Results from chemical and bacteriological monitoring programs
 - Evaluation of a waterworks compliance with Virginia's comprehensive design and construction regulations.
3. Geographic Information Systems (GIS) mapping of source water assessment areas will be provided.

4. This will be considered an initial assessment. As new data becomes available, assessments may be modified.
5. The delineation and land use activity (LUA) inventory included herein is considered minimum criteria to be utilized in the assessment.

C. Product (Deliverables)

Products will indicate where intensified site-specific source water protection will be needed and will include:

- maps of source water assessment areas showing delineations and land use activities;
- susceptibility determinations necessary for tailoring monitoring for chemical contaminants; and
- information useful to future regulatory decisions (e.g. Ground Water Rule).

IV. Source Water Assessment Areas Delineation

A. Ground Water Sources

1. VDH through the TEAM, TAC, WAC and Public Participation has determined that a fixed radius delineation approach for groundwater sources is the approach of choice for Virginia. The advantages and disadvantages of the six methods suggested by EPA in the June 1987, *Guidelines for Delineation of Wellhead Protection Areas* were considered. The basis for choosing the fixed radius approach is:
 - Virginia's regulatory permitting systems for contaminant releases to the environment, which locates sources of potential pollutants. These sources of contaminant releases will be utilized in the source water assessments.
 - VDH's public water supply well construction and abandonment regulations.
 - VDH's sanitary surveillance program for drinking water supplies where VDH staff performs surveys every 12 to 18 months.
 - VDH's chemical and bacteriological monitoring requirements for public water supplies per the SDWA and a Virginia program for routine raw water bacteriological monitoring to detect changes in microbiological quality.
 - VDH's completion of the GUDIS assessments has already identified those sources experiencing microbiological contamination resulting from surface water influence.
 - VDH's completion of vulnerability assessments for synthetic organic chemicals under the Safe Drinking Water Act Phase II/V Rule Waiver Program based on 1000 foot fixed radius assessment zones.
 - VDH's contract with the United States Geological Survey (USGS) to perform a statewide aquifer study which may identify areas where a more detailed delineation may be beneficial.
 - VDH's contract with the Virginia Department of Conservation and Recreation (DCR) to perform detailed studies in Karst areas where detailed delineation may be beneficial.
 - The costs of the other delineation methods exceed the incremental improvement of data quality expected for the other methods.
 - Neither the waterworks owners or VDH have adequate staff and financial resources to complete more complex delineations in the allotted time frame.
 - The reality that future assessments will be required due to new EPA Regulations.

2. Assessment Areas

- Zone 1– 1000 foot fixed radius – inventory land use activities (LUA) listed in Tables 1 and 2 including PSC sites as described for Zone 2 and potential conduits to groundwater listed in Table 3 (see Appendix F).
- Zone 2 – 1 mile fixed radius – identify potential sources of contamination (PSC) sites shown on GIS layers available from other regulatory authorities or other sources (Virginia Pollutant Discharge Elimination System (VPDES) discharges, tire piles, landfills, superfund sites, etc.).

B. Surface Water Sources

1. VDH through the TEAM, TAC, WAC and Public Participation has determined that a 5-mile fixed distance delineation approach for surface water sources is the approach of choice for Virginia. The advantages and disadvantages of time of travel versus fixed distance were considered. The basis for choosing the fixed distance approach is:
 - The 5-mile distance is a recognizable figure utilized by VDH and the Virginia Department of Environmental Quality (DEQ). It is based on Section 15.2-2109 of the Code of Virginia, which specifies that local governments may prevent water pollution within 5-miles of a water supply intake.
 - VDH's completion of vulnerability assessments for synthetic organic chemicals under the Safe Drinking Water Act Phase II/V Rule Waiver Program based on 5-mile assessment zones for non-tidal sources. The results of these vulnerability assessments will be utilized in the source water assessments.
 - Virginia's regulatory permitting system for contaminant releases to the environment, which locates sources of potential pollutants. These sources of contaminant releases will be utilized in the source water assessments.
 - VDH's public water supply construction and operations regulations. These regulations offer a substantial barrier to contaminants of public health consequent reaching the consumer.
 - VDH's mandatory filtration requirement reduces threats to public health from microbiological organisms. These requirements offer a substantial barrier to these organisms reaching the consumer.
 - VDH's sanitary surveillance program for drinking water supplies where VDH staff performs surveys every 6 months ensuring that filtration plants are operated properly. This surveillance program further strengthens the barriers to contamination. Changes in land use activities will be noted and utilized in refining assessments.

- VDH's chemical and bacteriological monitoring requirements for public water supplies. These requirements provide continuous monitoring of water quality changes and monitoring data will be utilized in the assessments.
- The possibility that future assessments will be required due to new EPA Regulations.

2. Assessment Area

a. Non-Tidal Source Intakes or Pumped Storage Project Intakes

- Distance upgradient from intake (limited only by topographic boundaries) (see Appendix G).
- Zone 1: Watershed bounded by a 5-mile radius – inventory land use activities listed in Tables 1 and 2 including PSC sites as described for Zone 2.
- Zone 2: Watershed >5 mile radius – identify PSC sites shown on GIS layers available from other regulatory authorities or other sources (VPDES discharges, tire piles, landfills, Superfund sites, etc.).

b. Tidal Source Intakes

- Distance upgradient and downgradient from intake (limited only by topographic boundaries).
- Zone 1: Watershed bounded by a 5-mile radius – inventory land use activities listed in Tables 1 and 2 including PSC sites as described for Zone 2.
- Zone 2: Watershed >5 mile radius – identify PSC sites shown on GIS layers available from other regulatory authorities or other sources (VPDES discharges, tire piles, landfills, Superfund sites, etc.).

c. Impoundment Intakes

- Distance from intake (limited only by topographic boundaries) (see Appendix G).
- Zone 1: Watershed bounded by a 5-mile radius – inventory land use activities listed in Tables 1 and 2 including PSC sites as described for Zone 2.

- Zone 2: Watershed >5 mile radius – identify PSC sites shown on GIS layers available from other regulatory authorities or other sources (VPDES discharges, tire piles, landfills, Superfund sites, etc.).

C. GUDIS Source Assessment Area

1. No identified flowing surface source

- Zone 1 – 1000 foot fixed radius inventory land use activities listed in Tables 1 and 2 including PSC sites as described for Zone 2 and potential conduits to groundwater listed in Table 3.
- Zone 2 – 1 mile fixed radius – identify PSC sites shown on GIS layers available from other regulatory authorities or other sources (VPDES discharges, tire piles, landfills, superfund sites, etc.). VDH may choose to extend the delineation for more distant upstream sources where appropriate.

2. Identified flowing surface source

- Zone 1 – 1000 foot fixed radius inventory land use activities listed in Tables 1 and 2 including PSC sites as described for Zone 2 and potential conduits to groundwater listed in Table 3.
- In addition, utilize the surface water Non-Tidal Source assessment area (IV.B.2.a) considering the well as the intake structure.

D. Conjunctive Delineation

VDH through its TEAM, TAC, WAC and Public Participation has evaluated the factors regarding the interaction of groundwater and surface water relative to public water supply sources in Virginia. Conjunctive delineation concerns are adequately addressed by the proposed groundwater and surface water assessment strategies.

V. Land Use Activity Inventory

VDH will assure that an inventory of Land Use Activities (LUA) of concern and potential conduits to groundwater (where applicable) that are present within the source water assessment area (Zone 1) is completed. The inventory shall include only those items listed in Appendix F Tables 1, 2, and 3. (Any further reference to LUAs regarding groundwater includes the potential conduits to groundwater listed in Table 3). PSC sites will be identified for Zone 1 and Zone 2. The inventory will include the name and address of the landowner.

VI. Susceptibility Determinations

A. Susceptibility Determination Process

VDH will determine the susceptibility of a waterworks source to possible contamination using a three-step process. The first step is a sensitivity determination, which is an evaluation of the hydrogeological and physical characteristics of the source water and its assessment area. The second step is an inventory of Land Use Activities (LUA) of concern and potential conduits to groundwater (where applicable). The third step is assigning susceptibility using the criteria in Chart A below.

Chart A

Type of Source Water	Sensitive Source	LUA present in assessment area	Susceptibility
Groundwater	No	No	Very Low
Groundwater	No	Yes	Low
Groundwater	Yes	No	Moderate
Groundwater	Yes	Yes	High
Surface water	Yes	No	Moderate
Surface water	Yes	Yes	High

The final product of the process establishes one of four possible susceptibility determinations (very low, low, moderate, and high) for each source water. The details of the process are:

1. Sensitivity Determination

- a. Groundwater – VDH will classify a groundwater source as sensitive if it is constructed within a groundwater area that tends to promote contaminant migration (or provide little protection to migration of contaminants). VDH will use the *Groundwater Map of Virginia* prepared by the Virginia Water Control Board Ground Water Program, 1985; as the reference for determining the predominant groundwater areas in Virginia. These sensitive groundwater areas include:

Cumberland Plateau
 Ordovician Shale
 Carbonate
 West Toe
 Blue Ridge
 Piedmont
 Triassic Basin
 Fall Zone
 Coastal Plain-Quaternary Aquifer

VDH will not define as sensitive a properly constructed source, as verified by VDH, located within one of the sensitive groundwater areas if it has been determined by the U.S. Geological Survey (as part of the Virginia Aquifer Susceptibility study) to be developed in a confined or non-sensitive aquifer. The fundamental premise of the Virginia Aquifer Susceptibility study is to use ground-water-age determinations from various environmental tracers and isotopes as a guide for the classification of areas and aquifers in terms of susceptibility of groundwater to near-surface contamination.

VDH will define a GUDIS source as sensitive.

VDH will define as not sensitive a groundwater source which is not located in a sensitive groundwater area, if all of the following five criteria are met:

- i. No known contamination of the source (as defined in Section VI-C) has been detected in the last 5 years.
- ii. The well is a Class IIB (or better) well which has been constructed in accordance with the *Virginia Waterworks Regulations*.
- iii. A driller's well log or the U.S. Geological Survey clearly indicates that an aquitard is present and there is no evidence to suggest it does not extend over the entire assessment area.
- iv. The most recent sanitary survey confirms that the source substantially adhere to the construction standards of the *Virginia Waterworks Regulations*.
- v. No known Potential Conduits to Groundwater as shown in Table 3 which penetrates the aquitard.

If the required information needed to confirm the items does not exist or is questionable then the source will be classified as sensitive.

- b. Surface Water - Surface water is by nature exposed to an inconsistent array of contaminants at varying concentrations due to changing hydrologic, hydraulic and atmospheric conditions. Because all surface water sources are open to the atmosphere, they are considered sensitive.

2. Land Use Activity Inventory

VDH will use the inventory of LUAs in zone 1 in the susceptibility determination for each surface source. VDH will use the inventory of LUAs in Zone 1 and the major PSCs in Zone 2 in the susceptibility determination for each groundwater source.

3. Susceptibility Determination

VDH will use Chart A to determine the susceptibility of a source after the sensitivity determination and land use activity inventory are completed. Groundwater sources will have one of the following susceptibility determinations: Very Low, Low, Moderate or

High. Surface water sources will have one of the following susceptibility determinations: Moderate or High.

Any known contamination of the source (as defined in Section VI-C) will result in a susceptibility determination of high.

The susceptibility determination may be revised based on additional data that becomes available.

Very Low

A ground water source is not sensitive to contamination and has no known LUAs of concern within its delineated assessment area. The results of the source water assessment will be made available to the public in accordance with Section VIII requirements.

Low

A groundwater source is not sensitive to contamination, however known LUAs of concern exist within its delineated assessment area. The LUAs will be ranked as to relative health risk (see ranking procedures) and the results of the source water assessment and the ranking will be made available to the public in accordance with Section VIII requirements.

Moderate

A ground water source is determined to be sensitive and has no known LUAs of concern within its delineated assessment area or a surface water source has no known LUAs of concern within its delineated assessment area. The results of the assessment will be made available to the public in accordance with Section VIII requirements.

High

A ground water source is determined to be sensitive and has known LUAs of concern within its delineated assessment area or a surface water source has known LUAs of concern within its delineation area. The LUAs identified must be ranked as to relative health risk (see ranking procedures). The results of the assessment and the rankings will be made available to the public in accordance with Section VIII requirements.

B. Ranking Land Use Activities Within Individual Assessment Areas

1. VDH will provide a ranking of LUAs so that waterworks and the public have a basis for determining the highest health priority for providing source water protection activities within individual assessment areas. The ranking will indicate the highest risk LUAs at the beginning of the list. For groundwater sources each Potential Conduit to Groundwater found in Table 3 will be listed. Tables 1 and 2 provide a ranking as to the relative health risk associated with each LUA. The relative health risk rankings were chosen as a collective decision by the Team and affirmed by the TAC. They are an

amalgam of the perceived risk of release of a contaminant from a LUA, chance of transport of the contaminant from the LUA to the source water, impact on the treatment process (for surface water sources) and relative public health risk of the contaminant itself. Contaminants that could produce 'acute' PMCL violations were regarded as 'high' risk, while contaminants that could produce 'non-acute' PMCL violations were regarded as 'moderate' risk. Risk factors were reduced if the chance of release and/or chance of transport and/or impact on the treatment process (for surface water sources) were considered to be low.

2. VDH (or other assessor) when possible will identify Best Management Practices (BMP) in use for each LUA. BMPs are protective measures that are the most practical and effective means of protecting source waters from pollution. Although BMP use at an identified LUA will not remove the LUA from the ranking, the information detailing each BMP at a specific LUA will be documented in the final source water assessment report for the waterworks. In addition, information regarding inappropriate operation and housekeeping, etc. at the LUA will be included in the report. The waterworks owner could then utilize this information in setting priorities for source water protection activities.

C. Additional Reporting

In addition, VDH will list any known contamination of the source within the last 5 years (regardless if the source of this contamination has or has not been identified) in the following order:

1. Acute health risk contamination of groundwater drinking water sources by microbial contamination. (i.e. a geometric mean > 3 in 20 or more total coliform MPN samples or 2 or more identified fecal coliform samples)
2. Associated health risk contamination of drinking water sources by nitrate/nitrite at $\frac{1}{2}$ the PMCL or greater.
3. Existing, known and confirmed drinking water source contamination for SOC/VOCs.
4. Existing, known and confirmed drinking water source contamination (at a concentration at or above the PMCL) for combined Radium-226 and Radium-228.
5. Existing, known and confirmed drinking water source contamination (at a concentration at or above the PMCL) for IOCs.

VII. Source Water Protection Program

The source water assessment is “for the protection and benefit of the waterworks”. The availability of the assessment to the owner is the first step in assisting the owner in preparing a Source Water Protection Program (SWPP). VDH will be available to provide general technical assistance to waterworks owners in developing a SWPP. VDH strongly encourages waterworks owners to provide ample opportunity for citizen involvement in source water protection activities. In addition, VDH has contracted with the Virginia Rural Water Association (VRWA) to provide direct assistance to small waterworks (pop. <10,000) in developing and implementing a SWPP. VRWA will be utilizing the Manual entitled *Implementing Wellhead Protection: Model Components for Local Governments In Virginia*, prepared by the Virginia Ground Water Protection Steering Committee.

Appendix H describes the existing Groundwater Protection Program in Virginia.

Appendix I describes laws, regulations and activities protecting surface water in Virginia.

VIII. Making Assessments Available to the Public

A. Contents of Assessment Reports

1. The assessment report will include the following:
 - A brief narrative explaining the assessment procedure and results
 - Map(s) of the delineated source water assessment areas including source location(s)
 - The location and description of inventoried LUAs within zone 1
 - The location and description of identified PSCs within zone 2
 - The name and address of identified owners of LUAs and PSCs
 - A priority ranking of the identified LUAs (with the highest risk LUA at the start of the list)
 - A listing of any known contamination of the source within the last 5 years (regardless whether or not the source of this contamination has been identified) as listed in Section VI-C.
2. The report format will be as simple as practical yet clearly identify the items. The report will be made available to the water works owner expeditiously following completion.
3. VDH is making efforts to obtain the capabilities to provide a hard copy of a GIS generated map showing the delineated assessment areas and inventoried LUAs and PSCs. If hard copies of GIS generated maps can not be produced, the information will be provided on a section of a USGS quad sheet (see Appendix J).

B. Procedures for Making Assessments Available to the Public

1. VDH responsibilities:
 - a. Provide the assessment report to the waterworks owner, the local health department and a local library upon completion.
 - b. Provide wide notification of the availability of the results and other information collected by use of the Internet with links to the USEPA "Surf Your Watershed" effort, the Virginia Register, the Virginia Press Association members, press releases and public service announcements on a monthly basis.
 - c. Provide notification of the availability of the results and other information collected to the local health departments, extension agents and town/county/city administrators and request them to include the notice in newsletters and other communications with the public.

- d. Upon specific requests for individual assessments, VDH will make every effort to provide such information. Copies of the information will be provided for a reasonable handling fee. Interested individuals who prefer to review the information without requiring copies will be allowed to do so.
- e. Ensure that the Consumer Confidence Report (CCR) includes the required SWAP information.
- f. Ensure that an announcement is sent to the local newspaper including the SWAP information listed in the CCR requirement below within 30 days of the completion of the assessment.

2. Waterworks Owner Responsibilities:

- a. Include in the Annual Consumer Confidence Report:
 - A brief summary of the susceptibility to contamination of the drinking water source, based on the completed source water assessment.
 - How to get a copy of the waterworks complete source water assessment report.
- b. Consider notifying customers of the availability of the completed source water assessment through billing notices or other available means, and to
- c. Consider utilizing public service announcement media or other appropriate local methods to expeditiously publicize the information that will be contained in the next Consumer Confidence Report concerning the source water assessment upon receipt of the completed assessment report from the VDH.

IX. SWAP Implementation Approach

A. Timetable

1. Community and Nontransient Noncommunity waterworks completed by July 1, 2002.
2. Transient Noncommunity waterworks completed by December 31, 2002.

B. VDH Staff

1. Community and Nontransient Noncommunity – Division of Water Supply Engineering
2. Transient Noncommunity – Office of Environmental Health Services/Local Health Departments

See Charts B and C

C. Priorities (in decreasing priority order)

1. Surface Sources with River/Stream Intakes
2. Surface Sources with Reservoirs
3. Groundwater Under Direct Influence of Surface Water
4. Groundwater in Karst Geology
5. Groundwater in Unconfined Aquifers
6. Groundwater in Confined Aquifers

D. General – The VDH staff will perform the assessment on the majority of sources. Waterworks owners will be encouraged to participate in any or all phases of the assessment. In all cases, VDH will make or concur with the final susceptibility determination.

1. The general implementation approach is to initially analyze and evaluate the available data from other information sources to determine its applicability. This will be accomplished with the aid of a contractor and the Virginia Economic Development Partnership (VEDP). If data is applicable but not currently in usable format (GIS), the data will be translated. This data will be made available through the VEDP or the Virginia Geographic Information Network (VGIN). Available locational data for the land use categories will be utilized in the inventory phase of the assessment.
2. DWSRF funds have been set-aside for complex, special needs, multi-state, etc. projects. These waterworks will be given the opportunity to apply for a Source Water Assessment Grant to be utilized for their use in funding an assessment that meets the minimum criteria in the SWAP.

E. Additional Support

1. United States Geological Survey (USGS) – support on a statewide basis will be provided by the USGS to assist VDH to assess the contamination potential of waterworks source waters in the Commonwealth. A study will identify the intrinsic

natural susceptibility of regional aquifers in Virginia. VDH will apply this information in screening groundwater supplies to identify those that may require a higher level assessment during the source water protection phase. The study results will be used by VDH as part of the susceptibility determinations as available.

2. Virginia Department of Conservation and Recreation (DCR) – support on a regional or location specific basis will be provided by DCR in performing 4 to 6 geological studies per year of groundwater sources in karst areas of the Commonwealth. VDH will select the groundwater sources to be studied and will utilize the conclusions in the final source assessments.
 3. Virginia Economic Development Partnership – In support of the assessment efforts, GIS services are to be performed by a subcontractor with assistance by the Virginia Economic Development Partnership.
 4. Other Agencies -
 - a. In support of the VDH SWAP, information from other state agencies involved in water quality assessment and protection efforts will be utilized as appropriate.
 - b. The following agencies were contacted regarding availability of data that could be utilized in the SWAP: Department of Environmental Quality; Department of Conservation and Resources; Department of Mines, Minerals and Energy and; Division of Mineral Resources (State Geologist).
 - c. As EPA Region III implements the UIC program in Virginia, VDH will seek to incorporate the UIC data into the assessments. VDH will work with EPA to coordinate the inspection of Class V wells in source water assessment areas.
- F. Assessment Updates – VDH intends to coordinate with and utilize the assessment data for the proposed Ground Water Rule and make the information available to the waterworks owner for source water protection activities. Additionally, VDH intends to add to its sanitary survey forms a section to update Land Use Activities within Zone 1 of the source water assessment areas.

**Number of Systems with a Surface Source(s)
verses
Number of Systems with a Groundwater Source(s)**

Total Number of Systems = 3805

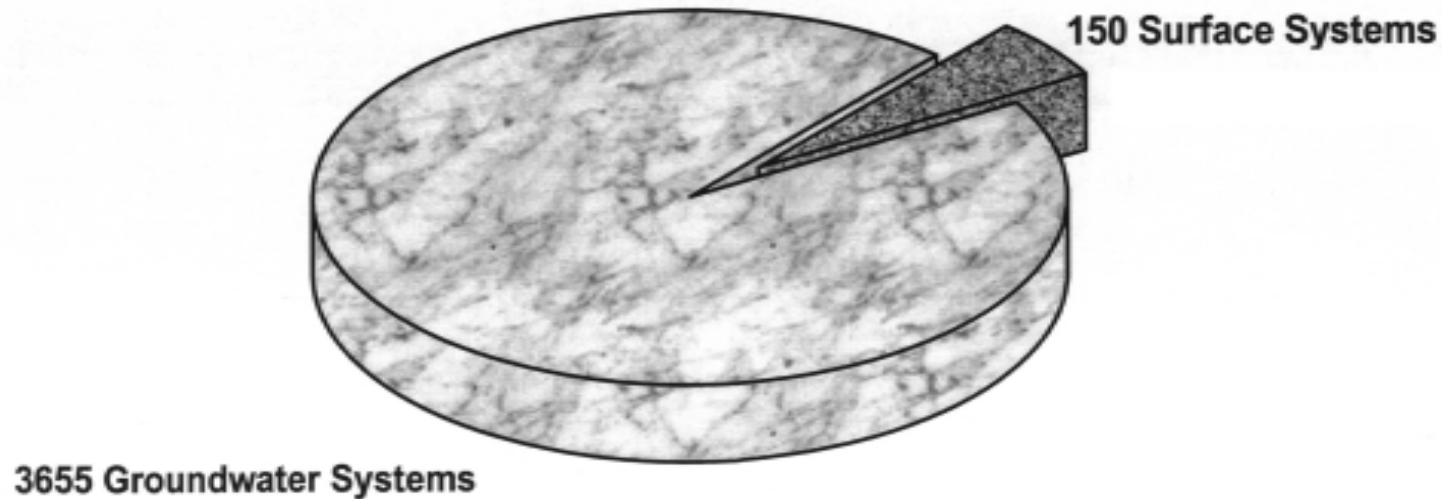
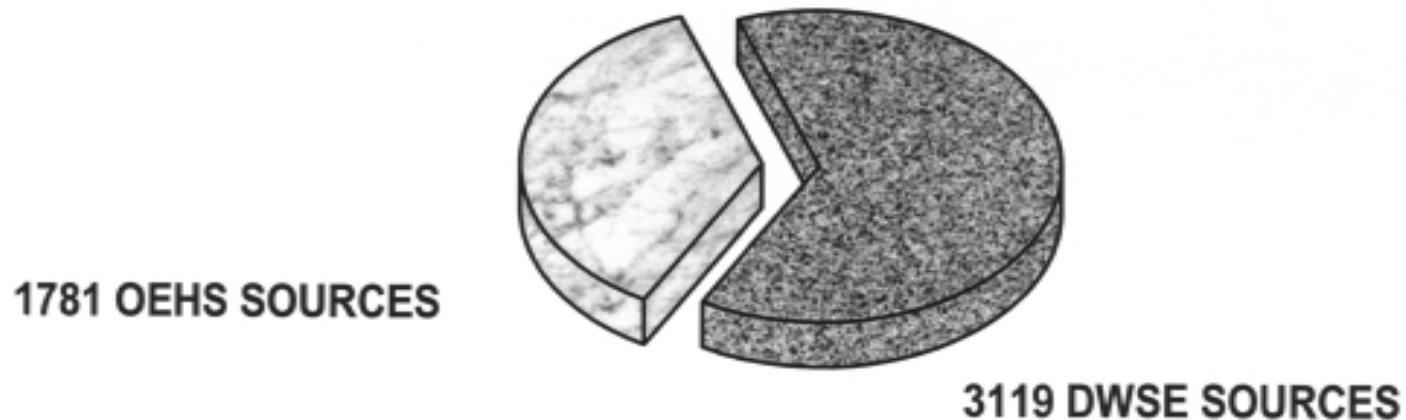


Chart B



**Number of DWSE Groundwater Sources
verses
Number of OEHS Groundwater Sources**

Total number of Groundwater Sources = 4900



DWSE = Division of Water Supply Engineering (community and nontransient noncommunity)
OEHS = Office of Environmental Health (transient noncommunity)

Chart C

Appendix A

DEFINITIONS

Aquitard	A confining bed that retards but does not prevent the flow of water to or from an adjacent aquifer, a leaky confining bed. It does not readily yield water to wells or springs, but may serve as a storage unit for groundwater (see confining unit).
Community Water System	A waterworks which serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents.
Confining Unit	<p>(1) A hydrogeologic unit of impermeable or distinctly less permeable material bounding one or more aquifers and is a general term that replaces aquitard, aquifuge, aquiclude.</p> <p>(2) Means a body of impermeable or distinctly less permeable material stratigraphically adjacent to one or more aquifers.</p>
Delineation (delineate)	The process of defining or mapping a boundary that approximates the areas that contribute water to a particular water source used as a public water supply. For surface waters, the land area usually consists of the watershed for a reservoir or stream. For groundwater sources, the boundary typically approximates the surface area that contributes water to the aquifer.
Groundwater Under Direct Influence of Surface Water (GUDIS)	Any water beneath the surface of the ground with (i) significant occurrence of insects or other microorganisms, algae, or large-diameter pathogens such as <i>Giardia lamblia</i> , or (ii) significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity, or pH which closely correlate to climatological or surface water conditions. Direct influence of surface water will be determined by the commissioner in accordance with 12 VAC 5-590-430.
Inorganic Compounds	Compounds that do not contain carbon as one of the combined elements.

Land Use Activity (LUA) Inventory	A list of activities that store, use, or produce chemicals or elements, and that has the potential to release contaminants identified in a state program (contaminants with MCLs plus any others a state considers a health threat) within a source water protection area in an amount which could contribute significantly to the concentration of the contaminants in the source waters of the public water supply.
Maximum Contaminant Level (MCL)	The maximum permissible level of a contaminant in water which is delivered to any user of a public water system.
NAICS	North American Industry Classification System
Noncommunity Water System	A waterworks that is not a community waterworks but operates at least 60 days out of the year.
Nontransient Noncommunity Water System (NTNC)	A waterworks that is not a community waterworks and that regularly serves at least 25 of the same persons over six months out of the year.
Potential Sources of Contamination (PSC)	For the purpose of this document, PSCs means those potential sources of contamination sites available from State, Federal and Local Regulatory Agencies and other sources of information such as VPDES discharges, tire piles, landfills, superfund sites, UICs, Industries, etc. PSCs will be located in both Zone 1 and Zone 2.
Sensitivity	The relative ease with which a contaminant applied near the land surface, or to the subsurface, can migrate to the delineated source water area.
Source Water Assessment	Source water assessment provides information on the potential contaminant threats to surface and ground water sources that are used to supply public water systems. Each source water assessment consists of a delineation of the source water assessment area, an inventory of land use activities, and a determination of the susceptibility of the water supply to contamination.
Source Water Protection Area	The area delineated by the state for a waterworks or including numerous waterworks, whether the source is ground water or surface water or both, as part of the state SWAP approved by EPA under Section 1453 of the SDWA.

Susceptibility	The relative ease with which a contaminant applied near the land surface can migrate to the aquifer of interest under a given set of land use practices and hydrogeologic sensitivity characteristics (land use and sensitivity).
Susceptibility Determination	An analysis to determine, with a clear understanding of where the land use activities are located, the susceptibility of the waterworks in the source water protection area to contamination from these activities.
Synthetic Organic Compounds (SOC)	One of the family of organic man-made compounds generally utilized for agriculture or industrial purposes
Watershed	A topographic boundary area that is the perimeter of the catchment area of a stream.
Volatile Synthetic Organic Compounds (VOC)	One of the family of manmade organic compounds generally characterized by low molecular weight and rapid vaporization at relatively low temperatures or pressures.
Watershed Area	A topographic area that is within a line drawn connecting the highest points uphill of a drinking water intake. from which overland flow drains to the intake.

APPENDIX B

VIRGINIA SOURCE WATER ASSESSMENT PROGRAM

Appendix B

Revised October 27, 1998

COMMONWEALTH OF VIRGINIA

DEPARTMENT OF HEALTH

Waterworks Advisory Committee Members

PURPOSE:

(As per Virginia Waterworks Regulations)
"The Waterworks Advisory Committee shall make recommendations to the Commissioner regarding water works and water supply policies, procedures, and programs of the Department."

APPOINTED MEMBERS:

ORGANIZATION

REPRESENTATIVE

Name	Address and Phone Number	Name	Address and Phone Number	3 yr. Term Ending
American Water Works Association	Lee Higgins, Administrative Secretary Virginia Section-AWWA P.O. Box 2446 Christiansburg, VA 24068-2446 (540) 381-1129 FAX (540) 381-1244	Ray A. Jackson	3506 Fendall Avenue Richmond, VA 23222 (804) 329-0098	8-31-01
Nontransient Noncommunity Representative	V/A Manufacturers Assoc. P.O. Box 412 Attn.: Carol Wampler Richmond, VA 23203 (804) 643-7489 FAX (540) 985-2426 FAX (804) 780-3853	Robert J. Robinson Environmental Affairs Director	American Electric Power P.O. Box 2021 Roanoke, VA 24022 (540) 985-2430 FAX (540) 985-2426 Robert_J_Robinson@aep.com	8-31-01
Southeast Rural Community Assistance Project, Inc.	Mary Terry SE/RCAP 145 Campbell Avenue, SW Suite 800, P.O. Box 2868 Roanoke, VA 24001-2868 (540) 345-1184 FAX (540) 342-2932	Jonathan Hiirst	SE/R CAP, Inc. 145 Campbell Avenue, SW Suite 800 Roanoke, VA 24001-2868 (540) 345-1184 FAX (540) 342-2932 JHIRST@ROANOKE.INFL.NET	8-31-01
Citizen	Ms. Connie M. Houston, President League of Women Voters of VA 1001 East Main Street, Suite 701 Richmond, VA 23219 (804) 649-0333 FAX (804) 649-0339	Marsha Parkinson	1636 Inglewood Drive Charlottesville, VA 22901 (804) 293-7897 mpc2x@virginia.edu	8-31-01

APPOINTED MEMBERS:

ORGANIZATION

REPRESENTATIVE

<u>Name</u>	<u>Address and Phone Number</u>	<u>Name</u>	<u>Address and Phone Number</u>	<u>3 yr. Term Ending</u>
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Virginia Water Well Association, Inc.	Calvin Norris P.O. Box 27186 Richmond, VA 23261 (804) 643-2725 FAX (804) 788-9058	Gary F. Burner Burner Well Drilling, Inc.	P.O. Box 98 McGaheysville, VA 22840 (540) 289-9421 FAX (540) 289-9740	8-31-00
Consulting Engineers Council	Harry W. Kincaid, Exec. Director Consulting Engineers Council 611 Research Road Richmond, VA 23236 (804) 794-6822 FAX (804) 379-3150	Edwin G. Snyder, P.E.	CH2M Hill/Virginia 11818 Rock Landing Drive Suite 200 Newport News, VA 23606 (757) 873-1511 FAX (757) 873-7657 ESNYDER@CH2M.COM	8-31-00
Virginia Society of Professional Engineers	Leigh Dicks, Exec. Director VA Society of Professional Engineers 9291 Laurel Grove Road, Suite 10 Mechanicsville, VA 23116 (804) 730-6883 FAX (804) 730-6850	Charles J. Jeckell, P.E.	Dept. of Public Utilities Municipal Center Virginia Beach, VA 23456 (757) 427-4171 FAX (757) 426-5778 CJECKELL@CITY.VIRGINIA-BEACH.VA.US	8-31-00
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Community Waterworks Owner	N/A	Jesse L. Royall, Jr., P.E.	Sydnor Hydrodynamics P.O. Box 27186 Richmond, VA 23261 (804) 643-2725 FAX (804) 788-9058 SYDNOR@MSN.COM	8-31-99

VIRGINIA SOURCE WATER ASSESSMENT PROGRAM

Revised October 27, 1998

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APPOINTED MEMBERS:

ORGANIZATION

REPRESENTATIVE

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Virginia Municipal League	Michael Amyx Executive Director VA Municipal League P.O. Box 12164 Richmond, VA 23241 (804) 649-8471 FAX (804) 343-3758	Robert Benninger, P.E. Assistant Utility Director	Roanoke County 1206 Kessler Mill Road Salem, VA 24153 (540) 387-6104 FAX (540) 387-6230	8-31-99
Virginia Association of Counties	James Campbell Executive Director VA Association of Counties 1001 East Broad Street, Suite LL20 Richmond, VA 23219 (804) 788-6652 FAX (804) 788-0083	Nelson Reid, Manager Water Treatment	Ni River WTP 10516 Gordon Road Spotsylvania, VA 22553 (540) 786-2364 FAX (540) 786-4435	8-31-99
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VIRGINIA SOURCE WATER ASSESSMENT PROGRAM

Revised October 27, 1998

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VWEA	Glenn Rehberger, Secretary-Treasurer Virginia Water Environment Assoc., Inc. CH2M Hill 11818 Rock Landing Drive, Suite 200 Newport News, VA 23606 (757) 873-1511 FAX (757) 873-7657	Herbert Dawson, Director of Water & Wastewater Treatment	468 Brightwell Drive Danville, VA 24540 (804) 797-3442 FAX (804) 799-6588	
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October 15, 1999

APPENDIX C

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APPENDIX D

Source Water Assessment Program
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APPENDIX E

Table 1**Public Participation:****Key Issues for Advisory Committee(s)**

- 1. Should the state do more to provide adequate opportunity for stakeholder groups to participate in development of the program? If so, how?**

The state published a notice in Volume 15 Issue 4 of the Virginia Register seeking participation on the technical and citizens committee to develop the SWAP. Many state and federal agencies were directly solicited for participation as well as individuals that had expressed interest at the EPA SWAP workshop held in Raleigh, NC on May 29-30, 1997 and at a Chesapeake/Virginia joint AWWA workshop in Falls Church, VA on August 7, 1997. Special efforts were expended to include citizen, environment group, and sensitive population representatives on the TAC.

The TAC recommends that the state mail the attached summary to the citizen, environmental and technical groups listed to obtain their input on the draft SWAP. In addition, publish the summary in the Virginia Register and place it on the VDH website.

- 2. Should the state do more to receive recommendations from both technical and citizen's perspectives?**

The state will hold public meetings after the TAC and the TEAM have concurred with the SWAP to receive additional public input. The state will seek opportunities to make SWAP presentations at technical, professional, environmental, etc. meetings and workshops.

The TAC recommends that the state mail the attached summary to the citizen, environmental and technical groups listed to obtain their input on the draft SWAP. In addition, publish the summary in the Virginia Register and place it on the VDH website.

- 3. What should the state do for ongoing public participation in implementing assessments once the state's SWAP is approved?**

The state does not plan to directly involve the public in implementing assessments. Public involvement is considered vital during the source water protection efforts.

However, the TAC recommends that the state utilize (prior to the inventory task) local meetings to educate the consumers and to obtain information on Land Use/Activities in the assessment areas.

Table 2

State's Strategic Approach:

Key Issues for Advisory Committee(s)

1. **Has the state done an initial review of all data sources available and determine the scope of the need for additional information?**

Yes

The state has initiated researching the availability of data from other state, federal and local sources. The state intends to utilize appropriate data and to translate the data into GIS format with contracted services.

The TAC includes representatives from numerous agencies.

2. **What level of exactness/detail should be achieved by each assessment to be considered "complete?"**

The initial assessment for the purposes of the SWAP would be complete if the delineation, inventory and susceptibility determinations have been performed following the SWAP criteria.

3. **Should the level of assessment provide for the protection and/or benefit of the public water supply(s)?**

Yes

4. **What should be the basis for differential levels of assessments to be completed for different public water supplies or categories of public water supplies? System type or size? Preliminary information about the existence of threats? Other?**

The SWAP describes differential assessments for surface versus groundwater and Community and Nontransient-Noncommunity versus Transient-Noncommunity (TNC) sources. The TNC sources assessment will be limited to the regulated contaminants, microbes and nitrate. The surface versus ground water susceptibility determinations have inherent differences.

5. **How will the state SWAP be coordinated among various environmental and other state programs (e.g. PWSS, water quality, water resources, agriculture, land use, information management, geologic)?**

Many of the environmental and other related state programs have representatives on the TAC. All GIS layers developed from this effort will be available to all state, federal and

Table 2 (cont'd)

local agencies through a state clearinghouse i.e. the Virginia Economic Development Partnership or the Virginia Geographic Information Network. Reference is made to the SWAP section on state groundwater and surface water programs.

6. How would the state's assessment program lead to state watershed approaches and link to wellhead and other protection programs?

The state's assessment program should foster and support watershed approaches and source water protection programs by providing additional watershed information such as accurate locations of water sources and an inventory of land use activities and by making it available to other agencies. The Department of Environmental Quality and the Ground Water Protection Steering Committee agencies are involved in the development of the SWAP.

Table 3

Delineation, Source Inventory, and Susceptibility:

Key Questions for the Advisory Committee(s)

1. **What delineation method and criteria will be used for systems using ground waters? Where shall recharge areas not be included and why?**

The state's Source Water Assessment Technical and Citizens Advisory Committee (TAC) and the Source Water Assessment TEAM developed the delineation criteria as presented in the SWAP.

The TAC felt that specific recharge areas are not included by definition and it is not practical to do so.

2. **What contaminants that are not currently regulated by EPA should be part of the state's SWAP program?**

While the basic contaminants of concern are those regulated by EPA, the assessment inherently is more extensive in that land use activities are inventoried and included in the susceptibility determination rather than specific contaminants.

3. **Should the state segment source water protection areas for more focused source inventories? What should be the basis for such segmentation?**

Yes, the state should and the TAC and the TEAM established the segmentation presented in the SWAP.

4. **How should the state define and identify significant potential contamination sources and how should the state undertake their inventory within source water protection areas?**

The TAC and the TEAM developed these guidelines as presented in the SWAP.

5. **How will the results of the susceptibility analysis be characterized?**

The TAC and the TEAM developed this characterization as presented in the SWAP.

Table 4

Boundary Waters, Multi-State Rivers, and the Great

Lakes: Key Issues for Advisory Committee(s)

- 1. What agreement should the state maintain or initiate with other states, tribes, or nations to gain more complete and consistent source water assessments?**

The State is currently supporting the Interstate Commission of the Potomac's efforts to coordinate activities involving source water assessments for Potomac intakes. The State should strive to develop appropriate agreements and to share information with other states and tribal organizations.

- 2. What contingency plans should be pursued?**

Contingency plans do not appear necessary.

- 3. What coordination/facilitation activities should the state request of EPA?**

EPA should facilitate States meeting together to discuss interstate issues.

- 4. Are compatible and complimentary assessments being done in watersheds shared with other states and countries?**

Efforts are being taken to meet with applicable states to effectively coordinate assessment activities to ensure appropriate assessments of all sources.

Table 5

Making the Results of Assessments

Available to the Public:

Key Issues for Advisory Committee(s)

- 1. What should be included in the results of the assessments, what should be the format of an understandable report on results, and when should the results be made available?**

The assessment report should include the following:

- A brief narrative explaining the assessment procedure and results
- A map of the delineated source water assessment area (SWAA) including source location(s)
- The location and description of inventoried land use activities within the SWAA
- The name and address of identified owners of such activities
- A priority ranking of the land use activities identified
- Known contamination of the source within the last 5 years for contaminants listed in Section VI-C.

The report format should be as simple as practical yet clearly identify the above items and should be made available to the public immediately following completion.

- 2. How and when should the state make available all the information collected during each assessment when someone requests it?**

The State should make every effort to provide such information upon request. Copies of the information should be provided for a reasonable handling fee. Interested individuals who prefer to review the information without requiring copies should be allowed to do so. Copies will be made available at the waterworks, the local health department and a local library by the State.

- 3. What type of maps should be developed to display the results of the assessments?**

The State is making efforts to obtain the capabilities to provide a hard copy of a GIS generated map showing the delineated SWAA and inventoried land use activities. As a minimum the above information should be provided on a section of a USGS quad sheet.

(Table 5 cont'd)

4. How and when should the state make public all information collected during each assessment for a PWS(s)?

The State should not make public all information collected during each assessment. The State should make public that an assessment(s) has been completed for a PWS and how all information can be requested or viewed.

Provide notification of the availability of the results and other information collected to the local health departments, extension agents and town/county/city administrators and request them to include the notice in newsletters and other communications with the public.

Reference is made to the SWAP Section VIII Making Assessments Available to the Public for details.

5. How should the state or delegated entities provide wide notification of the availability of the results and other information collected?

Provide wide notification of the availability of the results and other information collected by use of the Internet with links to the USEPA "Surf Your Watershed" effort, the Virginia Register, the Virginia Press Association members, press releases and public service announcements on a monthly basis.

Reference is made to the SWAP Section VIII Making Assessments Available to the Public for details.

Table 6

State Program Implementation:

Key Issues for Advisory Committee(s)

1. What should be the timetable for state SWAP program implementation?

The timetable for completing community and nontransient noncommunity waterworks assessments is July 1, 2002 and December 31, 2002 for transient noncommunity.

2. How much should the state spend on SWAP program development and implementation, and should the resources come from the DWSRF and/or other resources?

The State should utilize the maximum amount available through the DWSRF set-asides. Since the Final Guidance states "EPA believes that Congress expected the assessment set-aside funds would be sufficient for assessment functions" and since the State set-aside the maximum allowed, no further funding should be utilized. The State will be supporting this effort with existing PWSS staff.

3. Should the state delegate aspects of the assessments? If so, to whom? Should funding be provided to delegated entities?

Virginia's plan does not delegate aspects of the assessment to other entities.

The State should encourage the waterworks, planning district commissions, etc. to participate in whole or in part in the assessment process. However, any assessment must meet or exceed the requirements in the SWAP and receive approval/concurrence by the State. Funding should be made available for the large (>50,000 population) and/or complex surface source assessments. Delegation to other agencies is not necessary or practical.

4. How should state agencies coordinate with each other and with other state, federal, and local stakeholders when implementing SWAPs?

The State should make all assessment information available to other state, federal and local stakeholders. See Table 2 Key Issue #5.

5. How and what should the state report to EPA regarding SWAP implementation?

The State should report to EPA on an annual basis the number of initial assessments completed during the previous year. Reports would end once these assessments for all waterworks are complete.

Table 6 (cont'd)**6. When and how should the state update assessments?**

The next general update of the assessments should take place during assessments required by the Ground Water Rule. Waterworks that develop Source Water Protection Plans should include an element requiring updates based on new land use activities of concern within the SWAA. The State's sanitary survey forms should include a question to the owner relative to any knowledge of new land use activities of concern. The sanitary survey staff should be provided (on a routine basis) updated GIS layers which should identify new land use activities for their consideration.

APPENDIX F

Table 1
LAND USE ACTIVITY INVENTORY
(Community and Nontransient Noncommunity Waterworks)

CLASSIFICATION	CONTAMINANT	SURFACE WATER RISK	GROUND WATER RISK	NAICS CODE
Residential/Commercial				
Fuel Storage Systems [ground water only]	V	X	medium	814110
On-site sewage system [ground water only]	M, N	X	medium	814110
Agriculture				
Chemical/fuel storage areas	V, S, N	low	medium	111, 112
Crop and fodder production	S, N	low	medium	111
Specialty crop production/nursery (e.g. horticulture, citrus, nuts, fruits)	S, N	low	medium	112
Livestock/poultry				112
Pasture (grazing)	M, N	medium	low	112
Intensive animal feeding operations				112
Confined animal feeding operations (permitted)	M, N	high	high	112
Confined animal feeding operations (non-permitted)	M, N	high	high	112
Aquaculture	M, N	low	medium	11251
Animal burial areas	M, N	low	medium	112
Manure holding or spreading	M, N	medium	medium	112
Other				
Industrial/Commercial [Dry and Discharging]				
Above ground storage tank (> 660 gallons) excluding potable water and petroleum	V, S, N	medium	medium	
Animal Slaughtering or Processing	M, N	low	medium	311
Asphalt Plants	V, S, N	low	medium	32412
Car Wash	V	low	low	811192
Cemetery [ground water only]	M, N, S	X	low	812220
Coal Gasification Facility	V	low	medium	324199
Dry Cleaning Establishment	V	low	medium	812320
Electrical and Electronic Product Manufacturing	I, V	low	medium	335310, 334410
Electroplating/Metal Finishing	I, V	low	medium	332813
Fertilizer/Manufacturer/Distributor/Storage	N, S	medium	medium	325, 422
Fire Training Facilities	V	low	medium	922160
Food Processing	M, N	low	low	311
Funeral Home/Mortuary	M, V	low	low	812210
Furniture/Boat Refinish (Boat Yards)	V, S, N	medium	medium	811420, 336612
Gasoline Station/Service Center	V, S, N	low	medium	447100
Golf Course	N, S	low	medium	713910
Hazardous Waste Recovery Facility	V, S, R, M	high	high	562211
Hazardous Waste Transfer, Storage or Disposal	V, S, R, M	high	high	562
Hospital	V, S, R, M	low	medium	622110
Laboratories	V, S, R, M	low	medium	541380, 621510
Machine Shops	V	low	medium	332710
Marina [Surface Only]	M, V, S	medium	X	713930
Military Base	V, S, R, M	high	high	928110
Oil & Gas Production (Refining)/Storage/Pipelines	V	medium	medium	324110, 422710, 486910
Paint Shop	V	low	medium	811121
Pesticide/Herbicide Manufacturer/Distributor/Storage	S	medium	medium	325320, 422690, 422910, 812290
Photo Processor/Printer	I	low	medium	486910, 221120
Pipeline / Powerline Right of Way	S	low	low	326100, 325211
Plastic Manufacturer	V, S	low	medium	221110
Power Generation Station	S	medium	low	421930
Scrap and Junk Yards	V, I	low	medium	562111
Solid Waste Collection/Transfer Site	V, S, M, I	low	low	562211
Superfund Site	V, S, R, M, I	high	high	562
Underground Injection Well [groundwater only]	V, S, R, M, I	X	high	
Underground Storage Tanks [excluding potable water][groundwater only]	V	X	medium	
Underground Storage Tanks [leaking][regulated][groundwater]	V	X	high	
Wood Preservative Manufacturer/Wood Preserver	S	low	medium	321114
Other				
Wastewater Facilities				
Combined Sewer Overflow/Discharge	M, N, V, S	high	low	22132
Septage Lagoon	M, N	medium	medium	22132

VIRGINIA SOURCE WATER ASSESSMENT PROGRAM

Table 1
LAND USE ACTIVITY INVENTORY
(Community and Nontransient Noncommunity Waterworks)

CLASSIFICATION	CONTAMINANT	SURFACE WATER RISK	GROUND WATER RISK	NAICS CODE
Sewer Lines (Surface-crossing and adjacent lines only) [surface water only]	M, N	High	X	22132
Storm Sewer Discharges and Stormwater infiltration ponds	V, N, S	Medium	low	22132
Untreated Piped Discharge [straight pipe]	M, N	High	low	22132
Wastewater Pump Station	M, N, V	High	low	22132
Wastewater Treatment Facility [point source discharge]	M, N, V	Medium	low	22132
Wastewater Treatment Nondischarging lagoon/mass drainfield	M, N, V	Low	medium	22132
Land Disposal				
Biosolids	M, N, I	low	low	111, 112
Industrial Sludge	M, N, I, S, V	low	low	562
Landfill (Lined)	M, N, V, S	low	medium	562212
Landfill (Unlined)	M, N, V, S	low	high	562212
Open Dump	M, N, V, S	low	High	5622
Septage	M, N	medium	Medium	111, 112, 562
Tire Pile	V	high	High	5622
Wastewater	M, N	medium	Medium	22132
Other				
Resource Extraction				
Coal	V	low	Low	21211
Oil + Gas	V	medium	Medium	211
Sand, Gravel, Limestone	V	low	Low	2123
Other				
Transportation				
Airport	V	low	Medium	422720
Parking Lots	V	low	Low	814
Primary Roadways	V, S, N, M, R	medium	Low	48
Railroad Tracks and Yards	V, S, N, M, R	medium	Low	482110
Salt Storage Sites	I	low	Low	48
Truck Terminals	V, S, N, M, R	medium	Medium	484
Special Cases (specifically identified as a significant source of contaminants)				
Barge and Vessel Traffic for surface sources		high	X	483211
Caves/Sinkholes for surface sources			X	

"X" – does not mean no risk

M = microbiological
N = nitrate/nitrite
V = volatile organic chemicals
S = synthetic organic chemicals
I = inorganic chemicals
R = radiological contaminants

(NOT all inclusive)

VIRGINIA SOURCE WATER ASSESSMENT PROGRAM

Table 2
LAND USE ACTIVITY INVENTORY
(Transient Noncommunity Waterworks)

CLASSIFICATION	CONTAMINANT	SURFACE WATER RISK	GROUND WATER RISK	NAICS CODE
Residential				
On-site sewage system [ground water only]	M, N	X	medium	814110
Agriculture				
Chemical/fuel storage areas	V, S, N	low	medium	111, 112
Crop and fodder production	S, N	low	medium	111
Specialty crop production/nursery (e.g. horticulture, citrus, nuts, fruits)	S, N	low	medium	111
Livestock/poultry				112
Pasture (grazing)	M, N	medium	low	112
Intensive animal feeding operations				112
Confined animal feeding operations (permitted)	M, N	high	high	112
Confined animal feeding operations (unpermitted)	M, N	high	high	112
Aquaculture	M, N	low	medium	11251
Animal burial areas	M, N	low	medium	112
Manure holding or spreading	M, N	medium	medium	112
Other				
Industrial/Commercial [Dry and Discharging]				
Above ground storage tank (> 660 gallons) excluding potable water and petroleum	V, S, N	medium	medium	
Animal Slaughtering or Processing	M, N	low	medium	311
Fertilizer/Manufacturer/Distributor/Storage	N, S	medium	medium	325310
Hospital	V, S, R, M	low	medium	622110
Laboratories	V, S, R, M	low	medium	541380, 621510
Marina [Surface Only]	M, V, S	medium	X	713930
Solid Waste Collection/Transfer Site	V, S, M, I	low	low	562111
Underground Injection Well [groundwater only]	V, S, R, M, I	X	high	562
Other				
Wastewater Facilities				
Combined Sewer Overflow/Discharge	M, N, V, S	high	low	22132
Septage Lagoon	M, N	medium	medium	22132
Sewer Lines (Surface-crossing and adjscant lines only) [surface water only]	M, N	high	X	22132
Storm Sewer Discharges and Stormwater infiltration ponds	V, N, S	medium	low	22132
Untreated Piped Discharge [straight pipe]	M, N	High	low	22132
Wastewater Pump Station	M, N, V	High	low	22132
Wastewater Treatment Facility [point source discharge]	M, N, V	Medium	low	22132
Wastewater Treatment Nondischarging lagoon/mass drainfield	M, N, V	Low	medium	22132
Land Disposal				
Biosolids	M, N, I	Low	low	111, 112
Industrial Sludge	M, N, I, S, V	Low	low	562
Landfill (Lined)	M, N, V, S	Low	medium	562212
Landfill (Unlined)	M, N, V, S	Low	high	562212
Open Dump	M, N, V, S	Low	high	5622
Septage	M, N	Medium	medium	111, 112 562
Wastewater	M, N	Medium	medium	22132
Other				
Special Cases (specifically identified as a significant source of contaminants)				
Barge and Vessel Traffic for surface sources		High	X	483211
Caves/Sinkholes for surface sources			X	

"X" – does not mean no risk

M = microbiological
N = nitrate/nitrite
V = volatile organic chemicals
S = synthetic organic chemicals
I = inorganic chemicals
R = radiological contaminants

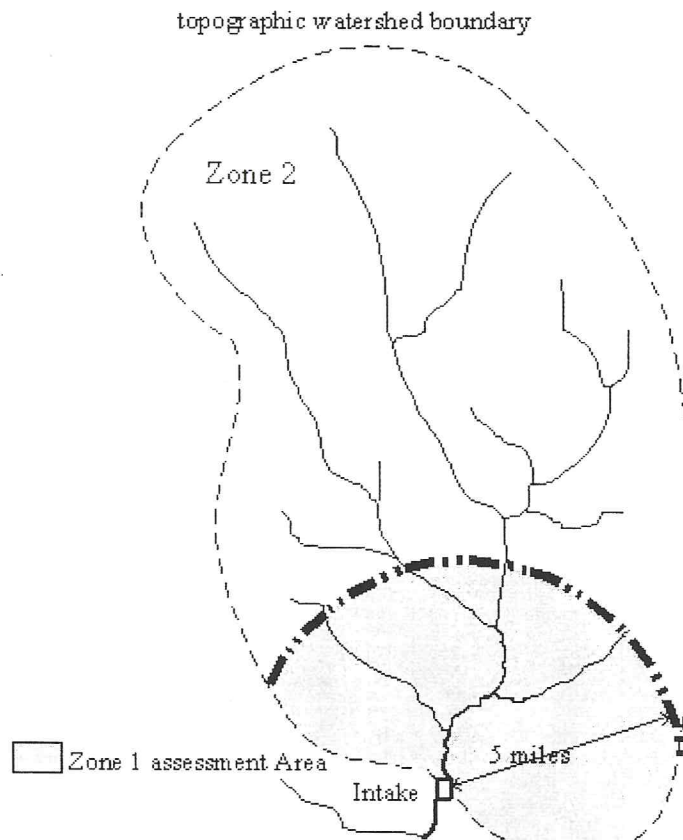
(NOT all inclusive)

VIRGINIA SOURCE WATER ASSESSMENT PROGRAM

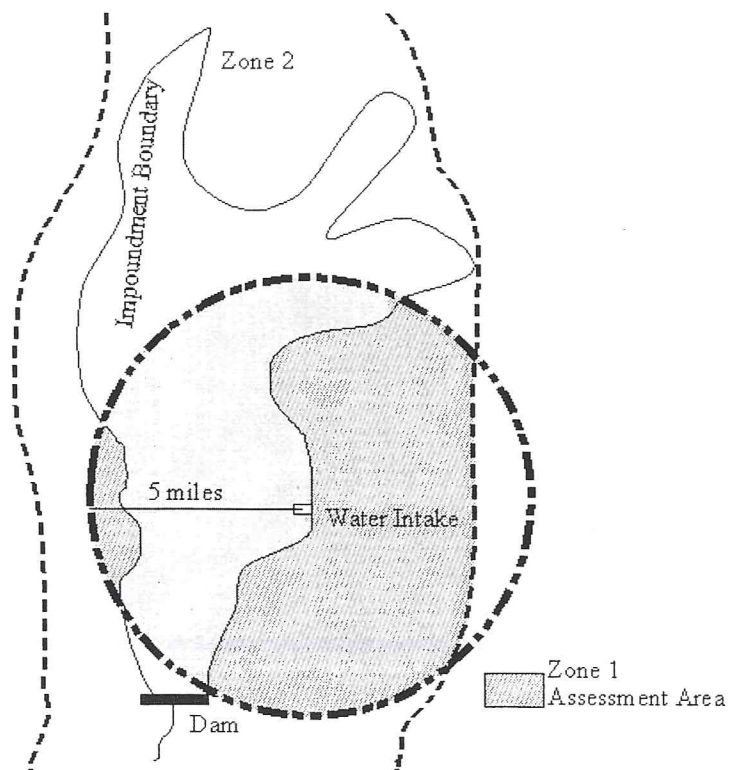
Table 3
POTENTIAL CONDUITS TO GROUNDWATER
(All Waterworks Utilizing Groundwater)

Abandoned Wells (which have not been permanently abandoned according to the Virginia Department of Health Regulations)
Caves / Sinkholes
Elevator shafts
Other Wells in Use (other than wells constructed in accordance with the Virginia Department of Health Regulations)
Ponds, streams
Vertical Ground Source Heat Pump systems

APPENDIX G



Nontidal Source Intake



Impoundment Intake

APPENDIX H

Appendix H

GROUND WATER PROTECTION PROGRAMS

Ground water programs in Virginia strive to maintain existing high water quality through adopted statutes, regulations, and policies. Advancing ground water protection efforts is the goal of many state programs in numerous state agencies. In late 1986 an interagency committee was formed to stimulate, strengthen, and coordinate ground water protection activities in Virginia. The Ground Water Protection Steering Committee (GWPSC) continues to meet bi-monthly with representation from the following agencies:

Department of Environmental Quality (DEQ)
 Department of Health (VDH)
 Chesapeake Bay Local Assistance Department (CBLAD)
 Department of Mines, Minerals, and Energy (DMME)
 Virginia Polytechnic and State University (VPI&SU)
 Department of Housing and Community Development (VDH&CD)
 Department of Agriculture and Consumer Services (VDACS)
 Department of Conservation and Recreation (DCR)
 Department of General Services, Division of Consolidated Laboratories (DCLS)
 Department of Business Assistance (DBA)
 US Geologic Survey (USGS)

The following paragraphs briefly describe ground water protection activities at member agencies.

Wellhead Protection Efforts: Building grassroots support for ground water and wellhead protection continues to be priorities of the GWPSC. Accomplishments to date include the development and distribution of a 1991 publication Wellhead Protection: A Handbook for Local Governments in Virginia and a 1993 publication on wellhead protection activities in the Commonwealth (Wellhead Protection: Case Studies of Six Local Governments in Virginia), hosting a number of one day workshops, and the voluntary completion of Biennial Wellhead Protection Reports. Future efforts will include cooperating with the Virginia Department of Health on source water protection issues. Funding for GWPSC activities, including wellhead protection, is provided through DEQ's Federal Ground Water Protection Grant.

Ground Water Management Act of 1992: The 1992 session of the Virginia General Assembly adopted the Act and repealed the Ground Water Act of 1973. The Act establishes criteria for the creation of ground water management areas and requires persons who withdraw more than 300,000 gallons of ground water per month to obtain permits. The Act requires that previously exempted agricultural ground water withdrawals obtain ground water withdrawal permits. The DEQ adopted regulations to implement the Act in September of 1993. This regulation is currently in the process of amendment to include specific requirements for agricultural ground water withdrawal permits and to require DEQ to perform technical evaluations of proposed withdrawals.

Underground Storage Tank (UST) Program: The DEQ currently maintains records on some 74,000 regulated USTs at 25,000 facilities in Virginia. The UST program maintains a computer database of all UST information and tracks the reporting of installations, upgrades, repairs, and closures. Local building/fire officials assist by permitting UST activities statewide. Compliance monitoring is performed on a periodic basis and includes computer searches, outreach through presentations and informational mailings, compliance mailings, and random site inspections. By December 22, 1998, all existing (pre-1988) USTs must be upgraded to new tank standards, replaced, or closed. The DEQ conducted 6,000 UST inspections during 1997 to inform owners of this deadline. Federal grant funds and matching State funds support this program.

Leaking Underground Storage Tank (LUST) Program: The LUST side of the UST program is involved in overseeing leaks from underground storage tanks. Regional Office Ground Water staff performs initial investigations and direct owners/operators to take appropriate remediation activities. Regional Office staff review all required reports and issue corrective action plan (CAP) permits as needed. Central office staff provides audit/review of regional office approved site characterization (SCR) reports and CAPs and assist the regional staff as necessary. To assist owners and operators with UST releases, the tank program maintains procedures for UST owners/operators to obtain reimbursement for certain corrective action costs and third party claims through the Virginia Petroleum Storage Tank Fund (VPSTF). A combination of Federal LUST Trust Funds and VPSTF monies are used to implement this effort.

In cases where owners/operators cannot be identified or are unable to act effectively the DEQ LUST staff utilize a private contractor to investigate and cleanup. The LUST staff also manages the alternate water supply (AWS) effort and provides technical review of reimbursement requests for reimbursing owners/operators who have spent more than their limit of financial responsibility.

Aboveground Storage Tank (AST) Program: The DEQ has proposed a new regulation that will consolidate three existing regulations and aid DEQ efforts to eliminate duplication in regulations, provide uniformity in regulation, streamline government services, and increase performance and efficiency. The existing regulations relate to the 9,968 presently registered ASTs/facilities located in the Commonwealth that have an individual AST capacity of 660 gallons or an aggregate facility capacity of 1,230 gallon or more of oil. Proposed additions to the regulations will establish criteria for granting) variances from the AST Pollution Prevention Requirements and will allow DEQ to evaluate and take the necessary steps to accept US Coast Guard and EPA approved response plans either wholly or with state specific information added. Registration fees, "Oil Discharge Contingency Plan" fees, and State funds support the AST program.

Waste Permitting Activities: The Resource Conservation and Recovery Act (RCRA) Base Program addresses ground water quality issues at both permitted and unpermitted land-based units. Information is maintained for non-Hazardous and Solid Waste Amendment (HWSA) sites and is divided into two sectors. The term "sites" refers to facilities; most facilities have more than one regulated unit. There are a total of 47 units among 29 facilities. The first sector, "Base Program Correction Action" sites are permitted units required to perform corrective action if the ground water concentrations exceed established Ground Water Protection Standards. The second sector is "Unpermitted Land Disposal Facilities (LDF)" where continued operation of the facility is contingent upon removal or decontamination

of contaminated media. In instances where the LDF is closed, ground water monitoring is required to demonstrate that closure performance standards are met. When standards are not met, the site is issued a Post Closure Permit and corrective action is taken.

Other information maintained are ground water contamination statistics from the DEQ's Federal Facilities Restoration and Superfund Office. The Federal Facilities Restoration activities include Department of Defense (DOD) installations (Army, Navy, Air Force, Defense Logistics Agency, and Formerly Used Defense Sites) and a NASA installation for a total of 33 installations. Currently eight Federal Facilities are listed on the National Priority List (NPL) and 25 non-NPL sites. Base Realignment and Closure is occurring at seven facilities. Federal funding from the Department of Defense supports the Federal Facilities Restoration program. The Superfund Program, funded with both Federal and State dollars, carries out activities required by law or legal agreements at 20 NPL sites. Two of these sites have now been cleaned up and delisted. Additional activities within this Office include DEQ's Voluntary Remediation Program and the Brownfields Program. The Voluntary Remediation Program provides a mechanism for eligible participants to voluntarily clean up properties not mandated for remediation under existing environmental laws. This program serves as a mechanism for cleanup of Brownfield sites. There are currently 75 Brownfield sites that are either potential candidates for clean up, formally in the program or have been cleaned up under the program. A combination of registration fee and EPA funding supports the Voluntary Remediation Program. The DEQ's Brownfields Program, funded through EPA, is currently under development. None of these four programs currently collect ground water quality data; they do receive and review data collected by outside sources.

Pesticide Disposal Program: The VDACS, in cooperation with the Virginia Pesticide Control Board, has conducted a highly popular Pesticide Disposal Program since 1990. As of October, 1997 more than 240 tons of unwanted pesticides have been collected from 1455 agricultural producers, pesticide dealers and commercial pest control firms located in 83% of Virginia's counties and independent cities and disposed of safely. Collection and disposal of agricultural pesticides will be carried out in the remaining counties in 1998. The pesticide disposal program has benefited from a high level of interagency cooperation among the VDACS, DEQ, DCR, DCLS, and Virginia Cooperative Extension. Funding to support this program has been pooled from Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and Clean Water Act (Sections 319 Non Point Source and 106 Ground Water Protection) grants and the Office of Pesticide Services program fees.

Pesticide and Ground Water Management Plan: In response to the EPA Pesticides and Ground Water Strategy, the VDACS formed a task force in 1992. This committee comprised of representatives from the water user community, four representatives from the GWPSC, four representatives from the agricultural community, a member from the Board of Agriculture and one from the Virginia Pesticide Control Board. The objective of the task force was to draft a Generic State Management Plan (GSMP) for pesticides and ground water. GSMP development was cooperatively funded by the VDACS, DCR, and DEQ through EPA FIFRA, Clean Water Act (Sections 319 Non Point Source and 106 Ground Water Protection) grants. The completed GSMP was submitted to EPA Region III in 1993 and received EPA concurrence in 1995.

The GSMP established a graduated response plan for pesticides detected in ground water and a process for developing pesticide specific management plans (PSMP) should such be required by anticipated federal rule making and a graduated response approach for managing pesticides identified as potential threats to ground water.

Pesticides in Ground Water Monitoring Project: In preparation for implementation of PSMPs, the VDACS initiated a pilot monitoring project in September, 1994 and completed in March, 1996. A total of 49 shallow bored wells were sampled in eight localities. Samples were analyzed for alachlor, atrazine, cyanazine, metolachlor, simazine and nitrates. At least one pesticide was detected in nine of the wells. One well exceeded the Maximum Contaminant Level (MCL) established under the Safe Drinking Water Act for alachlor (2 ppb) with a detection of 9 ppb. Thirty-four wells had detectable levels of nitrate. Seven wells exceeded the MCL established under the Safe Drinking Water Act of 10 ppm. The highest level of nitrate was 17.2 ppm.

CIBA Atrazine Monitoring Study: The VDACS cooperated in an Atrazine Monitoring Study with CIBA Ag Chemicals in 1994. Under this study, 64 drinking water wells were sampled and analyzed for atrazine, simazine, prometon, propazine, ametryn, prometryn, metalaxyl, metolachlor, cyanazine, three metabolites of atrazine, and nitrates. At least one pesticide was found in 19 wells. However, concentrations were generally very low. No wells had pesticide residues at or above the MCL. Fifty-three wells had detectable levels of nitrate and sixteen of these wells had levels of nitrates at or above the MCL of 10 ppm.

Cat Point Creek Watershed-Shallow Ground Water Monitoring: The DCR, in cooperation with the Tidewater Resource Conservation and Development Council, initiated a ground water monitoring study in the Cat Point Creek watershed in December, 1995. Land use in the watershed is dominated by rowcrop agriculture, grasslands, and forestry. The purpose of this ground water study was to begin a multiple-year process to evaluate the effectiveness of integrated crop management (ICM) in reducing the loading of nitrate and pesticides to the shallow water-table aquifer. ICM incorporates nutrient management and pest management into one plan to be followed by producers. In this study, two producers implemented ICM at three different study sites (sites 1-3) beginning in the spring of 1996. A well cluster, consisting of three wells per cluster, was established in each of the ICM fields and in the control fields. Ground water samples for nutrients were collected twice a month between February and July and on a monthly basis for all other months. Pesticide samples were collected in May and November of 1996. Average nitrate concentrations are shown on the chart below. Atrazine was the only pesticide detected in ground water and it was only found in samples collected at the ICM and control fields at site 1 in May 1996. Pesticides were not detected in any of the November, 1996 samples. Ground water monitoring activities were funded through the DEQ's Federal 106 Ground Water Protection Grant.

Polecat Creek Watershed-Shallow Ground Water Monitoring: In June 1997, the CBLAD initiated ground water monitoring for nitrates as part of the Polecat Creek Watershed project. Activities have been funded by the Clean Water Act, Section 319 Non-Point Source grant funds and Chesapeake Bay grant funds. The USGS is conducting the ground water monitoring in Caroline County. There are two well transects installed adjacent to agricultural land uses and one transect in a residential subdivision. Pending grant applications include determining flow periods, history, and chemistry for ground water in this watershed and, ultimately, attempting to learn if pollution is flowing into surface waters through ground water.

CONCLUSION

Ground water programs in Virginia strive to maintain the existing high water quality. The Virginia Ground Water Protection Steering Committee (GWPS), established in 1986, continues to meet bi-monthly as a vehicle for sharing information, for directing attention to important ground water issues, and

for taking the lead on ground water protection initiatives requiring an interagency approach. This interagency advisory committee is designed to stimulate, strengthen, and coordinate ground water protection activities in the Commonwealth. Ground water protection activities in the Commonwealth are as varied as the funding sources that support them.

APPENDIX I

State Stormwater Management Regulations

In 1990, the **Virginia Department of Conservation and Recreation (VDCR)** enacted the *State Stormwater Management Regulations (VR 215-02-00)*. These regulations implement the 1989 *State Stormwater Management Law* (Code of Virginia, 10.1-603.1 to 10.1-603.15) which was designed to provide clear enabling authority for local stormwater management programs in Virginia. The state regulations, which are voluntary for local governments, assume that a local government must adopt the regulations in their entirety in order to demonstrate clear enabling authority for a local stormwater management program. The state regulations require the control of stormwater pollution and peak flows discharged by new development. The stormwater pollution control requirements specify minimum standards for three different structural BMPs (i.e. wet detention basin, extended detention dry basin, infiltration facility), including design criteria.

State Erosion Control Regulations

These regulations (*VR 625-02-00*), which are enforced by **VDCR**, specify minimum standards for the control of soil erosion and sediment deposition from construction sites. The regulations specify structural and nonstructural controls for construction site conditions. These regulations are mandatory for all new development in Virginia.

NPDES Stormwater Permitting Program

In 1992-1993, Virginia cities and counties with populations of 100,000 or greater filed NPDES stormwater permit applications with the **Virginia Department of Environmental Quality (DEQ)** pursuant to the federal *Clean Water Act*. These municipal permit applications specify comprehensive stormwater management programs which will be implemented by each municipality during the 5-year NPDES permit term.

Hazardous and Solid Waste

The **Waste Division of DEQ** administers the state's *Hazardous Waste Management (VR 672-10-1)* and *Solid Waste Management Regulations (VR 672-20-10)*.

- **Solid Waste Management**

Local governments in Virginia are required to provide proper disposal of solid waste in accordance with DEQ's regulations. Many of the cities, counties, and towns in Virginia accept nonhazardous solid wastes from commercial sources within their jurisdiction for disposal in the same facility used for residential wastes. No liquid wastes may be disposed of in a solid waste landfill.

If a business elects to operate its own solid waste management facility, it must obtain a permit for the facility from the DEQ. Prior to applying for a state permit, the applicant also is required to obtain approval or certification of compliance with local land use regulations and, if applicable, siting approval from the appropriate local government.

- **Hazardous Waste Management**

Anyone who generates, transports, stores, treats, or disposes of hazardous waste in Virginia is subject to Hazardous Waste Management Regulations. The purpose of these regulations is to control all hazardous wastes that are generated or transported in Virginia. The waste generator is responsible for packaging, labeling, marking, and placarding hazardous material prior to transporting. A generator may not accumulate hazardous waste on-site for more than 90 days without becoming subject to additional regulations which apply to operators of permitted hazardous waste storage facilities. Those generating less than 220 pounds per month may be exempt from the full scope of the regulations, but are encouraged to recycle and reuse.

- **Hazardous Waste Management Facilities**

Hazardous waste management facilities are regulated by the DEQ and require a state permit. Application for a permit must be made by anyone who intends to treat, store, or dispose of or in some way operate hazardous waste management facilities. Applications for a permit requires a detailed filing and lengthy public participation process.

- **Toxic Substances**

The Waste Division keeps records on the locations and amounts of toxic substances. Commercial establishments manufacturing or using chemical substances in manufacturing are required to file inventory reports. (Note: See the section on the Virginia Department of Health for overlap in this program.)

NPDES/Water Quality

The **DEQ Water Division** administers the *NPDES Permitting Program*, the state *Water Quality Standards Regulations* (VR 680-21-00), and the state's *Groundwater Withdrawal Regulations* (VR 680-13-07).

- **Virginia Pollutant Discharge Elimination System (VPDES) Permit**

This permit is required where there is a point source discharge of pollutants to surface waters. The permit includes effluent limitations, self-monitoring requirements, and reporting requirements.

- **Toxic Management Program**

This program was established for the purpose of controlling the levels of toxic pollutants in surface waters from point source discharges. As VPDES permits are processed a determination on the need for a toxics management program is made. An owner is required to biologically and chemically monitor for toxic pollutants. If the results of this monitoring indicates the toxicity does or may exist then a toxicity reduction program is required as a condition of the VPDES permit.

- **Pretreatment Program**

Certain publicly owned wastewater treatment works are required to have a pretreatment program designed to control the industrial discharges into their sewerage system. The pretreatment program is implemented at the local level with approval and overview from DEQ. Where an approved program is required, it will be included as a condition of the VPDES permit issued to the locality.

- **Virginia Pollution Abatement (VPA) Permit**

This permit is required where an owner manages the pollutants without having a point source discharge to surface waters. It is applicable where the wastewaters or sludges are land applied or recycled. The permit includes management requirements, self-monitoring, and reporting requirements.

Septic Tanks/Wastewater Treatment

The **Virginia Department of Health (VDH)** administers the state's *Sewage Handling and Disposal Regulations*, which cover the design of septic tank systems and other residential sewage disposal systems, and the state's *Sewage Collection and Treatment Regulations*, which include design standards for sewer systems, pumping stations, and wastewater treatment plants.

Toxic Substances

VDH is designated as the State Toxic Substances Information Agency, and along with DEQ's Waste Division, keeps records on the locations and amounts of toxic materials. Commercial establishments manufacturing or using chemical substance in manufacturing are required to file inventory reports. (Note: See the section on DEQ's Waste Division for overlap in this program.)

This information is available to state agencies for use in regulatory matters.

Policies/Regulations Covering Point Source Discharges

The **Virginia DEQ** has established more stringent effluent limits for wastewater treatment plant discharges in selected water supply watersheds in the State of Virginia. Examples include the *1971 Occoquan Watershed Policy* which requires a limited number of advanced wastewater treatment (AWT) facilities in the 580 sq-mi watershed, and the *Chickahominy River Watershed Policy* which sets stringent effluent limits for wastewater discharges upstream of the Newport News Waterworks intake at Walker's Dam.

Other watersheds of public water supplies have typically been designated by **DEQ** as separate stream/river sections for the purposes of setting water quality standards and effluent limits for upstream wastewater discharges (**State Water Control Board Water Quality Standards Regulations**, VR 680-21-00). The designated "PWS" section of the stream/river usually begins at the intake point, and extends at least 5 miles upstream -- or the designation may include the entire upstream watershed.

In most water supply waterworks, **DEQ** and the **VDH** enforce a minimum separation distance of 5 miles between the water supply intake and any new point source discharge. The minimum separation distance of 5 miles is based on *Section 15.1-292 of the Code of Virginia*, which specifies that local governments may prevent water pollution within 5 miles of a water supply intake. **DEQ's Occoquan Watershed Policy** specifies a more stringent minimum separation distance (15- to 20-miles).

The Chesapeake Bay Local Assistance Department administers the Chesapeake Bay Preservation Act of 1988. This Act established a cooperative state and local program to protect water quality in Chesapeake Bay and its tributaries through improved land use planning and management. In 1990, the Chesapeake Bay Local Assistance Board promulgated the Chesapeake Bay Preservation Area Designation and Management Regulations (VR 173-02-01). The Regulations are mandatory for all Tidewater counties, cities and towns, and may be adopted on a voluntary basis by localities in other areas of the state. The Regulations require localities to designate Resource Protection Areas and Resource Management Areas, based upon the presence of certain environmental features where improper development would have an adverse effect on water quality. The Regulations also require localities to incorporate measures into their land use management ordinances that protect the water quality of the Bay and its tributaries.

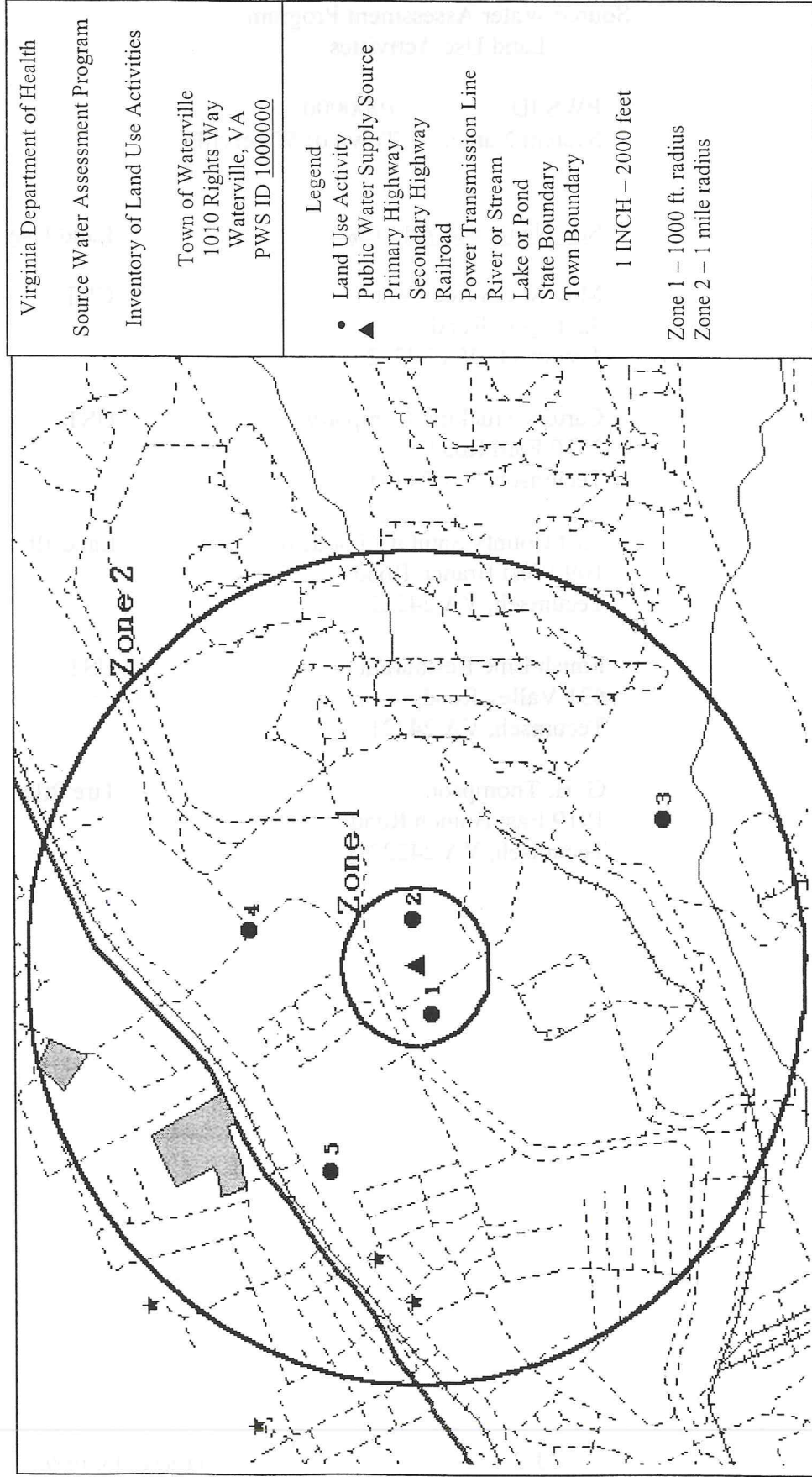
For any new urban development, the post-development stormwater pollution load must not exceed the pre-development load based on average land cover conditions. Redevelopment projects must achieve at least a 10% reduction in stormwater pollution loading of total phosphorus, the "keystone" pollutant, compared to existing conditions. This is achieved through preserving indigenous vegetation, limiting the area of land disturbance, minimizing impervious cover, and using structural BMPs where necessary. The Regulations also require septic system pumpouts every five years, reserve septic drainfields, and soil and water conservation plans for all land where agricultural activities are being conducted, among other measures.

In addition, the Regulations require localities to consider the protection of potable water during development of their comprehensive plans. This involves identification of surface and groundwater supply systems, determination of existing and future demand, assessment of the quality of the source waters, identification of possible point and nonpoint sources of pollution, determination of the impacts future land use and population growth will have on the quality of the water supply, and the formulation of policy and management strategies designed to protect this resource.

If a watershed is included within a Chesapeake Bay management area, the requirements of the Regulations could serve as the basis for controlling both agricultural and urban stormwater pollution. If the current Chesapeake Bay management areas do not cover any or all of the water supply watershed in a particular jurisdiction, the local government could elect to expand the boundaries of the management areas to address water supply watershed management needs.

APPENDIX J

Appendix J



Virginia Department of Health
Source Water Assessment Program
Land Use Activities

PWS ID: 1000000
System Name: Town of Waterville

<u>Map Site #</u>	<u>Site Name and Address</u>	<u>Land Use</u>
1	M & M Service Center 92 Tripoli Road Tecumseh, VA 24222	UST
2	Carters Trucking Company 3310 Ford Road Tecumseh, VA 24421	UST
3	East County Sanitary Landfill 109 West Branch Road Tecumseh, VA 24222	Landfill
4	Finish Line Restaurant 631 Valley Road Tecumseh, VA 24221	UST
5	G. H. Thompson 1019 East Branch Road Tecumseh, VA 24222	Tire Pile

APPENDIX K

Appendix K

Source Water Protection Team Agenda
January 27, 1998

- 10:00 a.m. Welcome and Introductions
- 10:15 a.m. Final Source Water Assessment Program (SWAP) Guidance Review
- 11:00 a.m. Current Conceptual SWAP Review
- 11:45 a.m. Set-Asides for SWA's
- 12:00 p.m. Lunch – Box lunches provided
- 12:30 p.m. Source Water Protection Team Tasks
- 1:30 p.m. General Discussions on Delineation, Inventory, Susceptibility Determinations, etc.
- 2:15 p.m. Response to EPA's Key Issues
- 3:00 p.m. Adjourn

Inbox

Received: JANUARY 28, 1998 09:10am Sent: JANUARY 28, 1998 09:08am
From: GPEAKS.VDH.STATE.VA.US <GPEAKS.VDH.STATE.VA.US>
To: CREST(Charles Rest), RCONNER(R.E. Conner), RWHITNER(Raymond Whitner),
RMORRISSETTE(Randall Morrisette), RVANLIER(Robert Vanlier), KTAYLOE(Kimberly Tayloe), AWEBER(Alan
Weber), AMCTHENIA(Andrew McThenia), LIBARKIN@EROLS.COM
Subject: Source Water Protection Team
Cc: TGRAY(Thomas Gray)

The first meeting of the TEAM was held on Jan.27,1998 and the agenda for the day was followed . The goal of this meeting was to bring the TEAM members up to date on EPA's guidance and DWSE's concept of a possible SWAP. The general concensus was to begin our tasks with the full TEAM involved in each step and if deemed necessary, later ,to consider subcommittees on specific issues.The KEY ISSUES found on page 2-5,table 1,of the guidance documents was discussed. In general, it was felt that the state had done an acceptable job on ISSUE 1. Relative to ISSUE 2,a suggestion was made to use news releases and our web site to advise the public at various points in the development of the SWAP what we intend to do and to request comment.ISSUE 3 received considerable attention and the consensus was to be very cautious in using the public in performing assessment duties.One idea that was felt to have merit to consider later was making the SWAP information available to the consumers as we begin the assessments on a particular source so they could help identify possible contaminate sources i.e. buried chemical drums etc.Overall, educating the public was considered important.

----- End of Message -----

Jan 27
1998
meeting minutes



COMMONWEALTH of VIRGINIA

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

Department of Health
P O BOX 2448
RICHMOND, VA 23218

TDD 1-800-828-1120

MEMORANDUM

DATE: February 6, 1998
TO: Source Water Protection Team
FROM: Jerry Peaks/Charles Rest
SUBJECT: 2nd Meeting – February 23, 1998
Emphasis – Delineations

AGENDA

- 10:00 Presentation of Groundwater Under the Direct Influence of Surface Water Determination (GUDIS) – Jerry Peaks
- 10:20 Presentation of Phase II/V Vulnerability Analysis – Ray Whitner
- 10:45 Review Guidance Document Related to GW Delineations
- 11:00 Address Transient Noncommunity (TNC) Waterworks Process
- 11:20 Address Community (C) and Nontransient Noncommunity (NTNC) Waterworks Delineation Methods
 - review mailouts/handouts
 - advantages/disadvantages of methods
 - obtain consensus on method(s)
- 12:00 Box Lunch
- 12:30 Cont'd GW Discussions

MEMORANDUM

February 6, 1998

Page 2

1:30 Address Surface Water Delineation Criteria

- review guidance document related to surface delineations
- review EPA document on delineating surface sources
- obtain consensus on method(s)

3:00 Adjourn

It is important that each member has read and contemplated the EPA State Source Water Assessment and Protection Programs Final Guidance document especially concerning Delineation issues. Attached is additional information related to delineation methods, which we hope will illustrate the advantages and disadvantages of the various methods. As in all programs developed to protect the public's health, we need to be mindful of the benefits relative to the cost in dollars and time. Please keep in mind the siting and construction standards and the bacteriological and chemical monitoring requirements of the *Waterworks Regulations*; the VDH surveillance program; previous groundwater source assessments; and the SWAP as a first step in an ongoing source water protection effort as you consider delineation methods.

We hope to have a highly successful meeting. See you there!

Surface Water Delineation

Feb 23, 1998

Hand written notes indicate
decisions made.

- I. Setback from water body - 100 - 500ft. *1000 ft.*

*1000' relates well to the previously decided 1000' fixed
radius for groundwater sources*

- II. Upstream (main stem(s))

- a. 0-5 miles - inventory all sources of the significant potential sources of
contamination.

- b. >5 miles - GIS layer sites (NPDES, Tire Piles, landfills, etc) *on watershed map*
~~available to owner.~~
No further inventory.

- III. Upstream (tributaries) - entering main stem(s) - *total distance from intake
equals 5 miles.*

- a. 0-0.5 miles above intake - See II a. & b. above

- b. >0.5 ≤ 5 miles - inventory sites on GIS layers

- c. >5 miles - no further inventory - See II b. above

- IV. Downstream (Tidal only) - case by case

MAPS - will include entire watershed
Intermittent tributaries - same as tributary criteria - use USGS maps



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MEMORANDUM

DATE: March 10, 1998
TO: Source Water Protection Team
FROM: *Jerry*
Jerry Peaks/Charles Rest
SUBJECT: SWAP Team Meeting - February 23, 1998

The second SWAP Team Meeting was held and the attached agenda was followed. The 10:00 am and the 10:20 am presentations were given as background on efforts previously made by VDH staff relative to susceptibility/vulnerability assessments of groundwater sources. The Final Guidance Document (10:45 am) was quickly reviewed relative to Ground Water delineations.

A discussion of the 11:00 am agenda item, "TNC" process, covered a range of issues. The guidance indicates that the minimum SWAP requirements for TNC's were to address the two regulated contaminants i.e. microbes and nitrates. The team discussed, in particular, a concern about Leaking Underground Storage Tanks (LUSTs) and whether to include them on inventories and in the susceptibility determinations. It was concluded to use the same delineation criteria that we would decide upon for community systems; to limit the inventory and susceptibility determinations to microbes and nitrates; and to show locations of USTs within the delineation area that was available on existing GIS layers as information for the owner.

Considerable discussion of the 11:00 am agenda item ensued with reference made to previous mailouts and new handouts provided at the meeting. The six- (6) general methods suggested by the Final Guidance were discussed and their pros and cons considered. Based on all of the information available, it was decided that we would recommend a 1000-ft. fixed radius as the sourcewater assessment area (area of delineation). For GUDIS that had an obvious stream or "sinking stream" source, the surface delineation criteria would be utilized.

The 1:30 pm agenda item, addressing Surface Water delineation criteria, was also discussed after reviewing specific items in the Final Guidance Document. The draft discussion paper, attached, on Surface Water Delineation was used as a springboard for discussion. The handwritten notes indicate decisions made. Rob volunteered to investigate further whether it would be more appropriate to utilize Time of Travel (TOT) rather than distance to establish the delineation distance above the intake.

MEMORANDUM

March 10, 1998

Page 2

The assignment for the entire TEAM was to further consider the 1000-ft. set back distance for surface delineation.

Also, VDH staff was to evaluate whether the 1000-ft. set back distance would sufficiently cover (delineate) the intermittent streams entering the surface source. This was to be accomplished by viewing topos for surface sources in their field office.

In addition to the above assignments, which are intended to bring closure to the "Delineation" exercise, we should utilize a portion of the next meeting to discuss what we intend to inventory i.e. the "significant potential sources" of contamination. Please review pages 2-7 paragraph 3; pages 15, 16, and 17 Significant Potential Sources; and Appendix E of the Guidance Document.

The next meeting date has been scheduled for April 22, 1998 from 10:00 a.m. until 3:00 p.m. at Sydnor.

Attachments



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MEMORANDUM

DATE: April 13, 1998

TO: Source Water Protection Team

FROM: *Jerry* Jerry Peaks/Charles Rest

SUBJECT: 3rd Meeting - April 22, 1998
Emphasis - Delineations/Inventory

AGENDA

- 10:00 Discussion and changes to minutes from the February 23, 1998 meeting.
- 10:15 Discussion of Team assignment to "further consider the 1000-ft. set back distance for surface delineation". VDH staff reports on their evaluation "whether the 1000-ft. set back distance would sufficiently cover (delineate) the intermittent streams entering the surface source".
- 10:45 Report on Time of Travel vs. distance to establish the delineation distance above a surface intake.
- 11:15 Conjunctive Delineation
- 11:45 Close delineation criteria
- 12:00 Box Lunch (provided)
- 12:30 Inventory Discussions
 - Significant Potential Sources of Contamination re: pages 2, 15 and 17

Memorandum
April 13, 1998
Page 2

- 1:45 Comments from Jerry Peaks on Ground Water Protection Council Policy Meeting
- 1:50 Update on GPS/GIS efforts
- 2:00 Update on SWPP RFP
- 2:10 Handout - draft SWAP document
- 2:20 Advise of TAC meeting and recommendations to TAC
- 2:30 Key Issues - Tables
- 2:55 Next Meeting
- 3:00 Adjourn



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MEMORANDUM

DATE: April 28, 1998
TO: Source Water Protection Team
FROM: Jerry Peaks/Charles Rest *gony*
SUBJECT: SWAP Team Meeting Minutes - April 22, 1998

The third SWAP Team Meeting was held and the attached agenda was followed. The minutes from the February 23, 1998 meeting were accepted.

The 10:15 a.m. agenda item was postponed in order to hear Rob VanLier's report on the possibility of utilizing Time of Travel (TOT) in lieu of distance as a delineation criteria for surface supplies. Rob had performed an excellent review and provided documents relative to TOT. Based on Rob's report and the Team member's previous knowledge and understanding of the advantages and disadvantages of TOT, it was decided that we would not use TOT.

The 10:15 a.m. agenda item discussion garnered considerable new incite into the surface delineation criteria. Andy presented a map of a watershed in his area, which assisted us in visualizing our deliberations about a 5-mile delineation and the 1000-ft set back issue. Rob pointed out that DEQ's Water Quality Standards presently use the 5-mile delineation and topographic boundaries as appropriate. It was the consensus to recommend for the surface water delineation criteria a 5-mile distance (upstream) on the main stem(s) and all tributaries and not to use a 1000-ft. setback distance. If there are topographic boundaries within the 5-mile distance, which better define the watershed, these boundaries will be used. This allows for complete coverage of the watershed up to 5-miles for our inventory activities. As previously decided, beyond the 5-miles we will still include on maps the locations of contaminant sources available on GIS layers.

The 11:15 a.m. agenda item, Conjunctive Delineation, was discussed with reference to Appendix D of the Final Guidance. The consensus from the Team was that our current delineation criteria, compiled with VDH's groundwater under the influence of surface water determinations adequately addressed conjunctive delineation. All surface streams, lakes, etc. within the source water protection area delineated will be shown on the maps.

Memorandum
April 28, 1998
Page 2

The delineation criteria discussion was closed with the attached describing the consensus of the Team.

The 12:30 p.m. agenda item, Inventory Discussions, began our detailed deliberations of the potential sources of contamination that we felt were significant. We concluded that there are many potential sources of contamination that may or may not be "significant" due to quantity of contaminant, on-site contaminant containment, geological properties, etc. It was decided that a list would be developed of potential sources of contamination that we would inventory. We would title this list as "Significant" sources of contamination. After the inventory, the actual "significance" would be determined and incorporated into the Susceptibility Determinations.

Appendix E of the Final Guidance Document was reviewed as well as VDH's Phase II/V inventory list and a list developed by the State of Florida. The attached list is a compilation of the agreed upon "significant" potential sources of contamination. This is our first draft and there may be changes to sources as well as the addition of qualifying criteria (i.e. greater than 100 lbs., 10 acres or more, etc.) to some sources.

A handout of a draft SWAP that incorporates many of our deliberations was distributed.

The assignments for the Team are as follows:

1. Review and comment on the Draft SWAP.
2. Review and comment on the draft list of "Significant" Potential Sources of Contamination.
3. Consider the implementation impacts of the list on those that will be performing the inventory.
4. Consider (and research if interested) the next issue – Susceptibility Determinations.

The next meeting will be announced later.

Attachments



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MEMORANDUM

DATE: June 8, 1998
TO: Source Water Protection Team
FROM: Jerry Peaks/Charles Rest
SUBJECT: SWAP Team Meeting Minutes – June 2, 1998

The fourth SWAP Team Meeting was held and the attached agenda was followed. The minutes from the April 22, 1998 meeting were accepted.

The 10:15 a.m. agenda item discussion relative to the surface delineation criteria resolved an issue concerning whether the 5-mile delineation was the watershed within a 5-mile radius or the watershed bounded by a 5-mile distance (upstream) on the main stem(s) and all tributaries. The consensus was the latter. If there are topographic boundaries within the 5-mile distance, which better define the watershed, these boundaries will be used. This allows for complete coverage of the watershed up to 5-miles (river reach) for our inventory activities. This also matches DEQ's definitions and criteria for the water quality standards associated with water supply intakes.

The issue of proposing two (2) zones for groundwater delineation in order to match the two (2) proposed for surface water was readily accepted with zone 1 being the required well lot. This was one of those "assumed" criteria that certainly needed to be added to the description.

For the "suspected" feature for GUDIS, it was the consensus to add as a case-by-case criteria.

The 11:15 a.m. agenda item discussion concerned Robert Royall's letter dated May 8, 1998. The consensus was to have a separate table entitled "Potential Conduits of Contamination" or similar title.

The 11:30 a.m. agenda item relative to the usage of the term "significant" in association with potential sources of contamination resulted in recommending the removal of the term significant from the inventory table(s). Usage of the term "significant" in the text was not felt to be a major item and I have used "poetic license" to propose a minor change to "potential significant sources of contamination" since our concept was to inventory "potential" sources and determine their

MEMORANDUM

June 8, 1998

Page 2

"significance" during the susceptibility determination phase. The EPA Title III List of Lists was discussed but at this time it's usefulness to establish "threshold quantities" for potential contaminant sources inventory was deemed to be limited.

The 1:00 p.m. agenda item on Susceptibility Determinations (SD) was an information sharing and brain storming session. There does not appear to be definitive guidance from EPA nor is a lot of information available from other states. Handouts were provided as resource information plus Andy and Ray presented information that will be copied and forwarded to each member.

The attached list is a result of our "brain storming" on parameters that may be valuable in performing SDs. There was no attempt to validate any item and all thoughts were encouraged.

The status of the remaining agenda items with the exception of the key issues was discussed.

The latest draft of the SWAP was handed out. Future drafts will have changes marked for easy reference.

The assignments for the TEAM prior to the next meeting are as follows:

1. Review and comment on the Draft SWAP.
2. Review all available information on Susceptibility Determinations.
3. Prepare to focus on methods/procedures, etc. for Susceptibility Determinations.

Attachments: Brain storming list
Revised Inventory tables



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MEMORANDUM

DATE: May 26, 1998
TO: Source Water Protection Team
FROM: Jerry Peaks, Charles Rest
SUBJECT: 4th Meeting – June 2, 1998
Emphasis – Delineations/Inventory/Susceptibility Determination

AGENDA

10:00 Discussion and changes to minutes from the April 22, 1998 meeting.

10:15 Consider TAC suggestions on delineation:

- Surface language
- Two (2) zones for groundwater
- Suspected feature for GUDIS

11:15 Consider Robert Royall's letter

11:30 Inventory Discussions

- Significant Potential Sources of Contamination – name change to Potential Significant...
- Threshold Quantities – Sara Title III and e-mail request

12:00 Box Lunch (provided)

Memorandum
May 26, 1998
Page 2

1:00 Susceptibility Determination discussion
2:00 Update on SWPP RFP
2:10 Update on draft SWAP document
2:20 Update on GPS/GIS efforts
2:30 Key Issues – Tables
2:55 Next Meeting
3:00 Adjourn

Attachments: Criteria
Robert Royall's letter



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MEMORANDUM

DATE: July 24, 1998
TO: Source Water Protection Team
FROM: Jerry Peaks/Charles Rest *Jerry*
SUBJECT: SWAP Team Meeting Minutes – July 7, 1998

The fifth SWAP Team Meeting was held and the previously provided agenda was followed. The minutes from the June 2, 1998 meeting were accepted.

The 10:15 a.m. agenda item relative to the delineation criteria recommendations of the TAC were discussed and accepted by the TEAM. Attached is the criteria sheet. The TEAM recommended some clarification to the GUDIS language, which the author has revised and is attached for your comments. Also, an ASTM standard was handed out which is the basis for the Zone 2 for groundwater.

The 11:15 a.m. agenda item discussion was related to our inventory list(s). The TAC had recommended a separate table for the Transient Noncommunity sources. The attached Tables 1, 2, and 3 were handed out. Because we are waiting for some additional input from two TAC members on stocking rates under the agriculture item and the Resource Extraction issue, the tables are considered draft. In addition, the TAC recommended that the TEAM investigate and evaluate the use of the Standard Industrial Classification (SIC) Manual. Charles, Ray and Bruce volunteered to perform this task.

For the 11:30 a.m. agenda item relative to an update on the SWPP RFP, it was reported that the Virginia Rural Water Association was the selected contractor and will soon begin contacting and encouraging waterworks to develop Source Water Protection Programs.

For the 11:35 a.m. agenda item, a revised SWAP document was handed out.

For the 11:45 a.m. agenda item, it was reported that bids were accepted for the GPS equipment and it should be delivered soon. Efforts are being made to hire a contract GIS guru to advise the Division on such matters and to translate data to GIS format.

MEMORANDUM

July 24, 1998

Page 2

The 12:30 p.m. agenda item on Susceptibility Determinations (SD) was a second information sharing and brain storming session. There does not appear to be definitive guidance from EPA nor is a lot of information available from other states. Handouts were provided as resource information. Alan reported on a joint meeting held with the SWAP people from the EPA Region 3 states. General comments from our TEAM included (but was not limited to) keeping the ranking system relatively simple; utilizing existing databases, maps, etc.; having a point system to limit subjectivity; Minnesota and Idaho's type of system looked promising; tie in (relate) to the Inventory; difficulty (or impossibility) of performing a S.D. contaminant by contaminant; etc. The TEAM decided to have two separate subcommittees to each develop a strawman for the groundwater sources and they would make these available for comment by fax in the last week of July. After the TEAM decides on a system for groundwater, the surface water system will be developed. The two subcommittees are Charles, Ray, Ron and Alan, Randy, Jesse and Rob. Other TEAM members should study the handouts and be prepared to give input.

Ron Conner volunteered to begin a "definition" section to include in the SWAP document.

It appears that the next meeting will be in late August due to vacation schedules and that we may have to meet twice a month in September in order to complete this difficult task relative to Susceptibility Determination.

Attachments: Delineation Criteria Sheet with revised Language for GUDIS dated 7/24/98

Revised Inventory tables (3) dated 7/7/98

Revised Inventory table 3 dated 7/24/98



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MEMORANDUM

DATE: June 19, 1998
TO: Source Water Protection Team
FROM: *Jerry* Jerry Peaks/Charles Rest
SUBJECT: 5th Meeting – July 7, 1998
Emphasis – Delineations/Inventory/Susceptibility Determination

AGENDA

10:00 Discussion and changes to minutes from the June 2, 1998 meeting.

10:15 Consider TAC suggestions on delineation:

- Surface language – back to radius
- Two (2) zones for groundwater – to match surface zones
- Suspected feature for GUDIS – no longer a concern

11:15 Inventory Discussions

- Robert Royall's letter
- Significant Potential Sources of Contamination – name changes
- TAC revisions

11:30 Update on SWPP RFP

11:35 Update on draft SWAP document

11:45 Update on GPS/GIS efforts

Memorandum
June 19, 1998
Page 2

12:00 Box Lunch (provided)
12:30 Susceptibility Determination discussion
2:55 Next Meeting
3:00 Adjourn

Attachments: Criteria



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MEMORANDUM

DATE: July 24, 1998
TO: Source Water Protection Team
FROM: Jerry Peaks/Charles Rest *Jerry*
SUBJECT: 6th Meeting – August 11, 1998
Emphasis – Inventory/Susceptibility Determination

AGENDA

- 10:00 Discussion and changes to minutes from the July 7, 1998 meeting
- 10:15 Consider suggestions on delineation language for GUDIS
- 10:30 Inventory Discussions
 - SIC Committee Report
 - Tables 1, 2, and 3 comments
- 11:00 Update on GPS/GIS efforts
- 11:15 Susceptibility Determination Committee Reports
- 12:00 Box Lunch (provided)
- 12:30 Susceptibility Determination discussion continued
- 2:55 Next Meeting date
- 3:00 Adjourn



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MEMORANDUM

DATE: August 13, 1998

TO: Source Water Protection Team

FROM: Jerry Peaks/Charles Rest *Jerry*

SUBJECT: SWAP Team Meeting – August 11, 1998

The sixth SWAP Team Meeting was held and the previously provided agenda was followed. The minutes from the July 7, 1998 meeting were accepted.

The 10:15 a.m. agenda item relative to clarifying the delineation criteria for the GUDIS was revised and is attached.

The 10:30 a.m. agenda item discussion was related to Tables 1, 2, 3 and the TAC recommendation that the TEAM investigate and evaluate the use of the Standard Industrial Classification (SIC) Manual. Charles, Ray and Bruce performed an evaluation of using the SIC codes and reported to the full TEAM. As a part of the report, new Tables of Land Use/Activity Inventory were created which followed the SIC codes with their associated classification names. Attached are the tables and the transmittal memo describing how the tables were developed.

After much discussion, the TEAM decided to recommend to the TAC that SIC codes be utilized in some manner since they were a recognized standard classification system and also since the manual includes descriptions of the classifications which would aid whomever was performing the inventory. The TEAM also decided to recommend to the TAC that the original table format be utilized with the appropriate SIC codes added in columns to the right of the land use/activity. Attached are examples of the recommendations. Bruce Hicks provided the TEAM with information (attached) on available software that could possibly be utilized to locate many of our listed land use/activities by SIC codes. *-TAC OK*

The TEAM also recommended alphabetizing the land use/activity by major classifications, which has been done.

Memorandum
August 13, 1998
Page 2

The SIC system has been revised (1997) to standardize the classification system between the US, Canada and Mexico. The new coding will be utilized in our final product.

Further discussion of the original Table 1 and 2 resulted in a decision to ask the TAC if the Crop Land heading needed to have the current three subheadings i.e. crop, fodder, specialty. Are the chemicals etc. applied different enough to need separate headings? Also, the TEAM wanted the TAC to consider whether the Caves/Sinkholes for surface sources under Special Cases was needed. It appears that the 5-mile radius would cover this issue. *did not cover*

Relative to Table 3, Potential Conduits to Groundwater, Mr. Andrew Stone's letter (attached) of July 23, 1998 was considered. The TEAM essentially agreed to the request and the revised language is found on the attached Table 3.

The 11:15 a.m. agenda item on Susceptibility Determinations (SD) began with reports of the two separate subcommittees who had been tasked to each develop a strawman for the groundwater sources.

It was agreed that the more complete strawman would serve as the basis for discussion with the other report and today's brainstorming as other possible areas/items to include. After significant discussions, the attached draft was developed and rewritten following the meeting. This draft will be recommended as a strawman to the TAC for further ideas and/or concurrence. It is expected that both the TAC and the TEAM will want to polish this draft in some areas. The assigned points are recognized as needing further evaluation.

The two subcommittees were tasked with developing strawmen for the surface water susceptibility determination to present at the next meeting.

Ron Conner has not yet completed his task of developing a "definition" section to include the SWAP document.

The next meeting will be September 3, 1998.

Attachments: Delineation Criteria Sheet with revised Language for GUDIS dated 8/17/98
Revised Inventory tables (2) dated 8/5/98 and cover memo
Revised Inventory tables (1) dated 8/18/98 and analysis sheet
Harris InfoSource 1997 Industrial Directory Disc
Andrew Stone's 7/23/98 letter and revised table 3 dated 8-18-98
Draft Susceptibility Determination Protocol dated 8/13/98



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MEMORANDUM

DATE: September 22, 1998

TO: Source Water Protection Team

FROM: *Jerry Peaks* Jerry Peaks/Charles Rest

SUBJECT: SWAP Team Meeting - September 3, 1998

The seventh SWAP Team Meeting was held and the minutes from the August 11, 1998 meeting were accepted.

The meeting was devoted to reviewing the "strawman" for the surface water susceptibility determination as provided by Ray, Charles, Ron, and Bruce. They are to continue researching how to use contaminant concentrations in the rating system. Alan, Randy, and Rob are to develop a second "strawman" along the line of the Arizona rating system.

The next meeting is scheduled for 9:00 a.m. on September 30, 1998 with a possible extension to October 1, 1998.

GWP/teh



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MEMORANDUM

DATE: October 2, 1998
TO: Source Water Protection Team
FROM: Jerry Peaks/Charles Rest *Jerry*
SUBJECT: SWAP Team Meeting - September 30, 1998 and October 1, 1998

The eighth SWAP Team Meeting was held on two consecutive days.

Much of the meeting was devoted to reviewing two "strawmen" for the surface water susceptibility determination as provided by the two subcommittees.

The TEAM decided to recommend to the TAC the strawman proposed by "Rob's" subcommittee. If the TAC did not favor this concept, "Charles'" subcommittee strawman would be presented. Copies of the latest drafts of the strawman will be provided at a later date. (Please note that "Rob's" subcommittee strawman, if accepted, would replace the previous groundwater concept.)

Considerable effort was expended in assigning "expected" contaminants of concern and health risk ranking to each line item on the Land Use/Activity Inventory tables. "Charles'" subcommittee will prepare additional tables that include these items. Also a narrative description of the "logic" used to assign the health risk rankings will be provided. Ray will make a contact with a fire official and Alan will investigate photo processing in order for us to assign contaminants of concern and health risk ratings for these two items.

Jerry will continue to attempt to get input from Lynn Haynes relative to resource extraction. Without this input, the TEAM will recommend collapsing the line items to four categories: coal mining, petroleum mining, sand and gravel mining, and other mining.

The TEAM felt it necessary to document herein that we do not support a statewide ranking of waterworks relative to one another.

The next meeting is scheduled for 8:00 a.m. on October 28, 1998 at the Abingdon Field Office. This time and location was chosen because four of the TEAM will be there and the others present thought it was a good idea.

GWP/teh

APPENDIX L

Appendix L

Source Water Assessment Technical and Citizens Advisory
Committee (TAC)

Agenda

February 25, 1998

- 10:00 a.m. Welcome and Introductions
- 10:15 a.m. Description of Source Water Assessment Program (SWAP)
- 10:45 a.m. Review SWAP Development Approach
- 11:00 a.m. Review SWAP Supporting Activities
- 11:15 a.m. General Discussion
- 11:55 a.m. Set Next Meeting Date



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MEMORANDUM

DATE: March 3, 1998

TO: Source Water Assessment Technical and Citizens Committee (TAC)

FROM: *Jerry Peaks*
Jerry Peaks

SUBJECT: February 25, 1998 Meeting Minutes

The subject meeting was held at Sydnor Hydrodynamics, Inc. An agenda was provided to all attendees. Handouts included the EPA document entitled "State Source Water Assessment and Protection Programs Guidance", a December 17, 1997 letter with attachments to Dale Long at EPA and an excerpt (pages 18 and 19) of the VDH Set-Aside Workplan. Highlights of each handout was discussed and the conceptual approach VDH would like to take relative to preparing a Source Water Assessment Program (SWAP) was described. The letter to Dale Long and the excerpt from the Workplan describes this concept.

The TAC member list has not been finalized at this time but will be prior to the next meeting. It is expected that the next meeting will be in late April and that recommendations from the Source Water Protection Team will be available for discussion. It was suggested that the TAC review the handouts prior to the next meeting.

Attachment

Source Water Assessment Technical and Citizens Advisory
Committee (TAC)

Agenda

April 30, 1998

- 10:00 a.m. Welcome and Introductions
- 10:10 a.m. Quick Review of SWAP Process
- 10:30 a.m. Report on Source Water Protection Team's Delineation Recommendations
- 11:30 a.m. Report on Source Water Protection Team's Inventory Deliberations
- 12:00 noon Box Lunch Provided
- 12:30 p.m. Discussion of Key Issues from Tables 1, 2 and 3 as applicable of the Final Guidance Document
- 1:30 p.m. General Discussion of Susceptibility Determinations
- 2:30 p.m. Adjourn



COMMONWEALTH of VIRGINIA

Department of Health

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

P O BOX 2448
RICHMOND, VA 23218

TDD 1-800-828-1120

MEMORANDUM

DATE: May 4, 1998

TO: Source Water Assessment Technical and Citizens Committee (TAC)

FROM: Jerry Peaks *Jerry*

SUBJECT: April 30, 1998 Meeting Minutes

The subject meeting was held at Sydnor Hydrodynamics, Inc. An agenda was previously provided to all attendees. Handouts included minutes from the SWAP TEAM meeting of April 22, 1998 and a DRAFT Source Water Assessment Program (SWAP) document.

The minutes of the TEAM meeting may be useful in documenting some of their deliberations relative to conceptual and technical issues that the TAC will also consider. The DRAFT Source Water Assessment Program document is the very rough beginning of the SWAP that will be submitted to EPA for approval by February 1999. The goal is to receive concurrence from the TAC, the TEAM and the Waterworks Advisory Committee (WAC) on the final SWAP product. Comments on the DRAFT would be appreciated very much.

The major discussions of the meeting involved the TEAM's initial recommendations relative to delineation criteria. These discussions were extremely productive. No final decisions were made or expected on the delineation criteria. Various members of the committee were asked or volunteered to provide clarifying language to some of the criteria. Attached is a second draft of the criteria based on my understanding of the discussion. In addition, some members suggested that consideration be given to having two (2) zones of delineation for groundwater sources. It was suggested that "due to previous experience with EPA", they might more readily grant their favor if both groundwater and surface water had two (2) zones. It was mentioned that with GIS layers this could be readily done. However, some cautioned that having two (2) zones for surface sources was expressly mentioned in EPA guidance and that there was no obvious technical merit to two (2) zones for groundwater sources. A firm suggestion on what distance to use to delineate the boundary of the second zone was not agreed upon, however, twice the distance was mentioned. It was suggested that this issue be taken back to the TEAM for their input.

Memorandum
May 4, 1998
Page 2

The committee discussed in general terms the nature of the inventory step of the process and generally (but not finally) agreed that an inventory of land uses/activities of potential "significant" sources of contamination would be accomplished. The actual significance of the individual potential sources of contamination would be considered in the next step of the process, i.e., the Susceptibility Determination. A first draft list/table of potential sources of contamination was discussed. This draft is very preliminary as neither the TAC nor the TEAM had opportunity to review and discuss in any detail. I am requesting that comments be sent to me prior to the next meeting and that the committee be prepared to discuss inventory issues at the next meeting.

The committee also discussed in general terms the Susceptibility Determination issue. Members were asked to provide me with any information they had relative to performing Susceptibility Determinations (vulnerability analysis etc.) on any related parameter.

The following dates are offered for the next meeting:

June 8, 9, 10, 15, 17, 18

Please let me know as soon as possible which dates that you could not attend.

Attachment

11/

Source Water Assessment Technical and Citizens Advisory
Committee (TAC)

Agenda

June 9, 1998

- 10:00 a.m. Welcome and Introductions
- 10:10 a.m. Report on TAC's Delineation Recommendations to the Source Water Protection Team
- 10:45 a.m. Report on TAC's Inventory Recommendations to the Source Water Protection Team
- 11:30 a.m. Discussion of Key Issues from Tables 1, 2 and 3 as applicable of the Final Guidance Document
- 12:00 noon Box Lunch Provided
- 1:30 p.m. Continued Discussion of Susceptibility Determinations
- 2:30 p.m. Adjourn

Source Water Assessment Technical and Citizens Advisory
Committee (TAC)

Agenda

June 30, 1998

- 10:00 a.m. Welcome and Introductions
- 10:10 a.m. Continue discussion of Delineation Recommendations to the Source Water Protection Team
- 10:45 a.m. Continue discussion of Inventory Recommendations to the Source Water Protection Team
- 11:30 a.m. Discussion of Key Issues from Tables 1, 2 and 3 as applicable of the Final Guidance Document
- 12:00 noon Box Lunch Provided
- 1:30 p.m. Continued Discussion of Susceptibility Determinations
- 2:30 p.m. Adjourn



COMMONWEALTH of VIRGINIA

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

Department of Health
P O BOX 2448
RICHMOND, VA 23218

TDD 1-800-828-1120

MEMORANDUM

DATE: July 1, 1998
TO: Source Water Assessment Technical and Citizens Committee (TAC)
FROM: Jerry Peaks *Jerry Peaks*
SUBJECT: June 9 and June 30, 1998 Meetings Minutes

The subject meetings were held at Sydnor Hydrodynamics, Inc. Agendas were previously provided to all attendees. Handouts included numerous articles/information relative to Susceptibility Determination, a DRAFT Source Water Assessment Program (SWAP) document dated June 1998, and a revision to the list of Potential Sources of Contamination that included a second list of Potential Conduits.

At the June 30th meeting, revisions that were made following the June 2nd meeting were included in handouts of two tables for Land Use/Activity Inventories plus a revised delineation criteria sheet. Also, a list of Susceptibility Determination "brainstorming" ideas from the TEAM was handed out. The major discussions of the meeting involved the recommendations relative to delineation criteria. These discussions were extremely productive and the attached criteria reflects the consensus of the TAC.

The committee continued the discussion of the Land Use/Activity Inventory lists which are now Tables 1 and 2, Land/Use Activity Inventory and Potential Conduits to Groundwater, respectively. It was suggested that a 3rd Table be developed for the Transient-Noncommunity systems to prevent confusion. We are expecting to continue polishing these tables by adding some "threshold quantities" to some of the line items. Sarah has promised to provide stocking rates, etc. for some of the livestock line items and David Ormes with DEQ will be contacted regarding fuel oil tank sizes. Also Lynn indicated at the June 9th meeting that he had some suggestions on the Resource Extraction list. In general, the consensus was that the tables reflected the wishes of the TAC to this point in the process. A suggestion was made to consider the Standard Industrial Classification (SIC) Codes as a means to tie our listed items to a recognized standard. The standards may also assist the people performing the inventories in some manner. It was agreed to task the TEAM in this evaluation.

Memorandum
July 1, 1998
Page 2

The committee also continued discussion in general terms of the Susceptibility Determination issue. Most of the discussion was sharing of background information, brainstorming and general concept building. Some of the notable comments included: to keep it relatively simple, develop a reasonable "ranking" system to limit subjectivity, if a point system is developed to consider weighting some of the parameters higher than others. It was agreed that the TEAM should be tasked with developing a "strawman(s)" for evaluation/comments by the TAC.

Attachments

Source Water Assessment Technical and Citizens Advisory
Committee (TAC)

Agenda

Sept. 18

~~August 27, 1998~~

- 10:00 a.m. Welcome and Introductions
- 10:10 a.m. Discussion of revisions to the Delineation criteria language for GWUDIS
- 10:45 a.m. Discussion of Inventory Recommendations from the Source Water Protection Team (SIC codes) and further comments on inventory line items
- 11:30 a.m. Discussion of Key Issues from Tables 1, 2 and 3 as applicable of the Final Guidance Document
- 12:00 noon Box Lunch Provided
- 1:00 p.m. Discussion of Susceptibility Determinations recommendations from the Source Water Protection Team
- 2:30 p.m. Adjourn



COMMONWEALTH of VIRGINIA

Department of Health

P O BOX 2448

RICHMOND, VA 23218

TDD 1-800-828-1120

MEMORANDUM

DATE: September 22, 1998

TO: Source Water Assessment Technical and Citizens Committee (TAC)

FROM: Jerry Peaks *Jerry Peaks*

SUBJECT: September 18, 1998 Meetings Minutes

The subject meeting was held at Sydnor Hydrodynamics, Inc. Handouts included a revised Delineation Criteria Sheet dated 8/17/98, revised Tables 1, 2 & 3 dated 8/18/98, and information provided by Sarah relative to water assessments for agricultural activities.

The TAC concurred with the revised delineation criteria dated 8/17/98 with the addition of "or other sources" following "GIS layers available from other regulatory authorities".

The TAC also concurred with the TEAM's recommendation to use the original style for Tables 1-3, Land Use Activities, with the addition of appropriate NAIC codes for informational purposes. Additionally, the changes made to Table 3 relative to Andrew Stone's letter was acceptable.

The committee continued the discussion of the Land Use/Activity Inventory lists, Tables 1, 2 and 3. We are expecting to continue polishing these tables by adding some line items. We are no longer considering stocking rates, etc. for the livestock line item "Pasture (grazing)". The TAC feels that we should inventory all pastures. We have not heard from Lynn relative to suggestions on the Resource Extraction list. The attached Tables 1, 2, and 3 reflect changes suggested at the meeting. In general, the consensus was that the tables reflected the wishes of the TAC to this point in the process.

Tables 1, 2, and 3 of Key Issues found in the SWAP Guidance document were discussed and responses suggested. Attached is a draft dated October 1, 1998 of the responses.

Memorandum
September 22, 1998
Page 2

The committee discussed the draft groundwater Susceptibility Determination dated 8/13/98 provided by the TEAM. The TAC, in general, supported this style of Susceptibility Determination. A number of suggestions were made for the TEAM to further consider such as:

- For Water Quality, 1. GWUDISW, consider using whatever rating system is developed for surface water to establish Low, Moderate, High.
- Continue to consider microbiological levels for Water Quality, 2. Contaminant Detection.
- For Source Construction Details change Wells: casing and/or grout depths do not meet Regulations to 50 points (note springs, etc. 50 points).
- For Land Use/Health Risk, consider well and spring flow rates in terms of gallons per day instead of gallons per minute. This gets to the flow and duration issues.
- Total point Summary should have Water Quality removed, as it currently has no point value(s) assigned.

Dave, Terry and Terri will consider a variation in points assigned to the Geological Data (geological formations) to provide to the TEAM.

The next TAC meeting will be October 22, 1998.

Attachments: Revised Tables 1, 2, and 3 dated October 1, 1998
Revised Key Issues (Tables 1, 2, and 3) dated October 1, 1998

Source Water Assessment Technical and Citizens Advisory
Committee (TAC)

Agenda

October 22, 1998

- 10:00 a.m. Welcome and Introductions
- 10:10 a.m. Handout revised SWAP dated 10-98
- 10:30 a.m. Review September 18, 1998 minutes
- Request TAC's concurrence on Inventory Tables to this point
 - Request TAC's concurrence of Key Issues responses from Tables 1, 2, and 3
- 11:00 a.m. Discussion of Susceptibility Determinations transmitted by memo of October 5, 1998
- 12:00 noon Box Lunch Provided
- 1:30 p.m. Discuss Tables for LUAs with Relative Risk Factors
- 2:30 p.m. Handout Key Issues responses from Tables 4, 5, and 6 – comments due at November 5th meeting
- 3:00 p.m. Adjourn – Next Meeting November 5, 1998



COPY

COMMONWEALTH of VIRGINIA

Department of Health

P O BOX 2448


RICHMOND, VA 23218

TDD 1-800-828-1120

MEMORANDUM

DATE: November 2, 1998

TO: Source Water Assessment Technical and Citizens Committee (TAC)

FROM: Jerry Peaks 

SUBJECT: October 22 1998 Meetings Minutes

The subject meeting was held at Sydnor Hydrodynamics, Inc. Handouts included revised Land Use Activity Tables 1 & 2 that included contaminants expected and risk factors, Pennsylvania Source Water Assessment October 1998 Working Points and Key Issues Tables 4, 5, & 6.

The TAC concurred with the revised Land Use Activity Tables 1 & 2 with suggested changes.

Tables 1, 2, and 3 of Key Issues found in the SWAP Guidance document were concurred with by the TAC.

The committee discussed the draft Susceptibility Determination that was based on Arizona's protocol that has been provided by the TEAM. The TAC concurred with using this style of Susceptibility Determination. A number of suggestions were made for the TEAM to further consider.

Dave, Terry and Terri will consider the groundwater areas to be listed as sensitive in Step 1.

The next TAC meeting will be November 5, 1998.

Attachments: Revised Tables 1, 2, and 3 dated CR 10/28/98
Revised Susceptibility Determination dated CR 10/28/98
November 5, 1998 Agenda

Source Water Assessment Technical and Citizens Advisory
Committee (TAC)

Agenda

November 5, 1998

- 10:00 a.m. Welcome
- 10:10 a.m. Review October 22, 1998 minutes
- 10:20 a.m. Review minor changes to Inventory Tables based on TAC's suggestions
- 10:30 a.m. Discussion of changes Susceptibility Determination
- 11:30 a.m. Discuss Key Issues responses from Tables 4, 5, and 6
- 12:00 noon Box Lunch Provided
- 1:30 p.m. Discuss Chapter V-Making Assessments Available to the Public
- 2:00 p.m. Discuss SWAP Fact Sheet
- 3:00 p.m. Adjourn



COMMONWEALTH of VIRGINIA

Department of Health

P O BOX 2448

RICHMOND, VA 23218

TDD 1-800-828-1120

MEMORANDUM

DATE: November 20, 1998
TO: Source Water Assessment Technical and Citizens Committee (TAC)
FROM: Jerry Peaks *Jerry Peaks*
SUBJECT: November 5th and 17th Meetings Minutes

The subject meetings were held at Sydnor Hydrodynamics, Inc. Handouts at the November 5th meeting included revised Land Use Activity Tables 1 & 2 dated CR 10/28/98, the Susceptibility Determination Section dated CR 10/28/98 and Key Issues Tables 4, 5, & 6. These handouts were previously attached to the October 22, 1998 minutes.

Handouts at the November 17, 1998 meeting included the attached revised Land Use Activities Tables 1, 2 & 3 dated 11/16, a revised Susceptibility Determination Section dated 11/16, and a revised Section V-Making Assessments Available to the Public. Previously faxed to the TAC were the Key Issues Tables 4, 5 and 6 responses.

The TAC concurred with the revised Land Use Activity Tables 1, 2 & 3 without any further suggested changes.

The TAC concurred with the draft Susceptibility Determination with minor editorial changes.

Responses to Tables 4, 5, and 6 of Key Issues found in the SWAP Guidance document were concurred with by the TAC with minor changes recommended.

Section V was discussed and the attached revision reflects/resolves the concerns/comments of the TAC.

The attached one page announcement has been developed and will be widely distributed.

It was the general consensus that the TAC has completed its duties until after the public meetings scheduled for January 1999.

GWP/teh

Attachments: Revised Tables 1, 2, and 3 dated 11/16/98
Revised Susceptibility Determination dated 11/16/98
Revised Section V-Making Assessments Available to the Public
Virginia's Source Water Assessment Program One Page Flyer

TAC AGENDA-NOV.17,1998

REPORT ON EPA REGION 3 STATES MEETING

REVIEW CHANGES TO LAND USE INVENTORY TABLES

REVIEW CHANGES TO SUSCEPTIBILITY DETERMINATION PROCEDURE

REVIEW CHANGES TO SECTION 5 MAKING ASSESSMENTS AVAILABLE TO THE PUBLIC

REVIEW REVISIONS TO KEY ISSUES TABLES 4,5 & 6, RESPONSES

HANDOUT SWAP PUBLIC MEETING ANNOUNCEMENT FLYER

APPENDIX M

MINUTES

Waterworks Advisory Committee

Meeting Date: January 21, 1999

Meeting Location: Sydnor Hydrodynamics – Richmond, VA

Members Representatives Present/Absent - see attached attendance log

Others Present:

Robert Payne – VDH-Enforcement Director
Greg Abbott – SCC
Marc Tufaro - SCC

The meeting was called to order at 10:00 a.m. by Ray Jackson, Chair, with Tom Gray as Secretary.

The minutes were approved with the exception of misspelled names of DCLS staff.

Chair Report:

Ray Jackson noted that the agenda was incorrect for the WAC July meeting. The correct date is July 15, 1999. It was noted that the new Acting Health Commissioner is Anne Peterson.

Enforcement:

Robert Payne, VDH-DWSE's Enforcement Director, gave an overview of DWSE's enforcement efforts and thoughts on use of enforcement. There is always a balance between solving the problem and causing the owner to abandon the waterworks.

Ray Jackson reported on an article on the safety concern of PVC pipe related to VOCs. Drought was discussed and problems still exist. Larry Lawson stated that DEQ is getting requests to reduce stream water flow by. As there exists a Drought Emergency, DEQ can waive permit requirements easily.

Legislation:

ICR – Allen Hammer reported that the ICR is in the final phases. Discussion indicated that EPA considered keeping to their schedule more important than the data.

CCR – Hugh Eggborn is fielding questions in anticipation of the CCR's first round due October 1999. VDH's DWSRF Program grant applications proposes for VDH to hire several part time summer employees to assist the small waterworks to comply with the CCR. Also, VRWA and AWWA is offering training. VDH will seek a Waiver from the Governor so waterworks with less than 500 people do not have to mail their CCR. Robert Payne is assigned to coordinate VDH's request for a waiver and target data for the Governor's approval is mid-March.

DBP rule – Allen Hammer stated that John Capito (VDH-Danville Field Director) is in Washington, DC today to learn more about this rule. The rule applies to waterworks serving 10,000 or more people.

Source Water Assessment Program (SWAP):

Jesse Royall (a member of VDH's public participation team to develop the SWAP) gave a status report. The public hearings were held and only two had attendees. The draft as developed has received a preliminary positive response from EPA. Jesse Royall recommended that the WAC move forward and endorse the draft. Motion was made to endorse the draft, seconded, and unanimously passed. VDH has placed advertisements in 3 newspapers to inform the public of the SWAP.

APPENDIX N

VIRGINIA DEPARTMENT OF HEALTH

REGISTRATION SHEET

DATE: 1/11/99 1:00pm
page 1 of 1

Wish to Speak ?	Name/ Address	Representing/ Phone
YES	John Q. Public 3931 North Street Quinton VA 23217-3245	JQP Waterworks 804 - 555 - 1234
NO	WAYNE WEIKEL 145 Campbell Ave. SW. Roanoke, VA 24001	SE/RCAP (540) 345-1184
NO	RONALD E. CONNER LEXINGTON FIELD OFFICE, VDH 131 WALKER ST LEXINGTON, VA 24450	VA DEPT OF HEALTH (540) 463-7136
NO	KEN COFFMAN 1280 LUGAR LANE FINCASTLE, VA. 24090	VA-RURAL WATER ASSOC.
NO	DAVID NELMS 1730 E. PARHAM RD RICHMOND VA 23228	U.S. GEOLOGICAL SURVEY
NO	Bob Tate Lexington Field Office	VDH/OLP 540/463-7136
NO	Jerry Peats VDH	
NO	Alan Weber VDH	

VIRGINIA DEPARTMENT OF HEALTH

REGISTRATION SHEET

DATE: 1/11/99 7:00pm
page 1 of 1

Wish to Speak ?	Name/ Address	Representing/ Phone
YES	John Q. Public 3931 North Street Quinton VA 23217-3245	JQP Waterworks 804 - 555 - 1234
Yes	Robert F. Caniva HSMH PO Box 13446 Roanoke VA 24034	540-857-3155
	Ronald E. Conner Va Dept of Health 131 Walker St Lexington	(540) 463-7136
	Bill Tenger FOR VA PO Box 1750 Roanoke VA 24008	540-343-3696
NO	Wayne Weikel PO Box 2868 Roanoke, VA 24001	SB/RCAP (540) 345-7184
NO	Jerry Peats VDH	
NO	Alan Weber VDH	

**COMMENTS TO PUBLIC MEETING
VIRGINIA'S SOURCE WATER ASSESSMENT PROGRAM
ROANOKE, VIRGINIA
7:00 PM, JANUARY 11, 1999**

BY: Robert F. Canova, PE, AAEE
Director of Environmental Division, Hayes, Seay, Mattern & Mattern, Inc.
Trustee, Virginia Section of American Water Works Association
Member, Government Affairs Committee of Virginia Water Environment Association

Review comments relative to Draft Virginia Source Water Assessment Program, dated December 15, 1998:

1. The Program (page 6) states that Section 15.1-292 of the Code of Virginia authorizes local governments to prevent water pollution within 5-miles of a water supply intake. Section 15.1 of the Code of Virginia has been repealed and there is no equivalent code in Section 15.2. Historically, local governments have not had the authority to prevent water pollution outside their own jurisdiction. Prevention of water pollution is the responsibility and privilege of the Virginia Department of Environmental Quality.
2. Coordinate the Source Water Assessment Program with the EPA Clean Water Act initiatives for watershed assessment and total maximum daily load policy.
3. Use of a fixed radius of influence for ground water sources is a start, but probably not realistic for defining true potential for ground water contamination, especially in karst geology. As an example, we cannot currently identify sources of coliform contamination to ground water sources under the influence of surface water.
4. Appendix F does not appear to include a land use category for "urban" to account for urban runoff.
5. Appendix F does not appear to include a category for contamination not necessarily related to land use, such as spills. Add the following data sources to the Program:
 - Virginia DEQ Pollution Complaint file and data base
 - Federal NPL List
 - Federal CERCLIS List
 - Federal RCRA TSD Facilities List
 - Federal RCRA Generators List
 - Federal ERNS List
6. Appendix F "agricultural land" should be quantified as "agricultural land under cultivation", to account for the potential sources of siltation, herbicides, pesticides and fertilizers. Soil Conservation Service has a file of 5-Year cultivation plans from the agricultural community.
7. Can the Source Water Assessment Program address air borne sources of water pollution? Can the Program address interstate sources of pollution?

Sincerely,

Robert F. Canova
Hayes, Seay, Mattern & Mattern, Inc.
P.O. Box 13446
Roanoke, VA 24034
Tel (540) 857-3155
Fax (540) 857-3296
rcanova@hsmm.com

Response to Robert F. Canova

At the Roanoke Public Meeting (7:00 p.m.), Mr. Canova presented comments. Each comment was discussed directly with Mr. Canova by the TAC and TEAM members present. The following were our responses:

1. We have researched this comment. The proper Code number is §15.2-2109 and does state the five miles. We will make any necessary corrections.
2. Our intent is to coordinate the assessments with any appropriate source water protection activities.
3. We agree and this is acknowledged in our SWAP.
4. Mr. Canova agreed that the storm water discharge activity listed would resolve this comment.
5. After discussion with the TAC and TEAM members, Mr. Canova was satisfied that the various transportation categories adequately addressed his concern for spills. The data sources that he suggested to add are to be investigated by our subcontractor.
6. Mr. Canova was advised that our TAC and TEAM did discuss this issue and felt that uncultivated land also received application of fertilizers, herbicides, pesticides, manure, biosolids, etc. and needed to be included.
7. Relative to airborne sources of pollution, we do not feel that Virginia has "significant potential pollution" sites of this nature. Relative to interstate sources of pollution, the SWAP will address this issue.

Response to Bill Tanger

At the Roanoke Public Meeting (7:00 p.m.), Bill Tanger of Friends of the Rivers of VA had a number of comments.

1. His coalition represents the surface water interest in the state. He would like to be on our mailing list, which we agreed to. We tried to get a list of those who might be interested but their group was not mentioned. A large mailing list was used.
2. Maps – Tanger's group is in the process of publishing a report on rivers for the entire state. We explained that our maps would be for individual sources but the latitude & longitude locations could be used by his group for mapping.
3. Mr. Tanger asked who will help with mapping? We responded that we have contracted for someone to work with the Virginia Economic Development Group to prepare our GIS layers.
4. Mr. Tanger asked about the money available for the assessments. We described the funding available. We will use this through some contracts but use our staff for the majority of the assessments.
5. Mr. Tanger asked if this is a one-time project or will it be updated? We advised that we will get this done for existing sources under this effort and that all new ones would have an assessment. We described future assessments were probable through the Ground Water Rule, etc. Our sanitary surveys would be geared to update the inventory of land use activities.
6. Mr. Tanger asked that the VA Conservation Directory, Chesapeake Bay Directory and their National Group be added to the mailing list. We responded that we would add these to our mailing list.

The meeting adjourned at 8:20 p.m.
7 total in attendance

VIRGINIA DEPARTMENT OF HEALTH

REGISTRATION SHEET

DATE: 1/12/98 - 2:00 pm
page 1 of 2

Wish to Speak ?	Name/ Address	Representing/ Phone
YES	John Q. Public 3931 North Street Quinton VA 23217-3245	JQP Waterworks 804 - 555 - 1234
No	Jerry Peaks VDH-bwp	804-371-2882
Yes	Kyle Briesath 4455 Connecticut Ave NW A300 Washington DC 20008	Clean Water Action 202.895.0420 x102 Kbriesath@cleanwater.org
No	Richard D. Herlihy 21300 Chesdin Rd Petersburg, Va 23803	Appomattox River Water Auth 804-590-1145
No	Robert M. GORE 1602 Rolling Hills Dr Suite 212 Richmond, VA 23229	VIRGINIA SECTION AMERICAN WATER WORKS ASSOCIATION (804) 252-1521
No	Roland C Steiner ICPRB, Suite 300 6110 Exec Blvd Rockville MD 20852	Interstate Commission on the Potomac River Basin (301) 984-1308 x114
No	George E. Harlow, Jr. U.S. Geological Survey-WRD 1730 EAST BARNHART ROAD Richmond VA 23276	U.S. Geological Survey (804) 261-2631

VIRGINIA DEPARTMENT OF HEALTH

REGISTRATION SHEET

DATE: 1/12/
page 2 of 2

Wish to Speak ?	Name/ Address	Representing/ Phone
YES	John Q. Public 3931 North Street Quinton VA 23217-3245	JQP Waterworks 804 - 555 - 1234
No	Traci Goldberg 8560 Arlington Blvd. P.O. Box 1500 Merrifield, VA 22151	Fairfax County Water Auth
No	Scott Emery 723 Woodlake Dr. Chesapeake, Va 233201	Hampton Roads Planning Dist. Commission 757 - 420 - 8300
No	W. S. Shaw 300 Turner Rd Richmond, VA	VDH - OWP
No	Steven Douglas 300 Turner Rd Richmond 23225	VDH - OWP
No	Bennett K. Ragnan 300 Turner Road Richmond, VA 23225	VDH, OWP
Yes	Patti Jackson P.O. Box 110 Richmond, VA 23218	James River Ass'n

VIRGINIA DEPARTMENT OF HEALTH

REGISTRATION SHEET

DATE: 1/12/99 7:00pm
 page of

Wish to Speak ?	Name/ Address	Representing/ Phone
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YES	John Q. Public 3931 North Street Quinton VA 23217-3245	JQP Waterworks 804 - 555 - 1234
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NO Alan Weber
VDH

NO Terry Peaks
VDH

Source Water Assessment Program

Public Meeting

January 12, 1999

2:00 p.m.

The meeting started at 2:10 p.m. with opening remarks by Mr. Jerry Peaks. Mr. Peaks had available extra copies of the Source Water Assessment Document and offered to distribute this document to any individuals that needed a copy at that time. Mr. Peaks then explained the format of the meeting which included his introductory comments, a question and answer session, and then a formal public comment. In his opening comments Mr. Peaks reviewed the EPA schedule for submission of the plan to them for review, and the goal that the State Health Department had of performing all Source Water Assessments within a 42 month time frame. Mr. Peaks then went on to discuss the three committees that were involved in the preparation and review of the Source Water Assessment Program. Specifically Mr. Peaks described the Technical and Citizens Advisory Committee, how it was formed, and the criteria used in forming its membership. He then briefly discussed the Source Water Assessment Team and their roll in putting together the Source Water Assessment Program. Thirdly, Mr. Peaks indicated that the Waterworks Advisory Committee to the State Health Commissioner would provide a final endorsement of this document before it's submission to the EPA.

Mr. Peaks then gave a brief overview of the Source Water Assessment Program by summarizing it's goal as follows:

- Delineation and identification of sources of contamination.
- Identification of land use around the Water Supply Source.
- Determination of susceptibility of the Water Source.
- A final assessment provided to the Public.

Mr. Peaks then indicated that EPA has had a draft of the Source Water Assessment Program for approximately 30 days and that they have generally given positive comments on the program based on their initial review. Next a general question and answer session was open to the Public. These questions were general in nature and addressed issues such as what affect would this program have on owners, will there be funding available to assist owners and how will the Health Department provide resources to see that this program is fully implemented. There were also some general questions as to how the delineation areas were determined, how will GIS overlays be used and then made available for information, and why was the Health Department not using a goal of 24 months without the 18 month extension. Public comments are as follows:

Kyle Briesath provided the following comments and followed up with written comments:

- 1 The Technical and Citizens Advisory Committee (TAC) did not have an adequate representation by environmental groups and sensitive population groups.
2. Urge that the TAC committee should be involved throughout the implementation of the Source Water Assessment Program.

3. *They were concerned that the goals identified in the Source Water Assessment Program did not mention water quality goals or Public Health as a significant concern.*
4. *Source Water Assessment Program was weak on how information was made available to the Public. Specifically the report indicates that the information would be available at a Public Library. This information should be made available at more than just one Public Library.*
5. *The goal section on the Source Water Assessment Program states the intent to do a Source Water Assessment but not to identify corrective recommendation. The report should also include specific recommendation for corrective actions.*
6. *They were concerned that the Health Department was not using the 24 month time frame as identified by the EPA for completion of the Source Water Assessments. They were also concerned that there was no financial plan to get the work done and that the State Health Department did not have a specific budget item for the performance of the Source Water Assessment.*
7. *The Source Water Assessment should include specific information on regulated and unregulated contaminants found within the assessment area. There should also be some program for water quality testing results to be included as part of the report and the program.*
8. *The product deliverables for the plan would include recommendations for source water protection action.*
9. *The Health affects of contaminants identified in the Source Water Assessment should be listed as part of the program deliverables or as a minimum be identified where they could be easily obtained.*
10. *Source Assessment should include specific references to the consumer confidence report, and that water quality information may be found there.*
11. *They were concern that fixed radius area for wells was not sufficient. They believe that every available accurate information should be used to develop the area around a well for assessment as opposed to a standard fixed radius.*

The following are comments from Patricia Jackson of the James River Association:

1. *There is not adequate citizen representatives on the TAC committee. This resulted in public health and public notice issues not being properly addressed.*
2. *The TAC meetings were scheduled during the day. This resulted in these meetings not being assessable by the public.*
3. *The public notice requirements of the source water assessment program are not adequate to insure that the public will be notified.*
4. *There needs to be a greater effort to involve the public and the TAC during the source water assessments from here on out.*
5. *The State Health Department should consider newspaper advertisement style notifications of the Source Water Assessment plan and allow comments before the February 6th submittal to EPA.*

6. *In the Source Water Assessment Program the wording which identifies the efforts the waterworks owner must do to perform public notice is minimal. The waterworks owner should be required to do more in the area of public notice.*
7. *Table number 1 should be relabeled "potential sources of contamination" as it was originally worded. Ms. Jackson does not agree with this change made by the TAC and the Source Water Assessment Team.*
8. *In table 1 landfill should be identified as lined or unlined and the risk of unlined landfills should be increased to high risk for Groundwater sources. Lined landfills should have a medium risk associated with them. Open dumps should have a high high risk assessment.*
9. *Why don't we identify specific contaminant for barges and sink holes. We should list all potential contaminant.*
10. *The scope of work for the Source Water Assessments should be looked into in detail. There needs to be budget items for this work and additional people hired and money allocated to insure that these assessments are performed in a timely manner.*

The following are additional comments from Kyle: comment no. 11 continued.

11. *All cost areas should have separate delineation areas*
12. *The surface water delineation of five miles from the intake is not adequate. There were no further public comments from any individuals in attendance. Mr. Peaks therefore closed the meeting.*

**Virginia Source Water Assessment Program
Public Comments to the Draft**

Submitted to
Jerry Peaks
Virginia Department of Health
1500 East Main Street
, Room 109
Richmond, VA 23219

January 19, 1998

Submitted by
Kye Briesath, Clean Water Action
Chris Miller, Piedmont Environmental Council

Introduction

As concerned consumers, environmentalists and family members, we are submitting this first draft of our comments regarding Virginia's Source Water Assessment Program. Water is our most important natural resource. Virginia's population density, close proximity to pollution sources and rapid development make the state's drinking water highly vulnerable. The Congressionally mandated SWAP gives Virginia a new weapon with tremendous potential to protect our drinking water at its source -- the ultimate pollution prevention. Given limited resources and no guarantee of funding for second assessments, it is imperative that we do it right the first time.

Overall, we are disappointed with Virginia's draft SWAP dated December 15, 1998. This draft lacks important details, public participation and public input, and commitment to public health. Our comments are intended to inspire the drafters of the document to provide more specific information, include more citizens in decisions, and set higher standards to protect the health of the most vulnerable among us.

We would still appreciate future opportunities to comment on this SWAP draft, particularly after we review information about this SWAP that we have requested as part of this document. We will continue to comment on Virginia's draft as we receive new information or obtain new insights, and we would like to be involved in subsequent discussions and decisions regarding the implementation of SDWA and the development of Virginia's SWAP and Source Water Protection Plans. If you have any questions about our comments, please do not hesitate to call or E-mail us for further clarification. We do appreciate the opportunity to participate in this important process, and hope that our contributions will improve the overall health of the citizens of the Commonwealth.

Clean Water Action

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II. Description of Public Participation

We have concerns about who was notified and recruited to participate in the Waterworks Advisory Committee, the Source Water Protection Teams and the Source Water Assessment and Technical and Citizens Committees. Notification was listed in the Virginia Register -- but the average citizen or community organization does not receive this expensive and obscure publication. Invitations to participate were given to those who participated in an EPA SWAP workshop in North Carolina -- but we assume that it was a very small and limited group attended (who did attend?). Invitations were given to participants in a American Water Works Association workshop -- but waterworks professionals have dominated the SWAP Citizen Advisory Committees nationwide and their issues appear to have overshadowed the participation and input of citizen's groups.

Water works professionals are technical experts on these issues and are paid by our water fees to participate in these types of processes, unlike other citizen or consumer group representatives who are largely volunteers and are not compensated for their participation. While both lower costs and higher protections for public health would be the ideal combination, we are concerned that measures should be taken to guard against potential conflicts of interest from those who may be more interested in lower costs for the industry rather than higher public health standards.

The plan notes that "special efforts were expended to include citizen, environmental group, and sensitive population representatives" but we would like to know specifically what the state did to reach out to these groups since we did not notice your efforts. We are also concerned that only a few representatives from these groups are listed on the committees, and when we called several of them they did not realize they were on the committee. Some citizen members were only able attend one or a few meetings.

We are not satisfied with the level of public participation throughout the process in Virginia. Minutes of the meetings do not list the participants in each meeting, and we are concerned that very few of the listed citizen group representatives actively attended many

meetings. We would appreciate a listing of the attendees at each of the three SWAP committees meetings'. We would have also preferred to see more detailed minutes of the proceedings, the recommendations made by the participants, and the inclusion or lack of inclusion in the draft Assessment. We are also disappointed that state officials, after noticing limited citizen participation, did not make a more concerted effort to correct the situation by calling participants who failed to attend meetings, or by actively recruiting additional citizen participants. In fact, Ellen Bundrick and Kye Briesath from Clean Water Action requested to serve on the Citizen Advisory Committee -- Ellen the summer of 1998 and Kye in December of 1998. Ellen was the only one who received a response about participating -- a staff member discouraging her participation since the group had been meeting since February, but neither she nor Kye received invitations to future meetings or other information about the process, nor did they receive invitations to the public meetings about the SWAP or requests for written comments. We also note that several public meetings on the SWAP were held in Richmond and Roanoke, but were concerned that none were held in Northern Virginia where a large number of state residents live, and concerned that the public meetings were not well publicized.

We would like to formally request that an expanded Citizen Advisory Committee continue throughout the implementation of this SWAP. We would like the state to actively seek the participation of a wider group of citizen, environment and public health groups throughout this assessment program, as well as in the formation and implementation of Source Water Protection recommendations for Virginia. We also request that a Clean Water Action representative serve on the ongoing Citizen Advisory Committee. We would like an accounting of funds already spent and funds allocated for future public participation efforts from the SDWA set-aside in Virginia.

We would also appreciate a list of other recommendations and comments the state has received on the draft Assessment, the sources of those comments, the decisions reached about including those recommendations, and other changes to the draft Assessment that will be sent to the EPA.

III. SWAP Development Approach

We are appalled that the first goal states that "Assessments will be conducted for the protection and benefit of waterworks and for the support of monitoring flexibility" (which a cynic could interpret as maintaining minimal testing requirements). The goals should state that the primary goal of the SWAP process is to provide a detailed assessment for the purpose of developing a strong drinking water protection plan for the optimal public health of Virginia residents, including the most vulnerable among us like children, elderly, or ill family members. Based on the public participation in the development of this document, we are concerned that the results of the assessments may be skewed to minimize costs to affected waterworks and the state budget at the expense of increased risks to public health. This entire section of "Goals" omits the very objective that the state SWAPs were meant to address through the Safe Drinking Water Act.

While we support maintaining monitoring flexibility when a SWAP is well done and

complete, a bad assessment could lead to unnecessary negative public health consequences. We want to make sure that a thorough assessment of all the contaminants in Virginia's source waters are evaluated before eliminating testing for contaminants that could pose potential health threats to our population. How will the public participate in the review and development of the list of contaminants to be assessed?

We are encouraged that the waterworks owners will be "encouraged to proceed with source water protection programs," and that later in this section the draft notes that the final assessment will indicate where intensified site-specific source water protection is needed. As the assessments are completed, we would like the state to develop a list of specific recommendations for source water protection in its final SWAP report, and to follow up with those recommendations. We also want citizens involved in establishing these recommendations for source water protection.

"Assessments of all sources will be completed within 42 months". The SDWA guidelines call for completion of assessments within a 24-month time frame. A one-time 18 month extension may be granted by the EPA Administrator for certain and specific reasons, generally financial in nature. We are concerned that the state make every effort to complete the assessment within the earliest possible timeline. The sooner the assessments are complete, the sooner prevention programs can be established to protect public health.

"Assessments will provide meaningful information...". The statement in this goal directly contradicts later statements in this draft that indicate that the state does not have "adequate staff and financial resources to complete the assessments". We would hope that the state would commit to fully implementing a full assessment within the timeline mandated by the SWAP. We request that the public be involved in financial decisions regarding the SWAP's budget and staffing. We urge that the state provide a detailed work plan as to how each SWAP dollar would be spent and for what, and who would carry it out as required by the Intended Use Plan. We support state efforts to maximize funding for the assessment and the secure additional financial and staffing resources to prepare accurate and thorough source water assessments. We would like to see a budget for the SWAP, including the funds available from the SDWA set-aside in Virginia and the timetable for expenditure of those funds. How does the state reconcile its current budget surplus (shown as being \$900 million according to the Washington Post of 1/10/99) with its concerns for completing a full assessment? If staff and funding are problematic, how will the state overcome these issues? How will the public have the opportunity to review allocations of funding to assure a complete assessment?

We also understand that a large portion of the assessment assignments and funds will be distributed to water utility professionals serving as consultants to this assessment process. We would also request that citizens be involved in evaluating the results generated by utility professionals who may have a different perspective about their research or findings than citizens may have. We also urge the state to consider a wider list of independent contractors, as well as non-profits or other consumer, environmental or public health

organizations to complete sections of the assessments.

The draft must more specifically define and detail the nature of the waivers to Phase II/V monitoring referred to and demonstrate that continued acceptance of the waivers is fully compliant the EPA SWAP/SWPP guidelines and appropriate for the health of Virginia residents. What would be required of the state to re-evaluate the existing, planned, proposed and possible waivers prior to their inclusion as part of the SWAP?

IV. Source Water Assessment Areas Delineation

We are concerned that the state decided to utilize a fixed radius to delineate most ground water and surface water sources rather than first utilizing the delineation information currently available. **We would urge the state to first fully utilize all of the information available from USGS, GIS mapping and other sources to determine much more accurate delineations. We also encourage the state to involve the public in the determination of any fixed radius delineation before the decision to do so is made, and that every effort will be made to utilize more specific delineation models at the state's earliest opportunity.**

Conjunctive delineation of water sources (a combination of ground and surface water) outlined in the plan are similarly flawed. If the state does not plan on using information available from a variety of existing government sources, we deserve an explanation about why.

We think that the state offered poor justification for a fixed radius approach, including the rationale that treatment and filtering mitigates the need for more specific source delineations. Virginia has had a poor record of inspecting, enforcing and fining NPDES violators, prompting the EPA enforce fines on one of the worst polluters in the state who was not being held accountable for their pollution (Smithfield). These facts do not make us confident that a fixed radius approach will protect us from pollutants that may be further away from the source but may affect our drinking water more profoundly than sources much closer to the source within the fixed radius.

We also recommend that separate delineation plans be implemented for karst and non-karst areas, with special emphasis on obtaining sound geological delineation boundaries for karst areas. Karst areas hasten water flow and often have fast times of travel to the well head, requiring greater scrutiny than a fixed radius delineation would give. **The state should make every effort to use time of travel for water reaching well heads in its determination of all groundwater delineation zones.** Virginia is full of porous rock, and the beautiful Lurray Caverns are a magnificent example of the underground caves that abound in the state. Water can travel quite quickly in these areas and should be evaluated accordingly.

Utilizing a fixed radius for surface water is also problematic, and we would urge the state to utilize as much of the watershed as possible in the delineation zone for surface waters. Again, a fixed radius is certainly cheaper financially to administer, but it often bears little resemblance to the sources of pollution to our water supply. We urge a dual approach with an evaluation the entire watershed for potential contaminants that reach a drinking water

source within ten years, with special emphasis and details for those segments where the time of travel to the source is one year or less. We also suggest that the delineation for tributary intakes have a minimum width of 1000 feet on each bank for the principle stream (500 feet on each tributary draining into the stream) and a minimum length of ten miles upstream of the intake, including the principal stream and all tributaries which drain into it. These minimum values can be decreased only if comprehensive modeling exists which conclusively shows the values should be decreased.

It is also important to include time of travel and the entire recharge areas for ground water sources in mapping the delineation zones. These areas are also susceptible to contamination. We believe that the assessment and protection of recharge areas is vital to the protection of source water and therefore must be included.

We also request that the state furnish more specific details about how it will coordinate assessments for source water protection areas that cross state boundaries, make any memorandum of understanding with other states available for public comment, and amend these memorandum to the SWAP. A broader stakeholder process that includes drinking water consumers should be mandated for interstate assessments.

V. Land Use Activity Inventory

We are concerned that the euphemistic "land use activity" category obfuscates the real meaning of this section, and suggest that it be renamed something more meaningful such as "potential sources of contaminates." Forests, wetlands and other land uses are not listed in the charts, and are not the land use types that are the sources of pollution to our drinking water that we are concerned about.

We urge the state to fully utilize data available including information on the locations of solid waste landfills, Confined Animal Feeding Operations, mining, Superfund sites, underground and above ground storage tanks, oil and gas tanks, incinerators, hazardous waste sites, abandoned wells, and other significant point and non-point pollution sources. Land use associated with agricultural operations (even large unregulated facilities), commercial facilities, manufacturing and industrial facilities, institutional facilities, and utility companies may also be considered potential sources of contamination particularly as they relate to nonpoint source discharges. All contaminants from these sources should be considered as contaminants of concern.

Virginia is only second to Pennsylvania in solid waste trash dumps and it is increasing rapidly, jeopardizing our ground water sources once the liners tear. The limited liability and thirty year insurance coverage that dump site owners are required to have may become obsolete as soon as it is needed most. Virginia has lax regulations for a huge poultry industry that profoundly affects that nitrogen and phosphorus in our water sources, and now only chicken growers with more than 100,000 chickens are regulated. In addition, urban sprawl

threatens ever increasing acres of wetlands that help to filter and clean our water. The assessment should also take future zoning into account when assessing pollution sources, especially regarding future housing, solid waste facilities, animal operations, and other potential sources of pollution. Virginia needs to address each of these land use issues if it is to properly assess and protect our drinking water sources – including issues of both quality and quantity of water available for our growing population.

We urge the state to fully utilize data available from the EPA's Regulated Contaminants, Contaminant Candidate List, and Health Advisory List of Contaminants; NPDES point source dischargers; Toxic Release Inventory; US Geological Survey's National Water-Quality Assessment list of monitored contaminants; Department of Health Health Advisories for unregulated contaminants; and other information that is routinely collected by non-profit organizations such as the Chesapeake Bay Foundation; to identify which contaminants may be or have been found in Virginia's source waters and to be included in the assessment. If the state does not plan on using information from these sources, we deserve and explanation about why.

We would also request that the final SWAP draft include a list of contaminants to be assessed, and that the final assessment include a listing of the specific sources of each of the contaminants within a delineated water source, listing the sources name and address in the reports available to the public.

We would also encourage that greater significance be given to septic systems, particularly as much of the state is experiencing tremendous growth in individual homes and small septic tank use. These can have a tremendous influence on water sources and can overwhelm the land's ability to filter water before it reaches the aquifer. The state also has quite a few "straight pipes" and holding tanks on older homes that could impact both ground and surface water sources.

Due to the unique nature of each source water intake, we urge the state to include and solicit information from a wide variety of local sources in assessing each site. We encourage the state to gather local information from water treatment plants, local surface water protection agencies, area health departments, area fire departments, business and industries, agriculture, education, planning, environmental groups and the general public in assessing each intake. We would also encourage the state to organize teams, similar to those in some states for well head protection programs, in the development of the assessment and recommendations for source water protection. The inclusion of diverse people and interests in the assessments will provide for a more comprehensive assessments, and will help the assessments become valuable tools for future source water protection efforts.

VI. Susceptibility Determination

We would like specific details about the contaminants that the state will be

assessing. Of course, the state will assess the contaminants required by the SDWA and other regulations, but **we would hope that the state will also assess the unregulated contaminants that are potentially health threatening and that are currently emitted or found in the state's waters.** We are glad that many utilities regularly monitor for unregulated contaminants, but we would like the results of those tests compiled in the SWAP to help obtain a full listing of the contaminants found in Virginia's waters. If a contaminant has not been found, or is found in quantities related to no or minimal health effects, we would support waivers for testing for these contaminants, but first we would like to see what has been tested, what has been found and in what quantities in which water sources, and research the potential health effects of those contaminants. We would like to comment further on this issue after reviewing the contaminants list the state plans to assess. **We also ask the state to include public review and comments prior to adoption of their final contaminant lists to be included in the assessment.** We would also like citizens to be involved in decisions about the reevaluation of contaminants in light of new developments or information.

The SWAP draft also mentions that public water supplies (for systems serving over 100,000 people) are currently tested for microbial contaminants, but cryptosporidium and other fecal matter is routinely found in our drinking water in significant amounts, causing public water boil alerts and recommendations for boiling tap water for vulnerable populations. Many people are afraid of drinking public tap water and are buying bottled water in ever increasing amounts. The addition of chlorine and other chemicals to kill bacteria may also have adverse health effects — chronic exposure can lead to bladder and colo-rectal cancers and other problems. We need to protect our drinking water at its source and decrease our reliance on treating already polluted water before we drink it. **We would hope that the assessment would include an evaluation of microbial contaminants in smaller water sources, and include in the assessments possible sources of contamination from regulated and unregulated confined animal feeding operations and human waste disposal sources.**

VII. Source Water Protection Program

Again, we would like to reiterate our desire for the final Assessment to include specific recommendations for source water protections, and to include citizen participation in the determination of the recommended protections.

VII. Making Assessments Available to the Public

The draft mentions that copies of the final Assessment will be made available in a public library, but **we would like the state to add that at least one full copy will be made available in the main library in each county.** We are pleased that the Assessment will be made available on the web, and would urge that the state review other potential sources for

distribution. We also urge the state to include information about how local citizens can review the full Assessment in the Consumer Confidence Reports that water utilities will be sending to the public annually, as well as send this information to residents who will not receive these Reports because they do not receive a water bill. This notice should also include a way to obtain a copy of the SWAP by phone or mail, and specify how the public can get involved in the state's water protection efforts.

All Virginia citizens have the right to know about the quality of their drinking water and the threats to that water. This information provides the best opportunity for source water protection -- aware citizens will insist on healthy water. **Therefore, public disclosure of the assessments must be comprehensive, in an easy to read format, and written in lay language as much as possible. The final assessment should also include comprehensive maps with the drinking water intakes, delineation boundaries, and sources of contamination plainly marked, and should also include points of reference like major towns, tributaries and rivers, and town/county boundaries.** Each individual source of contamination should be listed, with narrative descriptions including the contaminants of concern from each. Translations into Spanish, and other major languages as needed, should be available to those that do not speak English. The draft SWAP should also include a method for informing workers about the quality of the drinking water in their workplace.

Preliminary assessment results, not just final results, should be disclosed to the general public, especially when there are cases of severe contamination. There may be instances where protection measures are needed before final assessments are completed in order to protect public health. Preliminary results should be made available at the earliest possible time for public review and as much information as can be collected each year should be included in the Consumer Confidence Reports sent to consumers annually.

Virginia Department of Health

Responsiveness Summary for Public Comments for The Source Water Assessment Program Public Meeting – January 12, 1999

ORGANIZATION NAME	CONTACT NAME	COMMENTS	RESPONSE
Clean Water Action	Kye Briesath	We would like to formally request that an expanded Citizen Advisory Committee continue throughout the implementation of this SWAP. We would like the state to actively seek the participation of a wider group of citizen, environment and public health groups throughout this assessment program, as well as in the formation and implementation of Source Water Protection recommendations for Virginia. We also request that a Clean Water Action representative serve on the ongoing Citizen Advisory Committee.	This issue was discussed by the Technical and Citizens Committee (TAC) and the TAC's response is found in Appendix E, Table 1, Public Participation, Issue 3.
		We would like an accounting of funds already spent and funds allocated for future public participation efforts from the SDWA set-aside in Virginia.	VDH intends to develop this documentation.
		The goals should state that the primary goal of the SWAP process is to provide a detailed assessment for the purpose of developing a strong drinking water protection plan for the optimal public health of Virginia residents, including the most vulnerable among us like children, elderly, or ill family members.	VDH changed the goal to include "protecting the public's health".

		<p>As the assessments are completed, we would like the state to develop a list of specific recommendations for source water protection in its final SWAP report, and to follow up with those recommendations. We also want citizens involved in establishing these recommendations for source water protection.</p>	<p>This issue was discussed by the Technical and Citizens Committee (TAC) and the TAC's response is found in Table 5, Making the Results of the Assessment Available to the Public, Issue 1.</p>
		<p>We are concerned that the state make every effort to complete the assessment within the earliest possible timeline. The sooner the assessments are complete, the sooner prevention programs can be established to protect public health.</p>	<p>VDH will make every effort to complete the assessment within the earliest possible timeline. This issue was discussed by the Technical and Citizens Committee (TAC) and the TAC's response is found in Table 6, State Program Implementation, Issue 1.</p>
		<p>We request that the public be involved in financial decisions regarding the SWAP's budget and staffing.</p>	<p>This issue was discussed by the Technical and Citizens Committee (TAC) and the TAC's response is found in Table 6, State Program Implementation, Issue 1.</p>

Virginia Department of Health

		<p>We would also request that citizens be involved in evaluating the results generated by utility professionals who may have a different perspective about their research or findings than citizens may have.</p>	<p>VDH does not foresee a need for additional involvement. The TAC developed strict criteria for the assessment and VDH must concur with all assessment results (Section IX. D. General)</p>
		<p>We would urge the state to first fully utilize all of the information available from USGS, GIS mapping and other sources to determine much more accurate delineations.</p>	<p>VDH intends to utilize this information in the delineation areas.</p>
		<p>We also encourage the state to involve the public in the determination of any fixed radius delineation before the decision to do so is made, and that every effort will be made to utilize more specific delineation models at the state's earliest opportunity.</p>	<p>The TAC has established the delineation criteria that VDH will utilize; however, we agree that we should use every effort to utilize more specific delineation models at the earliest opportunity.</p>

Virginia Department of Health

		<p>We also recommend that separate delineation plans be implemented for karst and non-karst areas, with special emphasis on obtaining sound geological delineation boundaries for karst areas. The state should make every effort to use time of travel for water reaching well heads in its determination of all groundwater delineation zones.</p>	<p>The TAC has established the delineation criteria VDH will utilize. The limitations of the chosen criteria is well understood. VDH has contracted for five (5) detailed delineation studies per year in karst areas by DCR.</p>
		<p>Utilizing a fixed radius for surface water is also problematic, and we would urge the state to utilize as much of the watershed as possible in the delineation zone for surface waters.</p>	<p>The TAC has established the delineation criteria VDH will utilize. Zone 2 includes the entire watershed.</p>
		<p>It is important to include the time of travel and the entire recharge areas for ground water sources in mapping the delineation zones.</p>	<p>The TAC has established the delineation criteria VDH will utilize.</p>

Virginia Department of Health

		<p>We also request that the state furnish more specific details about how it will coordinate assessments for source water protection areas that cross state boundaries, make any memorandum of understanding with other states available for public comment, and amend these memorandum to the SWAP.</p>	<p>Specific details are not available at this time. Reference is made to Appendix N, Table 4, Boundary Waters, Multi-State Rivers, and the Great Lakes, Issues 1 and 4.</p>
		<p>We are concerned that the euphemistic "land use activity" category obfuscates the real meaning of this section, and suggest that it be renamed something more meaningful such as "potential sources of contaminants."</p>	<p>The TAC considered in great detail this issue and decided on the term "Land Use Activity".</p>
		<p>We urge the state to fully utilize data available including information on the locations of solid waste landfills. Confined Animal Feeding Operations, mining, Superfund sites, underground and above ground storage tanks, oil and gas tanks, incinerators, hazardous waste sites, abandoned wells, and other significant point and non-point pollution sources.</p>	<p>VDH concurs and this is included in the SWAP in numerous locations.</p>

Virginia Department of Health

		<p>We urge the state to fully utilize data available from the EPA's Regulated Contaminants, Contaminant Candidate List, and Health Advisory List of Contaminants; NPDES point source dischargers; Toxic Release Inventory; US Geological Survey's National Water-Quality Assessment list of monitored contaminants; Department of Health Health Advisories for unregulated contaminants; and other information that is routinely collected by non-profit organizations such as the Chesapeake Bay Foundation; to identify which contaminants may be or have been found in Virginia's source waters and to be included in the assessment.</p>	<p>VDH concurs and this is included in the SWAP in numerous locations.</p>
		<p>We would also request that the final SWAP draft include a list of contaminants to be assessed, and that the final assessment include a listing of the specific sources of each of the contaminants within a delineated water source, listing the sources name and address in the reports available to the public.</p>	<p>VDH will add a list of the current EPA regulated and unregulated contaminants in an Appendix. Please note the comment in Appendix N, Table 3, Issue 2 for additional information.</p>
		<p>We would also encourage that greater significance be given to septic systems, particularly as much of the state is experiencing tremendous growth in individual homes and small septic tank use.</p>	<p>VDH feels that this issue is important and that the current SWAP adequately addresses it.</p>

Virginia Department of Health

		Due to the unique nature of each source water intake, we urge the state to include and solicit information from a wide variety of local sources in assessing each site.	VDH concurs and intends to do so.
		We would like specific details about the contaminants that the state will be assessing. We would hope that the state will also assess the unregulated contaminants that are potentially health threatening and that are currently emitted or found in the state's waters.	VDH will add a list of the current EPA regulated and unregulated contaminants in an Appendix. Please note the comment in Appendix N, Table 3, Issue 2 for additional information.
		We also ask the state to include public review and comments prior to adoption of their final contaminant lists to be included in the assessment. We would also like citizens to be involved in decisions about the reevaluation of contaminants in light of new developments or information.	The TAC has established in the SWAP the contaminants of concern. Further public involvement does not appear appropriate.

Virginia Department of Health

		We would hope that the assessment would include an evaluation of microbial contaminants in smaller water sources, and include in the assessments possible sources of contamination from regulated and unregulated confined animal feeding operations and human waste disposal sources.	VDH concurs and feels the SWAP addresses this issue.
		We would like the state to add that at least one full copy will be made available in the main library in each county.	VDH feels that this is included in Section VIII. B.1.a.
		We also urge the state to include information about how local citizens can review the full Assessment in the Consumer Confidence Reports that water utilities will be sending to the public annually, as well as send this information to residents who will not receive these Reports because they do not receive a water bill. This notice should also include a way to obtain a copy of the SWAP by phone or mail, and specify how the public can get involved in the state's water protection efforts.	VDH feels that this is included in Section VIII. B.2.a. as well as in the Consumer Confidence Report requirements.

Virginia Department of Health

		<p>Therefore, public disclosure of the assessments must be comprehensive, in an easy to read format, and written in lay language as much as possible. The final assessment should also include comprehensive maps with the drinking water intakes, delineation boundaries, and sources of contamination plainly marked, and should also include points of reference like major towns, tributaries and rivers, and town/county boundaries.</p>	<p>VDH concurs and feels that the SWAP includes these suggestions.</p>
		<p>Preliminary assessment results, not just final results, should be disclosed to the general public especially when there are cases of severe contamination.</p>	<p>In cases of severe contamination, the public is already notified through other VDH/SDWA requirements. Assessments should not normally discover existing contamination of the source (potential sources of contamination). However if the assessment does identify a violation of the MCL standard, the VDH will require public notification.</p>

Virginia Department of Health

James River Association	Patricia Jackson	There is not adequate citizen representatives on the TAC committee. This resulted in public health and public notice issues not being properly addressed.	This issue was discussed by the Technical and Citizens Advisory Committee (TAC) and the TAC's responses are found in Appendix E, Table 1, Public Participation, Issues 1 and 2.
		The TAC meetings were scheduled during the day. This resulted in these meetings not being assessable by the public.	The meetings were scheduled during the day. However, the public meetings on January 11 and 12 were expanded at Ms. Jackson's request to include an evening meeting so the public could attend. Only two (2) people attended; one (1) consultant and one (1) representative from the "Friends of the Rivers of Virginia".
		The public notice requirements of the source water assessment program are not adequate to insure that the public will be notified.	This issue was discussed by the Technical and Citizens Advisory Committee (TAC) and the TAC's responses are found in Appendix E, Table 5, Making the Results of Assessments Available to the Public, Issues 1, 2, and 3. Section VIII of the SWAP provides the TAC approved details.

Virginia Department of Health

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		There needs to be a greater effort to involve the public and the TAC during the source water assessments from here on out.	This issue was discussed by the Technical and Citizens Advisory Committee (TAC) and the TAC's responses are found in Appendix E, Table 1, Public Participation, Issue 3.
		The State Health Department should consider newspaper advertisement style notifications of the Source Water Assessment plan and allow comments before the February 6 th submittal to EPA.	VDH concurred and advertised in the Roanoke Times, the Richmond Times Dispatch and The Virginian-Pilot. No further public comments were received.
		In the Source Water Assessment Program the wording which identifies the efforts the waterworks owner must do to perform public notice is minimal. The waterworks owner should be required to do more in the area of public notice.	This issue was discussed by the Technical and Citizens Advisory Committee (TAC) and the TAC's responses are found in Appendix E, Table 5, Making the Results of Assessments Available to the Public, Issues 1, 2, and 3. Section VIII of the SWAP provides the TAC approved details.

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		Table number 1 should be relabeled "potential sources of contamination" as it was originally worded. Ms. Jackson does not agree with this change made by the TAC and the Source Water Assessment Team.	The TAC considered in great detail this issue and decided on the term "Land Use Activity".
		In table 1 landfill should be identified as lined or unlined and the risk of unlined landfills should be increased to high risk for Groundwater sources. Lined landfills should have a medium risk associated with them. Open dumps should have a high high risk assessment.	This will be presented to the TAC and TEAM for their consideration.
		Why don't we identify specific contaminants for barges and sink holes. We should list all potential contaminants.	This will be presented to the TAC and TEAM for their consideration.

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		<p>The scope of work for the Source Water Assessments should be looked into in detail. There needs to be budget items for this work and additional people hired and money allocated to insure that these assessments are performed in a timely manner.</p>	<p>VDH has determined that it can perform the assessments in a timely manner with current staff.</p>
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APPENDIX O

Current Drinking Water Standards

National Primary and Secondary Drinking Water Regulations

National Primary Drinking Water Regulations (NPDWRs or primary standards) are legally enforceable standards that apply to public water systems. Primary standards protect drinking water quality by limiting the levels of specific contaminants that can adversely affect public health and are known or anticipated to occur in public water systems. Table 1 divides these contaminants into Inorganic Chemicals, Organic Chemicals, Radionuclides, and Microorganisms.

Table 1

National Primary Drinking Water Regulations				
Contaminants	MCLG¹ (mg/L)⁴	MCL² or TT³ (mg/L)⁴	Potential Health Effects from Ingestion of Water	Sources of Contaminant in Drinking Water
Inorganic Chemicals				
Antimony	0.006	0.006	Increase in blood cholesterol; decrease in blood glucose	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder
Arsenic	none ⁵	0.05	Skin damage; circulatory system problems; increased risk of cancer	Discharge from semiconductor manufacturing; petroleum refining; wood preservatives; animal feed additives; herbicides; erosion of natural deposits
Asbestos (fiber 10 micrometers)	7 million fibers per Liter	7 MFL	Increased risk of developing benign intestinal polyps	Decay of asbestos cement in water mains; erosion of natural deposits
Barium	2	2	Increase in blood pressure	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
Beryllium	0.004	0.004	Intestinal lesions	Discharge from metal refineries and coal- burning factories; discharge from electrical, aerospace, and defense industries

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Cadmium	0.005	0.005	Kidney damage	Corrosion of galvanized pipes; erosion of natural deposits; discharge from metal refineries; runoff from waste batteries and paints
Chromium (total)	0.1	0.1	Some people who use water containing chromium well in excess of the MCL over many years could experience allergic dermatitis	Discharge from steel and pulp mills; erosion of natural deposits
Copper	1.3	Action Level=1.3; TT^6	Short term exposure: Gastrointestinal distress. Long term exposure: Liver or kidney damage. Those with Wilson's Disease should consult their personal doctor if their water systems exceed the copper action level.	Corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives
Cyanide (as free cyanide)	0.2	0.2	Nerve damage or thyroid problems	Discharge from steel/metal factories; discharge from plastic and fertilizer factories
Fluoride	4.0	4.0	Bone disease (pain and tenderness of the bones); Children may get mottled teeth.	Water additive which promotes strong teeth; erosion of natural deposits; discharge from fertilizer and aluminum factories
Lead	zero	Action Level=0.015; TT^6	Infants and children: Delays in physical or mental development. Adults: Kidney problems; high blood pressure	Corrosion of household plumbing systems; erosion of natural deposits
Inorganic Mercury	0.002	0.002	Kidney damage	Erosion of natural deposits; discharge from refineries and factories; runoff from landfills and cropland
Nitrate (measured as Nitrogen)	10	10	"Blue baby syndrome" in infants under six months - life threatening without immediate medical attention. Symptoms: Infant looks blue and has shortness of breath.	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
Nitrite (measured as Nitrogen)	1	1	"Blue baby syndrome" in infants under six months - life threatening without immediate medical attention. Symptoms: Infant looks blue and has shortness of breath.	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
Selenium	0.05	0.05	Hair or fingernail loss; numbness in fingers or toes; circulatory problems	Discharge from petroleum refineries; erosion of natural deposits; discharge from mines
Thallium	0.0005	0.002	Hair loss; changes in blood; kidney, intestine, or liver problems	Leaching from ore-processing sites; discharge from electronics, glass, and pharmaceutical companies

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Organic Chemicals	MCLG⁶ (mg/L)⁴	MCL² or TT³ (mg/L)⁴	Potential Health Effects from Ingestion of Water	Sources of Contaminant in Drinking Water
Acrylamide	zero	TT ⁷	Nervous system or blood problems; increased risk of cancer	Added to water during sewage/wastewater treatment
Alachlor	zero	0.002	Eye, liver, kidney or spleen problems; anemia; increased risk of cancer	Runoff from herbicide used on row crops
Atrazine	0.003	0.003	Cardiovascular system problems; reproductive difficulties	Runoff from herbicide used on row crops
Benzene	zero	0.005	Anemia; decrease in blood platelets; increased risk of cancer	Discharge from factories; leaching from gas storage tanks and landfills
Benzo(a)pyrene	zero	0.0002	Reproductive difficulties; increased risk of cancer	Leaching from linings of water storage tanks and distribution lines
Carbofuran	0.04	0.04	Problems with blood or nervous system; reproductive difficulties.	Leaching of soil fumigant used on rice and alfalfa
Carbon tetrachloride	zero	.005	Liver problems; increased risk of cancer	Discharge from chemical plants and other industrial activities
Chlordane	zero	0.002	Liver or nervous system problems; increased risk of cancer	Residue of banned termiticide
Chlorobenzene	0.1	0.1	Liver or kidney problems	Discharge from chemical and agricultural chemical factories
2,4-D	0.07	0.07	Kidney, liver, or adrenal gland problems	Runoff from herbicide used on row crops
Dalapon	0.2	0.2	Minor kidney changes	Runoff from herbicide used on rights of way
1,2-Dibromo-3- chloropropane (DBCP)	zero	0.0002	Reproductive difficulties; increased risk of cancer	Runoff/leaching from soil fumigant used on soybeans, cotton, pineapples, and orchards
o- Dichlorobenzene	0.6	0.6	Liver, kidney, or circulatory system problems	Discharge from industrial chemical factories
p- Dichlorobenzene	0.075	0.075	Anemia; liver, kidney or spleen damage; changes in blood	Discharge from industrial chemical factories
1,2- Dichloroethane	zero	0.005	Increased risk of cancer	Discharge from industrial chemical factories
1-1- Dichloroethylene	0.007	0.007	Liver problems	Discharge from industrial chemical factories
cis-1, 2- Dichloroethylene	0.07	0.07	Liver problems	Discharge from industrial chemical factories
trans-1,2- Dichloroethylene	0.1	0.1	Liver problems	Discharge from industrial chemical factories
Dichloromethane	zero	0.005	Liver problems; increased risk of cancer	Discharge from pharmaceutical and chemical factories

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1-2-Dichloropropane	zero	0.005	Increased risk of cancer	Discharge from industrial chemical factories
Di(2-ethylhexyl)adipate	0.4	0.4	General toxic effects or reproductive difficulties	Leaching from PVC plumbing systems; discharge from chemical factories
Di(2-ethylhexyl)phthalate	zero	0.006	Reproductive difficulties; liver problems; increased risk of cancer	Discharge from rubber and chemical factories
Dinoseb	0.007	0.007	Reproductive difficulties	Runoff from herbicide used on soybeans and vegetables
Dioxin (2,3,7,8-TCDD)	zero	0.00000003	Reproductive difficulties; increased risk of cancer	Emissions from waste incineration and other combustion; discharge from chemical factories
Diquat	0.02	0.02	Cataracts	Runoff from herbicide use
Endothall	0.1	0.1	Stomach and intestinal problems	Runoff from herbicide use
Endrin	0.002	0.002	Nervous system effects	Residue of banned insecticide
Epichlorohydrin	zero	TT ⁷	Stomach problems; reproductive difficulties; increased risk of cancer	Discharge from industrial chemical factories; added to water during treatment process
Ethylbenzene	0.7	0.7	Liver or kidney problems	Discharge from petroleum refineries
Ethylene dibromide	zero	0.00005	Stomach problems; reproductive difficulties; increased risk of cancer	Discharge from petroleum refineries
Glyphosate	0.7	0.7	Kidney problems; reproductive difficulties	Runoff from herbicide use
Heptachlor	zero	0.0004	Liver damage; increased risk of cancer	Residue of banned termiticide
Heptachlor epoxide	zero	0.0002	Liver damage; increased risk of cancer	Breakdown of heptachlor
Hexachlorobenzene	zero	0.001	Liver or kidney problems; reproductive difficulties; increased risk of cancer	Discharge from metal refineries and agricultural chemical factories
Hexachlorocyclopentadiene	0.05	0.05	Kidney or stomach problems	Discharge from chemical factories
Lindane	0.0002	0.0002	Liver or kidney problems	Runoff/leaching from insecticide used on cattle, lumber, gardens
Methoxychlor	0.04	0.04	Reproductive difficulties	Runoff/leaching from insecticide used on fruits, vegetables, alfalfa, livestock
Oxamyl (Vydate)	0.2	0.2	Slight nervous system effects	Runoff/leaching from insecticide used on apples, potatoes, and tomatoes
Polychlorinated biphenyls (PCBs)	zero	0.0005	Skin changes; thymus gland problems; immune deficiencies; reproductive or nervous system difficulties; increased risk of cancer	Runoff from landfills; discharge of waste chemicals

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Pentachlorophenol	zero	0.001	Liver or kidney problems; increased risk of cancer	Discharge from wood preserving factories
Picloram	0.5	0.5	Liver problems	Herbicide runoff
Simazine	0.004	0.004	Problems with blood	Herbicide runoff
Styrene	0.1	0.1	Liver, kidney, and circulatory problems	Discharge from rubber and plastic factories; leaching from landfills
Tetrachloroethylene	zero	0.005	Liver problems; increased risk of cancer	Leaching from PVC pipes; discharge from factories and dry cleaners
Toluene	1	1	Nervous system, kidney, or liver problems	Discharge from petroleum factories
Total Trihalomethanes (TTHMs)	None ⁵	0.10	Liver, kidney or central nervous system problems; increased risk of cancer	Byproduct of drinking water disinfection
Toxaphene	Zero	0.003	Kidney, liver, or thyroid problems; increased risk of cancer	Runoff/leaching from insecticide used on cotton and cattle
2,4,5-TP (Silvex)	0.05	0.05	Liver problems	Residue of banned herbicide
1,2,4-Trichlorobenzene	0.07	0.07	Changes in adrenal glands	Discharge from textile finishing factories
1,1,1-Trichloroethane	0.20	0.2	Liver, nervous system, or circulatory problems	Discharge from metal degreasing sites and other factories
1,1,2-Trichloroethane	0.003	0.005	Liver, kidney, or immune system problems	Discharge from industrial chemical factories
Trichloroethylene	Zero	0.005	Liver problems; increased risk of cancer	Discharge from petroleum refineries
Vinyl chloride	Zero	0.002	Increased risk of cancer	Leaching from PVC pipes; discharge from plastic factories
Xylenes (total)	10	10	Nervous system damage	Discharge from petroleum factories; discharge from chemical factories
Radionuclides	MCLG¹ (mg/L)⁴	MCL² or TT³ (mg/L)⁴	Potential Health Effects from Ingestion of Water	Sources of Contaminant in Drinking Water
Beta particles and photon emitters	None ⁵	4 millirems per year	Increased risk of cancer	Decay of natural and man-made deposits
Gross alpha particle activity	None ⁵	15 picocuries per Liter (pCi/L)	Increased risk of cancer	Erosion of natural deposits
Radium 226 and Radium 228 (combined)	None ⁵	5 pCi/L	Increased risk of cancer	Erosion of natural deposits
Microorganisms	MCLG¹ (mg/L)⁴	MCL² or TT³ (mg/L)⁴	Potential Health Effects from Ingestion of Water	Sources of Contaminant in Drinking Water
<i>Giardia lamblia</i>	Zero	TT ⁸	Giardiasis, a gastroenteric disease	Human and animal fecal waste

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Heterotrophic plate count	N/A	TT ⁸	HPC has no health effects, but can indicate how effective treatment is at controlling microorganisms.	n/a
<i>Legionella</i>	Zero	TT ⁸	Legionnaire's Disease, commonly known as pneumonia	Found naturally in water; multiplies in heating systems
Total Coliforms (including fecal coliform and <i>E. Coli</i>)	Zero	5.0% ⁹	Used as an indicator that other potentially harmful bacteria may be present ¹⁰	Human and animal fecal waste
Turbidity	N/A	TT ⁸	Turbidity has no health effects but can interfere with disinfection and provide a medium for microbial growth. It may indicate the presence of microbes.	Soil runoff
Viruses (enteric)	Zero	TT ⁸	Gastroenteric disease	Human and animal fecal waste

National Secondary Drinking Water Regulations

National Secondary Drinking Water Regulations (NSDWRs or secondary standards) are non-enforceable guidelines regulating contaminants that may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor, or color) in drinking water. EPA recommends secondary standards to water systems but does not require systems to comply. However, states may choose to adopt them as enforceable standards. See Table 2.

Table 2

Contaminant	Secondary Standard
Aluminum	0.05 to 0.2 mg/L
Chloride	250 mg/L
Color	15 (color units)
Copper	1.0 mg/L
Corrosivity	Noncorrosive
Fluoride	2.0 mg/L
Foaming Agents	0.5 mg/L
Iron	0.3 mg/L
Manganese	0.05 mg/L
Odor	3 threshold odor number
pH	6.5-8.5
Silver	0.10 mg/L
Sulfate	250 mg/L
Total Dissolved Solids	500 mg/L
Zinc	5 mg/L

Notes

¹ Maximum Contaminant Level Goal (MCLG) - The maximum level of a contaminant in drinking water at which no known or anticipated adverse effect on the health effect of persons would occur, and which allows for an adequate margin of safety. MCLGs are non-enforceable public health goals.

² Maximum Contaminant Level (MCL) - The maximum permissible level of a contaminant in water which is delivered to any user of a public water system. MCLs are enforceable standards.

The margins of safety in MCLGs ensure that exceeding the MCL slightly does not pose significant risk to public health.

³ Treatment Technique - An enforceable procedure or level of technical performance which public water systems must follow to ensure control of a contaminant.

⁴ Units are in milligrams per Liter (mg/L) unless otherwise noted.

⁵ MCLGs were not established before the 1986 Amendments to the Safe Drinking Water Act. Therefore, there is no MCLG for this contaminant.

⁶ Lead and copper are regulated in a Treatment Technique which requires systems to take tap water samples at sites with lead pipes or copper pipes that have lead solder and/or are served by lead service lines. The action level, which triggers water systems into taking treatment steps if exceeded in more than 10% of tap water samples, for copper is 1.3 mg/L, and for lead is 0.015mg/L.

⁷ Each water system must certify, in writing, to the state (using third-party or manufacturer's certification) that when acrylamide and epichlorohydrin are used in drinking water systems, the combination (or product) of dose and monomer level does not exceed the levels specified, as follows:

- **Acrylamide** = 0.05% dosed at 1 mg/L (or equivalent)
- **Epichlorohydrin** = 0.01% dosed at 20 mg/L (or equivalent)

⁸ The Surface Water Treatment Rule requires systems using surface water or ground water under the direct influence of surface water to (1) disinfect their water, and (2) filter their water to meet criteria for avoiding filtration so that the following contaminants are controlled at the following levels:

- ***Giardia lamblia***: 99.9% killed/inactivated
Viruses: 99.99% killed/inactivated
- ***Legionella***: No limit, but EPA believes that if *Giardia* and viruses are inactivated, *Legionella* will also be controlled.
- **Turbidity**: At no time can turbidity (cloudiness of water) go above 5 nephelometric turbidity units (NTU); systems that filter must ensure that the turbidity go no higher than 1 NTU (0.5 NTU for conventional or direct filtration) in at least 95% of the daily samples for any two consecutive months.
- **HPC**: NO more than 500 bacterial colonies per milliliter.

⁹ No more than 5.0% samples total coliform-positive in a month. (For water systems that collect fewer than 40 routine samples per month, no more than one sample can be total coliform-positive). Every sample that has total coliforms must be analyzed for fecal coliforms. There cannot be any fecal coliforms.

¹⁰ Fecal coliform and *E. coli* are bacteria whose presence indicates that the water may be contaminated with human animal wastes. Microbes in these wastes can cause diarrhea, cramps, nausea, headaches, or other symptoms.

