

GROUNDWATER RECHARGE STAKEHOLDER ADVISORY GROUP

FINAL MEETING NOTES ADVISORY GROUP MEETING – THURSDAY, DECEMBER 1, 2011 DEQ PIEDMONT REGIONAL OFFICE TRAINING ROOM

Meeting Attendees

<i>STAKEHOLDERS</i>	<i>INTERESTED PUBLIC</i>	<i>TECHNICAL SUPPORT</i>
Leita Bennett – AWWA/Atkins	Alicia Connelly – City of Norfolk Water Utilities – Alternate for Chris Harbin	Emily Aleshire - DCR
Peter Brooks - PMBA	Blair Krusz – Virginia Agribusiness Counsel	John Aulbach - VDH
Greg Evanylo – VA TECH	Vernon Land – City of Suffolk	Melanie Davenport – DEQ
Ed Fleischer – CH2M Hill		Marcia Degen – VDH
Larry Foster – AWWA VA Section/Newport News Waterworks		Karen Johnson – EPA – Via Phone
Chris Harbin – City of Norfolk Utilities		Scott Kudlas – DEQ
Ron Harris – Newport News Waterworks		Rebecca LePrell – VDH
Janet Herman – UVA		Barry Matthews – VDH
Mike Lang – New Kent County – Public Utilities – Alternate for Larry Dame		Randy McFarland – USGS
Michael Lawless – Mission H2O		Bill Norris – DEQ
Peter McDonough – Golf Course Superintendents Association		Valerie Rourke – DEQ
Britt McMillan – Eastern Shore of Virginia Groundwater Committee		Neil Zahradka – DEQ
Clifton Parker IV – Aqua America		
Jim Pletl – Hampton Roads Sanitation District		
Cameron Tana – HydroMetrics Water Resources, Inc.		
Cabell Vest – VAMWA		
Brent Waters – Golder Associates		

NOTE: The following Stakeholder Advisory Group Members were absent from the meeting: Larry Dame – New Kent County – Public Utilities; Whitney Katchmark – Hampton Roads PDC; & Craig Maples – City of Chesapeake Public Utilities.

1. Welcome (Bill Norris & Melanie Davenport)

Bill Norris, Regulatory Analyst with DEQ's Office of Regulatory Affairs, called the meeting to order. Melanie Davenport, Director of DEQ's Water Division, welcomed the attendees to the meeting. She thanked everyone for coming to today's meeting. She acknowledged that some of those in attendance have been with us on this journey as we have taken other steps in this process. She indicated that she wanted to take a moment to explain where we are, why we are here and how this process fits into other things that DEQ has done related to reuse. She noted the following:

- In 2008, the State Water Control Board adopted its first version of the Water Reuse and Reclamation Regulation.
- Early on, DEQ staff determined that we could make some improvements to that regulation to make it easier to use and a bit more flexible. So, we initiated a regulatory effort to revise the Water Reuse and Reclamation Regulation in early 2011.
- Many of the attendees of this meeting served as members of the Regulatory Advisory Panel (RAP) for that regulatory action.
- The work of that RAP has been concluded and we have proposed amendments to the regulation that have been approved by the State Water Control Board and are currently in Executive Review.
- As we discussed how we could make the Water Reuse and Reclamation Regulation more functional, one of the issues that was raised was the question of Groundwater Recharge.
- When we develop regulations, we do have a framework within which we have to operate, so during the RAP for the Water Reclamation and Reuse Regulation, we had actually noticed our intent to examine groundwater recharge. What we realized when we looked at the question of groundwater recharge was that if we are going to move forward with this concept, there may be a number of other regulations that we would need to examine and revise in the process. So, DEQ scaled back that original regulatory action to just deal with the Water Reuse and Reclamation Regulation, because that was what we had "Noticed" was our intent.
- Part of this process was a little bureaucratic but part of it was DEQ's opinion that moving forward with the possibility of groundwater recharge is a pretty complicated endeavor and that there may be a number of regulations involved. There are some very big questions that will need to be addressed and that it wasn't just as straight forward as going into and tweaking the Water Reclamation and Reuse Regulation to make it work better.
- The decision was made to move forward with the amendments to the Water Reclamation and Reuse Regulation and take a separate action to consider if we would move forward with the concept of groundwater recharge, and what regulations we would need to look at and revise to address groundwater recharge. We can probably think of at least three regulations that would need to be included in any regulatory action.
- With a regulatory process, once DEQ publishes a Notice of Intended Regulatory Action (NOIRA) we only have six months from the close of the NOIRA comment period to complete the work of a RAP and submit a proposed regulation or proposed regulatory amendments to the State Water Control Board.
- We thought that the issues involved were fairly complex and that six months might not be enough time to complete the process of actual regulatory language development, and we are not even sure what regulations need to be amended. We need to know that before we can initiate a NOIRA.
- This Stakeholder Advisory Group (SAG) has been formed as part of a pre-regulatory action to help us answer these questions. This group is here to help us determine what we need to do if we are going to move forward with groundwater recharge. What are the technical issues that need to be addressed? What are the regulatory issues? What regulations are involved? It may take a few months to work through that process, at which point, we would better understand the scope of regulatory actions needed to prepare the NOIRA.
- This is a complex issue. This group is here to help us make sense out of all of it. We appreciate your willingness to assist us in this process. We are here to get your insight, your input, your experience, and your assistance.

2. Purpose of Advisory Group; Instructions to the Group; Introductions (Bill Norris & Angela Neilan):

Bill Norris, Regulatory Analyst with the DEQ Office of Regulatory Affairs, reviewed the purpose of the advisory group and outlined the guidelines for the group. He noted the following:

- This is a pre-regulatory action.
- We will be proceeding in the same format as a formal regulatory action, so these will be public meetings, there will be notes generated for each of the meetings, and the meetings will be recorded.
- A representative from EPA, Karen Johnson, will be participating via phone.
- Staff will be providing some background information on some of the existing rules and regulations that we think address the concept of groundwater recharge at some level.
- We need your feedback. This is your opportunity to help structure how groundwater recharge could be addressed in the Commonwealth in a pre-regulatory process.
- Everyone who volunteered to participate in this pre-regulatory SAG has been included either as a member of the advisory group or as a member of the technical support component of the group. The technical support category of membership on the group represents all of the agencies, both federal and state, that have an interest in groundwater recharge.
- Everyone needs to sign-in on the sign-in sheet and to provide an email address so that everyone can receive the meeting materials.

Angela Neilan, the facilitator for the meeting, welcomed the meeting participants and asked for brief introductions from those attending today's meeting. She asked for each of those in attendance to provide a brief statement of what brought you to today's meeting and what you would like to see come out of today's meeting. The attendees noted the following:

- Would like to see a decision as to whether this is a good idea or not.
- Would like to get a better understanding of the regulations that will need to be looked at during this process.
- Interest is in the vadose injection aspect of groundwater recharge.
- Need to get an understanding of how these potential regulatory changes might impact the regulations of the VDH in general and the VDH Office of Drinking Water in particular.
- Would like to see how end-users (e.g., golf courses, turf grass industry, etc.) would benefit from groundwater recharge and the continuing growth of water reuse.
- Here to make sure that the water resources of the Commonwealth are protected for future generations.
- Want to make sure that the quality of our groundwater is protected.
- Here to become more educated on groundwater recharge.
- Here to learn and to provide support as needed.
- Would like to see recommendations for regulation revisions that are protective and supportive of the designated uses of our water resources, both quality and quantity.
- Here to help ask questions and to bring a scientific context to the discussions and to evaluating the decisions of the group.
- Want to see what implications this has to the management of the Commonwealth's groundwater

- resources and whether this is a good idea or not.
- Here looking for water supply and waste water disposal solutions.
- Here to protect the interests of private well owners.
- Would like to see how groundwater recharge and aquifer storage and recovery projects can be promoted as ways to protect groundwater resources in the Commonwealth.
- Want to see how this approach would impact discharge permits.
- Looking for consistency between agencies on how groundwater resources are protected and managed.
- Hoping to identify some options for those areas needing recharge.

3. Regulations and Policies Affecting Groundwater Recharge with Reclaimed Water in Virginia (Valerie Rourke):

Valerie Rourke gave a presentation on the Regulatory Framework for Groundwater Recharge with Reclaimed Water in Virginia. (A copy of her presentation has been provided to the group.) She confirmed that Karen Johnson was still on the phone from EPA. She welcomed the meeting attendees to the meeting and noted that we welcome your input, thoughts and ideas as we begin the process of examining potential regulatory actions that DEQ may undertake to develop a program for groundwater recharge with reclaimed water. She noted that before we begin that process it is useful to know what is already in place, so that we can avoid duplication and conflict. She informed the group that much of her presentation will focus on the existing regulatory framework in Virginia for groundwater recharge. Her presentation included the following information:

- Virginia has both federal and state laws, regulations, guidelines and policies that can affect groundwater (GW) recharge with reclaimed water.
- Federal Regulations:
 - US EPA Water Reuse Guidelines:
 - No federal regulations for the reclamation and reuse of wastewater.
 - EPA Water Reuse Guidelines are periodically updated:
 - Last published in 2004
 - Next publication due in 2012
 - Guidelines minimally address methods and technology, but provide overview of other states' requirements regarding groundwater recharge
 - US EPA SDWA Underground Injection Control (UIC) Program:
 - Regulates wells that are used to inject various liquids underground in accordance with 40 CFR Part 144
 - Class V wells – include wells to recharge or replenish aquifers, and to provide salt water intrusion barriers and subsidence control
 - At a minimum, requires an inventory be maintained of underground injection wells, including Class V wells
 - Most GW recharge with reclaimed water would qualify for permit-by-rule, but could be issued an individual permit by EPA where there is "potential for endangerment"- this would be done on a case-by-case basis
 - Virginia has not sought delegation of UIC program from EPA;, therefore EPA retains the authority to issue UIC permits in the state

- At the State level, both DEQ and the Virginia Department of Health (VDH) have regulations and policies that can affect groundwater recharge with reclaimed water:
- Virginia – DEQ Regulations:
 - Water Reclamation and Reuse Regulation (9VAC25-740)
 - Not a permit regulation; primarily a technical regulation, similar to Virginia's Sewage Collection and Treatment regulations – Facilities that reclaim domestic, industrial or municipal wastewater will in most cases be subject to the requirements of this regulation and will be covered with either a VPA or a VPDES permit.
 - Groundwater injection with reclaimed water may be excluded from the requirements of the regulation determined by the method of groundwater recharge that is used. For example, groundwater recharge through the use of rapid infiltration basins or direct injection wells would be excluded, while groundwater recharge through the use of vadose zone wells would not be excluded from the requirements of this regulation.
 - Proposals for GW recharge with reclaimed water must be evaluated on a case-by-case basis to determine appropriate standards and monitoring requirements that are necessary to protect public health and the environment.
 - Does not consider recharge of potable GW supplies with reclaimed water to be indirect potable reuse. Indirect potable reuse, as defined in the regulation, does not recognize groundwater recharge as a means of intentionally augmenting a potable water supply source.
 - Virginia Pollution Abatement (VPA) Permit Regulation (9VAC25-32)
 - Issued to water pollutant management activities that do not have a discharge to surface waters – these include land treatment of municipal and industrial wastewater, and land application of biosolids, stabilized septage and industrial sludges and residuals.
 - DEQ could also issue a VPA permit to authorize discharges to groundwater per 9VAC25-32-30.
 - GW recharge authorized by a VPA permit has been limited to rapid infiltration basins designed and operated in accordance with the SCAT Regulations, 9VAC25-790-880 (pertains to land treatment systems). VPA permits have not been used for vadose injection wells or direct injection wells.
 - Sewage Collection and Treatment (SCAT) Regulations (9VAC25-790)

Most reclaimed water is derived from municipal waste water and the same processes that are used to reclaim municipal waste water are those that are used in sewage treatment plants. Consequently, the SCAT Regulations, which contain design, construction, and operation requirements for sewage treatment plants, are applied to reclamation systems of similar source water.

 - Address land treatment systems that include rapid infiltration and require all such systems to be designed to meet Groundwater Standards.
 - Rapid infiltration systems must be:
 - Designed, in part, to recover renovated water either through under-drains or wells for subsequent reuse, and
 - Evaluated for potential impacts to aquifer hydraulics and water quality – through predictive modeling and verified by GW monitoring

- Groundwater Withdrawal Regulations (9VAC26-610)
 - Allow GW withdrawal permits to be issued for GW recharge where the project:
 - Has an associated withdrawal of the recharge water for subsequent reuse, and
 - Is located within a Groundwater Management Area.
 - Any use of reclaimed, reused or recycled water to augment a public water supply that is proposed in a GW withdrawal permit application must be approved by VDH – i.e., through the issuance of Waterworks Operation Permit or equivalent thereof.
- Groundwater Standards (9VAC25-280)
 - All GW recharge projects must comply with the Groundwater Standards, which include both narrative and numerical standards that are protective of groundwater quality.
 - Zones for mixing wastes with GW may be allowed, but must be determined on a case-by-case basis and kept to smallest size possible.
 - Like many other states, Virginia's Groundwater Standards contains a GW Antidegradation Policy that would apply to groundwater recharge with reclaimed water. The policy contains the following narrative components:
 - If no GW standard for constituent – the natural quality of that constituent must be maintained in the groundwater.
 - If GW standard for constituent exists – maintain natural quality if below standard or do not add any more of that constituent if natural quality above standard.
 - Variances to GW Antidegradation policy may be allowed and the procedures for such variances are described in the regulation.
- DEQ Water Resources Policy (9VAC25-390)
 - Regulation consisting of policies established by the SWCB to protect and appropriately manage the Commonwealth's water resources.
 - Pertaining to groundwater recharge with reclaimed water, the policy contains two policies that are inconsistent on acceptable pollutant loads to groundwater:
 - 9VAC25-390-30.5.e – "subsurface storage and groundwater recharge should be encouraged subject to the provisions that such practices do not cause pollution of underground water resources".
 - 9VAC25-390-30.4.e – "discharge of pollutants into groundwater aquifers shall be contrary to board policy" with some limited exceptions that do not include GW recharge with reclaimed water.
 - This regulation does not provide clear direction or policy that supports groundwater recharge with reclaimed water.
- Virginia – VDH Regulations:
 - Waterworks Regulations (12VAC5-590)
 - These regulations have no direct effect on groundwater recharge with reclaimed water; however, there are certain provisions of these regulations that can indirectly affect this activity.
 - 12VAC5-590-820. General.
 - "Preference shall be given to the best available sources of supply which present minimal risks of contamination from wastewater and which

groundwater with treated drinking water. Are there additional sources besides reclaimed water and treated drinking water that should be considered? Should the use of stormwater or surface water be considered?

- Do we want to develop a new regulation or amend an existing regulation to authorize GW recharge? Or maybe many different regulations?
- Are there conflicting or duplicative regulations that need to be taken into consideration?
- What resources do we need to evaluate and permit GW recharge projects in a manner that is protective of human health and the environment?

Group discussions included the following:

- What makes the statements contained in the DEQ Water Resources Policy (9VAC25-390) inconsistent? *Staff response: 9VAC25-390-30.5.e allows the addition of some pollutants based on the anti-degradation policy where their concentrations are not exceeding the standards while 9VAC25-390-30.4.e states that no pollutants can be added into the groundwater aquifers.*
- How much of the groundwater characterization efforts mandated by House Document No. 92 have been completed and what has gone on with the standards? *Staff response: These are recommendations and not all of the recommendations have become part of State Water Control Law. This is one of those recommendations that has not found its way into the law yet. This topic will be addressed during the next presentation, but basically since no funding was authorized along with this recommendation; it has been a difficult task to perform this recommendation.*
- The Groundwater Anti-degradation Policy states that "if groundwater standard for constituent exists - maintain natural quality if below standard". Does that mean maintain the quality below the standard? *Staff response: That is the way that it has traditionally been interpreted.*
- If you exceed a standard, you are not supposed to add anymore of the constituent to the groundwater. The anti-degradation policy states that "if groundwater standard exists - do not add constituent if natural quality above standard." Does that mean that you cannot add any additional constituent or water at all even if it could dilute the concentration in the groundwater which would in essence be improving the quality of the water? *Staff response: That traditionally has been the agency's position. We are looking to this group to help determine whether that is realistic and what would be your recommendations for moving forward with groundwater recharge. It was suggested that the determining issue would be if we are talking about a "load" or a "concentration".*

4. Current and Projected Groundwater Availability in Virginia (Scott Kudlas)

Scott Kudlas gave a presentation on the current and projected groundwater availability in Virginia. (A copy of his presentation has been provided to the group.) He noted that this discussion has been going on for about 10 years now. During that time, DEQ has internally been looking at this issue from the perspective of a "disposal" question and a water quality question and did not look at it from the other side of the house which is water quantity, so not a lot of progress has been made on the topic of groundwater recharge. When you look at this only from a water quality perspective, the issues and concerns are very different from those that need to be addressed when looking at it from a water quantity perspective. Now the agency realizes that when looking at the groundwater resources of the Commonwealth that we cannot look at it solely as a "disposal" issue. We need to start integrating our understanding and think about it from both a water quality and a water quantity perspective. We need to

think about: Is groundwater recharge a good idea from a water quality perspective? Is groundwater recharge a good idea for managing some of the water quantity issues? Given these two approaches, what are the risks associated with it? And, how do we best manage these risks?

His presentation contained the following information:

- The Coastal Plain Aquifer system is comprised of a number of layers of sediments. These sediments were deposited in two types of processes and those sediments have different properties in how they store water; how water moves through them; and what happens when you withdraw water from them. There are sediments that were deposited when they were in riverine environments, which are fluvial sediments and sediments that were deposited when they were in a marine environment, which are marine sediments. The difference between the two sediments is grain size and storage capacity.
- The Coast Plain Aquifer system is made up of the following aquifers which are made up of the marine sediments:
 - Yorktown-Eastover
 - Piney Point
 - Aquia
- The Coastal Plain Aquifer system also contains the Potomac Aquifer which is made up of fluvial sediments.
- Prior to 2006, the Potomac Aquifer was considered as three different aquifers; a lower, a middle and an upper. In the most recent evaluation, the current thinking is that it really functions as a large leaky system. The Potomac Aquifer is the dominant supply because of its productivity. It is able to supply a lot of water for people of a very high quality. It is used by a lot of people.
- The emerging issue of concern that DEQ has been working on for the last five or six years with USGS and other folks in the Hampton Roads Planning District area is the sustainability of the aquifer system.
- Groundwater monitoring gauge data from USGS shows wells that are screened in the Potomac Aquifer. There are some pretty distinct trends downward. The data presented cover about 20 to 30 years. The latest data is from 2008 and 2010. If the system is looked at overall, the decline on average and system-wide is 2.4 feet per year. This level of draw-down for users drawing from the eastern portions of the Potomac Aquifer is not dramatic, but for users drawing from the other portions of the aquifer this could have a drastic impact on the availability of water in 35 years or so, if current trends continue. According to an evaluation of the current data available from USGS there is no evidence to show that the trend will not continue, even if we never issue another permit again.
- The further east you go the more water that is available. As you pump in the far eastern part of the system, you have impacts along the fall line, particularly for significant withdrawals. Significant withdrawals represent multiple millions of gallons per day withdrawals.
- The system dewateres in the western portions of the system first.
- Information developed by the USGS in the Hampton Roads area shows the change in storage of water in the Potomac Aquifer from pre-development to 2008. By considering the proportion of the total storage used by the model, cell location reveals spatially where future water resources

may be more limited. The data shows extensive areas where the head is below the 80% drawdown criterion (drawdown above 80% of the head difference between predevelopment conditions and the elevation of the top of the aquifer). The data also shows small areas where the simulations reveal the average head may be below the top of the unit.

- When the water is pumped down below the top of the aquifer, those sediments that were holding the water compact because of the weight of the earth or land above it. When the sediments compact, the potential is for some percentage of that capacity to be permanently lost. The ability to recharge the sediments and to make use of the whole system is degraded. That is why there is a concern about pumping GW down below the top of the aquifer from a resource management perspective.
- If the dominant water supply is groundwater and you are talking about a 30 year window or a 100 year window there is no "just-in-time" water supply anymore. If you can't get the water from groundwater and you need to get it from surface water there is a time disconnect. The King William Reservoir project took 20 years to get to the answer NO. James City County had a similar experience. We need to be more conjunctive with our management of the groundwater resource and we need to get more surface water, but those things don't happen overnight. So, we need to start talking about these issues and planning for them now.
- Groundwater storage calculations. Loss of compressible storage with calculation area expressed as a percent of storage available above 80% criterion levels. Scenario #4 shows 70% or more of the available storage above the regulatory threshold being used up under total permitted scenarios. Scenario #4 is a steady state total permitted scenario and represents 65% of the available storage in the whole system. Does that mean that we are going to run out of water? No, but our children could if we do not act.
- A series of simulated water levels were presented that represented a "steady state" scenario in different aquifers in the system. The point is to illustrate orders of magnitude of change in pumping and how that affects various areas that are below the regulatory standards or will be dewatering the aquifer because they are below the aquifer top. This is a "steady state" scenario looking at 2008 reported pumping, so this is actual pumping data by user and actual pumping by International Paper.
- The simulations show significant areas where de-watering is occurring below the fall-line, along I-95. The data illustrated by the "simulated water levels" based on actual pumping data, shows areas in the Aquia and the Potomac Aquifers where the water is simulated to be below the regulatory threshold and no additional water withdrawal permits are supposed to be issued under the regulation. Should we be concerned about this?
- Scenarios using the "total permitted amount" from 2005 were shown. This represents the amount of water authorized in all the permits that had been issued in 2005. Permittees say that they are not going to use that amount but they don't want to give up any of their permitted amount. Because the amount is in the permit and it authorizes the permittee to pump that amount, when DEQ does their analyses for sustainability, there needs to be some assurance that what has been authorized is what you are legally allowed to do. What impact does that have on sustainability? The simulations show a number of very large areas that may result in subsidence, because it is below the aquifer top. There are significant regional impacts based on a worst case scenario evaluation.
- The other thing that is of interest is that when the groundwater withdrawal program was created in 1972, it was created as a result of a concern on the part of the General Assembly and DEQ

and even some of the local communities, regarding change in the hydraulic gradient and what that meant in terms of the potential for saltwater intrusion. In the pre-development time before we started pumping and even for a significant portion of time after we started pumping, groundwater would slowly move from the fall-line into the Chesapeake Bay and the Atlantic Ocean. But by the 70's, we understood that because of some of our major pumping centers, we had in fact reversed that gradient and now the groundwater was coming inland along with water from those saline or brackish bodies of water.

- USGS recently completed a study of the salt concentrations in those waters. The study shows salt concentrations that extend fairly far inland, but at a very significant depth so that it doesn't interfere with any of our water supplies or individual private homes wells.
- A number of localities in the Hampton Roads area that depend on groundwater now, have groundwater desalinization plants with reverse osmosis technology. That need is directly related to the salt concentrations that we are beginning to see.
- So what we think is happening is that the salt water is very slowly (in the orders of 100's of years) moving inland at the lowest parts of the aquifer and moving at the top of the aquifer in the terms of decades, which is why we see the need for the use of reverse osmosis facilities. As people are pumping, we are trying to manage their pumping to minimize some of their impacts to the aquifer. We have put in pumping schedules and things like that in the permits. What we believe is resulting in episodic drawing up of that salt water at the bottom or in the middle of the aquifer, is the wedge that is coming in. The lateral movement toward the western part of the system is largely driven by the big withdrawals in that area. The intermittent pumping of the public water supply wells is impacting the water level of that salt concentration in the Hampton Roads area.
- Subsidence – We are looking at subsidence in the Franklin area of about a foot over the life of that withdrawal. The two largest industrial withdrawals in the Franklin area and West Point seem to account for the major amount of the subsidence evidenced and projected for the Hampton Roads area. Subsidence has occurred. The only data that we have is from these two plants.

Group discussions included the following:

- The presentation seems to focus on aquifers in the Coastal Plain. There are aquifers in the state that are not in the Coastal Plain. There are aquifers in the Piedmont and in the Shenandoah Valley. *Staff response: Yes, there are groundwater resources in other parts of the state, but they exist in "fractured rock" systems and are not normally classified as "aquifers". Also, most of the information that exists on the resource is focused on the fluvial or marine sediment aquifers that are found in the Coastal Plain. The information, therefore, is from that area of the state. If any of you have data on the resource from other areas of the state, we would be glad to discuss and consider it.*
- Virginia does not have the same types of aquifer systems as other states. All of Virginia's aquifers eventually go to fresh water. We don't have the same conditions in our coastal plain as other states. *Staff response: That is primarily due to the nature of the sediments involved.*
- Is there any evidence that the areas of subsidence will be able to rebound? *Staff response: Currently, it appears that the areas of major subsidence that have been identified are not "elastic"*

and therefore will not be able to rebound. What has occurred is permanent and will continue over time.

- What is "Scenario #4"? Is it everyone using the maximum amount, every day, all the time, concurrently, out to steady state? How far out in the future does the projection run? *Staff response: Yes, that is correct. The projection runs out 100 to 200 years.*
- Does the scenario include private well usage or non-permitted usage? *Staff response: The scenario does include an estimate for those uses. The estimate used for non-permitted use is 30 to 40 mgd. Historically, DEQ's estimates of unpermitted use have only been 20% of the actual unpermitted use. This was during the last time that the management area was done. The reported use and the actual use that we had was only 20% of what people actually asked for.*
- What proportion of water being pumped from these industrial operations might possibly be substituted for by direct nonpotable reuse? *Staff response: Not in broad cumulative terms. Some of the things that are required when groundwater withdrawal permits come up for renewal are that each facility must look at available alternates and show need, and must have a conservation management plan. This varies between facilities, in costs, and in a facility's ability to look at those alternate sources. We look at it in every permit that we issue. It is usually a negotiated part of the permitting process. There is no set percentage of reduction that we are looking for.*
- Will pumping resume at International Paper? *Staff response: Politically, the paper mill will come back on line because of the jobs it creates. Yes, it is anticipated that there will pumping there again. How much and at what rates is currently part of a permit application process.*
- What is the current estimate for withdrawals for 2011? *Staff response: The currently available estimate of actual use is a rate around 90 MGD. This is based on available data from 2010 because of the year lag-time in the data.*
- The wells at International Paper were shut down around April and May and were shut down for most of 2010. What has been the impact of the shutdown? *What the USGS has indicated in its simulations and what seems consistent to what we have seen in the monitoring of the cone of depression from the International Paper (IP) withdrawals is that you have an initial very quick rebound of 70 to 80% of the rebound and then it stops. There are rebounds of 100 to 150 feet depending on what well you are looking at.*
- International Paper was approached prior to their shutdown regarding the reuse of waste water. Their response was that they were a food product paper manufacturer and could not afford to have the stigma of using reclaimed water. The problem is how you provide them with an alternative potable water supply to use in their process. This would be an extreme cost in a highly competitive paper world. The same kind of scenario probably applies to West Point. There are extreme costs associated with competitive markets. Another problem is that the communities in the areas of these facilities essentially exist because of the presence of these facilities. *Staff response: One of the things as a state that needs to be looked at from a policy perspective is how do you manage the economic transition from industries, like paper production or textile production that are on the margins of profitability at this point in time and that are going downward because it is only profitable now to make those products in China? How do you manage that transition? What kind of incentives do you provide those communities to transition from one industry type to another? What is the allowable margin of profitability for an industry to make a transition?*
- *Staff comment: To clarify the concept of recharge – Some might think that if you got 44 inches of rainfall in an area in a year that you would probably see 40 inches of recharge, that is probably*

true for the water table aquifer, but to the Potomac Aquifer you are talking about withdrawing 90 mgd or 100 mgd at different points in time versus 1 inch of recharge a year. The math doesn't add up. We are mining that system.

- *What are some of the water age dates? Staff response: 1,000's of years. In the Potomac Aquifer, looking west to east from the fall-zone to the Bay and the shore there is water that is 10,000 years old just a few miles east of the fall-zone. By the time you get as far east as the outer rim of the impact crater there is water that is 40,000 years old. People are still looking at it but there may be water trapped inside the crater from the actual date of the impact, 35 million years ago, or even pre-impact.*
- *Staff comment: One of the things that the group might want to consider is from a water resource management perspective is that even though there are facilities that are having an impact because of the scale of their withdrawals on the fall-zone because it is a thinner aquifer there may be opportunities to have groundwater recharge here to maintain a water level above regulatory standards.*
- *Because of the scenario illustrated in the withdrawal charts, should we be discharging from plants at all? Shouldn't we be using that water to recharge the groundwater system? Staff response: That may be a good knee-jerk reaction but problem is that for the public water supplies in Virginia 75% of the public water supply demand is on surface water, and we have been discharging and those flows have been counted for each of those withdrawals downstream of each discharge so you can't just do it. People are depending on those surface water flows.*
- *Are we looking at a near-term issue or problem? Staff response: No, not in the next 10 years, but if you look at 30 and 50 year projections, the scale moves but it doesn't go away. There are still the kinds of impacts economically on those localities. Scenario #4 is the worst case scenario. It is the full term steady state at total permitted use, which means that all of the water that has been authorized is being withdrawn. It assumes that everyone exercises the total authorized amount every day. Ultimately we are taking out more than is going into the system, so we need to begin addressing the issue now. It is a question of sustainability of the resource.*
- *Is there concern that if numerous facilities were recharging instead of discharging that there would be a major impact on river levels and available surface water? Staff response: Yes, the data shows that would be the case.*
- *What about the protection of individual domestic supplies under a reinjection scenario? Staff response: In the next year to 18 months, you see a State Water Resources Report that will show some of that information and we will be able to demonstrate how taking a certain amount of the discharge off the water budget impacts people during low flow periods. We can calculate the number of days where the water flow will fall below the 7Q10, where your assimilative capacity is, and where it falls below the amount that people downstream are withdrawing. There is no easy answer. There are a lot of issues. We will probably have to use all of the tools available to us in our toolbox. Hopefully, we won't all be in court for 20 years while we work these things out.*
- *Isn't the issue that there is only information available in the Coastal Plain where there are major withdrawals? Staff response: The presumption is that when you have pumping in a confined aquifer system, you are going to be dropping water levels in the rivers in the Coastal Plain. That is not the case. It really doesn't happen because they are not that directly connected. However, when you get to the western part of the state, you don't have those large storage reservoirs that we call aquifers. Instead, you have fractures in rocks that are holding water. As you pump that water out, you have a much quicker and significant impact on free flowing streams in the western portion of the state.*

- The model that USGS has developed and that DEQ is using has been developed through hundreds of hours of work. This model provides some very useful information; we probably don't know a fraction of what it could provide. Could it tell us for the Potomac System, how short is it in terms of the water balance? How much more are we extracting than is generally recharged to it? How close do we know that number? Can we find it out? If we knew that number, that could inform our decision and our perspectives on this. *Staff response: There is a number, but we don't have it available today.*

ACTION ITEM: Scott Kudlas will determine the requested number that represents "how much more are we extracting from the Potomac System than is generally being recharged" and provide that to the group.

- *Staff Comment: One component of the Virginia Groundwater Withdrawal Program that differs from all of our neighboring states is a cap on the amount of allowable withdrawals. The cap is based on the transition point, which is based on the difference between the withdrawal and the recharge amounts, and is applied to the region that is being managed. North Carolina, South Carolina, and Georgia all do it this way. Maryland is taking a slightly different approach, but largely they have capped what we have talked about (e.g., nonhuman consumption withdrawals like irrigation, etc.). They state that you cannot use the Potomac Aquifer for those types of uses.*
- Because the withdrawals from an aquifer system are so non-unique it is tough to come up with an available yield from an aquifer system, which is why we have not done it. *Staff response: Yes, that is true, but what we have doesn't seem to be sustainable and is not leveling off.*
- One exception to this observation about putting water in the ground and taking it away from other users downstream is those facilities that put water into the ocean every day. Our facility discharges about 165 mgd in Hampton Roads. *Staff response: You are lucky; you are down at the mouth of the system.*
- If we could move that water where it needed to be, at the quality that we needed it to be at, there is potential there. But the key will be regulations supporting that type of activity. We need direction and right now there is a lot of uncertainty. We need to provide that construct that allows for that type of decisions to be made. Then not over the course of 5 or 10 years, but over 30 to 50 years, we can probably address this problem. *Staff response: That is correct. It is not an insurmountable problem if we can communicate with each other about what our needs are in order to draft those regulations that support those types of activities and efforts. So if the collective stakeholder group can think about their niche of the water budget and the water use budget and identify what things they may need to promote the kinds of objectives that they have, then we can start to balance things and start to compare "apples to apples" and actually craft language.*
- The other aspect of this is we have focused a lot on the restoration of groundwater as a source for drinking water; there is also groundwater influence on streamflow. There are places in the state where flows are either too high or too low. We need to look at a larger construct and not just look at groundwater recharge but also how do we restore designated uses or habitat in our streams and rivers and putting the water back where it originally started. Groundwater recharge is just part of a much bigger question. *Staff response: Appreciate that comment. The comment is right-on. It is all water. It is all part of one big water budget and ultimately we are going to have to be that comprehensive. We are talking narrowly today, but it just because political considerations and others have raised it up to having us wrestle with it.*

- There are two distinct issues to address in this process. In one area of the state, we are looking at water quality concerns due to salt water intrusion and in the other area of the state 100's of miles away, we are looking at "head" problems. The issues are geographically distinctive, but are non-unique. *Staff response: To deal with one area, we probably have to convert people to surface water to the extent that you can. In the other area of the state, we would have to look at injection into the groundwater to address the problem. Also, there is probably not enough water to go around to deal with both issues in the same way.*
- What about the Chesapeake Bay TMDLs issues? *Staff response: This is a very good point, and is particularly salient when you talk about wanting to dispose. That is one of those areas where you do have health concerns about nitrogen and human health. We must look at what level of treatment is needed to treat the water too and how much dilution do you get in the natural aquifer system. We don't know all the answers to these questions. As noted previously, this is a very complex issue and we need to at least start talking about what we need to know to be able to make some decisions.*
- The guidelines for the group seem to focus on groundwater quality. Was it the intent of DEQ to only focus on groundwater quality? *Staff response: No. To make the guidelines clear can we revise them to say "quality and quantity"? Staff response: Yes, the process is open to all considerations and includes looking at both "quality and quantity" concerns raised by the stakeholder group. We are looking for input and guidance from the group. We need you to express that desire and concern so that we can include it in the final report that results from the meetings of this group.*
- You cannot look at this from only one perspective; it concerns both groundwater quality and quantity. *Staff response: We agree that both should be looked together in this process. This is one of the reasons that this group was brought together as a pre-regulatory body.*
- What is the outcome that is expected from the group? *Staff response: There has been some interest expressed by some that we should be moving ahead with the process to allow for and account for groundwater recharge. We want to make sure that we consider all aspects of this approach before we begin a full regulatory process. We want your input to identify the whole universe of what we need to look at as far as the development of regulations or regulatory amendments to address the issue of groundwater recharge. After we have your recommendations and suggestions as to actions that we need to consider and regulations that we need to look at, then we will present that information and those recommendations to management to help proceed to the next steps in the process. We want to make sure that we have all of the bases covered and all stakeholder concerns identified before we take those regulatory steps. As noted earlier, when we begin a regulatory process, we publish a Notice of Intended Regulatory Action (NOIRA) and we have a mandated six month period after the close of the comment period to present a set of draft regulations to the board for consideration. That is not a lot of time to form an advisory panel and have them meet to assist with the drafting of regulatory language and to finalize the draft regulation or regulations. We are trying to become more focused with the help of this group as to what are the technical issues involved and what options do we have for regulatory fixes to address those issues in a meaningful manner. We wanted to hold at least one meeting of this group prior to the start of the General Assembly session so that we could start the process of identifying the issues involved, because of the difficulty of pulling a group like this together during the session. One thing that we all need to consider is what are the other obligations we have during the next several months and can we have another meeting before the session starts or do we need to delay until after the session. Mondays and Wednesdays are bad during the session because of committee meetings where some of you may be involved. For each of the meetings that we have there will be fairly detailed meeting notes that*

will be developed and provided to the group for review and consideration. Copies of the presentations and any handouts will also be provided. You will have an opportunity to react and respond to what is included in the meeting notes. The point of contact for the group is Bill Norris. All information or materials that you would like to share with your fellow group members should be routed through Bill Norris for distribution to the group. How many meetings it will take will depend on what we get into and what information the group feels needs to be covered before undertaking regulatory changes.

- *Staff Comment: One of the things that we need to consider is that we are dealing with a multi-headed monster and we each know parts of it. Two things that we would like to try to do is to the extent we can, avoid unintended consequences to different regulatory programs that we have, because it does cross so many, and coming up with some changes that we may need to come back to in a couple of years to revise. We need to consider how we might be able to sequence the issues and what kinds of information we might want to have or develop before we go into a regulatory process. That would be really helpful. Should we address the issues cumulatively or do we need to address things in a step-wise fashion? What is the sequence? What information do we need before we go to each step? What does the language say?*
- *Still trying to get an idea of where we are going and the purpose of this group. The issue of groundwater recharge with reclaimed water could be regulated in a number of ways: domestic; septic; stormwater; and rapid infiltration basins for municipal wastewater. Groundwater recharge to the water table aquifer is primarily going on to improve surface water quality. There are advantages to it. There is some consumptive loss and quantity too. Typically, it does not take away from the surface water base-flow. Then there is protecting and managing water levels in the aquifer. We are talking about a program that regulatorily-wise jumps into the federal underground injection control, where you are injecting water into the confined aquifers. Basically you can recharge the water table aquifer but very little actually reaches the confined aquifers. To look at a benefit to the confined aquifers, we are looking at direct well injection with reclaimed water. Then the anti-degradation policy has to be taken into consideration. Are we considering looking at the state seeking primacy on underground injection control (UIC) wells? *Staff response: At this time we have not taken a position on that. This group is broad enough so that is the type of issue that is on the table for discussion as to whether that is appropriate for the agency to pursue in the overall discussions on groundwater recharge. The reason that we are talking about the water quantity side is that we have historically only dealt with this on the discharge side and that is a separate unique permitting program. From a resource management perspective do you want to be more strategic? Do you want to ensure that if you are permitting these activities to occur that they are being permitted in those locations and in those quantities where they will have the most benefit to the resource; for both quantity and quality? The larger consideration for resource management is not just one of disposal.**
- *How many Class 5 deep well injection wells are permitted in the Commonwealth? *Staff response: That list is maintained by EPA. There is probably only one well in the Coastal Plain that would be considered a deep injection well. The other wells are related to mining activities; septic systems; and a number of groundwater heat pump reinjection wells.**
- *Are we only talking about the Coastal Plain? *Staff response: No, but the majority of the data that we have is from the Coastal Plain, we don't know about the other areas of the state. In addition, most of the benefit from groundwater injection would be seen in the Coastal Plain.**

- The groundwater system in the Shenandoah Valley is very different from that in the Coastal Plain. There are completely different residence times. *Staff response: You are looking at residence times in terms of decades or less in the northern portions of the Shenandoah Valley compared to thousands of years in the Coastal Plain.*
- The quality and quantity differences between the Coastal Plain and other areas of the state are significantly different. This is something that we need to recognize and address during our discussions. *Staff response: That is the challenge. The general enabling legislation for the Groundwater Management Act is statewide and you can do it anywhere. We could develop regulations that are comprehensive and would apply statewide or we could do regulations that would apply to specific regions of the state.*
- With respect to the management of the declining water levels are there established objectives for the different areas? For inland areas is it to avoid in the long term exceeding the 80% criterion? Is additional decline of water levels acceptable as long as the 80% is not exceeded? Is the objective to avoid additional salt water intrusion or is additional lateral intrusion acceptable closer to the coast? *Staff response: In the preamble of the Groundwater Management Statute, it talks broadly about maintaining the safe supply for everybody for the long term and does talk about maintaining quality and quantity. As far as having a clear regulatory objective, we only have it in 2/3rds of the Coastal Plain - it doesn't cover the whole Coastal Plain - and it is primarily that 80% criterion. We could see heads decline to 80% of the predevelopment head. We are looking to maintain over the long term stabilized water levels to the extent that we can with a 20% buffer.*

5. Reactions from the Group (Angela Neilan; Stakeholders: and Technical Support Members)

Angela Neilan asked for reactions and comments from all of the stakeholders and technical support members. Reactions and comments included the following:

- We have two very distinct issues that are connected. One is the technical issue of injecting something other than drinking water into a drinking water system and the other is the regulation. This has been done in other states, but the definitions of and use of the term "waters of the state" are different from that used in the Commonwealth. We need to make sure that whatever we do is appropriate for Virginia and the way we handle the water.
- We have a resource that is being depleted and we have a resource that is being underutilized. If we are really serious about addressing deficiencies and surpluses then we need to look at both resources. As a committee we need to ask is this worthy of further evaluation? There is an overarching issue of the availability of financial resources.
- Let's discuss the framing questions and see where we go from there.
- We need to divide the regulation by physiographic provinces.
- Comfortable that we have a resource that we could potentially use to augment groundwater. Anxious to get into the water quality discussions to see if it is feasible.
- Need to discuss both the quality and quantity aspects.
- The technical issues are going to be quite a challenge.
- Supply and demand are going to be an issue now and into the future.

- Meeting TMDLs could be an issue.
- The framing questions presented by staff are the right questions to start this discussion.
- This is a big task.
- This is an ambitious task.
- Data on water quality, especially groundwater quality will be helpful to the discussions. We have to determine where we are before we can arrive at a solution.
- There are different groundwater conditions in areas of the state that need to be addressed. There is not a one-size-fits-all solution. Different approaches will need to be considered.
- There is lots of evidence from other states and lessons learned that could be used to help guide our thinking on this process of groundwater recharge. Would like to see some discussions on how the success of these types of facilities/installation would be monitored. How do we know that is a performing the way it was permitted to perform?
- Need to look at this from a statewide perspective not just as a Coastal Plain concern. Groundwater is a significant resource across the state, but there is virtually no data outside the Coastal Plain. We need to address this lack of data so that we can address the issue. This can't be a one-size-fits-all solution.
- Concerned about how we will be able to convince the local rate payers that groundwater recharge is a good investment.
- The concern that is noted a lot of the time in the public arena is "Why are talking about something that won't be a problem for 50 years?"
- Sustainability is the answer for why we are looking at this issue now. The trends demonstrated by the available data are pretty powerful. There is sufficient technical background to help us address the "one-size-does-not-fit-all" scenario.
- Can learn a lot from approaches being undertaken in other states, including California, Arizona, etc.
- Need to work together so that if this approach is taken that it can be done properly with minimal impact on the resource.

She requested that in order to facilitate the afternoon's discussions that all attendees who were officially designated as members of the stakeholder group should sit at the table and all others should try to sit around the outside of the table.

6. Facilitated Discussion of Framing Questions, Relevant Issues and Possible Regulatory Actions for Groundwater Recharge in Virginia (Angela Neilan; Stakeholders; and Technical Support Members)

Staff reiterated the "Framing Questions" that had been briefly introduced during the staff presentation. Angela Neilan facilitated a discussion of the framing questions, relevant issues and possible regulatory actions for groundwater recharge in Virginia. These discussions included the following:

- **Question #1. Do we need to do groundwater recharge? Why?**

- We are already doing it.
- Yes, but with possible limitations and reservations.
- Have to do it because the current withdrawals are unsustainable.
- If it is a means of augmenting the supply, yes. If it is for disposal, don't know.
- It is a reasonable component of an overall resource management strategy.
- There are alternatives. Do we need to do it, no, but in the current context, we may need to. Yes, with reservations.
- We need to be able to provide this as an option.
- No, there are better ways of doing this than injection.
- Do we need to do groundwater injection, then the answer is no. If we need to do groundwater recharge, then the answer is yes.
- The question reads: Do we need to do groundwater recharge? Every septic system in the state of Virginia does that already.
- The question for this group should be do we need to do groundwater recharge with reclaimed water?
- Yes, we have to consider groundwater recharge with reclaimed water.
- What is the purpose of groundwater recharge? Is it for disposal or is it for augmenting supply?
- If we want to reuse this water, why does it have to go underground? Could a bunch of tank farms be used to hold the water until it is useable or needed?
- Is it for disposal or for beneficial reuse?
- We are not asking for groundwater recharge with reclaimed water as a mandate, we want to be able to include it as an option, as a tool in the water resource management toolbox.
- It is a framing question to help generate discussions.
- The question should be "Do we need to include groundwater recharge with reclaimed water as an option?"

CONSENSUS: The group decided that we need to consider "groundwater recharge with reclaimed water" as an option, not as a mandate.

- Regarding septic tanks and drainfields and "groundwater recharge" - There are over 1 million individual systems in the state of Virginia and number of large municipal systems that have drainfields. Are they considered groundwater recharge? If they are then we are already doing groundwater recharge. We may want to define what "groundwater recharge" is for the purpose of these discussions. Septic systems provide water to provide recharge to groundwater, but is it groundwater recharge?
- There are three types of groundwater recharge systems: 1) gravity flow, i.e., rapid infiltration basins; 2) vadose zone wells; and 3) direct injection. This group is to consider all three.
- Rapid infiltration basins are not normally viewed as groundwater recharge systems, but as disposal systems. They are covered in the Sewage Collection and Treatment regulations as a gravity flow system.
- Do drain fields come under one of those types of groundwater recharge systems? Their main function is not groundwater recharge, but wastewater disposal. They do have an unintended or a secondary function of providing water for recharge of groundwater. That doesn't address the quality issue, but only that they recharge the groundwater to some extent.

- Are we only looking at systems whose primary purpose is providing additional water to the groundwater system? DEQ would be regulating systems other than those regulated by the Health Department. DEQ and VDH are currently developing a process where alternative on-site sewage systems would be jointly permitted by the two agencies to do water reclamation and reuse that doesn't involve groundwater recharge. With that exception, VDH has always and will continue to regulate drainfield systems.
- The SCAT regulations state that one of the purposes of rapid infiltration basins is in part to provide for groundwater recharge as well as disposal.
- Stormwater management practices also include the use of rapid infiltration basins. These basins should also be looked at as a possible means of providing groundwater recharge. There are a lot of Class 5 wells that fall under that category. They could be used to facilitate recharge to groundwater. The purpose of stormwater management practices wouldn't just be for disposal of water upland in the watershed, it could facilitate recharge to the groundwater.
- Is the mandate for this group only for the beneficial recharge of groundwater or is it also for waste disposal or disposal of the water. The systems permitted to date with the exception of Chesapeake, has been for waste disposal and any groundwater level benefit has been incidental.
- Should we be looking at just recharge only as quantity issues (a means of water level recharge) or also as a method of disposal? Should we make a clear distinction between these different types of recharge? Yes, we should be making a clear distinction as we go through our discussions. Not sure that we are in agreement as to which type we should be looking at. Are we "lumping" everything together or are we looking only at the subset of beneficial reuse?
- Would argue that the need for "maintaining the water table elevation" is too narrow a view of "need". There should be an examination of a whole host of considerations (i.e., water quality, energy consumption, production of water resources, treatment, etc.). There are lots of reasons to consider recharge of groundwater locally so ultimately that you can develop it for supply later, but in the meantime you are achieving other ends, such as disposal and treatment. Should broaden the concept of "need".
- We need to be all on the same sheet. There has been no predetermination of what it should be, that is a function of this group.
- Need to identify what groundwater system we are going to recharge. Are we doing something on the surface or are we talking about one of the intermediate aquifer or the big aquifer? The Potomac Coastal Plain Aquifer is the elephant in the room. We are a large state and we cover a lot of physiological provinces with a lot of different issues. Where the water table is, there is benefit to recharging the water table in a lot of those areas.
- Reclaimed water has to be a beneficial reuse by definition. It is not septic tank drain field effluent, it is not stormwater; it is well defined treated water whose purpose is not disposal but reuse.
- Regardless of the purpose of the recharge is; the quality of the water will be affected. Water quality is affected either way. Need to consider the relationship with water quality.
- Yes, groundwater recharge should be considered as an option.
- Could any of the industries be using the non-potable water directly instead of putting it into the ground and pulling it back out? Instead of potentially putting a contaminant

- source into an aquifer? The question is does it need to go back into the ground?
 - It will always come back to economics! Methods of treatment for surface disposal should be balanced against subsurface disposal.
 - The Water Reclamation and Reuse Regulation is voluntary, if you elect to do it you have to abide by the regulations.
 - What is the state's position on new industries and water withdrawals? There is not a real clear policy. The policy is to ensure that all of the existing users of both groundwater and surface water system can continue. The ability of the agency to have a strict policy is not established through the policy mechanism yet. The presentation given today has been presented to the upper levels of administration, so the conversations have been initiated. This group could make recommendations and raise questions regarding reuse.
 - Projects in the Groundwater Management Areas require the evaluation of alternatives of which reuse would be one. The review is pretty cursory and if it is found to be economically feasible then that is all that needs to be said. Some will do it but others will not.
 - DEQ did develop a paper entitled "Expanding Water Reclamation and Reuse in Virginia". The paper is available on the Water Reclamation and Reuse Program page. The findings were that it should not be mandatory but should be more market driven. Wasn't the purpose to promote water reclamation and reuse? Where it is appropriate (environmentally, economically and socially) it should be encouraged.
 - Need to recognize that there are limitations on the use of groundwater recharge.
 - It should be encouraged and promoted as an option, not a mandate, where it is economically feasible.
 - Groundwater recharge should be especially encouraged in the Groundwater Management Areas where we have data available, but it should also be looked at on a statewide basis. Data for those other areas of the state should be developed so that the resource can be evaluated and properly and efficiently managed.
 - Need to concentrate our efforts first in those areas of the state where we have some information. If it works there then we can expand the program.
 - There is never enough data. Need to build on our existing data base.
 - In areas of the state where there is a lack of data, there could be a higher treatment standard that could vary based on the available information.
 - This conversation is appropriate for all areas of the state.
 - Need to avoid negative unintended consequences.
 - Standards of quality were set for the water reclamation regulation. But the water reclamation regulation did not include standards for groundwater recharge. There are not established standards for groundwater recharge. Standards would have to be developed and what regulations does it go into.
 - Sustainability of the groundwater resource needs to be considered.
- **Question #2. Do we want to consider groundwater recharge with more than just reclaimed water?**
 - Such as: There is already one facility in Virginia that is permitted to recharge groundwater with treated drinking water. Do we need to consider recharge with treated surface water; recharge with treated drinking water; recharge with stormwater, etc?
 - Standards should apply no matter where the water comes from. Standards should be set

to apply to any source. Standards should be set to protect the existing use and existing systems.

- The facility in Chesapeake is not for the recharge of groundwater, it is essentially a storage function. It is a totally different application than has been discussed here. When you talk about recharge with reclaimed water, it is not really a reuse by itself. At some point it becomes part of the aquifer. It is either withdrawn for reuse or provides subsidence control or preventing salt water intrusion, it still has to have a reuse. It can be used as storage for a subsequent withdrawal later for a future reuse.
 - The storage facility in Chesapeake is already covered under an existing program and regulation.
 - It will be difficult to have one set of standards that would cover all categories of recharge: drinking water; surface water; stormwater; etc.
 - The standards should be set for each end-use.
 - Could see the possible use of surface water during periods of high flow for recharging groundwater.
 - Florida uses deep well injection as a means of disposal.
 - Should exclude water that does not meet standards for end-uses.
 - Water quality effect must always be considered.
- **Question #3. Do we want to develop a new regulation or amend an existing regulation to authorize groundwater recharge?**
 - Don't know yet!
 - Whatever is simpler!
 - May require the amendment of more than one regulation.
 - Would make sense to separate beneficial use versus other goals.
 - Amendments would probably be required in both the groundwater and reuse regulations.
 - The VPA permit regulation deals with disposal at or close to the surface. Rapid infiltration basins have always been a system that works close to the surface and really didn't involve wells. The VPA regulation was written so broadly that we could regulate groundwater injection well, but the intention was never meant to be that because we don't have guidance or the technical expertise within the Office of Land Application Programs to review those types of projects.
 - The Groundwater Withdrawal Regulation has been used to permit the one recharge project with potable water, but that is only applicable to Groundwater Management Areas. That program area does have the technical expertise for reviewing groundwater recharge projects.
 - Are either of these regulations, VPA or Groundwater Withdrawal, appropriate to address groundwater recharge projects?
 - The rapid infiltration basins that are in place today, they are there for a reason and they fall under an existing permit program for a reason. That system for better or worse is working. Under what scenario would we want to do the same thing but have it for reuse where it wouldn't work equally well under the existing regulatory program? Under what scenarios would we need to permit it under a different set of regulations than are currently in place? Don't know the answer.
 - There should be some kind of regulation that would combine parts of other regulations as a kind of one-stop regulatory process.

- Need to do this in the context of an overarching water management program for the state.
 - Need to look at the bigger picture in these discussions – could take 5 or 10 years to make this happen.
 - Need to be thinking along the lines of the way the water quality regulations were written rather than the way the Sewage Treatment regulations were developed.
 - The groundwater standards that we have today need to be revised! They are really old and are due for an update and revision.
 - Could put it into the reclaimed water regulation as an option for reclaimed water reuse.
 - If we were talking about only DEQ regulations then we could combine the various changes into one defined regulatory action, which has been done before (the Biosolids Regulation). The problem is that we are talking about not just DEQ regulations; there are other agencies and regulations that have some stake in groundwater recharge.
 - Need to focus on Groundwater Recharge as a beneficial reuse. Not on whether it is reclaimed water or stormwater, but it is on the groundwater recharge as a beneficial recharge.
 - It will be a difficult task but it does need to be a unilateral approach not just DEQ and all of the pieces need to be tied together.
 - Need to focus on the groundwater issue overall, not just on the concept of reclaimed water reuse. Reclaimed water may be one of the solutions.
 - Are we looking at the purpose of this group to address groundwater recharge for beneficial reuse? That is the area that is not covered under the regulations. Need to look at groundwater recharge as a beneficial reuse!
 - One of the problems in Virginia is the "lack of storage".
 - The simple approach to this should be: Do we want groundwater recharge? What quality do we need? Do we really care where it comes from if it is at that quality? What is the impact of that quality on the aquifer system?
 - Should there be a separate groundwater recharge regulation for beneficial reuse only? Yes! Need to consolidate disparate pieces of other regulations into one. Some pieces have applicability to other practices. As long as it does not affect the aquifer system or its use negatively in the future.
 - The biggest piece that is missing is the water quality goal. If you don't know where you are today, you don't know what can be put in the ground. This will be a difficult and controversial task.
 - Some areas might benefit from use of stormwater for recharge.
 - The stormwater flows can be significant.
- **Question #4. Are there conflicting or duplicative regulations that need to be taken into consideration?**
 - Yes!

Consensus: There are conflicting or duplicative regulations that need to be taken into consideration.

- Groundwater standards do not address aquifer storage and recovery.
- UIC – Underground Injection Control program – EPA – How many states have primacy

for the UIC program? There a few, but not many.

ACTION ITEM: Staff will determine the number of states that have primacy over the EPA UIC program and provide that information to the group.

- A lot of what we are talking about might fall under the UIC program. The EPA UIC program is more of a registration program than a permitting program. If DEQ took primacy than we would have to maintain that inventory and would have to take over the permitting of all injection wells in the Commonwealth, which would include wells associated with mining.
- Regulation of all stormwater is handled under the existing DCR permitting program.
- VDH can permit shallow systems under the new Alternate Onsite Sewage System Regulations but the standards do reference DEQ's groundwater standards. Don't know that many people can meet the requirements. The regulations can be found on the Town Hall site – 12VAC5-613.

POLLING OF GROUP: Would the Stakeholder Group recommend that a separate regulation be developed to address specifically groundwater recharge for beneficial use only? NO! There was no consensus that a separate regulation in and of itself was required. However, the group felt that you could consolidate the disparate pieces of other regulations that address groundwater recharge and consolidate them into one regulation or program.

- The question was raised as to whether the staff would take the recommendations of the group to develop the regulations or did the staff have a concept already in mind to address this issue. *Staff response: Staff noted that yes the recommendations of this group would be used to develop the solution - that is the reason that this group was formed. We need and want to get your input. What is the staff's concept of dealing with this? Staff response: The reason that this group was formed was that when we were in the Regulatory Advisory Panel for the Reclamation Regulation, we realized that this was a multi-headed monster with a number of regulations that were potentially impacted with the concept of groundwater recharge. We put this group together to help us identify all of the components that need to be addressed to deal with the concept of groundwater recharge. We need to figure out with your help whether it makes sense to open up a number of regulations or does it make sense to only have one separate regulation. If we have a consensus that there is a need for something separate then that will help us determine the next needed course of action. This is a pre-regulatory action - we usually don't do this. Normally, when we bring a group like this together, we already have a NOIRA that lays out all of the items that we will be looking at modifying or amending to accomplish a stated regulatory objective. At this stage of this process, we don't know what all of those pieces should be. That is why we need your input and recommendations. We need your input and expertise so that we can formulate where we need to go in this process to make this work. We don't have a predefined or pre-conceived idea that "these are the pieces" that we need to do. We as a staff and you as an advisory group need to take everything that has been discussed today and evaluate it to make a determination of where do we go from here. We need to examine what all of the pieces of what regulations would need to be amended.*
- A concern was raised about opening up a series of regulations that could potentially

result in other unintended and unrelated items and sections being revised during the process. *Staff response: That is the reason that we are taking a pre-regulatory approach, we want to be able to be as specific as possible in the NOIRA that will be developed for any resulting regulatory action so that we can limit the action to only those pieces of the regulations that are impacted by or have an impact on groundwater recharge. The NOIRA will spell out exactly what will be addressed during the regulatory process. We can make the NOIRA as general as needed or as specific as needed. We need your input to be able to put that process together in the appropriate manner.*

- There is an advantage in not creating a separate regulation but in consolidated disparate pieces of other regulations into one. A combined new set of regulations to address this issue would be helpful in the public education and legislator education that will be needed to promote groundwater recharge as an option among people would withdraw and encourage them to recharge. Maybe if the changes are included in one package it could be used to motivate revisiting and revising the groundwater standards. It is ambitious but it seems to have some advantages.
 - Perhaps the best approach would be to look at this as if we knew nothing about regulations. The ideal would be to have something that said that regardless of the source; here is how you would do groundwater recharge. Maybe we need to step back and ask: What do we want to do? What is the goal?
 - The presentations today demonstrated that we have more going out than is going into the groundwater system. What is your gut feeling as to when the withdrawal reductions would begin? *Staff response: In all likelihood, the next administration is going to have to deal with it, given the timing involved.*
 - The group could comment that there are a number of solutions that need to be considered to address these issues. *Staff response: Any suggestion would be useful. The use of groundwater recharge is just one option, one tool in the toolbox that could be used. The information presented today was to show the group that there is a larger issue out there that needs to be considered.*
 - There needs to be a systematic approach.
 - Need to consider linking groundwater withdrawals with the groundwater recharges.
 - Treating to level necessary to meet standards means it meets drinking water standard is expensive – may be easier to use direct potable reuse. Need to look at it from the perspective of public acceptance. There are geochemistry limitations that will need to be considered with groundwater recharge.
 - There are operational issues and concerns that need to be considered.
- **Question #5. What resources do we need to evaluate and permit groundwater recharge projects in a manner that is protective of human health and the environment?**
 - Additional DEQ staff would be needed.
 - Need to have geochemical and hydrological data on a statewide basis.
 - Some information is available to DEQ.
 - Funding for a pilot study should be made available.
 - There is a need for additional data from outside of the coastal plain.
 - There needs to be the ability to monitor drawdown and to monitor water quality.
 - There needs to be chemical and biological quality monitoring. There is a public

- perspective that this is currently being done.
- What is the quantity impact on shallow wells?

- **Question #6. Others?**

- Water quality effect must always be considered.
- Other reuses/options play an important role.
- Option vs. mandate for water reuse (i.e., to address supply issues).
- Need to look at the lack of storage when and where surplus water is available.
- Promotion and public perception – consolidation of regulations has value.
- Should link groundwater withdrawal limits with recharge.
- Treating to level necessary to meet standards means it meets drinking water standard is expensive – may be easier to use direct potable reuse. Need to look at it from the perspective of public acceptance. There are geochemistry limitations that will need to be considered with groundwater recharge.

7. Public Input and Meeting Wrap-Up (Bill Norris)

Staff asked the stakeholders and members of the public for any additional thoughts or ideas for the good of the Advisory Group discussions.

- It was noted that the group had a number of ideas and concepts that needed to be considered.
- Staff will go over the notes and the recording to identify key points for further discussion by the group at a future meeting. There are a few points that will need to be further discussed at a future meeting.
- A copy of the notes and a copy of Scott Kudlas' presentation will be provided.
- A copy of the sign-in sheets was requested.
- Additional data from USGS on the state's groundwater resources will be distributed to the group.
- Can staff extract the pieces of the numerous regulations that would be affected by either a single regulatory action or multiple changes be pulled together for review by the group?

ACTION ITEM: Staff will extract pieces of regulations that would be affected by either a single or multiple regulatory action(s) for consideration by the group.

No public comment was given.

8. Next Meeting Date:

A tentative date for a follow-up meeting of the Stakeholder Advisory Group will be sent to the distribution list.

9. Meeting Adjournment:

DEQ staff thanked the Advisory Group members and the members of the interested public for their participation and contributions to the process. The meeting was adjourned at approximately 3:00 P.M.