EASTERN VIRGINIA GROUNDWATER MANAGEMENT ADVISORY COMMITTEE

WORK GROUP #1 – ALTERNATIVE SOURCES OF SUPPLY

MEETING NOTES – MEETING #2 - FINAL

THURSDAY, OCTOBER 15, 2015
DEQ PIEDMONT REGIONAL OFFICE – TRAINING ROOM

Meeting Attendees

EVGMAC – WORKGROUP #1	
Jay Bernas – Hampton Roads PDC	Gregg Jones – Cardno
Richard Costello – VA Home Builders	David Jurgens – City of Chesapeake
Larry Dame – New Kent County	Donald Rice – Newport News Water Works
Judy Dunscomb – The Nature Conservancy	Paul Rogers, Jr. – Farmer – Production Agriculture
Jason Early – Consulting Hydro-Geologist	Erik Rosenfeldt – Hazen and Sawyer
Bill Gill – Smithfield Foods	Chris Thomas – King George County SA
Steve Herzog – Hanover County	Mike Vergakis – James City County

EVGMAC – WORKGROUP #1 – STATE AGENCIES	
John Aulbach – VDH - ODW	Scott Kudlas - DEQ
Allen Knapp – VDH - OEHS	John Loftus – VA Economic Development Partnership

NOTE: Advisory Committee Members NOT in attendance: Kyle Duffy – International Paper; Katie Frazier – VA Agribusiness Council;; Jeff Gregson – VA Well Drillers Association; Carole Hamner – WestRock; Skip Harper – VA Department of Housing and Community Development – State Building Codes Office; Bryan Hill – James City County; Whitney Katchmark – Hampton Roads PDC; Mike Kearns – Sussex Service Authority; Kristen Lentz – City of Norfolk; Dave Morris – City of Newport News; Ram Natarajan – Aqua Virginia; Mark Sauer – DEQ – Tidewater Regional Office; Thomas Swartzwelder – King and Queen County; Wanda Thornton – Eastern Shore Groundwater Committee; Brett Vassey – VA Manufacturers Association

INTERESTED PARTIES ATTENDING MEETING	
Lauren Abraham – Vectre Corp./VA Association of Commercial Real Estate	Peter Nash – Golder Associates
Clifton Bell – Brown and Caldwell	Doug Powell – James City Service Authority
Preston Bryant – James City Service Authority/McGuire Woods Consulting	Gina Shaw – City of Norfolk
Robert Crockett – City of Chesapeake/Advantus Strategies	Kurt Stephenson – Virginia Tech
Guillermo Espiga – Poseidon Water	Wilmer Stoneman – Farm Bureau
Chris Harbin – City of Norfolk	Chris Tabor – Hazen & Sawyer
Eric Hardiman – Luck Companies	Shannon Varner – Troutman Sanders/Mission H2O
Kenneth Lin – International Paper	John Voorhees – Cardno
Craig Maples – City of Chesapeake	Andrea Wortzel – Troutman Sanders/Mission H2O
Jamie Mitchell – Hampton Roads Sanitation District	

SUPPORT STAFF ATTENDING MEETING	
Elizabeth Andrews - DEQ	Craig Nicol - DEQ
Sharon Baxter - DEQ	Bill Norris - DEQ
Brandon Bull - DEQ	Mark Rubin – VA Center for Consensus Building

MEETING HANDOUTS:

A. **Draft Meeting Agenda;**
B. **List of EVGMAC Members and Work Groups #1; #2A; & #2B Members;**
C. **Balance of Meeting Schedule;**
D. **Draft Meeting Notes – 1st Meeting – September 17, 2015**

1. **Welcome & Introductions (Mark Rubin – Meeting Facilitator)**

Mark Rubin, Executive Director of the Virginia Center for Consensus Building at VCU, opened the meeting and welcomed everyone to the meeting.

He asked for introductions of those in attendance and asked for the organizations that they represented.

2. **Meeting Notes – 1st Meeting of Work Group #1 – September 17, 2015 (Bill Norris)**

The draft meeting notes from the September 17, 2015 meeting of Work Group #1 were distributed with the meeting handouts.

3. **Review of Agenda; General Sense of the Process and Introductory Comments (Mark Rubin):**

Mark Rubin reviewed the agenda for the meeting and the plan for conducting the meeting and then went through some general meeting and location logistics. Mark discussed the process and the ground rules. He noted the following:

- The members of the interested public are invited to participate in the process during the course of the meeting by either working through a member of the Work Group or by coming to an "Open Chair" temporarily and being recognized to share their comments or recommendations.

4. **Presentation #1 - Desalination Costs and Financing Considerations (Guillermo Espiga – Poseidon Water):**

Guillermo Espiga, the Head of Development for Poseidon Water, provided a briefing and presentation on Desalination Costs and Financing Considerations to the group. (A copy of the presentation will be uploaded to the DEQ's Eastern Virginia Groundwater Management Advisory Committee webpage.)

During the presentation the following items were noted and discussed:

- Poseidon Water is building and developing the largest sea water desalination plant in the America's at Carlsbad.
- Try to balance risk and profits.

- This project is co-located adjacent to a power plant – sharing the discharge and the intake structures/points.
- The benefit was a locally controlled – drought proof high quality unlimited source water – use of sea water desalination – an unlimited source in the ocean.
- Life of Project – 30 years – looking at 50 years for the next project.
- Need to have the ability to retrofit technology constantly – upgrading technology on filters and membranes constantly.
- Water users in the area are paying a premium for reliability.
- The power plant that is co-located on the site is going out of commission in 2017/2018 – Poseidon Water will be taking over the intake and discharge sites which will need to be retrofitted.
- Will need to be mindful of having to alleviate concerns over the use of desalination and the resulting "salty" discharge – "too expensive"; "it kills fish"; "discharge is too salty"; "uses too much energy".
- Need to plan by looking at "what your next reliable source of water would be if one is needed" and what kind of delivery system would be needed.
- Need a project champion within the agency/project team – need a champion in the public sector.
- Need for regulatory certainty.
- Need transparency – communication with public – need for public out-reach.
- Benefit from predictability of costs – need to make sure all costs are accounted for.
- The plant produces 54 million gallons of clear water a day – 100 million gallons per day plants are possible.
- The filtering membranes used are cleaned once a year and replaced every 7 years.
- The salt brine that results from the process is diluted with 200,000 million gallons from the power plant and then fully diluted when it reaches the ocean.
- The question is would a plant built in Virginia similar to the Carlsbad plant be cheaper? Can we do it cheaper? Would the use of "brackish water" be cheaper than "sea water"? Likely – the conventional wisdom is that brackish would be cheaper than sea water.
- The water discharging/resulting from such a plant in Virginia would have to meet the Safe Drinking Water Act.
- Geography – source water and discharge sites would need to be taken into consideration in looking at the costs for such a project.
- Need to really understand the source water quality and the discharge site water quality – need to design a robust project - need to design looking at the worst case scenario – need the proper design.

5. **Break:**

6. **Presentation #2 – Demand Management and Sea Water Desalination – Sea Water Desalination and Public Water Supply Conservation (Gregg W. Jones - Cardno):**

Gregg W. Jones with Cardno provided a briefing and presentation on Demand Management and Sea Water Desalination. (A copy of the presentation will be uploaded to the DEQ's Eastern Virginia Groundwater Management Advisory Committee webpage.)

During the presentation the following items where noted and discussed:

- Discussed the water needs and water management approach in the Tampa Bay Region of Florida – Nearly 100% reliance on groundwater from 13 well fields – average of 230 mgd pumped to supply 1.8 million customers.
- No regional management system but it is interconnected – up to the individual local communities/localities – somehow it works.
- Discussed the use of reclaimed water – indirect potable reuse.
- Reclaimed water plan for Pasco, Pinellas and Hillsborough Counties – looking at a 2020 conceptual reuse plan that includes the use of Aquifer Storage and Recovery (ASR) wells.
- Discussed use of aggressive goals for water conservation.
- Need for a master water plan.
- Discussed the reverse osmosis process used in the project area in Florida.
- The reason for co-locating a treatment facility with a power plant is not to have access to power but to have access to existing intake and discharge structures and locations which can be expensive to put in place and time consuming in the permitting process.
- The history of the development of the project was discussed.
- The project is used as a "drought" protection mechanism.
- Public Water Supply Conservation was discussed.
- It was mentioned in the previous meeting that all the "low hanging fruit" in terms of water conservation options have been picked. The question is how do you know that? How would you determine that? How do you know that there is no more conservation that you can squeeze out of a system? The way you do that is through "conservation modeling".
- The benefits of public water supply utility conservation for a utility include: deferral or downsizing of new capital facilities and lowering the rate of increase in demands and postponing of facility construction. If you can lower the demand, maybe you don't have to build that facility for 10 years instead of having to build it next year or it doesn't have to be as large as originally planned.
- Most water conservation measures have a cost effectiveness that is much greater than that of other alternative water supply sources. If you have to build 1 billion gallons per day of source that is a lot more expensive than if you implement the best management practices to conserve it.
- In addition, you can reduce your water purchases from wholesale water providers.

- So what is a public water supply use? Any user served by a public water supply utility including single family residential; multi-family residential; institutional (hospitals, schools); commercial (restaurants, businesses) & industrial.
- Indirect residential use is declining – because of more efficient water use fixtures.
- Outdoor residential water use is increasing.
- Water conservation strategies currently being used were discussed.
- The requirement in Florida for the inclusion of a comprehensive water conservation plan was discussed – there also needs to be an education program.
- It was noted that the rate structures need to account for the different categories of use – the different tiers of usage need to be taken into consideration.
- The use of incentives and rebates was discussed.
- Educating the public is a necessary component of a comprehensive water conservation program/plan.
- Florida's EZ Guide Water Conservation Model for Public Water Supply Utilities was discussed – it identifies the most cost efficient water conservation practices available to a water utility by estimating and analyzing its current water use on a parcel by parcel basis – it is a very complex model.

7. Issues/Options related to "Demand Management" that are "Applicable to Virginia" (Mark Rubin and Workgroup members and meeting attendees):

Mark Rubin asked for the group to identify those issues/options that have been discussed in today's presentation on "demand management" that could be applicable to Virginia. What can we do in terms of "demand management"? What are we doing now that we need to take into consideration as a base-line to work off of? The items discussed included the following:

- Irrigation
- Demand Management
- Residential Irrigation – residential lots – residential irrigation – 25% to 50% depending on nature of the system based on the water supply plans – some rural jurisdictions don't have any irrigation.
- In terms of agricultural irrigation it was noted that they are doing a number of cost-savings measures – there are more pivots; use of different sprinkler heads; irrigating at night; use of soil tensiometers to help regulate moisture – the agricultural community is doing more – they are moving towards more efficient methods of supplying the needed water – in the state of Virginia the rule of thumb is North of the James most of the water for irrigation is surface water (rivers, lakes, streams, impoundments) – South of the James most of the irrigation water is surface water with more supplemental groundwater – only used in extreme times – and most of the time are small wells. There are probably not over 3 or 4 pivots in the state that actually have water that is supplied directly by a well – where the pivot sits directly over the well – that is normally

used in Georgia and a lot in the mid-west where each pivot has one well that supplies it. In the state of Virginia for the most part we are just talking about small wells that are supplementing ponds – they are only run in extreme times – they are cut off when we get rain falls that fill the surface water back up. Agriculture is trying to do its part.

- There is a lot of residential irrigation from individual private wells that needs to be taken into consideration – a lot of that use is unmeasured and likely unknown – most of these are shallow wells.
- Something that could help in terms of demand management are "costs" – If you have a high rate you will get people's attention – but there are some that don't care.
- When you reduce the usage, you reduce your revenue stream then you have to raise your rates to meet expenses – how do you explain that? If you cut production, you cut your revenue stream – the only answer is a higher rate to cover your costs – there are fixed costs that still have to be covered.
- In Virginia, you have to deal with "grandfathering" of old existing wells and consideration of the "Dillon Rule" and its impact on what localities can legally do or impose or are authorized to do. – You have to consider the political will both in Richmond and at the local level.
- The use of "shallow wells" needs to be considered.
- The current groundwater regulations don't differentiate between uses. Should we look at prioritizing uses of groundwater? The current threshold of 300,000 gallons a month is probably a proper threshold for certain uses but it might be improper for other uses. In Maryland, the threshold is 10,000 gallons a month to trigger the requirement for a permit – they have subdivided their aquifer system and designated different allowable uses and availability depending on the aquifer and different use type.
- Is lowering the trigger for when a permit is required also part of the discussion? Should lowering the trigger be considered? This could be part of a demand management strategy – reduce the "trigger" level.
- Some of the demand management items that have been discussed are directly related to different market segments/sectors – there needs to be consideration of different market sectors that are impacted by these different approaches.
- The question is who is going to do any reporting that is required? This is an enforcement issue.
- What can we do in terms of demand management in regard to private wells?
- The current groundwater withdrawal permits have something similar but not comparable to the "water conservation management plan" that was discussed in the presentation today – however it is probably not realizing its full potential and part of that is somewhat vague – the standards are particularly specific so in terms of implementation the plans tend to be vague and nonspecific – so there may be an opportunity for improvement here.
- How much of residential irrigation is using "drip irrigation" these days? Do we know? It is likely not very much. It was noted that conversations with the landscaping industry still seem to indicate that maintenance on a "drip irrigation" system is still too high to make its wide spread use feasible – it is always used as an excuse not to use. It was noted that there is an increased

use of "drip irrigation" in the wastewater arena – in drain fields – the upfront costs and maintenance costs are going to be higher – it is more efficient.

- Need to look at the use of rebates and incentives – somebody would need to look at the cost-balance to determine the feasibility of using rebates and incentives.
- Water conservation can be a hard concept for people to grasp.
- Education and public outreach is needed but changing people's habits can be difficult.
- Are we one of the few countries in the world where we can drink our water? When you go to other countries they tell you not to drink the water. They can drink it but we can't – they are used to the water, we aren't. Are we a spoiled nation? Everything that we are trying to do here is to get the water to where we can drink it. We are trying to manage the groundwater resource so that it is sustainable – that is why we are here.
- During the presentation we heard about tiered pricing and that tends to drive folks towards wells – so the tiered pricing structure does accomplish some amount of reduced use – but some of that drives people to get to alternate sources – so alternate sources of water, if they are shallow water wells they are not in competition with the utilities but the suggestion is that there might be a shallow groundwater deletion issue which is driving towards withdrawals from the aquifer that is already oversubscribed. If irrigation is a big deal, are there alternative sources of supply for irrigation that can be developed? Yes, but they are expensive. Reclaimed water can be a source of irrigation water.
- Not a good idea to say that the shallow aquifer doesn't matter – it probably does.
- Use of reclaimed water for irrigation does take a very robust piping scheme. Some of the reclaimed water regulations in Virginia make the use of reclaimed water for irrigation very difficult.

8. Summary of Flip Chart Notes – Demand Management Options/Concepts:

Mark Rubin summarized the group's discussions on demand management options and concepts with the following notations on the flip charts:

- Residential irrigation – look at the use of reclaimed water;
    - Purchase
    - Wells
    - Specific to public water use
- Cost structure – drives folks to alternate sources – raise rates/cut production – dilemma – this cuts revenue to locality/utility
    - Political will/Dillon Rule – Barriers
- Different uses
- Prioritize uses/differential
- Lower trigger for unregulated
- Rebate for water efficient devices – Is authority there for this?

- Tie to adequacy of water source
- Require a lot of education of public
- Generally viewed as a hard to do.

9. Issues/Options related to "Desalination" that are "Applicable to Virginia" (Mark Rubin and Workgroup members and meeting attendees):

Mark Rubin asked for the group to identify those issues/options that have been discussed in today's desalination presentations that could be applicable to Virginia. What might work and might not work? Is this a strategy that needs to be considered? The items discussed included the following:

- Costs – are related to where do you put the plant; what are you doing with the water; what uses are anticipated, etc.? Where is it going to go?
- Concern is location of discharge point.
- Wastewater regulations come into play and need to be considered – toxicity issues – wasteload allocations.
- Probably a good idea to consider but there are a lot of issues that need to be resolved before proceeding. There is a lot of "what ifs" that need to be looked at.
- What should be on the table as options? Everything should be on the table – the committee should identify the issues (political; legislative; and regulatory) that would keep us from implementing a particular option. There are going to be financial and regulatory issues that need to be considered.
- We are looking at a 30 year period – this is a long-term problem that needs long-term solutions. Some solutions may work in some areas and not in others.
- Shouldn't we be looking at a combination of desalination and injection? Yes.
- There are spatial concerns that need to be considered. Where do you need the water? Where do you need the recharge to be able to replenish the aquifer? With injection you would use the aquifer as an underground reservoir.
- Should we be looking at some kind of collaborative venture? Instead of just one locality or one water supply entity building a desalination plant could this be done as part of a collaborative venture among multiple water suppliers? Could we use a regional entity since we would be looking at regional impacts? Would likely need a legislative solution.
- Concerns over the possible impacts associated with the injection of briny water were raised.
- Need to consider the costs of moving water to get the best bang for the bucks.
- The use of storm flows from rivers was discussed as a source for recharge of the aquifer.
- Probably looking at a regional solution.
- Could consider using surface water from whatever source and treating is as an aquifer recharge treatment system – letting the aquifer serve as the distribution system.
- It is a question of quantity - Need to have a steady flow to design and run a facility.
- Desalination is not the silver bullet but it is a tool in the tool box.

- Surface water treatment for injection needs to be considered.
- Might need to consider the creation of a water authority or a water district. Where would this option/concept be more properly discussed? There is an "Alternative Management Structures Workgroup" (Workgroup #2A) that might be the appropriate discussion platform for that option.

10. Summary of Flip Chart Notes – Desalination Options/Concepts:

Mark Rubin summarized the group's discussions on desalination options and concepts with the following notations on the flip charts:

- Where to put it? – need power plant, existing distribution system
- Regulatory issues
- Desalination and injection (eliminates the need for distribution system) – has regional impact – need to model to account for potential to push salt water further inland
- PARKING LOT: Surface water – storm flow – into ground – aquifer would serve as distribution system
- Consideration of desalination of brackish water and associated issues.

11. What do we talk about at the next meeting? (Mark Rubin):

Mark Rubin asked the group for topics that we might want to discuss at the next meeting of the Workgroup which is currently scheduled for Tuesday, October 27th from 9:00 to 12:30. Items noted were:

- Groundwater permit thresholds – potentially reducing the current threshold – looking at it from the demand management perspective;
- Aquifer storage – needs to occur on both the up-stream and down-stream ends of the system – need to look at both ends of the stream – need to look at the aquifer as the ultimate storage option;
- Consideration of the use of banking.
- Need to expand the uses of reclaimed water – and identifying and removing the regulatory hurdles – are there impediments to the use of reclaimed water – there are lots of regulatory hurdles – what are those hurdles?
- Need to get all ideas out and on the paper.
- The question is can we inject enough water in the ground to make a difference? Can it be done in the western part of the state?
- With regard to injection: What we have been able to do with our modeling is that, based on our current understanding of how the system works, injection will be beneficial and it can be done. Now that doesn't mean that our understanding of the system is right. To the best of our knowledge, it looks like there is a significant potential benefit and it looks like we can inject a

pretty significant amount of water into the system but there is an additional understanding that needs to be realized at a site-specific scale in order to determine whether or not the water can be accommodated at the available injection sites.

- Would it be useful for this group to hear a presentation on what is understood at this point in time? And what remaining questions need to be answered or resolved?
- Should the state spend some money doing some studies? Should we recommend that the legislature provide funding to do site-specific or area-wide studies? What questions need to be addressed through the study?

Ultimately the product from the next meeting of the group should be an identification of what we need to report to the main Advisory Committee as recommendations from the three meetings of this workgroup. Topics for the next meeting will be:

- Groundwater permit threshold;
- Aquifer storage/banking options;
- Expanding the use of reclaimed water – what at the hurdles;
- Consideration of the criteria identified in the "criteria" list handout
- Injection of water – what do we do when we inject it? – Craig Maples will put together a presentation on "injection" for the next meeting.
- Presentation on "reuse" – identification of process and impediments – Scott Kudlas will put together a short presentation about the program and get some folks actually out in the field implementing a reuse program to discuss their programs and to describe any obstacles.

12. Review of Issues/Options Identified at the September 17th Meeting (Mark Rubin – Members of the Work Group – Stakeholders):

Mark Rubin distributed a listing of "criteria" that resulted from the discussions of the group at their September 17th meeting which included the following:

- Affordability
- Practicable – available – affordable – feasible
- Minimize the stranding of existing infrastructure
- Protect public health
- Consistency of quality
- Protect the quality and integrity of products that rely on water
- Assurance of safety to the public
- Effective waste management from the purification process
- Adequate/Sustainable Supply
- Optimize demand management where practicable
- Reliability and Volume
- Adequate quantities in the future for both current needs and growth

- Insure a balance between the needs of current users with future needs
- Availability during emergencies
- Ease of monitoring as to quantity and quality
- State and federal consistency
- Consistency in design standards
- Consistency in consumption standards
- Regulatory impediments and expectations
- Look into unregulated sources/unpermitted users
- Protect the interests of private well drillers
- Rural and small locality sensitivities
- Allow citizens to build and live where they want
- Encourage the development and use of small scale alternatives
- Think about where to put the water back into the ground, either through water reuse or other (injection)

13. Public Comment: No public comment was offered.

14. Scheduling and Next Steps (Mark Rubin):

Mark Rubin reviewed the remaining meeting schedule and outlined the "next steps" in the process.

15. Next Meetings related to the EVGMAC and its Workgroups: The next meeting of this workgroup:

- **EVGMAC – 3rd Meeting of Work Group #1 – Tuesday, October 27, 2015 – DEQ PRO Training Room – 9:00 – 12:30;**

16. Meeting Adjournment:

Mark Rubin thanked everyone for their attendance and participation in today's meeting.

The meeting was adjourned at 4:30 P.M.