

Summary

Project: Arlington County Biosolids Upgrade

Subject: Biosolids Advisory Stakeholder Meeting

Date: Thursday, October 07, 2021

Location: WebEx

Attendees: John Bloom, C2E2
Sandra Borden, Crystal City Civic Association
Paul Guttridge, Aurora Highlands Civic Association
Joan McIntyre, EcoAction Arlington
Claire Noakes, C2E2
Peter Robertson, Fiscal Affairs Advisory Commission
Steve Young, Joint Facilities Advisory Commission

Tom Broderick, Arlington County Water Pollution Control Bureau
Lisa Racey, Arlington County Water Pollution Control Bureau
Mary Strawn, Arlington County Water Pollution Control Bureau
Brian Balchunas, HDR
Stephanie Spalding, HDR
Rahkia Nance, HDR
Jessica Snead, HDR
Samantha Villegas, Raftelis

Agenda

1. Introductions
2. Rock-N-Recycle
3. Program Updates
4. Biogas Utilization and Recommendation
5. PFAS/Contaminants of Emerging Concern
6. Site Layout
7. Next Steps

1. Welcome and Introductions (S. Villegas and T. Broderick)

Samantha Villegas opened the meeting and greeted attendees. Tom Broderick thanked attendees for participating and noted the program is continuing to progress and meet targets.

Samantha shared details of how to use the WebEx virtual meeting platform. The group decided to adjust the agenda and delay discussion of branding and the website preview to the end of the meeting.

2. Rock-N-Recycle (M. Strawn)

Mary Strawn gave an outreach update on the Rock-N-Recycle event that she and Kacey King-McRae staffed on September 18, 2021. She said it was a great opportunity to talk to young families about the program and share what other facilities have done, and what the County's plans are. The banner and poster images that focus on the solids handling processes, biogas, and Class A biosolids were well-received, and there was positive feedback and excitement for nutrient-rich products and renewable natural gas.

She noted that several people mentioned forever chemicals and PFAS so there is a general awareness of those constituents (also discussed later in this meeting).

The County also had a booth at the Arlington County Fair with information about the Arlington Re-Gen program.

3. Program Updates (M. Strawn)

Mary provided the following updates in three categories:

Immediate Needs Project Updates

- Completed replacement of motor control center 1 in Preliminary Treatment Facility
- Replacement of influent screens, screen handling equipment, scum concentrator, and other headworks equipment as well as building ventilation improvements to begin Fall/Winter 2021 and continue into Spring/Summer 2023

Long-range Updates

- Provided a recommendation for gas utilization
- Developed a shortlist of site plans
- Began air emissions modeling
- Working toward draft facilities plan (end of 2021)

Implementation Phase Updates

- Completed delivery risk assessments

- Identified potential project packages
- Evaluated project delivery options and began working with the County's Purchasing Office

The County reviewed the current high-level project schedule.

4. Biogas Utilization and Recommendation (B. Balchunas)

Brian Balchunas explained that the project team has been working closely with the County over the last several months to define the options that are available for beneficial use of biogas, and the options have undergone a rigorous evaluation process. A methane-rich biogas is generated as a byproduct of the anaerobic digestion process, and the County is evaluating the beneficial use options for this biogas. Three alternatives have been developed for the evaluation:

- **Alternative 1.** Generation of steam and heat for on-site use. Approximately 25% of biogas would be used to generate steam, with the other 75% being flared. Some cleaning of the biogas would be required for use in boilers. This is used as a baseline comparison only and is not considered feasible as it does not beneficially use all the biogas, which is one of the program's goals.
- **Alternative 2.** Generation of onsite electricity. This would involve further cleaning the gas and installing a combined heat and power (CHP) facility to generate electricity onsite and recover heat for use in the wastewater treatment processes. This would generate a maximum of 1.5 megawatts (MW) of energy, which is about 35 percent of the plant's total electricity usage. Therefore, the plant would still need to purchase the balance of its power from the grid.
- **Alternative 3.** Production of renewable natural gas for offsite use. Renewable natural gas is produced by upgrading the biogas generated through the digestion process to remove the carbon dioxide. The composition of the renewable natural gas would be very similar to fossil fuel natural gas. This renewable natural gas could be injected into the Washington Gas pipeline and used as vehicle fuel. All electricity from the plant would come from the grid.

The project team reviewed multiple metrics that were included in the evaluation including carbon reduction, financial (capital, operations and maintenance, and social cost of carbon), and non-economic factors. HDR facilitated the analysis, which included reviewing different market conditions through sensitivity and statistical analyses. This evaluation showed that Alternative 3 consistently had the lowest present worth cost,

highest non-economic score, and lowest on-site emissions and lowest net carbon emissions.

The carbon reduction information presented is only for the biogas utilization alternatives and focused on electricity and natural gas usage only. Once program elements are finalized, HDR will complete a more detailed carbon footprint analysis of all the biosolids facilities. The operations and maintenance costs assumed that Dominion Energy would be carbon neutral by 2050. If these goals are achieved earlier, the carbon reductions for Alternative 2 phase out sooner. The non-economic metric was scored by County team members.

The project team recommended proceeding with Alternative 3. Brian noted that a draft detailed gas utilization report has been submitted to the County, documenting all the calculations and analysis. The Advisory Panel will be given a copy of the Report after the County team has had a chance to review and comment on the draft report.

Questions from the Advisory Panel members regarding gas utilization are summarized at the end of these notes.

5. PFAS/Contaminants of Emerging Concern (S. Spalding)

In response to the Advisory Panel's request for additional information during the June 2021 meeting, Stephanie Spalding discussed per- and poly-fluoroalkyl substances (PFAS) and contaminants of emerging concern and noted specific public concern regarding impacts on health. She explained that PFAS can be found in waterproof items, stain repellents, and firefighting equipment. There are over 4,000 chemicals in this family and their structure causes them to remain in the environment for a long time. Wastewater plants do not produce PFAS; the chemicals can get into water systems from industry and everyday human use.

Though most research has been focused on drinking water and wastewater to date, studies are underway to determine the impact of PFAS in biosolids. There are no Virginia state regulations for biosolids land application anticipated at this time, but eventual PFAS drinking water standards may impact discharge limits on wastewater and biosolids. Arlington County biosolids are at low risk for elevated PFAS levels given the lack of industrial discharges in the County.

The proposed biosolids treatment processes are adaptable to future regulatory changes. Room will be reserved for additional downstream treatment processes should they ever be necessary.

There were no questions from the Advisory Panel members on this subject.

6. Site Layout (M. Strawn)

Mary shared two potential site layout options that have been developed, and reviewed buildings that have been identified for reuse or demolition. One option is to decommission the dewatering building and construct the new facilities around it so current processes could be kept in service for the duration of construction. A key advantage of this option is that no temporary dewatering facilities would be required during construction. The second option is to renovate the existing dewatering building and repurpose it for some of the new facilities. This option would reuse existing infrastructure but would require temporary operations during construction. No decisions have been made and both options are being further developed.

Questions from the Advisory Panel members regarding site layout are summarized at the end of these notes.

7. Next Steps

In the interest of time, the group decided to postpone the discussion of the Arlington Re-Gen brand and website preview. HDR will send the preview and survey questions to the group at a later date.

Mary Strawn will provide brochures to the Advisory Panel to share with their respective groups.

The next meeting will be scheduled for early 2022.

Questions

| Question | Response |
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| Is air modeling being done for all scenarios and options that will be discussed today? | Yes, for Alternatives 2 and 3 (but not the baseline scenario of Alternative 1). The project team has done preliminary modeling focused on local emissions near the Water Pollution Control Plant. The project team currently prefers the |



| Question | Response |
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| | <p>renewable natural gas alternative that has lower on-site emissions than the CHP alternative. A comprehensive air emissions report is being completed. It was noted that no modeling was completed for sources outside of the plant (i.e. natural gas bus fleets) because plant alternatives do not directly change vehicle emissions from the current use of natural gas outside of the plant.</p> |
| <p>If the County electrifies the bus fleet, could the emissions from use of the renewable natural gas vs. electrification be different?</p> | <p>Electrification of the County’s bus fleets would change the emission profile (including emission locations) associated with the bus fleet. However, any study of the impacts of those changes are beyond the scope of this study. If the renewable natural gas is not used locally by the County in the bus fleet, it would be used elsewhere by others as an offset for fossil-fuel based natural gas.</p> <p>The WPCB project is not dictating whether Arlington Transit (ART) or Washington Metropolitan Area Transit Authority (WMATA) will use vehicles powered by natural gas or electricity. Nor is the WPCB project dependent upon buses remaining natural gas-powered. Those bus electrification evaluations and decisions will be completed separately. The Water Pollution Control Bureau’s is not driving those decisions, which are being made by the Transit Bureau.</p> |
| <p>Did the County look at climate-related risks (i.e. storm surge, severe rainfall, and flooding events) as part of the risk analysis? How resilient will the facilities be in the face of those conditions?</p> | <p>The project area is outside the current and projected future 500-year floodplain. The current 500-year floodplain is at approximately elevation 15. The finished floor elevation of new facility-occupied spaces will likely be around elevation 22. The biosolids production process will</p> |



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| | <p>likely not be affected by flooding. Arlington does get a significantly larger amount of flow coming into the plant during wet weather, but it is less impactful on the solids handling processes. The one linkage made with overall plant resiliency was if Arlington were to implement using biogas for power generation on site. However, onsite generation would only provide 1.5 MW of power while total power usage is closer to 4 MW for the plant.</p> |
| <p>Does the quality of the gas have to be the same as injecting into the gas line as for vehicle fuel or can it be lesser quality?</p> | <p>If the gas goes directly to end users for vehicle fuel, fewer gas quality parameters would need to be monitored than if it went into the natural gas pipeline. However, the treatment process would be the same, as the additional treatment process is based on removing carbon dioxide in either instance.</p> <p>The WPCB is currently focused on pipeline injection rather than direct piping of renewable natural gas (RNG) to the compressed natural gas (CNG) fueling sites, as this provides greater resiliency for end uses.</p> |
| <p>Arlington County government is committed to 100 percent renewable electricity by 2025 by power purchase agreements and rooftop solar. Is the plant covered by that commitment so that electricity supply is 100 percent covered?</p> | <p>The WPCB confirmed through the Department of Environmental Services' Arlington Initiative to Rethink Energy staff that all County operations' electrical usage (including the WPCB) is expected to be from renewable sources by 2023.</p> |
| <p>For Alternative 3, why is it not possible to use a portion of biogas to feed the steam boiler rather than relying on purchased natural gas? This would allow for a self-sustaining process, reduce reliance on fossil fuels, and help meet County sustainability goals.</p> | <p>The system will be designed to allow biogas to feed the steam boilers. Note that the net gas usage and offset is the same since more renewable natural gas used onsite means less gas is sent to others as a replacement for fossil fuel, which potentially has a higher dollar</p> |



| Question | Response |
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| <p>Dominion Energy shareholders and Washington Gas shareholders profit off the sale at whatever price they're going to pay Arlington County for the gas. The County would receive less than the taxes and the profits that are being extracted from Arlington County as the customer. I would like to know where that environmental bonus/financial benefit is coming from and how sustainable it is? Is it locked for 40 years? Is additional information (including a financial analysis) available?</p> | <p>value. There are also economic benefits to sending the renewable natural gas offsite.</p> <p>The financial benefits come from the Renewable Fuel Standard (RFS) program which was authorized in 2005 and has survived multiple administrations. The standard requires obligated parties to use a certain amount of renewable fuels. The obligated parties under the RFS are refiners or importers of gasoline or diesel fuel. Compliance is achieved through blending renewable fuels into transportation fuels or by obtaining credits, called "Renewable Identification Numbers" (RINs). The RIN value is determined on the open market depending on the source of renewable fuel. They historically have traded at several times the value of the gas itself. Fuels derived from wastewater feedstock have higher sustainability metrics than other feedstocks, and thus are valued higher. The financial modeling was completed using a conservative value of the RINs looking at historical values and accounting for brokerage requirements to facilitate. Modeling was also done to evaluate the risks associated with the RIN market.</p> <p>There is no guarantee that the RFS program will continue indefinitely, although it has the support of the agricultural and environmental communities. The selected biogas utilization alternative will be adaptable to changing market conditions, allowing for the use of renewable natural gas onsite</p> |



| Question | Response |
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| | <p>or the future installation of CHP, should market conditions dictate.</p> <p>The project team will provide more details on the basis for analysis and the risk modeling that was performed including assumptions, and will discuss this topic in more depth at the next stakeholder meeting. This has also been documented in the draft gas utilization report currently under review by the County.</p> |
| <p>Relating to renewable energy credits, if you sell your RINs then the County cannot count any of the carbon reductions that you've sold to your environmental attributes, correct? We need to understand what environmental attributes are being sold and make sure they are not of value to the County.</p> | <p>The requirements of the RFS (and sale of RINs) are a different accounting than other environmental attributes. The County will be able to "count" the reduction of greenhouse gases in its internal accounting outside of the RIN program. Note, the social cost of carbon was included in the evaluations as a standard tool for valuing the CO2 reductions. Alternative 3 has the lowest present value even without factoring in this social cost of carbon.</p> |
| <p>Does this project look at installing solar panels on any of the buildings to reduce power needs?</p> | <p>The WPCB has worked with the AIRE team to discuss the feasibility of installing solar panels. Previous evaluations concluded that the WPCP was determined to not be a good location for several reasons including limitations in maintenance access to the wastewater treatment equipment and that the large tanks have domed rooftops. We also looked at an offsite warehouse, but the structural analysis was inconclusive.</p> <p>We will continue to evaluate future solar opportunities.</p> |
| <p>Did you calculate what the carbon emissions would be under each of the alternatives?</p> | <p>The calculations completed are for net reduction in carbon emissions for electricity (electricity generated and/or</p> |



| Question | Response |
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| | <p>additional electricity consumption) and natural gas (RNG generated and/or natural gas consumption) for the gas utilization equipment shown on Slides 28-30 only. Based on these factors, the net reduction in carbon emissions is approximately 3,500 metric tons/year for Alternative 2 and 3,800 metric tons/year for Alternative 3. Alternative 3 is higher than Alternative 2 because some of the power currently supplied to the plant comes from renewable sources. A full carbon footprint analysis for the new biosolids facilities is under way and will capture the percent reduction in carbon for the new facilities.</p> |
| <p>What are the capital costs at initiation and the cost to build it?</p> | <p>The baseline conceptual capital cost to use the biogas to generate the steam and heat required for the treatment process is \$10 million. The onsite electricity and heat have a higher conceptual capital cost at \$18 million. For renewable gas and additional gas upgrading, the conceptual capital cost is \$22 million.</p> <p>If you include operation and maintenance costs, Alternative 2 and Alternative 3 save money from either buying less electricity (Alternative 2) or sale of RINs (Alternative 3). More revenue is generated from the sale of RINs.</p> <p>Sensitivity analyses were completed to vary those parameters that may have high volatility (such as RIN value, price of electricity, and price of gas). When Monte Carlo models were run to vary these parameters, Alternative 3 had a lower cost than Alternative 2 in 95% of</p> |



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| | the model runs both with and without the social cost of carbon. |
| Are the axes in slide 36 in millions of dollars and is it showing one year's worth? Could you please explain how these costs are related to the overall project costs? | <p>The Y-axis is Total Present Worth in millions of dollars (capital plus the 20-year present worth of O&M costs). The X-axis is total non-economic score as scored by the County.</p> <p>Costs presented focus on the gas utilization equipment infrastructure, which is a small piece of the overall project. The overall project cost with all components is significantly more. The important takeaway from this is that the project itself is not being done for Arlington County to make money. It is being done because the County needs to upgrade its solids handling processes in a reliable and sustainable manner.</p> |
| In Alternative 3, there is more natural gas use on the boiler side and more renewable natural gas generating that is captured. Is this just net? What is the scope of the carbon reductions? Is it biogas only? What is it compared to? | Yes, it can be looked at as net natural gas usage. From a carbon standpoint, we did net out the natural gas being used in the boiler against the natural gas offset from injection into the pipeline. As noted previously, a full carbon footprint analysis for the new biosolids facilities is under way. This project does not look at the carbon footprint of the entire plant since those facilities will not change as a result of the upgrades. |
| Please clarify how costs are displayed in the bar chart on slides 32-34. | The operation and maintenance costs are the costs of running the gas equipment. The chart does not show overall operation and maintenance costs for all of the biosolids processes or the entire plant. If O&M costs are above zero, it means we are spending money. If they are less than zero, we are avoiding costs or generating revenue. HDR and County |



| Question | Response |
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| | staff will look into explaining this in more detail. |
| In Alternative 2, are you counting the electricity the entire plant will use? | No, electricity required to power the entire plant uses is not included. The reduction of purchased power due to the onsite generation (1.5 MW) is accounted for. Electricity demand for the new biogas upgrading equipment is also included. For this analysis, it is only important to include the avoided cost in Alternative 2. The net result is the same. |
| In Alternative 1, does the electrical cost only capture what would be used for the boiler operation? | Yes, the only added electricity is for use of the boiler. |
| Was 2016 weighting and criteria from neighbors included in the current review? | The project team did not use that information directly. Arlington did not overlay the earlier scores with the criteria, but folks who have been with the program over the years were keeping that in mind. Arlington has a good sense of preferences of the surrounding community which is reflected in the scoring. |
| When calculating capital costs, did you include debt financing? | No, it is the initial capital project cost which is standard when considering present worth analysis. Future O&M costs are discounted. We will further review this approach with the County. |
| How can you sell environmental attributes, in the case of transportation fuels, and be left with something less after you do? Do you still have renewable natural gas? | The requirements of the RFS (and sale of RINs) are accounted for separately than carbon credit programs. The County will be able to take credit for the reduction of greenhouse gases in its internal accounting independently of the sale of RINs. Note, the social cost of carbon was included in the evaluations as a standard tool for valuing the CO2 reductions. Alternative 3 has the lowest present value even without factoring in this social cost of carbon. |



| Question | Response |
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| What is the total project cost estimate with Alternative 3 right now? | The project team is working on the overall project cost now. By the next meeting, there should be a comprehensive facilities estimate. Costs presented today are conceptual costs for the evaluated alternatives. |
| What is in the CIP for this program? | The overall program is \$175 million. This will be updated with the comprehensive facilities estimate. |
| It seems like the gas goes into the pipeline. Is it being sold to Washington Gas and they will distribute it and take ownership and be broker for RINs and sell it onward to their customer? Is that the way it works? | It is still being determined on what the commercial side of this looks like. Washington Gas has two different companies. There is the public utility that provides the infrastructure and the for-profit side that sells the gas. The exact metrics of whether Arlington County becomes a producer of natural gas and sells it to others is still being determined. |
| What does Blue Plains do with their renewable natural gas? | Blue Plains produces electricity and does not sell their biogas. They are generating electricity on site. WSSC Water, which serves Montgomery and Prince George's Counties in Maryland, is proceeding with a renewable natural gas program and has contracts in place. WSSC is working with Washington Gas and becoming a distributor. |
| From the JFAC perspective, land is so scarce in Arlington. Is it possible to recapture the footprint or look at other opportunities for collaboration? Things like landscaping and parking need to be taken into account. | These considerations will be factored into the planning process. |
| Please explain the three versus four digesters. | Arlington anticipates needing four digesters in a future scenario but will not need them immediately. The existing dewatering building would be taken down to construct the fourth digester, if the option to decommission the dewatering building is implemented. |



| Question | Response |
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| <p>In moving the digester, it takes up some parking spaces and blocks an entrance. Can you explain the shrinking parking lot? Can you discuss whether you considered the larger site beautification needs between the two layouts?</p> | <p>This move allows us to keep the dewatering operations in service and minimizes the impacts of construction. HDR has proposed roadways to make maintenance access to these facilities a lot easier. Underneath the surface of these roadways would be utility piping associated with these buildings. Arlington will review the parking lot location to consolidate the footprint. We will also move the gate entrance located in the footprint of the digester further west. The WPCB is working through these logistical site impacts.</p> |
| <p>Talking points need to be developed for those not in the stakeholder group.</p> | <p>Agreed. We have produced some materials and will continue to work on and refine the message.</p> |