

MEMORANDUM

To: Members State Water Control Board

From: Allen Brockenbrough, CO
Thomas Faha, NVRO
Susan Oakes, NVRO
Kyle I. Winter, CO

Copies: Rush River WWTP Public Hearing File

Subject: Issuance of VPDES Permit No. VA0091651, Rush River WWTP
Rappahannock County

Background

On January 10, 2005, the Town of Washington submitted a VPDES Permit application for a proposed 0.06 mgd sewage treatment plant. If constructed, the plant will discharge to the Rush River.

The proposed plant will be located just upstream of the Route 211/522 Bridge over the Rush River. It will serve the Town of Washington.

Public Notice and Public Hearing

Notice of the proposed permit issuance was published in the *Rappahannock News* newspaper on December 22, 2005 and December 29, 2005. The public notice comment period ended on January 23, 2006. Staff received 36 comments and recommended a public hearing.

The Regional Director authorized a public hearing on the proposed permit issuance on February 13, 2006.

Notice of the Public Hearing and comment period was published in the *Rappahannock News* newspaper on February 23 and March 2, 2006, and all respondents to the original public notice were sent written or e-mailed notification of the public hearing.

The hearing was held on March 28, 2006, at the Rappahannock High School Auditorium. Ms. Komal Jain served as the hearing officer. A question and answer session preceded the hearing.

The second public comment period ended on April 12, 2006. DEQ received 61 comments during the second public notice comment period and the public hearing.

Summary of Comments and Staff Response

Staff received many comments on this draft permit and we have attempted to identify and combine them where it is possible without losing specifics. We have also tried to provide responses with regulatory, technical, and historical perspectives. The result is a long briefing memo.

In an attempt to help, before proceeding with the detailed comments, we have identified three general categories of comments that challenge the adequacy of the permit. They are briefly summarized below with responses that are inherent to the related specific comments on the following pages. It should also be noted that we received many

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comments in support of the proposed STP and draft permit but we have not detailed them since there is little reason for staff response.

Should DEQ permit a new discharge to an intermittent stream? If so, should this be done without requiring the applicant to submit an analysis of the alternatives? The suggested alternatives to discharge included reuse/reclamation, land application/spray irrigation, or disposal via drain field.

When developing limits for a proposed discharge, DEQ considers the critical volumes of flow in the stream receiving the proposed discharge. In most discharge scenarios, the critical flow volume is during periods of low flow or drought, and the permit limits are accordingly more stringent than in cases when the receiving stream experiences flows equal to or greater than that of the discharge. In the cases where the discharge is to an intermittent stream, the effluent limits are developed so as to support the applicable in-stream water quality standards at the point of discharge. DEQ's methodology in developing limits for discharges into intermittent streams is comparable to those of most other states, and has been approved by the EPA.

The VPDES regulation does not require an applicant to evaluate alternative systems prior to applying for a VPDES Permit. Typically, when a preliminary engineering report (PER) is developed for the wastewater plant, an alternatives analysis is presented to demonstrate that the selected option is the most cost-effective one. The Town has gone beyond this in that before applying for a discharge permit, they explored several options, including mass drainfields, pumping to the Sperryville sewage treatment plant, building a wastewater plant and piping the discharge to other sites, natural treatment systems, spray irrigation, repair of failing septic systems, and other non-conventional alternatives. After completing this review, the Town concluded that the best solution for both the health of its residents and the health of the environment and the Rush River is to install a state-of-the-art sewage treatment plant.

Staff received several comments concerning the extent and severity of the problem of failing septic systems in the Town, and that it is possible that the proposed discharge would result in improvement of the in-stream conditions in the Rush River. These comments cited as evidence improvements to the nearby Thornton River after the Town of Sperryville constructed a wastewater treatment plant to address similar issues with failing septic systems and straight pipe discharges.

Were the methods used to develop permit limits related to oxygen demanding substances sufficiently sophisticated to protect water quality?

For pollutants related to dissolved oxygen in the receiving stream (cBOD and TKN), DEQ uses a simplified Streeter-Phelps model; the assumptions in this model represent the following worst case scenarios:

- Receiving stream at low flow conditions (lowest seven consecutive days in a given ten-year period);
- Continuous discharge at the flow rate for which the facility was designed;
- Effluent pollutant concentrations at maximum levels allowed by the permit;
- Effluent dissolved oxygen concentrations at minimum levels allowed by the permit, and
- Conservative re-aeration rates of the effluent-stream mix as it flows downstream.

This approach is consistent with that of most other states, and has been approved by EPA. Typically, more sophisticated models are used by permittees and their consultants to demonstrate that *less* stringent limits are necessary to protect dissolved oxygen levels in the receiving stream.

Staff took the additional step of assigning a Tier II designation to the Rush River. In so doing staff applied antidegradation as part of the model and this yields limits more stringent than might otherwise have been required. Nonetheless, in response to the concerns expressed by the citizens, staff is recommending that the DO effluent limit be change from 6.0mg/l to 7.3mg/l.

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Do the nutrient related permit limits protect against impacts from nutrients, whether by ammonia toxicity or through the promotion of algal growth in the Rush River?

Nutrient levels in the permit have been derived from two criteria; the first pertains to the oxygen demand exerted by nitrogenous pollutants (TKN), and this is factored into the Streeter-Phelps model. The second criterion pertains to 9 VAC 25-40-70.A.3.a, *Regulation for Nutrient Enriched Waters and Discharges within the Chesapeake Bay Watershed*, which became effective in August 2005. This regulation establishes the requirement that a facility such as that proposed by the Town meet a total nitrogen concentration of 8.0 mg/l and a total phosphorus concentration of 1.0 mg/l. Should the permit be issued, it is the Town's prerogative whether or not to design the facility to meet more stringent nutrient concentrations, in which case the permit limits may be modified in the future to match whatever nutrient removal technology is eventually installed.

The TKN limit in the permit is 5.0mg/l. In order to meet the TKN limit of 5 mg/l as well as the Total Nitrogen limit of 8 mg/l, the proposed facility will be required to nitrify (convert Ammonia-N to Nitrate) year round, removing virtually all of the Ammonia-N. Wastewater treatment plants that fully nitrify typically have effluent Ammonia-N levels well below 1 mg/l, especially during the critical warm weather/low flow conditions on which the 2.2 mg/l Ammonia criterion is based.

§62.1-44.19:15.A.4. of the *Code of Virginia* requires facilities such as those proposed by the Town to offset any nutrient discharges resulting from their operation. DEQ is currently developing a new regulation, *General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia 9VAC25-820*, that will implement this legislation; the draft regulation is currently open for public comment and all are invited to comment. The regulation and the general permit associated with it will govern allowable offsets and will be effective by the end of the year, well before the Town can begin construction of a new STP.

Offsets will be required to be submitted to DEQ for approval prior to issuance of the CTO; they must be in the Rappahannock River Watershed and must not contribute to water quality effects locally, downstream, or in the Chesapeake Bay. In addition, pursuant to §62.1-44.19:12-:19, offsets must be reported annually and the permittee must provide confirmation of availability of offsets for the coming year. In the event that the Town of Washington offsets their nutrient discharge by acquiring credits from other point sources operating under the watershed general permit, then those trades will be made available for public review although there will be no opportunity for a formal public comment period. Should the Town choose to offset their nutrient loads by arranging for other nonpoint source improvements such as the removal of failing septic systems or the installation of agricultural BMP's, then those offsets will be added to the individual VPDES permits as enforceable requirements. Such offsets, being included in the individual VPDES permit, will be subject to public comment. Repair of failing septic systems would be considered to be a "baseline" requirement under the Chesapeake Bay Tributary Strategies and thus not eligible for the generation of nutrient removal credits. However, as all (even properly functioning) septic systems release nitrogen to groundwater (that eventually reaches surface waters), reduction of the load associated with a properly functioning septic system would be eligible. It is possible that the technology requirements and offset requirements will result in the proposed discharge having less nutrient-related impact than some of the alternatives suggested by opponents of the proposal.

Staff Comments

1. The following pages are a summary of the detailed comments we received on the draft permit. With each is staff's response to the comment.

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2. In preparing the answer to Comment #21, we noticed we made a mistake in calculating the limits for TRC. The limits in the draft permit were not calculated with the correct WLA from Attachment 7 of the Fact Sheet. The limits in the permit for TRC should be:

Monthly Average: 0.002 mg/l
Weekly Average: 0.003 mg/l

3. Based on the level of interest in this draft permit and concern for the Rush River expressed by many citizens, staff will recommend two additional changes to the draft permit:

- Change the DO effluent limit from a minimum of 6.0mg/l to 7.3mg/l.
- Add a special condition requiring instream monitoring above and below the point of discharge.

Staff believes these two changes provide added assurance that the proposed discharge will not compromise the water quality standards of the Rush River.

Staff will recommend the draft permit be modified accordingly.

Enclosed with this memo is a copy of Part I of the draft permit and the Fact Sheet.

Please let Tom or Susan know if you have any questions or would like more information.

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Summary of Comments

1. *Comments from Applicant* - This is a summary of the comments presented by the Mayor Leggett and Council Member Claudia Mitchell of Town of Washington.
- The Town has a long history of failing septic systems and that sewage has been identified in drainage ditches causing health concerns to its residents.
 - They believe the failing septic systems along with cattle are contributing to the Rush River fecal coliform impairment.
 - They are trying to resolve the failing septic systems while at the same time minimize growth and impacts to the environment.
 - The Town has spent approximately \$250,000 in studies on how best to correct the problems.
 - The Town has explored many options including mass drainfields, pumping to the Sperryville sewage treatment plant, discharge to Clopton Updike property, discharge to Avon Hall property, living systems, spray irrigation, repair of failing systems, and other non-conventional systems.
 - The Town has decided the best solution for both the health of its residents and the health of the environment and the Rush River is to install a state-of-the-art sewage treatment plant.
 - The Town proposes to construct an advance treatment plant with limits of technology for removal of nutrients in order to ensure that water quality standards will be maintained or exceeded and believes that the system will improve water quality.

Staff Response:

There were no issues for staff to address in these comments.

2. Comments from Rappahannock County - The following is a summary of comments from the Rappahannock County Board of Supervisors. In addition, the Board of Supervisors retained a professional engineering firm to review the draft permit and advise them; those comments are included here as well.
- Board of Supervisors has property in the Town that is marginally functioning and close to failure therefore has an interest in a sewage treatment solution.
 - Town of Washington has responsively explored options to resolve the failing septic systems.
 - County has recently restricted the use of private systems in its jurisdiction because they too often suffer from poor management, poor maintenance and inevitable failure.
 - Public sewage treatment system properly designed and run is an effective means of protecting the environment.
 - Limitations for BOD, TSS, & DO are representative of Tier II streams.
 - Total Nitrogen & Total Phosphorous also in accordance with current guidance.
 - Compliance with TKN limits is assured by meeting TN limits and will likely result in even lower concentrations of BOD & TSS in the effluent.
 - SBR Technology capable of providing high level of treatment including biological nutrient removal (BNR).
 - Inclusion of tertiary filters crucial to meeting low limits by permit.
 - Opinion that the proposed facility should be able to meet the discharge limit for conventional pollutants.
 - Suggest inclusion of a supplemental carbon source to assist in denitrification and a coagulant feed such as alum for phosphorous removal and to enhance settling during plant upsets.
 - Suggest alkaline feed to enhance nitrification.
 - Recommend that facility examine possibility of metals limits.

Staff Response:

Staff has no response to the County's comments concerning the need for a solution to the failing septic systems or concurrence with the Town's efforts to address them. The comments concerning the design considerations of the plant will be fully addressed through the submittal of the Plans and Specifications for the STP and reviewed under the Sewage Collection and Treatment Regulations.

3. Petition – Staff received a petition signed by over 220 people. The petition had the following statement: “We, the undersigned, oppose the plan that allows the discharge of treated sewage from the Town of Washington into the Rush River as it travels through our Rappahannock County.”

Staff Response –

The Town submitted an application for a VPDES permit in accordance with the permit regulation. A draft permit was prepared in accordance with all applicable regulations. The petition did not include any further statement for staff to respond.

4. Discharges to Zero Flow Streams - Discharges to zero flow streams is bad public policy and the state should reconsider this policy and pursue the goal of discharge elimination through requirements for reuse and land application.

Staff Response -

- Discharges of both process and storm water to such streams are ubiquitous in Virginia.
- Localities and facilities located at the headwaters of watersheds and sub-watersheds have little option but to discharge to zero flow streams since access to all weather streams is impractical.

- Regarding sewage treatment plants, there are hundreds throughout the state which discharge to zero flow streams and they range in discharge volumes from hundreds of gallons per day to several million gallons per day.
- Permits for such discharges are written to protect the water quality standards, the same as is done for discharges into permanent streams. The permits are written with limits based on no assimilative capacity, or dilution, since the critical design flow of the receiving stream is zero.
- The State Water Control Board has been issuing discharge permits to zero flow streams for three decades. Staff is not aware of any specific water quality problems that distinguish these discharges from discharges to permanent flowing streams. When water quality problems are determined to be the result of a discharge, they are almost always the result of permit violations.
- DEQ recognizes the goal of the Clean Water Act to eliminate all discharges but that is not yet practicable or achievable. The response to Comment #6 below discusses DEQ's efforts to encourage reuse
- DEQ's approach in permitting discharges to zero flow streams has been successfully applied for the past 20 years. The methodology used by DEQ is acceptable to EPA and consistent with the approaches used in many other states.

5. *Water Quality Modeling Issues – There were many issues relating to the water quality modeling performed by the staff and how those modeling results were applied in establishing effluent limitations. Specific comments and the staff responses include:*

- *DEQ should perform instream monitoring and use a more sophisticated DO model that is field calibrated to determine effluent limits for the proposed discharge*

Staff Response –

For DO related pollutants, BOD and TKN, DEQ uses a simplified Streeter-Phelps model with conservative assumptions to model for protection of the DO criteria. As in all modeling, the selection and use of data input requires professional judgment.

Field monitoring, verification, and calibration of a DO model requires many hours of staff time that is not available for the numerous discharges throughout the state. In this particular case it is even more problematic for the stream has no flow by which to perform field verification during the critical period; the only flows will be those from the discharge.

To cope with the realities of staff resources and the difficulty and problematic nature of measuring a stream at critical periods, DEQ instead uses a DO model with conservative reaction rates and a combination of assumptions that depict a worst case scenario: stream at low flow, discharge at maximum flow, and pollutant concentrations at maximum levels. It is by design a conservative tool the agency uses to determine if a worst case combination of events could be expected to cause a water quality problem. The modeling is done to protect the discharge and river under these extreme conditions and then used to set limits as though these conditions existed every day. It is an approach used not only by Virginia but by many states and sanctioned by EPA. The combination of all the assumptions in the model is considered to be extremely conservative and it is the staff's opinion that a field calibrated and verified model would likely result in less stringent effluent limitations.

The agency has used this tool and approach for setting effluent limits for the past 30 years and it has been shown to be successful. As an example, few waters on the 303(d) list are identified as being impaired because of permitted sources.

- *Per the user manual for the DO model, the model should not be used where there is excessive algal growth or where diurnal oxygen variations exist, and given the algae observed on March 2, 2006, the model should not have been used.*

Staff Response –

Staff has visited the Rush River many times for reasons associated with this permit development and as part of the ambient monitoring program. Observations have been made of patches of algal growth but at no time has it been characterized as extensive algal growth. At no times has staff seen the river with a green hue to the water column or where a significant portion of the substrate was covered with algae.

Subsequent to the public hearing on March 28, staff visited the Rush again to verify its previous observations and those made by the commenter. Patches of algal growth were again seen but as in the past they were infrequent and widely dispersed. Only one area of excessive growth was observed and it was not in the river itself but in a drainage area entering the river from a farm just upriver of the proposed discharge point. Staff continues to believe that despite these small patches of algal growth the Rush River has water quality above the standards. This free flowing stream, with a fairly steep slope, is not going to be subject to unusual diurnal variations which would require the application of a more sophisticated water quality model.

- *The DO model should not have been used because the permittee is proposing a sequence batch reactor (SBR) for treatment and thus the facility will likely discharge in batches and the model assumes a continuous discharge*

Staff Response –

In general permits are rarely prepared in relationship to the proposed treatment type because often the treatment proposed is not what is actually constructed. Permits are instead issued to meet the water quality standards of the receiving stream and only then does a permittee make a final decision on what level and type of treatment is needed.

Should the permit be issued and the Town construct an SBR facility, its size it would not preclude the possibility of a continuous discharge. Should the facility discharge in a non-continuous mode, it does not make the results of the model useless. The scenario raised in this comment is not unique and has occurred, wherever a discharge assumed to be continuous was in fact non-continuous.

The model does assume steady-state conditions, one of which is a continuous discharge. If the facility does discharge in batch mode, staff remains confident that the limits determined using the model will still protect the water quality standards of the Rush River. There are no readily available and practical models for staff to use to model batch discharges. Instead staff uses its collective experience and best professional judgment to determine effluent limits. Part of that process is to use the steady state DO model available to staff since it uses an inherent conservative factor when assuming a continuous discharge. By assuming a steady state continuous discharge, the criteria used to assess the effluent is the daily average DO minimum of 5.0mg/l. For batch discharges, the daily DO minimum value of 4.0 mg/l could be used and thereby allow the discharge to actually contain higher levels of BOD and TKN.

In other permits where staff did not feel the DO model could be used, staff used its professional judgment and assigned BOD limits of 10 mg/l and TKN limits of 3.0 mg/l. This has proven to be a sound decision. In this case staff has assigned BOD limits of 12 mg/l and TKN of 5.0 mg/l based on the DO model and also assigned a TN of 8.0 mg/l and a TP limit of 1.0 mg/l. Taken in total, staff believes these are more stringent

than the professional judgment limits and will protect the river even if the facility discharges in a batch mode.

- *Daily maximum limits - The limits in the permit should include a daily maximum in addition to monthly average and weekly averages. Without daily maximums, the effluent quality can fluctuate considerably higher without it being considered a permit violation and would result in discharge levels that are not protective of the river.*

Staff Response –

The permit regulation at 9 VAC 25-31-230.D.2 requires effluent limits for publicly owned sewage treatment plants (POTW) to be both monthly average and weekly averages; the proposed facility is a POTW. It does not preclude the inclusion of daily maximum limits. For facilities such as STPs, DEQ does not include daily maximum averages for several reasons. First, the effluent quality from a STP facility is consistent and does not vary much from day to day. Second, the sampling frequency of once per week in the draft permit has the same effect of a daily maximum limit; each sampling event is compared to the limit. Third, the averaging periods for the limits in the permit are appropriate and adequate for protection of the water quality criteria they seek to protect. This approach has been successfully applied in Virginia for over 30 years, is approved by EPA Region III and is also used in other EPA Region III states and experience shows that it is protective of water quality.

- *DO model reaeration rate - The reaeration rate used in the model is too high and an overestimate of the rate of natural reaeration and thereby yields BOD and TKN limits too high.*

Staff Response –

The coefficients and formulas in the model were studied and selected from a project commissioned by the State Water Control Board in the 1980s. The reaeration rate in the DO model is calculated based on the slope of the river. The calculation is based on a formula taken from the literature in which many reaeration formulas were evaluated. Compared to the literature the reaeration rate calculated for this permit process is not excessive and all of the various model reaction rates taken in total result in very conservative effluent limitations..

- *DO model and percent pool-riffle zone - The river is a pool-riffle system that would yield variable reaeration rates with the pools having lower reaeration rates.*

Staff Response –

Staff agrees with the comment. In setting the model parameters staff estimated the pool-to-riffle ratio to be 30% riffle and 70% pool.

- *DO model and sediment oxygen demand - The DO model should use a sediment oxygen demand of trace to light instead none as was used in the model for the draft permit.*

Staff Response –

Staff disagrees. As stated above staff's opinion is that the river is not experiencing excessive algal growth and the rocks and substrate were clear of decaying organic matter. The selection "none" for sludge deposits in the model for the purpose of sediment oxygen demand is appropriate for a stream close to the mountains like the Rush River.

- *DO model and loadings - The model as designed would allow for more loadings as the effluent discharge increased and that is not logical.*

Staff Response –

Staff disagrees. It is logical that as a stream's assimilative capacity is dependent on flow. Higher flows, whether from streams or discharges, are capable of assimilating higher loads. As mentioned several times above, the effluent limits are designed to protect the water quality standards upon discharge.

- *TKN limits not protective of ammonia criteria - The proposed TKN limits are not protective of the calculated chronic ammonia criteria of 2.2 mg/l listed in the Fact Sheet.*

Staff Response –

The TKN limit of 5 mg/l is protective of the ammonia criteria. TKN consists of Organic-N and Ammonia-N. In order to meet the TKN limit of 5 mg/l as well as the Total Nitrogen limit of 8 mg/l, the proposed facility will be required to nitrify (convert Ammonia-N to Nitrate) year round, removing virtually all of the Ammonia-N. Wastewater treatment plants that fully nitrify typically have effluent Ammonia-N levels well below 1 mg/l, especially during the critical warm weather/low flow conditions on which the 2.2 mg/l Ammonia criterion is based.

6. *Discharge Alternatives - The SWCB should require the Town to further study the extent of failing drainfields and encourage non-discharging alternatives such as recycling and reuse of wastewaters, discharges to mass drainfields and land application and should require an analysis of such alternatives prior to issuing a VPDES permit.*

Staff Response –

The VPDES regulation does not require an applicant to evaluate alternative systems prior to applying for a VPDES Permit or justify the need for the permit. Nonetheless, the Town has conducted studies of alternative systems and reached the conclusion that a discharging system is in the Town's best interest.

Staff does encourage and offer suggestions to applicants to reuse their effluent as part of our pollution prevention initiatives. The new regulations capping nutrient loadings in the Chesapeake Bay very much encourage alternatives to discharging the effluent and it is likely the applicant will strongly consider such alternatives as a means to minimize the amount of nutrients they discharge. Finally, DEQ is in the process of developing regulations that will encourage and govern the reuse of wastewaters. We anticipate these regulations should be drafted and ready for public notice by the end of 2006.

7. *Attainment of bacteria criteria – Numerous comments were received concerning the current non attainment status of the Rush River due to bacterial contamination, whether or not the proposed discharge would make conditions worse and whether the permit could be issued prior to development of a TMDL that looked at all the possible cleanup options.*

Staff Response –

The river has been identified as impaired because of bacterial concentrations. The source of the contamination has not been identified. A TMDL is scheduled for 2014. It is likely that there are multiple sources of bacteria causing the impairment and the TMDL will provide the prescription for the cleanup. It should be noted that wildlife can be the source of bacterial contamination and as such staff did not use the impairment designation when deciding it was of Tier II status for the purpose of determining effluent limits.

The E. coli criterion is concentration based and set at a level deemed protective of primary contact, such as needed for a public swimming beach. The draft permit sets the E. coli effluent limit equal to the water quality criterion and is not dependent on dilution from the receiving stream. As such the effluent can neither cause nor contribute to the problem. The limits in the draft permit are prepared in the same manner in which wasteload allocations (WLA) are prepared for all bacterial TMDLs in Virginia.

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8. *Errors in Fact Sheet Attachment - Attachment D of the Fact Sheet for the draft permit contains two errors, the answers for Section 2B question 6 and question 8c are incorrect.*

Staff Response –

We believe the comment concerns Attachment 10, EPA Checklist, since there is no Attachment D. The comment is correct, the answers to those questions are wrong. Question 6 asks if the permit allows new discharges and loadings of pollutants and question 8 asks if the proposed discharge will include a pollutant on the 303(d) list. The answer to both questions should be yes since the discharge will include bacteria.

These mistakes have no consequence on the draft permit.

9. *DO antidegradation violation - The permit would allow the DO to drop from 7.338 mg/l to 5.834 mg/l a significant drop and violation of DEQ's antidegradation practices.*

Staff Response –

7.338 mg/l is the DO level that would be assumed to be in the stream were there any flow under 7Q10 conditions. As modeled, the stream has no background flow and the draft minimum DO limit of 6.0 mg/l exceeds the daily average water quality criterion of 5.0 mg/l and will maintain a high quality receiving stream. However, compliance with a higher DO limit with the level of treatment required by this permit is a relatively minor proposition and the staff recommends raising the effluent DO limitation to 7.3 mg/l to ensure that no more than a 0.2 mg/l drop in DO occurs under any stream flow condition.

10. *TKN antidegradation violation - The draft permit would allow TKN to exceed background concentrations of the river.*

Staff Response –

There are no water quality criteria for TKN in the water quality standards. It naturally occurs in ambient waters and is not a parameter used for assessing water quality; DEQ does not include it in its ambient monitoring and assessment program. TKN limits are placed on effluent limits because the ammonia fraction of it can contribute to DO depletion and the TKN limit is established so that there is no significant DO depletion in the stream.

11. *Instream monitoring - The permit should require instream monitoring above and below the point of discharge.*

Staff Response –

Staff does not believe instream monitoring is warranted. In total, the limits in this permit are more stringent than what has been required in the past from similar sized discharges and receiving streams. The inclusion of nitrogen and phosphorus limits in the draft permit will require the permittee to achieve an effluent quality better than what has historically been required of similar sized STPs discharging to zero flows streams. The limits in the permits for those discharges have not compromised the water quality standards of their receiving streams.

For example, the Sperryville STP, which is close to the Town of Washington, is the same size as the proposed STP, discharges to a similar sized river, has BOD and TSS of 30mg/l and no nutrient limits, has not caused any known impacts to the receiving stream. It went on line around 1985 to correct the problems caused by failing septic systems in Sperryville and the poor quality of the Thornton River. The river now has much better water quality than it did prior to the STP.

However, because of the great level of interest and concern for the Rush River expressed by many citizens, staff will recommend that an instream monitoring special condition be included in the draft permit so as to provide added assurance that the discharge will not impact the water quality standards of the river.

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12. *Limit of technology limitations* – Comments were submitted indicating that CBOD, TKN, Total Nitrogen and Total Phosphorus limits should be set at limits of technology.

Staff Response –

There is no requirement that effluent limits meet the limits of technology. The VPDES permit regulation does require permits limits protective of the water quality criteria which the proposed permit accomplishes. The nutrient limits in the draft permit are based on the new regulation 9 VAC 25-40-70.A.3.a, *Regulation for Nutrient Enriched Waters and Discharges within the Chesapeake Bay Watershed*. This regulation became effective in August 2005. The Town prepared a preliminary engineering report (PER) a year earlier when the draft language for 9 VAC 25-40 would have required the facility to meet limits of technology for Total Nitrogen (3.0 mg/l) and a Total Phosphorus (0.3 mg/l). The Town prepared the PER in anticipation of the regulation being adopted accordingly and they did not anticipate a less stringent requirement. Staff prepared the permit in accordance with the regulation. Should the permit be issued it is the Town's prerogative whether or not to design to meet the more stringent nutrient concentrations. In accordance with 9 VAC 25-40-70, the VPDES permit limits may be modified in the future to match whatever nutrient removal technology is eventually installed.

13. *Nutrient offset* - Specific nutrient offsets should be placed in the permit and should apply to the segment of the Rush River receiving the discharge, the special condition does not give the public a chance to comment on the proposed offsets, and no credit should be allowed for the failing septic systems.

Staff Response –

DEQ is currently developing a new regulation, *General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia* 9VAC25-820, that will require facilities such as the proposed STP to obtain a general permit that addresses nutrient loadings; the draft regulation is currently open for public comment and all are invited to comment. The regulation and general permit will govern allowable offsets. What offsets are allowed will be decided with the development of the new regulation. The regulation will be effective by the end of the year, well before the Town can begin construction of a new STP.

The draft permit requires offsets in accordance with 62.1-44.19:12-19 of the State Water Control Law and regulations. Offsets are required to be submitted to DEQ for approval prior to issuance of the CTO and must be in the Rappahannock River Watershed and must not contribute to water quality effects locally, downstream, or in the Chesapeake Bay that violate water quality standards. In addition, pursuant to 62.1-44.19:12-19, offsets must be reported annually and the permittee must provide confirmation of availability of offsets for the coming year. In the event that the Town of Washington offsets their nutrient discharge by acquiring credits from other point sources operating under the watershed general permit, then those trades will be made available for public review although there will be no opportunity for a formal public comment period. Should the Town choose to offset their nutrient loads by arranging for other nonpoint source improvements such as the removal of failing septic systems or the installation of agricultural BMP's, then those offsets will be added to the individual VPDES permits as enforceable requirements. Such offsets being included in the individual VPDES permit will be subject to public comment. Repair of failing septic systems would be considered to be a "baseline" requirement under the Chesapeake Bay Tributary Strategies and thus not eligible for the generation of nutrient removal credits. However reduction of the load associated with a properly functioning septic system would be eligible.

14. *Atypical influent* - The wastewater going to the proposed STP will not be typical of a residential community because a hotel and several Bed & Breakfast establishments in the Town and the permit limits should be reflective of this. The permit should require oil and grease traps to protect the STP. The draft permit also does not consider the proportion of commercial to residential flows.

Staff Response –

The wastewater from hotels and B&Bs are considered domestic wastewaters with pollutant characteristics similar to household wastewater and are covered by the effluent parameters in the draft permit. The requirement for the installation of grease traps at local establishments is a matter for the Town to decide as part of its sewer use ordinance. Should the permit be issued, the Town will have to submit plans and specifications per the Sewage Treatment and Collection Regulation for approval and they can address the matter as part of that process. There are no industrial discharges expected to contribute to the influent.

15. *UV disinfection - The permit should require UV disinfection with chlorine as a backup.*

Staff Response –

The permit is drafted to cover both chlorination and UV disinfection methods. In so doing this leaves the Town some flexibility when it prepares its plans and specifications for the facility. Further it keeps staff from having to modify the permit if the Town ultimately chooses the opposite method.

16. *Failing septic systems - Proper documentation of failing septic systems is needed before it is concluded a STP and stream discharge is warranted. Furthermore, it is not plausible that the section of the Rush River at the proposed discharge location is caused by failing septic systems in the Town. There are two intermittent streams on either side of the Town that intercept the flows from the drainfields and these streams connect to the Rush downstream of the proposed discharge location and impairment.*

Staff Response –

The VPDES permit regulation does not require an applicant to demonstrate need or cause as part of a permit application. Whether or not the Town has a septic drainfield problem the Town has the right to submit a permit application. No other permittee has been required to submit an analysis of alternatives.

Nonetheless, the Town Mayor and Town Council members have detailed their efforts over the past ten years in studying possible solutions to the septic system problems at the Town. The stated the Town has spent about \$250,000 in studying various alternatives including mass drainfields, drip irrigation, piping the effluent to the Sperryville STP, and discharge to the Rush River. The first step in considering the option of discharging to the Rush River is a permit application.

The comment also assumes that the only means by which untreated sewage from the Town reaches the Rush River is from surface water courses. It is reasonable to assume that contaminated ground water from the failed drainfields also reaches the Rush River given the close proximity of the Town to the river and that the Town is about 50ft above the river. During the public hearing, testimony was given that some of the homes in the Town discharge their wastes to abandoned wells, that the ground water is contaminated, and the Town had to construct a water supply system several years ago because of contaminated ground water. Further, preliminary testing of E. coli samples indicates that the origin is in part traceable to human waste.

Finally, the untreated sewage that enters the two streams adjacent to the Town does eventually reach the Rush River. Regardless of what section of the river is impacted, the elimination of the failed drain fields can only have a positive effect on the Rush River.

17. *Waste assimilation capacity - In the proposed permit the capacity of the river is not first determined for any parameter, as is required by the TMDL regulations for impaired stream segments. The limits are based more on what appears the proposed STP can meet rather than the specific needs of the river for protection.*

Staff Response –

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The Rush River is included on the 303(d) list because of violations of the Fecal Coliform criterion which is being replaced by the new criterion for E. Coli. The effluent limitations in the proposed permit are drafted in accordance with 9 VAC 25-260-170.B. which requires that the water quality criterion for E. Coli be met in the discharge. As the effluent itself is required to meet the stream criterion, no credit is given for any assimilative capacity in the receiving stream and the effluent can neither cause nor contribute to additional water quality violations. This approach is consistent with the point source wasteload allocations for E. Coli developed in all of the TMDL's performed to date.

18. *DO limit is arbitrary - The DO limit appears to be arbitrarily set without consideration of stream conditions. Further, DO limit does not take into consideration that the Rush River, further upstream of the discharge point, is listed as a trout stream.*

Staff Response –

The DO criterion for the Rush River at the point of discharge is 5.0 mg/l daily average and 4.0 mg/l instantaneous minimum. Rush River is not a trout stream at the point of discharge. That portion designated as a trout stream is further upriver and a mountainous stream with a steeper slope. Staff is recommending that the effluent DO limit be raised in response to antidegradation concerns raised by the public. The proposed minimum limit of 7.3 mg/l exceeds the DO criteria for both stockable and natural trout waters.

19. *Nutrient limits are not protective of river - The Rush River has excessive algal growth and the TN and TP limits in the draft permit do not appear to have any relationship for the protection of the Rush River or what can be achieved by available technology and do not address the narrative standards for the Rush River per 40CFR122.44.*

Staff Response –

Having made numerous inspections of the Rush River, staff does not agree with the comment that there is excessive algal growth.

The nutrient effluent concentration limits and the zero net loading requirements in the draft permit are based on the 2005 amendments to the State Water Control Law and 9 VAC-25-40 *Regulation for Nutrient Enriched Waters and Discharges within the Chesapeake Bay Watershed*. While these limits and requirements are premised on the protection of the Chesapeake Bay, it is intuitive that they will also benefit the immediate receiving streams. They are in fact more stringent than those established for the protection of nutrient enriched waters located outside of the Bay watershed and more stringent limitations are not believed to be necessary to address the narrative standards in the Rush River.

20. *Application of Nutrient Policy - Nutrient monthly average limits of 2 mg/l and 10 mg/l for Total Phosphorus and Total Nitrogen respectively are required by 9 VAC25-40-30.*

Staff Response –

Section 9 VAC25-40-30 of the Nutrient Policy (*Regulation for Nutrient Enriched Waters and Discharges within the Chesapeake Bay Watershed*) applies to waters outside of the Chesapeake Bay watershed that have been designated as nutrient enriched. The Rush River is in the Chesapeake Bay watershed and has not been designated as nutrient enriched. The proposed permit includes yearly average nutrient limits of 1.0 mg/l Total Phosphorus and 8 mg/l Total Nitrogen in accordance with the 9 VAC 25-40-70.

21. *QL for TRC is too high - The total residual chlorine limit needs to be a daily maximum limit and the QL of 0.10mg/l is too high and should be reduced to a value between 0.001 to 0.05 mg/l.*

Staff Response -

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The permit regulation at 9 VAC 25-31-230.D.2 requires effluent limits for publicly owned sewage treatment plants (POTW) to be both monthly average and weekly averages; the proposed facility is a POTW. It does not preclude the inclusion of daily maximum limits but DEQ has not found a need for a daily maximum limit for chlorine.

The removal of free or residual chlorine is an instantaneous and complete reaction and if a facility were to violate a limit it would be for failure to provide dechlorinating agents at all. The resulting residual chlorine concentration would be well above the QL of 0.1 mg/l. If any one of the seven samples taken in a week were to show a detectable level, it would not be possible to average the detectable level below the weekly average limit. In effect, the weekly average limit is equivalent to a daily maximum limit.

DEQ continues to use a QL of 0.1mg/l because it allows facility operators to conduct the test instantaneously at the outfall without having to transport a sample back to the laboratory whereby chlorine could dissipate to yielding a lower concentration.

22. *E. coli limit is too high* - *The E. coli limit is set equal to the criterion but should be set lower to address the TMDL regulatory requirement of including a margin of safety.*

Staff Response –

By setting the effluent limitation at the criterion level, the effluent can neither cause nor contribute to excursions of the standard. There is no credit given for additional waste assimilation in the stream. Margins of safety are added to TMDLs to account for the uncertainty in predicting load allocations associated with non-point sources of pollution. With daily testing of the effluent as required by the permit, the level of uncertainty associated with the effluent quality is low. The proposed E. coli limit is consistent with the pointsource wasteload allocations established in all the TMDL's Virginia has performed to date.

23. *Permit does not address regulation* - *The draft permit does not address 40CFR 122.4(i) which prohibits permitting of a new discharge if the discharge will cause or contribute to the violation of water quality standards. And since the river is impaired for E. coli, the monthly average limit, absent a single sample maximum, will cause the discharge to contribute to the impairment.*

Staff Response –

As stated above, by setting the permit limits equal to the criterion, it is not possible for the discharge to cause or contribute to the impairment and the intent of 40 CFR122.4(i) is met. Because the criterion is concentration based, the fact that the discharge is adding additional bacteria to the Rush River does not mean the standards are violated. And since the effluent is at the criterion it will cause the concentration of bacteria in the river to decrease when upstream levels exceed the criterion.

With regards to monthly vs. single sample maximum limits, the Water Quality Standards contain both a geometric mean and single sample maximum numerical criteria for E. coli. However, only one of the two values, not both, is to be used for any given situation depending on the sample frequency of the water being tested. The single sample maximum is a value equivalent to the geometric mean with a statistical confidence level that is to be applied when only a single sample is used to characterize a water body. DEQ typically uses this value to characterize ambient waters where it is only possible to sample at a frequency of once per month or less. It is possible and preferable to sample sewage effluent at a more frequent basis, several times per month, and as such the geometric mean value listed in the water quality standards is the appropriate value to use.

24. *MBAS limits* - *The permit should contain limits for MBAS (soaps) and oil and grease because of the volume of laundry wastewater to the proposed plant.*

Staff Response –

DEQ does not believe the influent from the Town of Washington will be significantly different than other localities with hotels and restaurants. In the oversight of all these other STPs, DEQ does not have evidence to suggest that soaps and oil and grease need to be monitored and limited in the effluent. The permit does prohibit the discharge of effluent with floating solids or foam in other than trace amounts, one of the chief reason to monitor for soaps.

25. *Chlorophyll a monitoring - The permit should contain chlorophyll a monitoring and limits because of the algal problems in the river.*

Staff Response –

First, staff does not concur with the assertion that the river has algal problems. Second, requiring the applicant to monitor for chlorophyll a in the river serves little purpose since the Rush River does receive runoff from pasture land with cows present above and below the proposed discharge point. The permittee has no control over the impact caused from this agricultural source and other non-point sources to the river and it would be problematic in developing a cause and effect relationship.

26. *Monitoring frequency - The permit should require the monitoring of BOD, TSS, nutrients, and bacteria at a frequency of a minimum of three times per week instead of once per week or once per month.*

Staff Response –

In preparing permits, DEQ has the responsibilities of setting conditions that are fair, equitable, and warranted. The monitoring frequencies in this draft permit are consistent with those for similar sized facilities throughout the state. These frequencies have been shown to be adequate to determine compliance with the effluent limitations set forth in the permit. Staff does not see any justification to require this permittee to monitor the effluent at frequencies different than similar sized STPs.

27. *Antidegradation policy - The state does not appear to have an antidegradation policy that follows the provisions of the state and federal regulations.*

Staff Response –

Virginia's antidegradation policy is outlined in Guidance Memo 00-2011. It was approved by USEPA and has been in practice for VPDES permits for over 10 years.

28. *Permit conditions and permit limits are not protective of Rush River – Some citizens expressed in general terms that the draft permit and the limits contained in the permit are not protective of the Rush River.*

Staff Response:

It is DEQ's practice to prepare the permit conditions such that even under extreme conditions the water quality standards of the receiving stream are protected. This approach has been successful in regulating plants throughout Virginia, many of which are much larger than the proposed plant. This particular draft permit has effluent conditions more stringent than what is typically placed in permits. Staff rated the stream high quality (Tier 2) to provide even greater protection in modeling the DO and determining effluent limits. For these reasons staff believes the conditions and terms of the draft permit are protective and that any additional monitoring than what is already in the draft permit is not warranted.

29. *Impacts to stream, aquatic life, water quality – Some citizens were concerned with the impacts that the wastewater discharge will have on the Rush River and its water quality as well as impacts to aquatic life.*

Staff Response:

By basing the permit conditions under worse case conditions, staff is confident that all of the beneficial uses defined in the Water Quality Standards for the Rush River will be protected. Beneficial uses include the protection of the indigenous aquatic life, recreational uses such as swimming and fishing, and off stream uses such as irrigation. In addition to these requirements, the draft permit contains Total Nitrogen and Total Phosphorus limitations designed to protect the Chesapeake Bay.

30. *Impacts to quality of life, recreational uses* – Some citizens were concerned with the impacts that the discharge would have on the quality of life and recreational uses.

Staff Response:

In accordance with the Water Quality Standards, the draft permit contains requirements to protect all the beneficial uses of the river and in particular, human health. The effluent is required to be disinfected to a level that allows primary contact (swimming) in the river even under drought conditions when the only water in the river is that from the plant. There are hundreds of sewage treatment plants discharging in Virginia, most with permit conditions less stringent than those in this permit, and it has been the experience of DEQ and VDH that these discharges are protective of public health.

31. *Long-term protection and Tier III designation of the Rush River* – Some citizens were concerned with the long-term protection from new point source pollution, long-term protection of the health of the Rush River and preservation of the Rush River for designation as a Tier III water.

Staff Response:

The drafting of VPDES permits and the nomination and designation of State Waters as Exceptional (Tier 3) Waters are two distinct processes. The presence of a discharge to a water body does not preclude its ability to be nominated and designated as exceptional (Tier 3).

Permits are issued on five-year cycles. During the reissuance process DEQ will review the application for accuracy and completeness and look to see if there have been any changes to the facility since the permit was last issued which may change the permit limits and conditions. DEQ will also perform a site visit to confirm any changes. In addition, any changes to permit regulations or any new requirements will be incorporated into the reissuance as appropriate to ensure the permit meets all regulations and requirements.

32. *Population growth and property values* – Some citizens were concerned with unwanted population growth and property values.

Staff Response:

These matters are outside the realm of the VPDES Permit Regulation and not relevant to the issuance of the permit. The Permit Regulation does not authorize staff to assess or account for impacts other than water quality. Nonetheless, it should be noted that the permit does not convey any rights and nor does it exempt the applicant from local ordinances and requirements.

The permit protects all beneficial uses of the receiving stream, including human health criteria. As such, in accordance with the Water Quality Standards, the permit protects public health, aquatic life, and recreational uses of the Rush River and water quality should not be a basis for reduced property values.

33. *Permit to pollute* – Some citizens were concerned that the permit is a permit to pollute.

Staff Response:

VPDES permits do authorize the discharge of pollutants per the Clean Water Act and the State Water Control Law. Permits are prepared to assure that the discharge does not impair the beneficial uses of the receiving stream.

34. *Impacts from gases/odors/chemical irritants/pharmaceuticals* – Some citizens were concerned that the WWTP would discharge gases, chemical irritants and odors in its process. In addition the citizens were concerned about the potential for the discharge to contain pharmaceuticals.

Staff Response:

The facility must be operated in accordance with both the permit regulation and the Sewage Collection and Treatment regulation; both regulations require an operation and maintenance manual that addresses specifics of the facility and compliance with the regulations. The manual is required for the operation of the treatment system as well as routine preventive maintenance requirements to ensure compliance with the practices and procedures of the permit. Part of these requirements is the control of odors.

The presence of pharmaceuticals in treated effluent is an emerging issue. The USEPA and DEQ have yet to determine if and how to handle pharmaceutical byproducts in treated effluent. It is well recognized that there are pharmaceuticals in treated effluents and these may affect some aquatic communities. This is an emerging issue that is being studied on a national level. Given the number of failing septic systems in the Town of Washington, there is a strong possibility that the Rush River currently carries trace amounts of pharmaceuticals.

35. *WWTP operation and maintenance* – Some citizens were concerned with the ongoing operations and maintenance of the WWTP.

Staff Response:

The permit requires a Class III licensed operator and a Class II reliability rating. In addition, an operation and maintenance manual is required and is an enforceable part of the permit. The facility must be operated in accordance with the manual.

36. *Endangered species* - DEQ should see if the Rush River has threatened and endangered species before issuing the permit.

Staff Response –

Staff did check the Virginia Department of Game and Inland Fisheries database of threatened and endangered species. No species were listed for the Rush River.

37. *Failing septic systems and impacts of raw sewage* – Many citizens expressed concern over the health and public safety of the citizens of the Town as well as odors from the failing septic systems, the impact they are having on surface and ground water quality, and that the STP will only protect the Rush River as the Sperryville STP has protected and improved the Thornton River. These citizens also believed the Town has adequately studied the extent of the problem, solutions, and alternatives to a discharge.

Staff Response:

There are no specific permit issues for staff to address in this comment. Staff concurs that the current situation in the Town is a threat to public health and that the failing septic systems do impact water quality. Further, staff does believe the Town has studied the extent of the problem and possible alternatives.