



City of Harrisonburg, Virginia

Water and Sewer Operations Center

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December 15, 2015

Mr. Brian McGurk

Office of Water Supply

Virginia Department of Environmental Quality

P.O. Box 1105

Richmond, Virginia 23218

RE: City of Harrisonburg Water Withdrawal Permit for South Fork Shenandoah River No. 98-1672

Brian:

Thank you for the initial opportunity to review the pre-draft concepts that you are considering in the reissuance of the City of Harrisonburg's South Fork Shenandoah River Water Withdrawal Permit. Following my opportunity to undertake additional review of the referenced concepts, I am offering the following responses:

- **Maximum annual withdrawal for all three intakes: 3125 MG (8.54 MGD)**

Harrisonburg's plan for ultimate resource management is to assure that our agenda is acceptable long term from the triple bottom line perspectives (environmental, social and economical) regardless of the rate of growth or the period for which this permit will be written. As such, I am requesting the "Combined Maximum Annual Withdrawal" requirement be deleted in recognition of the "Single Maximum Daily Withdrawal" limit as you have provided and denoted under bullet 2 as follows. I understand that this annual requirement takes focus to define the expectations of the City's withdrawal during the period of the permit; however as noted, the City's perspective is much broader such to 1) provide service to its defined geographical service boundaries given a fully defined water use forecast and 2) to underlie foundation to a 30 year term bond funding arrangement

In summary, the referenced requirement adds potential for an undesirable application process to modify the permit if actual growth rate exceeds the permit growth rate forecast; this is certainly possible with Harrisonburg's industrial opportunities. Other concerns include the incompatibility of the shorter term permit privileges versus the longer term goals that the City pursues in both the funding rationale and land use planning. Elimination of the annual requirement will remove these concerns and default to the "Maximum Daily Withdrawal", thus allowing the City to grow to its potential, independent of growth rate, to the limits as established in the permit.

- **Maximum daily withdrawal from all three intakes combined: 15.03 MGD**

We have recently updated build-out projections based on FY2015 water usage and land development. In substitute of the original 15.03 MGD limit, I am requesting the total limit to be revised to **15.30 MGD**. I will be happy to provide to you the actual data and detailed calculations if requested. An overview of our forecast is as follows:

Raw Water Supply = (Existing Water Usage + Future Water Usage + Process Water + Water Loss) * PF

Existing Water Usage = Water Sales determined from the Harrisonburg Billing Office (**5.60 MGD**)

Future Water Usage = Undeveloped Land x Zoning Density Criteria x VDH Per Capita Criteria (**5.01 MGD**) plus the addition of contract obligations to Rockingham County and several private individuals

Process Water is WTP backwash water @ 0.023 MG per 1.0 MG treated: (**0.27 MGD**)

Water Loss = Raw Water – Sales – Process Water (**1.0 MGD**) = **9.1% loss**

PF = **1.29** based on ratio maximum two week raw water withdrawal to average annual daily water treated (two week period is cycle duration for replenish of distribution storage)

- **Maximum daily withdrawal from South Fork 9.5 MGD**
- **Maximum daily withdrawal from North River 7.6 MGD**
- **Maximum daily withdrawal from Dry River 4.0 MGD**

I am requesting that all limitations under this bullet be removed from the permit. Control of total withdrawal based on usage justification is already provided in the “Maximum Daily Withdrawal for All Three Intakes” as noted in the previous bullet. Protection of the stream is provided in the bullets that establish withdrawal allowance based on in-stream conditions; they follow below. These individual limitations place significant limitation on the City during periods when adequate water supply is available from each source. For example:

- 1) We intend to minimize our carbon footprint, maximize the quality of water to our customers, and provide environmental enhancements by utilizing Dry River to the fullest extent. We have constructed a 1.5 billion gallon impoundment on The Dry River source which DEQ has determined to have a safe yield of 8.3 MGD at continuous outfall. From the reserve storage in this impoundment we can release water into a 5 mile stretch of Dry River such to make it much more environmentally attractive while simultaneously feeding our intake at the lower reach. In addition, we have completed 18,147 of 55,000 feet (33%) of waterline construction that upon completion will allow us to deliver 13.5 MGD from the Dry River Source when the water is available. For perspective, our investigation of the gage station flows on the Dry River during the 1944 drought year suggested that the in stream flow exceeded 13.5 MGD on 143 days; we infer that this availability can be enhanced with controlled augmentation from our impounded reserves as noted.

2) In the event of contamination to any of our sources, each individual restriction as proposed will without purpose limit our mitigation opportunities to use the other sources.

- **Withdrawal from South Fork must not exceed 10% of estimated Stream Flow.**
- **Withdrawal from North River must not exceed 15% of estimated Stream Flow.**
- **Withdrawal from Dry River intake must allow a minimum flow-by of 0.5 MGD (0.744 cfs) past the intake whenever the water level of Switzer is at or above 2240ft NGVD**

The following table underscores the impact of the proposed requirements in comparison to the conditions that were issued in the original South Fork permit; the latter became the basis of our submitted Water Supply Plan. The significant importance is that we will be 6.8 MGD in deficit of needed water supply when the rivers simultaneously reach their recorded low flow.

Considering the 5 percentile level, we will be 3.3 MGD in deficit of needed water supply. This assumes that you have removed the “Maximum Daily Withdrawal” restrictions cited above.

Source	Original Permit	Permit at Min Flow	Permit at 5 Percentile
Dry River	1.0	1.0	1.0
North River	5.7	2.1	4.3
South Fork	8.0	5.4	11.3
Other	0.6	6.8	3.3
Total	15.3	15.3	15.3

North River at Burketown Station: Minimum = 22.0 cfs = 14.2 MGD; 15% withdrawal is 2.1 MGD.

North River at Burketown Station: 5 Percentile = 44.0 cfs = 28.4 MGD; 15% withdrawal is 4.3 MGD.

South Fork at Lynwood Gage Station: Minimum = 84.0 cfs = 54.3 MGD ; 10% withdrawal is 5.4 MGD.

South Fork at Lynwood Gage Station: 5 Percentile is 174.0 cfs = 112.5 MGD; 10% withdrawal is 11.3 MGD

I am requesting that the in-stream conditions be revised as follows:

- 1) “Maximum Daily Net Withdrawal from South Fork must not exceed 10% of the flow recorded at the Lynwood Gage Station; “Net Withdrawal” is equal to the amount water withdrawn at the intake less the amount of water returned upstream (HRRSA plus at VPGA at Hinton). I will be happy to provide to you the data for determination that our lowest daily return rate on record was 70%, thus only 30% of our withdrawal should be recognized.

2) “Maximum Daily Withdrawal from North River must not exceed 15% of the flow recorded at the Burketown Gage Station”

With the changes requested, we would be permitted and obligated to a more significant dependence on the South Fork to sustain our drought plan. See table below:

Source	Original Permit	Permit at Min Flow	Permit at 5 Percentile
Dry River	1.0	1.0	1.0
North River	5.7	2.1	4.3
South Fork	8.0	12.2	10.0
Other	0.6	0.0	0.0
Total	15.3	15.3	15.3

A withdrawal from the South Fork at 12.2 MGD at a recognized recycle rate of 70% will be “Net Withdrawal” of 3.66 MGD which is 6.7 % of the absolute low flow on record. This assures the City of its needed raw water supply while removing no more than 10% from the stream.

I am also requesting understanding to the inclusion of the reference to water level criteria in Switzer: “Maximum Daily Withdrawal from Dry River intake must allow a minimum flow-by of 0.5 MGD (0.744 cfs) past the intake whenever *the water level of Switzer is at or above 2240ft NGVD*. This is just a question of understanding on my part.

Thanks again for your assistance, let's discuss my recommendations at your earliest convenience

Cordially

Mike Collins

Copy: Kurt Hodgen, Anne Lewis