To: Healthcare and Regulatory Subcommittee of Legislative Oversight Committee

From: David Baize, Chief, Bureau of Water

Date: February 22, 2017

RE: Legislative Oversight Study of the Department of Health and Environment Control, Department responses to written questions submitted during public testimony

LOC Question and Response

Mr. Busbee asked the LOC to review implementation of the definition of "safe yield" in the *Surface Water Withdrawal, Permitting and Reporting Act* and the Department's regulatory implementation of this definition.

The Department follows the directives adopted by the SC General Assembly outlined in the Act, and the regulation promulgated in accordance with the Act, in issuing permits and registrations for withdrawal of surface water.

49-4-20(25) of the Act defines "safe yield" as: "the amount of water available for withdrawal from a particular surface water source in excess of the minimum instream flow or minimum water level for that surface water source. Safe yield is determined by comparing the natural and artificial replenishment of the surface water to the existing or planned consumptive and nonconsumptive uses."

This definition is general and is not directly implementable without further detail since there is no formula or mathematical process outlined in the Act to calculate safe yield.

Regulation 61-119 was promulgated with robust stakeholder involvement, and the definition of "Safe Yield" was specifically a point of much discussion. R.61-119.E.3.C.3.ii.(A) states: "The safe yield at the point of withdrawal will be evaluated as follows. For withdrawals in a stream segment not influenced by a licensed or otherwise flow controlled impoundment, the safe yield is calculated as the difference between the mean annual daily flow and twenty (20) percent of mean annual daily flow at the withdrawal point, taking into consideration natural and artificial replenishment of the surface water and affected downstream withdrawals."

The Department's procedure adheres to the regulatory definition. The average annual daily flow for the proposed withdrawal point is calculated minus the 20% average annual flow. That number is then adjusted, if necessary, to account for any upstream withdrawals, inflows, and needed water for downstream water users to calculate the final "safe yield."

Any changes to the regulatory mandated calculation of safe yield would require a statute or regulation amendment.

Written Questions Submitted by Mr. Busbee

1. Who in SC State Government coined the phrase "Safe Yield"?

   No one in state government coined this term. There was a very large and robust stakeholder process to develop the statute. Safe yield is a calculation typically applied to a reservoir, but the stakeholders adopted this term and it was subsequently applied to flowing surface water.

   The term "safe yield," in the case of flowing surface water, may more easily thought of as "legally available water." The term legally available water is being used by the consulting firm CDM Smith in the surface water basin models currently being developed. This is appropriate as the amount of water that is available for withdrawal is the key phrase in the statutory definition of "safe yield."

2. According to the definition in the SC Surface Water Law, what is supposed to be protected or safe under the safe yield formula? 49-4-2 in particular definitions 14 and 25.

   Definition 14 is the minimum instream flow, or the amount of water not available for permitting/withdrawal. Definition 25 is safe yield, which is the amount of water legally available for permitting/withdrawal.

3. Why does DHEC's regulations (R.61-119) define "Safe Yield" similarly to the Law in B.29 but differently in E.3.a.ii(A) it is calculated as "the difference between the mean annual daily flow and 20% of mean annual daily flow at the withdrawal point, or simply 80% of the mean annual flow?

   Regulation 61-119.B.29 mirrors the definition in the Act. This definition is general and is not directly implementable without a formula or mathematical process. This formula is provided in 61-119.E.3.a.ii.(A).

4. Did any hydrologist/experts with DHEC review the "safe yield" as it is defined in regulations E.3.a.ii.(A)? What are their names and credentials?

   Yes, several Department staff, all with decades of experience in working with water resources and stream flow statistics, participated in the stakeholder process to develop the regulation. Larry Turner, now retired, had over 30 years' experience with the

department, and was experienced in surface water modeling and stream flow statistics. David Baize, now Chief of the Bureau of Water, has 28 years of experience with the Department working in various programs on groundwater and surface water issues, has a B.S. and M.S degree, and is a registered Professional Geologist in two states. Chuck Gorman has over 30 years experience in the environmental field working both as a consultant and with the Department. In 2006, he began working on water resource issues with the Department. He is a Professional Geologist and currently serves as chair of the SC Board of Registration for Professional Geologists.

5. Do you know of any experts outside of DHEC that reviewed the law and the regulations at the time of their promulgation? Who were they? What are their credentials? What were their opinions of safe yield as defined in the regulation?

   Stakeholders participating in development of the regulation included representatives from: Greenville Water System, Spartanburg Water System, Coastal Conservation League, Beaufort Jasper Water and Sewer Authority, International Paper, Chamber Tech Committee, Farm Bureau, SCDNR, Duke Energy, Industry Council, American Rivers, Southern Environmental Law Center, and SCE&G. Among this group were representatives with experience in water resources management, stream flow hydrology, and surface water modeling. The current regulatory definition of 'safe yield' represents the general consensus from the participants involved in the stakeholder process.

6. Why did DHEC do away with the 20-30-40 plan for minimum instream flows?

   DHEC did not do away with these minimum instream flows and they are included in the regulation Section B.18 and E.3.i.A. These minimum instream flows are implemented as prescribed in the Act and Regulation. Note that, per the Act, minimum instream flows do not apply to existing water users that were issued initial or "grandfathered" permits, or to agricultural registrations.

7. Why is DHEC not considering the needs of downstream users and minimum in stream flows when issuing agricultural registrations and permits?

   Downstream uses are considered in development of a safe yield calculation. Please see the more detailed explanation above. The Act does not provide for minimum instream flows to be applied to agricultural registrations.

8. Is there a documented procedure explaining how minimum in-stream flows would be detected?

Since detection and monitoring methods at any specific location would be highly fact and circumstance specific, there is no written procedure. When minimum instream flow requirements apply to a surface water withdrawal permit, a specific process to monitor instream flows will be developed to fit the location of each withdrawal.

9. Has any science been done in DHEC to determine the safety of "safe yield?" If so, who? What are their rationales and assumptions? What were the uncertainties and risk involved in the science? Can we get a copy?

   During the four years of stakeholder discussion at the legislature and subsequent discussions during regulation development, no report was produced on this topic. The final Act and Regulation reflect these discussions among stakeholders with expertise in water resources and stream flow statistics.

10. What data was used in determining the safe yield formula described in regulation E.3.a.ii(A) which has become the basis for issuing surface water registrations and permits? Can we get a copy of the data?

    There were several examples of stream hydrographs used for discussion by the stakeholder group. Based on these discussions, the calculation that was developed establishes the amount of water that can be withdrawn based on the average of stream flow minus the 20% minimum in-stream flow value.

11. Under the current safe yield formula that is being used to issue surface water registrations and permits, is it legal for an agricultural entity to completely take the entire flow of the river if it is within the registered amount?

    Per the Act and Regulation, the amount requested for an agricultural withdrawal that is ultimately registered must be within the safe yield at that withdrawal point. An agricultural withdrawer may withdraw its registered amount and is not subject to minimum instream flows. However, the State Drought Response Act supersedes a permit or registration and can direct adjustments during low stream flow conditions during the highest stage of drought declaration.

12. Under DHEC's regulations can one agricultural entity own the entire safe yield of a river or stream?

    No entity can own the safe yield as a permit or registration does not establish a permanent allocation of water, but is subject to terms and conditions in the Act. Note the safe yield available for withdrawal is at the withdrawal point, and not the entire river or stream.

13. Is DHEC aware that the safe yield amounts calculated under their regulations are greater than the actual flows of the major river systems in SC for seven months of the year based on 70 years of data of average monthly flow from DNR and USGS?

    The Department is not familiar with the specific data being referenced. However, the amount of water available in any river, at any given time, is based on many factors, including the specific location of the withdrawal in question. The direction provided under the regulation is that the amount of water legally available for withdrawal is based on average stream flows, minus the 20% minimum instream flow, and being further adjusted as necessary to account for downstream user needs. All flowing streams are going to experience low stream flows, typically during dry summer months. Therefore, flows will be less than the average amount during certain times of the year.

14. What effects does no water have on fish and biological functions of a river or stream? What effects does no water have on downstream users?

    Sufficient water quantity and quality is a necessity for the long term survival of aquatic life in the waters of the state. As discussed above, downstream uses are considered when calculating the water that may be available for new users located upstream of an existing user. DHEC and DNR are currently developing models of our major surface water basins to better understand the availability of our surface water resources. Using these models to develop basin plans is an important step in developing sound science to guide management of our valuable water resources.