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SENATE ENVIRONMENTAL RESOURCES AND ENERGY COMMITTEE PUBLIC HEARING COMMENTS ON MARCELLUS SHALE NATURAL GAS WATERWATER TREATMENT ISSUES

Representative Reed, Members of the Committee, and distinguished guests, I would like to thank you for the opportunity to comment on Marcellus Shale Natural Gas Wastewater Treatment issues. I am Paul Hart, President of Hart Resource Technologies, Inc and Pennsylvania Brine Treatment, Inc. I own and operate three waste water treatment facilities that treat and dispose of fluids generated during the drilling, fracturing, and production of natural gas and oil wells. We have been in business since 1985 and process approximately 150,000,000 gallons of fluids per year. Our process involves separation of oils, chemical flocculation, and precipitation of heavy metals and barium, with direct discharge of high chloride fluids to the waters of the Commonwealth via valid NPDES permits. We agree there is a need to protect the waters of the Commonwealth, and we agree something must be done to address elevated TDS levels. However, the proposed rulemaking is not the solution and we have several concerns with the proposal to change the wastewater treatment requirements contained in 25 PA Code Chapter 95.

1. **The assessment that "many rivers and streams of this Commonwealth have a very limited ability to assimilate additional Total Dissolved Solids (TDS), sulfates and chlorides" is not conclusive from the data that has been presented by the DEP in their Background and Purpose position.**

   The Monongahela River was used as an example of a watershed that "has been significantly impacted by discharges of wastewaters containing high TDS concentrations". This impact on the Mon contributed to the formulation of the Department's "High TDS Wastewater Discharge Strategy" presented in April of 2009. Elevated levels of TDS were observed during low flow conditions. However, an additional study performed by Tetra Tech NUS, Inc in January of 2009 concluded that "TDS and sulfate concentrations exceeded PADEP water quality criteria in October and November of 2008, but were significantly below the water quality limits in December 2008. Chloride concentrations did not exceed PADEP and EPA water quality criteria throughout the study period." The study also found that the sulfates were most likely the result of mine drainage and that "TDS and sulfate concentrations were near the maximum allowable levels upon entering Pennsylvania (from West Virginia) during October and November 2008". Therefore DEP did not address the real source of the elevated TDS in the proposed strategy.

2. **Changes to Chapter 95 does not solve the problem.**

   DEP also cites several studies on other river systems that are impacted by high TDS and sulfates, most attributable to acid mine drainage. The conclusion of these studies is that some of the stream systems of the Commonwealth have a problem with TDS, but that problem is primarily attributable to the sulfates contained in AMD. This problem should be addressed by concentrating on the clean-up of abandoned lands and treatment of the existing AMD, rather than instituting a policy that targets manufacturing, mining, electric generation, and public water and wastewater facilities with end of pipe limitations. If the proposed strategy is implemented as is, it will have little

or no impact on the existing TDS levels, because the strategy does not address the primary source of TDS.

3. **Assimilative capacity does exist.**

Chapter 93 provides for the use of assimilative capacity to calculate discharge criteria. The proposed changes to Chapter 95 prevents the use of assimilative capacity. There are many watersheds in Pennsylvania that still have assimilative capacity even under Q710 conditions. We agree that under low flow conditions assimilative capacity is exceeded in a few watersheds such as the Monongahela. This problem should be addressed by the use of dynamic stream-flow management by instituting continuous stream-flow measurements along with a reduced or temporary elimination of discharge loading during times of extreme drought. In addition, the use of real-time in-stream monitoring for potential problem constituents of sulfates and chlorides should be used to form a more complete assessment of the streams in the Commonwealth. The information presented in favor of the regulation is an incomplete assessment of the TDS issues throughout the State and more data must be collected before any regulations are changed.

4. **500 mg/l End of Pipe too Restrictive.**

The proposed TDS limit of 500 mg/l is only attainable through the use of membrane, evaporation or crystallization technology. A more suitable approach to control TDS levels would be 500 mg/l in-stream. Previous regulations protected downstream drinking water intakes. A 500 mg/l in stream discharge would protect drinking water throughout the stream, as well as protect aquatic life throughout the stream. Should the Department of Environmental Protection choose to finalize Chapter 95 with a limited discharge of 500 mg/l at the end of a discharge pipe, it will prevent any regulated use of assimilative capacity and prevent any new facilities being established.

Additionally, the Department of Environmental Protection is currently reviewing Chapter 93 regulations. Should the Department choose to adopt these new changes, our Creekside facility capacity would be decreased by 44%. The Josephine facility capacity would be reduced by 78%, and our Franklin facility's capacity would be reduced 25% to 30%. This would be a reduction of 245,000 gallons of fluid processed per day.

5. **Best available technology.**

HRT is the only company in Pennsylvania that has operated a commercial crystallization system to treat high chloride fluids from the Pennsylvania Oil and Gas Industry. During the seven years that we operated a crystallizer unit, we produced an average of 15 tons per day of granular sodium chloride and 3,000 GPD of liquid calcium chloride. The salt that was produced was comparable to table salt in its consistency, and not suited for use as a road salt. In order to operate the crystallizer effectively, it took over 3 years to design, permit, order, construct, test, and modify the system so we could generate a saleable product with consistent quality. Although our crystallizer was small (30,000 GPD), no one else has that production experience with these types of oil and gas waste waters. To process the predicted volumes generated by the industry, major modifications will need to be made to treat larger volumes of brine water.

Other vendors have claimed they can filter, evaporate, or crystallize oil and gas waste waters, but they have not yet processed large quantities of high chloride fluids from the Marcellus formations. We have spoken to at least three vendors that wanted to filter or evaporate the brine water then contract with us to process the brine concentrate. There are also two crystallizer vendors that do

not plan to pre-treat the brine, but instead plan to produce a dirty salt that will be landfilled, even though there is no landfill that has agreed to take the readily soluble salt. This creates a new problem by producing a residual that may or may not be saleable and that also has the potential to re-dissolve into the freshwater environment if not handled properly. Therefore membrane, evaporation and crystallization cannot yet be considered Best Available Technology since it has not been proven on a large scale in Pennsylvania.These are not solutions or viable technology. They are only diverting the problem to another location.

If the brine is properly pre-treated, the solid salt or the liquid concentrate from these proposed treatment methods may have industrial uses. However, these residuals must be properly pre-treated before being concentrated in order to eliminate the generation of a possibly hazardous material. The disposal of the liquid concentrate in disposal wells in Pennsylvania is unsuitable at this time due to the inability of the formations to take any quantity of fluids on a regular basis.

6. **High energy demand for crystallization processes.**

To meet the proposed 500 mg/l discharge requirements many industries will have to resort to a crystallization process. According to a study completed by the Pennsylvania Chamber of Business and Industry and presented to the Water Resource Advisory Committee, "to treat 1,000,000 gallons per day of wastewater would require some 87,600,000 kilowatt hours of electricity annually (the equivalent electric demand of some 11,300 households); plus 262,800,000 cubic feet of natural gas annually." The small reduction in TDS may not justify a large increase in energy demand.

7. **Increased emissions.**

In addition to the increased demand for energy, questions also arise concerning the increases in air quality emissions associated with these treatment technologies. The Pennsylvania Chamber estimates that using the electric demand from one crystallizer as in the example above, nearly 60,000 tons of carbon dioxide emissions per year would be produced.

There will also be increased emissions from trucks that are required to haul fluids longer distances to specialized treatment processes, as well as additional trucks to haul the resulting residual solids. A small reduction in TDS may not justify an increase in air emissions.

8. **Economic Impact**.

There is a significant amount of capital that will be needed to build these types of systems. HRT has requested data from six different manufacturers with capital cost estimates ranging from $13 million for production of a liquid concentrate to $64 million for a crystallized product. Operating costs for the same systems are estimated to be $0.12 - $0.18 per gallon, excluding transportation. This means there will be a 150% to 300% increase in the cost of disposal. DEP has publicly stated that they estimate the cost of disposal to be $0.20 to $0.25 per gallon. This is a 416% increase in disposal costs. Less than a 1% reduction in TDS does not justify a 5% increase in the cost of energy.

Additionally, the shallow well producers would also be significantly affected by the dramatic increase in the cost of water disposal. Currently the shallow well industry employs an estimated 26,000 people, currently has 30,000 active natural gas wells, and produces an estimated 20% of Pennsylvania's natural gas.

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9. **Time Frame for implementation is too short**.

   The time frame to design, permit, and build these types of facilities will require a minimum of 30 months, which will not meet this regulation deadline of January 2011.

10. **Regulation Change is premature.**

    Although the Clean Streams Law "delegates the authority to preserve and improve the purity of its waters and develop remedies to purify those waters currently polluted to the Department, in the form of adopting rules and regulations as necessary to accomplish these tasks", the Department has failed to present Statewide compelling scientific evidence to change the current law.

    The Department has stated that during November and December 2008, the TDS and sulfates exceeded the EPA's Secondary Drinking Water contaminate levels at 17 potable water supply intakes on the Monongahela River. This incident triggered the Department's "Permitting Strategy for High Total Dissolved Solids (TDS) Wastewater Discharges" policy that "relies upon the basic water quality management premise that discharges of these pollutants must be managed through permit limitations required by the more stringent of treatment-based or water quality-based standards." However, according to EPA's National Secondary Drinking Water Regulations, Part 143.1 "the (secondary drinking water) regulations are not federally enforceable but are intended as guidelines for the States." Therefore DEP does not need a state-wide treatment-based approach when the technology is not currently available and the water quality data presented by DEP is limited to certain watersheds, not all State waters.

    A much more scientific approach is a water-quality based assessment of distressed watersheds, rather than a State-wide end of pipe limitation. Dischargers that will be affected by high TDS discharge limitations in distressed watersheds must take action to monitor stream flows and contaminate levels in order to assess the assimilative capacity of the streams. In order to further protect aquatic life, companies could also perform Whole Effluent Toxicity Testing for specific discharges into sensitive watersheds. This type of site-specific assessment has been proposed by Iowa during the rule revision to their current water quality standards.

Thank you for allowing me to present some of the problems associated with the proposed regulation change to Chapter 95. I hope I have also suggested some workable solutions.

Sincerely,

Paul J Hart
President
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