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INDEPENDENT REGULATORY
REVIEW COMMISSION

February 12, 2010

Environmental Quality Board
Rachel Carson State Office Building, 16th Floor
400 Market Street
P.O. Box 8477
Harrisburg, PA 17105

Re: Proposed Amendments to 25 Pa. Code Ch. 95; TDS, Chlorides and Sulfates Effluent Standards, 39 Pa. Bulletin 6467 (Nov. 7, 2009)

Members of the Board:

On behalf of its membership comprising thousands of businesses of all sizes and across all industry sectors, the Pennsylvania Chamber of Business and Industry ("Chamber") respectfully offers the following comments concerning the proposal to amend Ch. 95 to establish across-the-board treatment and effluent standards for Total Dissolved Solids (TDS), chlorides and sulfates applicable to new or increased TDS dischargers, irrespective of watershed, location, impact or need.

Since April of this year, the Chamber and its Water Work Group has worked in a task force with our members and a number of other industry organizations, including the Electric Power Generation Association, Pennsylvania Coal Association, Pennsylvania Chemical Industry Council, Pennsylvania Waste Industry Association, and others, in attempting to evaluate the potential applicability and impact of this proposal. Based on the inputs we have received, in June 2009, we prepared and presented to the Water Resources Advisory Committee a lengthy "working paper" which identified in some detail the concerns and questions from a broad spectrum of the regulated community concerning the Department's TDS Strategy and the "one size fits all" treatment standard approach embodied in the Ch. 95 proposal now before the EQB.

Since that time, we have continued to work with that task force to gather additional information from various impacted sectors. Concurrently, our representatives have participated in the Department's TDS Stakeholders Group process in an effort to better understand the potential TDS concerns and challenges that may arise in various watersheds, the impacts of this proposal, and potential alternative approaches to addressing possible TDS concerns. Those efforts have served to confirm many of the concerns that we expressed back in June regarding this particular regulatory proposal, and emphasized that we must, indeed, find another path.

The Department's TDS Strategy and these proposed Ch. 95 regulations have broad, substantial, and far reaching impacts upon a broad spectrum of Pennsylvania manufacturing and commercial operations, but those consequences and effects appear not to have been accorded appropriate assessment, consideration and balancing. We believe that irrespective of the worthiness of its objectives, these Ch. 95 standards, coupled with its fast-track deadlines, are ill-advised and unworkable, generating what will become an impending crisis in wastewater management that threatens the ongoing viability of a number of key sectors and enterprises. As we stated in June, it is essential that the Department work with all affected sectors and stakeholders to: (1) develop a better understanding of the real TDS challenges, in terms of affected streams and conditions, constituents, and related causes; (2) evaluate the options for addressing those TDS challenges; (3) carefully evaluate the technical and economic feasibility and effectiveness of each of the treatment technologies that might be used for various types of TDS constituents, including key issues regarding management and disposition of their resulting residuals; and (4) reframe a strategy and approach to more effectively address the real TDS challenges in a common sense and cost-effective manner.

Summary and Key Points

We have provided below detailed comments on the proposed Ch. 95 amendments. The following are the six (6) key points of the Chamber's comments:

(1) To be effective, Pennsylvania's strategy must be developed with a much more focused and accurate understanding of the specific streams evidencing TDS challenges, the specific constituents and hydrologic conditions that lead to TDS issues, and the primary sources of those constituents and loadings. The primary rationale for the new statewide end-of-pipe treatment standard proposed in Ch. 95 appears to be the observation of TDS challenges in a limited number of streams (such as the Monongahela River) many of which are predominantly impacted by drainage from mines abandoned decades ago, and the observations of elevated TDS conditions were limited to extreme and extended low flow conditions. The studies and surveys cited in the TDS Strategy and shared with the TDS Stakeholders Group do not evidence that we face a statewide TDS "***problem,***" but rather suggest an issue that affects specific streams and stream reaches under certain hydrologic conditions. A close examination of those studies further indicates that the sources and challenges in each watershed are different, and one across-the-board "solution" will not be efficient or effective.

(2) Before adopting and implementing the type of treatment limits as set forth in the proposed Ch. 95, DEP must develop an accurate understanding of the numerous sectors affected by the limits, and evaluate the technical and economic feasibility of implementing the proposed TDS limits in each of those sectors. The proposed definition of "High-TDS sources" sweeps in a wide range of industrial enterprises, far beyond those mentioned in the TDS Strategy, including electric

power generation, petroleum refining, chemicals manufacturing, iron and steel manufacturing, pharmaceuticals, meat packing, food processing, and others.

(3) In each of these affected sectors, the technologies available to address high-TDS wastewaters are limited, subject to varying capabilities depending on the matrix of constituents in individual wastewaters, and pose significant technical and economic feasibility issues. As detailed in the Pennsylvania Chamber's June 2009 Working Paper, the primary technologies proffered to meet the limits mandated by this proposal – reverse osmosis (RO), evaporation, and crystallization – are energy intensive and thereby engender significant generation of greenhouse gasses, very expensive from both a capital and operating cost standpoint, and leave a significant volume of residuals (concentrated brine or salt cake) which pose unresolved management and disposal challenges. Moreover, none of these technologies can be engineered, pilot tested, permitted and installed in anything like the 18-month timeframe envisioned by the TDS Strategy and the proposed Ch. 95 rules.

As just one example, an evaporation/crystallization facility designed to handle 1,000,000 gallons per day of brines would require some 87 million kilowatt hours of electricity annually (the equivalent electric demand of some 11,300 households); plus 262,800,000 cubic feet of natural gas annually, and would generate nearly 60,000 tons of greenhouse gas CO_2 emissions per year.

As another example, for just one power plant, the estimated cost of a brine concentrator and crystallizer to handle air scrubber wastewater is $62 million in capital, plus $4.5 million per year for O&M. Multiplied across the fleet of electric generating stations with current and planned scrubber units, and including other plant wastewater streams that may need treated (e.g. cooling tower blowdown, etc.) the proposed Chapter 95 rule would engender a demand for ***approximately 1 billion*** dollars in investment for FGD wastewaters alone. If the balance of power plant wastewaters are required to be treated, that cost escalates to $3 – 7.5 billion.

(4) All potentially available TDS treatment technologies present a substantial, unresolved challenge concerning management of resulting treatment residuals – whether they be concentrated brines in RO reject water or the salt cake/sludges from crystallization units. The sheer volume of residuals associated with implementing these proposed rules – which equates to literally thousands of tons of salt cake per year – should alone be cause for careful review and reconsideration.

(5) The 18-month timeframe for implementation of TDS treatment is wholly unrealistic and unachievable. Given the design, pilot-testing, permitting, equipment lead time, and construction steps outlined both in the Chamber's

comments and in presentations from various sectors provided to the TDS Stakeholders Group, a minimum of a 36-month timeframe is involved in development of high-TDS treatment facilities – and that assumes that all design and testing prove that the technology is feasible and that the residuals challenge can be met.

(6) The draft Ch. 95 leaves a number of serious and unresolved questions in terms of applicability and implementation, including (a) how the rules apply to facilities with multiple existing sources and outfalls; (b) situations involving high-TDS source water; (c) the impacts of the strategy on water conservations; and (d) the process for determining baselines and increases in TDS concentrations and loadings.

As a bottom line, the Chamber believes that water quality management should realistically address the instream needs and requirements of Pennsylvania streams, based on the best scientific information available. Given the unique TDS challenges for some streams, we believe the Department should adopt a more flexible approach to regulating TDS and its constituents in discharges, considering assimilative capacity under differing flow conditions. We believe that some of the options discussed by the TDS Stakeholders Group, particularly the watershed-based approach to TDS management, offer a more realistic and rationale approach to addressing those TDS challenges that may affect some streams – with actions that can be implemented before we confront the prospect of impaired instream quality.

Detailed Comments

1. To be effective, Pennsylvania's strategy must be developed with a much more focused and accurate understanding of the specific streams evidencing TDS challenges, the specific constituents and hydrologic conditions that lead to TDS issues, and the primary sources of those constituents and loadings.

The TDS Strategy and the proposed Ch. 95 regulations are based on an overly-generalized, incomplete and inaccurate assessment of the TDS issues in Pennsylvania streams.

On the one hand, the TDS Strategy and the preamble to the proposed rulemaking package start out with the correct observation that TDS is a parameter that is actually made up of many different constituents in water, including inorganic salts, organic matter, and other dissolved materials. Each of these constituents have different effects in terms of impacts on aquatic life and other water uses. Moreover, the sources of these constituents are many and varied, and include natural materials derived from local geology, constituents from atmospheric precipitation, and a wide range of anthropomorphic sources.

The primary rationale for adopting a new statewide end-of-pipe treatment standard, however, appears to be the observation of TDS challenges on only a few streams – specifically (i) the submission of multiple applications for treating TDS wastewaters in the watershed of the

West Branch Susquehanna River; and (ii) some high TDS readings on the Monongahela River and its tributaries during a period of extreme and extended low flow conditions. The studies and surveys cited in the TDS Strategy and the data provided to the TDS Stakeholders Group are sparse in terms of characterizing the situations. From what we can discern, these documents do not evidence that we face a statewide TDS "***problem,***" but rather suggest an issue that affects specific streams and stream reaches under certain hydrologic conditions.

Studies that evaluated Monongahela River's water quality conditions in late 2008 during the time period when TDS levels were elevated, indicate that the majority of the TDS challenge is associated with acid mine drainage ("AMD") from abandoned coal mines, including high concentrations of both sulfates and TDS entering Pennsylvania from West Virginia. The detailed and well-documented study conducted by Tetra Tech NUS, Inc, entitled "*Evaluation of High TDS Concentrations in the Monongahela River*" (January 2009), found that (i) drought conditions were occurring in the Monongahela River basin in October and November 2008, which decreased the amount of water in the river for dilution and increased concentrations of constituents such as TDS, sulfates, and chlorides; (ii) the main chemical component detected in the TDS concentrations and mass loadings was sulfates, most likely associated with mine drainage; (iii) chlorides accounted for less than 10 percent of the total TDS concentrations detected in the Monongahela River from October to December 2008; (iv) TDS and sulfate concentrations in the river were near the maximum allowable levels upon entering Pennsylvania from West Virginia in October and November 2008; (v) samples taken from October through December indicated that the relative percent of chlorides in TDS did not change significantly after the oil and gas exploration and production companies ceased or significantly reduced disposal of flowback and produced water at POTWs; (vi) while sulfate and TDS levels were elevated, concentrations of chlorides did not exceed DEP and EPA water quality criteria throughout the period; and (vii) long-term statistical trend analyses indicate that there is not a statistically significant difference in TDS mass loadings to the Monongahela River over the last seven years. The Tetra Tech study evidences that the predominant challenge for the Monongahela watershed was most likely the result of acid mine drainage, particularly from abandoned coal mines.

DEP has separately pointed to a few other streams that appear to have TDS assimilative capacity challenges in low flow conditions, such as the West Branch Susquehanna River. Again, the challenged stream reaches are predominantly impacted by historic sources of AMD; and the obvious solutions must include efforts to remediate those AMD sources.

The Allegheny Conference has prepared a detailed review of the history of TDS conditions in the Monongahela and other streams in Pennsylvania. What that data shows is that spikes in TDS values over the past 30 years have periodically occurred, but those conditions are relatively rare and that the pattern of TDS values does not indicate any particular upward trend.

The information available to date leads to two key observations.

First, the TDS challenge is one that is focused on a limited number of streams that are currently impacted predominantly by acid mine drainage, primarily from abandoned mine lands. The studies cited in the TDS Strategy and the data shared with the TDS Stakeholders Group do not show a "widespread" TDS problem. Rather, they indicate that the TDS challenges are watershed specific, and vary in terms of both the nature of the sources involved and the degree of potential intensity and duration. Instead of framing a focused, targeted and cost-effective approach to address the challenges faced by particular watersheds, this Ch. 95 proposal frames a broad and sweeping effort to impose, via Chapter 95, a new "one-size-fits-all" effluent limitation on all new or increased "high-TDS sources."

Second, the TDS assimilative capacity issue observed in the streams mentioned in the TDS Strategy and the Ch. 95 preamble is one that arises during severe low flow conditions, but is not a year round issue. Indeed, during most flow conditions, concentrations of TDS and its constituents are well below levels of concern. Yet the TDS Strategy and Ch. 95 proposal seeks to impose a statewide effluent treatment limitation aimed at addressing assimilative capacity on the most challenged streams under short-term, extreme low flow conditions. Instead, we would suggest, the Department should consider other possibilities and options for more watershed focused approaches, including dynamic management, that promise to be both more cost-effective and avoid the type of environmental and energy concerns discussed below.

2. An accurate understanding of the numerous sectors affected by the proposed treatment limits, and an evaluation of the technical and economic feasibility of implementing the proposed TDS limits, are critical.

The proposed Ch. 95 regulations would adopt and implement by January 1, 2011, a new treatment standard for high TDS sources. The proposed Ch. 95 amendments would impose a new end-of-pipe treatment "technology based" standard to be inserted into 25 Pa. Code Ch. 95 for all "high TDS sources." The term "high TDS sources" is defined by the proposed Ch. 95 to mean new or expanded sources of pollutants that includes a TDS concentration that exceeds 2,000 mg/l or a TDS loading that exceeds 100,000 pounds per day. Effective January 1, 2011, DEP is proposing that such high TDS sources would be subject to effluent limits of 500 mg/l of TDS, 250 mg/l of Total Chlorides, and 250 mg/l of Total Sulfates (in each case, stated as a monthly average).

At its April 15th briefing on the TDS Strategy, DEP stated that the rationale for this approach is to "set a level playing field" by requiring all high TDS sources to treat to a particular level. No further explanation has been provided supporting the selection and imposition of such across-the-board limitations. The Department appears not to have considered the technological issues of achieving the target concentrations. Rather, DEP chose concentrations that simply mirror current secondary drinking water standards.

In adopting regulations and taking other actions under the Clean Streams Law, including setting such treatment standards, DEP is explicitly obligated to consider a number of factors, including: (1) water quality management and pollution control in the watershed as a whole; (2)

the present and possible future uses of particular waters; (3) the feasibility of combined or joint treatment facilities; (4) the state of scientific and technological knowledge; and (5) the immediate and long-range economic impact upon the Commonwealth and its citizens. 35 P.S. §691.5(a).

The TDS Strategy and the preamble to the proposed Ch. 95 regulations do not reveal any consideration or analysis of these factors. Most particularly, the materials provided by the Department in support of the Ch. 95 proposal do not reflect a careful evaluation of the technical and economic feasibility of the proposed treatment standards as applied to various industrial and other wastewater sectors.

The Chamber, in conjunction with other industry associations, has sought to gather information concerning the impacts of the proposed treatment standards on various enterprises. As outlined in the following sections of these comments, the responses we have received indicate a series of technical and feasibility concerns that merit serious attention and evaluation before the Department moves forward with this Strategy.

3. The proposed definition of "High-TDS sources" sweeps in a wide range of industrial enterprises.

The TDS Strategy and proposed Ch. 95 preamble focus almost all of their discussion of "High-TDS sources" upon flowback water and produced brines from Marcellus Shale and other oil and gas well development, and AMD sources. However, these are far from the only sources of TDS that are swept into regulation under the standards reflected in the proposed Chapter 95. The Chamber's outreach and the information submitted by various industry sectors to the TDS Stakeholders Group has revealed that the proposed Ch. 95 regulations would directly and significantly affect a number of sectors, including electric power generation, petroleum refining, chemicals manufacturing, iron and steel manufacturing, pharmaceuticals, meat packing, food processing, and others. At the same time, the Ch. 95 rules would impact a number of industrial and commercial enterprises using larger publicly-owned treatment works (POTWs) that already have relatively high TDS loads (measured in pounds), particularly as POTWs in areas such as the Susquehanna and Delaware River Basins implement phosphorus reductions (where chemical treatment processes increase TDS levels).

Electric Power Generation. Many, if not most, Pennsylvania electric generating plants will likely be subject to the High-TDS source limits. A survey of power generators found a variety of current and anticipated "high-TDS" sources, including flue gas desulphurization ("FGD") wastewaters, ash storage runoff, boiler water makeup resin regeneration, cooling tower blowdown and related water treatment, ash landfill leachate, and other operations. Many of these units currently are not subject to TDS limitations, although a few have NPDES permits which either require monitoring only or impose a wide range of TDS limits based on various factors (including limits based on DRBC standards). For example, one station in western Pennsylvania has an FGD treated wastewater limit (measured at an internal monitoring point) for TDS of 40,000 mg/l monthly average based on "best professional judgment." One station discharging in the Delaware Basin has limits of 1,000 mg/l monthly average from certain low volume wastewaters and 3,500 mg/l monthly average from other sources, while another Delaware Basin generating facility has a limit of 15,000 mg/l as a monthly average and 30,000 mg/l daily maximum. A station in the Susquehanna River Basin equipped with an FGD scrubber system has a TDS monitoring only requirement.

Although §95.10 is cast as applying only to new or increased high-TDS sources, that formulation will, in fact, trigger TDS limits at many facilities. Generation facility owners are undertaking a variety of improvements to their stations – in many cases driven by other environmental imperatives – which will result in increased TDS concentrations, if not increased TDS poundage loadings. For example, as the result of the Clean Air Interstate Rule and other air regulations, many stations that have not already done so are planning the installation or upgrade of FGD systems, which generate wastewaters with TDS (primarily in the form of sulfates).

At the same time, many stations are dealing with more stringent thermal limits and/or mandates associated with Clean Water Act §316(b) intake entrainment/impingement requirements, leading to installation of recirculating cooling towers that reduce the volume of cooling water intake and discharge, but increase the concentration of TDS in the water due to evaporation of part of the water, leaving behind TDS from the source water. Currently, stations equipped with recirculating cooling towers report concentrations of TDS in incoming water of 50-650 parts per million (ppm), with 2-6 cycles of concentration. If these cooling tower discharges are classified as high-TDS waters, either because of their concentration/loadings alone or because they are from facilities that have other high-TDS loadings, the result will be to require substantial treatment to remove TDS that is, in fact, derived from the incoming source water.

Coal Mining and Processing. As recognized in the TDS Strategy, the coal mining and processing industry engenders several sources of TDS, from both process and stormwater discharges. Even the best state-of-the-art and properly operated mine drainage treatment plants (including those designed and operated by the Department at various sites) involve TDS in the treated effluent. Although the proposed Ch. 95 purports to apply its new end-of-pipe treatment limits only to "new discharges," the definition of "new discharge" in proposed §95.10(a) would appear to trigger for most existing mines, since additional, expanded or increased discharges are common at existing surface and deep mine operations as mines develop over the course of the active life of a mine. Thus, existing mines could quickly be considered "new discharges" under the proposed rule.

Food Processing. The food processing sector, which includes fruit and vegetable canning, meat packing, potato chip and snack manufacturing, similarly engenders significant TDS concentrations in some wastewaters. For example, one food processing facility in eastern Pennsylvania has noted that its TDS concentrations exceed the concentrations that define a high-TDS source, with a current NPDES permit that sets a limit in excess of 3000 mg/l as a monthly average. The facility has an on-site water supply well in which the measured TDS concentrations in the groundwater already exceed 500 mg/l. Using the supply well for on-site industrial processes requires softening of that water, and when used, the associated water softening process generates a noteworthy amount of TDS in a wastewater stream equating to approximately 800,000 gallons per day (gpd). The facility ceased using the on-site water supply well, partly as a result of the background TDS concentrations in the groundwater, and now it must purchase supply water from the municipal system. The concentrations of TDS in facility wastewater are expected to increase in the near term as a result of wastewater treatment upgrades designed to address nutrients, where the chemical treatment to remove phosphorus has the collateral effect of elevating TDS concentrations.

Petroleum Refining and Chemicals. Chemical manufacturing facilities, both large and small, likewise generate some significant TDS concentrations in typical wastewaters. One chemical facility in western Pennsylvania, for instance, generates approximately 100,000 gallons per day of high-TDS wastewater, which currently is conveyed to a POTW. Refineries, on the other hand, generate much higher volumes of what the proposed Ch. 95 rule classifies as high-TDS wastewaters. Petroleum refineries have various sources of TDS in their wastewater streams. Like the electric power generation sector, one of these sources is the air pollution control devices, such as wet gas scrubbers, that these refineries have or will be installing in the near future. These scrubber wastewaters have significant TDS and sulfate concentrations and are either processed through on-site wastewater treatment plants or conveyed to POTWs for additional treatment. Permits having limits greater than the proposed 500 mg/l and 250 mg/l limits have been issued or are in the approval process for these wastewaters based on assimilative capacity and the chemical, flow, biological, and use designation characteristics of the receiving waters. Current TDS technologies are polishing unit operations and require considerable wastewater treatment upstream of TDS removal. Requiring additional treatment of refinery or chemical plant TDS streams is not feasible since the current TDS technologies have not been demonstrated to be applicable to these wastewaters and prior to any TDS unit operations significant additional treatment upstream of TDS removal would be required. Besides the lack of demonstrated success of TDS technologies for typical refinery & chemical plant wastewater streams, costs of the existing technologies would be excessive and prohibitive.

In addition, recirculating cooling towers are utilized throughout the chemical and refining industry and would result in the same 316b issues and concerns as detailed previously in the electric power generation sector section.

Pharmaceuticals. Pharmaceutical and vaccine research and manufacturing operations are subject to strict Food and Drug Administration (FDA) requirements to ensure safe and effective medicines are discovered and delivered to the public. Good Manufacturing Practices (GMP) and Good Laboratory Practices (GLP) regulations require the highest levels of purity and cleanliness in every step of the pharmaceutical and vaccine process. The use of strong acids and bases are necessary to achieve cleanliness requirements, and subsequent neutralization of these chemicals to meet environmental discharge limits results in generation of high TDS effluent. Requirements for process area and laboratory conditions result in increased heating, air conditioning, and ventilation (HVAC) loadings to maintain extremely rigid temperature and humidity ranges and high levels of once-through ventilation rates. Increased building HVAC loadings translate ultimately to increased cooling tower evaporation and blowdown rates. TDS levels in cooling tower blowdown often exceed 3500 mg/l. One pharmaceutical research and manufacturing facility in eastern Pennsylvania generates approximately 1,500,000 gpd of high-TDS wastewater which is conveyed to a POTW.

Other Sectors. Outreach to Chamber members found that a number of other sectors, including paper and packaging, produce potentially high TDS wastewaters. This issue arises even in sectors where industrial processes are not the primary wastewater source. For example, one container manufacturer noted that its groundwater well sources at two plants were naturally high in hardness and TDS ranging from 700-900 ppm (*e.g.*, exceeding the proposed §95.10 discharge standard), and efforts to produce softer and purer water for manufacturing require use of RO water treatment units engendering investments approaching $1 million. These water supply treatment facilities, however, leave a reject stream that is high in TDS, which is currently handled by a POTW.

4. The technologies available to address high-TDS wastewaters are limited, and pose significant technical and economic feasibility issues.

In most plants, the source of TDS in industrial and commercial discharges is from the use of process-essential chemicals. Source reduction is therefore not an available alternative for achieving the proposed -TDS effluent limits. Segregating and disposal by transporting high-TDS wastewater streams off-site to a location where they can be treated and discharged is also not a feasible option for most industries and businesses. Therefore, desalination of effluents to achieve the proposed Chapter 95 TDS technology-based limits will be the only available alternative if a company wishes to add a new process or expand an existing process that would generate high-TDS wastewater.

The proposal to adopt Ch. 95 in its current form appears to assume, without any discussion or assessment, that technologies exist to address and treat high-TDS wastewaters, and that such technologies apply to and are feasibly implemented in all industrial sectors. Nothing could be further from reality.

In fact, the technologies available to remove TDS from wastewaters are limited and subject to varying capabilities depending on the matrix of constituents in individual wastewaters. At the same time, even when technically capable of addressing TDS in certain wastewaters, such technologies are energy intensive, very expensive from both a capital and operating cost standpoint, and leave a significant volume of residuals (concentrated brine or salt cake) which pose unresolved management and disposal challenges. Moreover, none of these technologies can be engineered, pilot tested, permitted and installed in anything like the timeframe envisioned by the TDS Strategy and the proposed Ch. 95 rules.

(a) The limited technical options for TDS treatment.

There are very few technical options for removal or reduction of TDS in high-TDS wastewaters, and the few technical methods available have serious limitations and complicated feasibility issues.

Unlike western jurisdictions, pond evaporation is simply not a feasible option in the humid northeastern United States, where rainfall rates equal or exceed evaporation rates.

Although the Department has expressed willingness to support underground injection of some wastewaters, the fact is that only five or six Class II underground injection wells have been permitted in all of Pennsylvania, and those wells have very limited wastewater acceptance rates. For example, one of the more significant wells can only accept 600,000 gallons in a month – hardly enough to form a feasible option of the millions of gallons per day of high-TDS wastewater generated in our mines, oil and gas well development, industries, and power plants.

Conventional treatment technologies, such as pH adjustment, metals precipitation, sand and membrane filtration and oil/water separation do nothing to address the TDS or chlorides challenge, and in fact contribute to the TDS discharge levels in some cases.

Thus, for most high-TDS wastewater, that leaves only three options: (i) reverse osmosis; (ii) evaporation; and (iii) evaporation coupled with crystallization.

Reverse Osmosis. Reverse osmosis ("RO") is a technology that utilizes pressure to force a solution through a membrane, retaining the solute (salt laden solution) on one side and allowing the pure solvent (water) to pass to the other side. TDS reduction via RO is effective for certain wastewaters up to a TDS concentration of approximately 40,000 ppm. RO membranes are prone to fouling and premature failure if wastewaters contain any of a variety of interfering constituents. Hence, in a typical industrial wastewater matrix which includes a variety of constituents, RO must be preceded by a variety of pre-treatment methods to remove the constituents that would interfere with or ruin the RO units. Pretreatment required for RO systems includes organic chemicals removal (to prevent fouling of the membranes), removal of certain inorganics that can foul membranes (calcium compounds), and removal of suspended solids.

Direct dischargers with existing biological treatment systems will typically have to install cartridge filters/microscreens, microfiltration and an ultrafiltration membrane filter upstream of the RO unit. Activated carbon absorption may also be required if the biologically treated effluent has residual total organic carbon that can foul the membranes.

Membrane fouling by organics, silica, calcium carbonate and calcium sulfate is a common problem with RO systems. Anti-scaling agents are used to minimize scaling and cleaning chemicals must be used regularly to maintain membrane efficiency. However, even with the use of these chemicals, the RO membranes eventually plug and the membranes must be replaced. For example, pilot testing of an RO system on a brackish groundwater resulted in a permanent loss of permeate production capacity (resulting in higher volumes of reject brine) over time in spite of use of a pretreatment system, regular cleaning of the RO membranes, and use of anti-scaling and anti-fouling chemicals.[1] Thus, RO membrane replacement is a recurring maintenance cost for these systems. When RO is applied to wastewater rather than brackish groundwater, membrane fouling and degradation is typically more pronounced.

RO treatment results in recovery of only 30-60% of the incoming water volume in the form of a treated water effluent containing less than 500 ppm of TDS. Conversely, 40-70% of the incoming wastewater is left in the form of a more concentrated, higher-TDS "brine" – often referred to as "reject" water. The TDS salts do not go away; they are only more concentrated in a somewhat smaller volume of wastewater.

Evaporation. TDS reduction via evaporation has been espoused as another available technology. Basically, the technology requires heating volumes of high-TDS water to evaporate a portion of the water, converting it to steam which may then be recovered through condensation, while leaving behind more concentrated brine solutions. Heat sources for evaporation systems may involve either electricity or fossil-fuel (using oil or natural gas and various heat transfer systems).

Evaporation systems require in almost all cases pretreatment to remove various constituents, such as inorganic chemicals, ammonia, and suspending solids, which will cause fouling of the process, and to prevent scaling.

Direct discharging plants with biological treatment systems will typically require additional solids removal by membrane filtration before the water is sent to the evaporator. Other pretreatment may be required including activated carbon for organics removal. Fouling of heat exchanger surfaces can greatly reduce distillation efficiency — calcium sulfate and calcium carbonate are the most common cause of such fouling.[2] If this type of fouling will potentially occur, calcium removal by chemical precipitation will be required upstream of the membrane filtration system. Sulfates in the wastewater will also pose a particular issue, as efforts must be undertaken to prevent sulfates from fouling the evaporative process.

Similar to RO technology, evaporation units leave significant volumes of residuals. A typical evaporation facility will recover 60-65% of the wastewater in the form of distilled water, leaving 40% of the volume as saturated TDS wastewater.

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[1] G. Juby, *Reverse Osmosis Recovery Maximization*, Desalination and Water Purification Research and Development Program Report No. 119, Bureau of Reclamation, Department of the Interior, Denver, CO (2006)

[2] J. E. Miller, "Review of Water Resources and Desalination Technologies," SAND 2003-0800, Sandia National Laboratories, Albuquerque, NM (2003).

Evaporation/Crystallization. Evaporation/crystallization takes the process one step further to evaporate the concentrated brine to produce a salt cake. Influent feed to the crystallizer is further heated through a heat exchanger to promote flash boiling of the brine, with the resulting vapor passing through a heat exchanger/condenser system. If the system works as desired, the resulting concentrate produces salt crystals and cake, which are removed and dewatered through a centrifuge system.

Often referred to as "zero liquid discharge" ("ZLD"), evaporation/crystallization does not destroy the TDS, it only changes it into a different type of residual posing a somewhat different dispositional challenge.

Such evaporation/crystallization technology has been tried in certain applications, but has not been proven as a universal cure. For example, the feasibility of a ZLD treatment system on electric generating plant FGD waste streams has not been proven. Our understanding is that only six ZLD systems have been installed for FGD wastewater streams, all in Italy. Kansas Power & Light is attempting to start up a ZLD, but it is not yet operational. Yet DEP seems poised to require every power plant in Pennsylvania planning near term installation of FGD systems to reduce air emissions to immediately move to install such unproven ZLD systems.

While equipment vendors may espouse that they can solve every problem, such technology must be proven in the wide range of sectors to which the Strategy would regulate. A far reaching public policy that imposes high capital and operating costs, energy impacts, and environmental challenges should not be based on marketing claims and sales pitches. Hard evidence of technical and economic feasibility must be provided.

(b) TDS treatment technologies are energy intensive; and related air pollutant and greenhouse gas emissions associated with that energy use should be seriously considered.

Each of the potential available treatment technologies involves significant energy inputs, and related increases in greenhouse gas emissions. While there certainly remains serious debate as to the appropriate approaches to climate change and greenhouse gas emissions at both the national and state level, the Rendell Administration and Department leadership have repeatedly expressed concerns about both conserving energy and reducing CO_2 and other greenhouse emissions. Thus, we certainly need to examine with care the impact of any new regulatory actions on the energy consumption and air emission. If wise environmental decisions are to be made, we cannot manage the environment on the basis of one medium at a time.

RO treatment is moderately energy intensive. The energy requirement for the RO membrane system (not including the necessary pretreatment units) treating brackish wastewater averages 9.6 kWh/1000 gallons of produced water. Expressed as the power requirements for treating the influent flow,[3] the average energy use is 13.7 kWh/1000 gallons. Based on a Department of Energy/EPA report,[4] electrical energy generation in the U.S. results in approximately 1.341 lb of carbon dioxide per kWh.[5] Thus, a 100,000 gpd RO plant would consume 500,050 kilowatt hours per year, equating to 335 tons of CO_2 emissions per year.

Evaporation (also known as thermal distillation) is moderate to high energy intensive. The literature indicates that energy requirements for all three thermal processes (multi-stage flash distillation, multi-effect distillation, and mechanical vapor compression) are essentially independent of the influent salt concentration[6] and are high — the average energy use for the most efficient thermal process (thermal or mechanical vapor compression) is 43.2 kwh/1000 gallons of product water (39 kWh/1000 gallons influent water). Thus, a plant that generates 100,000 gallons/day (gpd) of wastewater will require about 3,900 kWh of thermal/electrical energy to remove TDS. In the typical thermal distillation system, steam generated from combustion of natural gas or another fossil fuel (coal, fuel oil) provides most of the energy required. In most installations, electrical energy is a small component of the total energy use.

Evaporation/crystallization is a highly energy intensive method of treatment. The power consumption of a 1,000,000 gallon per day facility handling brines from Marcellus Shale wells, for example, has been projected at 10 megawatts plus more than 30,000 cubic feet of natural gas per hour. Thus, 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[7]); plus 262,800,000 ft^3 of natural gas annually. Using EPA's emissions factor of 1.341 pounds of carbon dioxide emissions per kwh, the annual electric demand for just one such evaporation/crystallization facility equates to nearly 60,000 tons of CO_2 emissions per year.

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[3] Assuming 30% reject flow.

[4] Department of Energy and Environmental Protection Agency, Carbon Dioxide Emissions from the Generation of Electric Power in the United States (July 2000).

[5] This value reflects an average of electrical generation from all sources: coal, natural gas, nuclear, wind, etc. If all electrical energy was from coal, the carbon dioxide generation rate is 2.095 lb/kWh.

[6] J. E. Miller, *supra.*

[7] Based on the U.S. Department of Energy, Energy Information Administration's *Middle Atlantic Household Electricity Report* (December 22, 2005) using 2001 data, electric consumption in 15 million Mid-Atlantic region households totaled 116 billion kwh, or an average of 7,733 kwh annually per household. (http://www.eia.doe.gov/emeu/reps/enduse/er01_mid-atl.html (last visited June 6, 2009)).

(c) The only potentially available TDS treatment technologies pose high capital and O&M costs.

RO and evaporation systems engender both high capital and O&M costs.

According to one study, the total capital cost of a brackish water RO system including pretreatment (but not biological treatment or brine concentration and disposal) costs an average of $8 per gallon of capacity.[8] Thus, the capital cost of a 100,000 gpd RO treatment system might be calculated at approximately $800,000.

The values reflected in that study, however, appear to understate RO system costs. One Chamber member who recently completed and commissioned an RO system to handle their wastewaters reports that for a 100,000 gpd wastewater system that included requisite pretreatment plus RO, total equipment and construction cost exceeded $5.3 million.

The biggest annual operating costs for RO are electrical power, membrane replacement, consumables, and labor costs. An actual case study for one Pennsylvania RO facility found operating costs (based on a 100,000 gpd capacity) were on the order of $81 per 1000 gallons, or around $2,956,500 per year.

Extremely high cost and multiple operating issues have lead the U.S. Environmental Protection Agency to reject reverse osmosis as defining "Best Available Technology" for treating wastewater from certain sectors. For example, in its analysis of the technologies available to treat landfill leachate, EPA evaluated RO and concluded that it was not more efficient in removing significantly more pounds of toxic pollutants than other treatment options, that is was "very expensive," and that potential operating and disposal problems weighed against defining BAT on the basis of RO implementation.[9] The factors that EPA has considered in evaluating RO technology should likewise be weighed by DEP before it embarks on setting a state technology-based treatment standard – particularly one that sweepingly applies to every industry sector across the Commonwealth with significant sources of TDS wastewater.

The projected cost of ZLD treatment is even higher, both for capital construction and operation. For one power plant, the estimated cost of a brine concentrator and crystallizer to handle FGD wastewater having a design flow rate of 400 gallons per minute (576,000 gallons per day) is $62 million in capital, plus $4.5 million per year for O&M. Multiplied across the fleet of electric generating stations with current and planned FGD scrubber units, the Strategy would engender a demand for ***several billion*** dollars in investment – and one that is being mandated to be expended on a "crisis basis" within a mere 18-month period. Given the current

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[8] J. E. Miller, *supra* (costs adjusted to 2009 values).

[9] *See* 65 Fed. Reg. 3008, 3019-3020 (January 19, 2000).

status of the capital and lending markets, the ability of power generators to raise the funds for such a large new and costly investment is in serious question.

Cost estimates for centralized wastewater treatment facilities utilizing evaporation/crystallization for oil and gas brines are similarly very high, with capital cost estimates ranging from $90-100 million for a 1 MGD facility. O&M costs for such a facility are estimated at approximately $15-20 million annually.

We note that some analyses or expressions of costs offered in support of the proposed Ch. 95 rules have attempted to state those costs in terms of cents per gallon, apparently suggesting that such values are low and inconsequential. However, the volumes of water used daily in Pennsylvania's manufacturing and agricultural sectors are large – measured at individual facilities in hundreds of thousands to millions of gallons per day. A value such as $.25/gallon, thus, translates to millions of dollars per year for a facility. These are ***not***, as suggested by some, inconsequential, but rather major cost impositions that threaten the economic competitiveness and viability of Pennsylvania mining, manufacturing, and commercial facilities.

(d) All potentially available TDS treatment technologies present a substantial, unresolved challenge concerning management of resulting treatment residuals.

All of the available TDS treatment methods leave one significant issue – what to do with the remaining concentrated TDS reject wastewaters, salt cake or other residuals. At present, the TDS Strategy does not offer a solution – indeed, it does not seem to even consider the problem.

RO Residuals

As noted above, RO technology recovers approximately 30-60% of the wastewater, leaving concentrated reject water equating to 40-70% of the influent volume.

Today we have landfills in Pennsylvania utilizing RO units for onsite pretreatment of leachate, but those units leave substantial volumes of reject high-TDS residuals which are trucked some distance to large municipally-owned sewage treatment plants. The TDS Strategy would apparently cut off the avenue for disposition of the reject wastewaters, leaving the conundrum that there appears to be no place in Pennsylvania where the Strategy would provide for such residuals to be managed. The challenge will multiply if other facilities are forced to utilize RO, evaporation or crystallization treatment.

For example, one typical chemical plant that generates 100,000 gpd of wastewater, if equipped with an RO unit, would generate approximately 30,000 gallons per day of reject water. This translates into 10,950,000 gallons, or 91,323,000 pounds, of reject water requiring disposal each year. Because this waste stream would itself be a high-TDS wastewater, it could not be discharged to any surface water in Pennsylvania. The only remaining management option would be to haul the reject water to an out-of-state industrial wastewater facility (in a jurisdiction that has less stringent TDS controls) or to some type of solid waste facility that would provide for solidification and disposal. There are a number of logistical difficulties, however, which make this option impractical. The chemical company would first need to construct storage tanks and loading facilities for the wastewater. At least three 250,000 gallon storage tanks (fabricated of stainless steel because of the corrosive characteristics of high salt waters) would be needed in order to provide the required storage capacity and operational flexibility for the wastewater treatment facility and would require a capital outlay well in excess of $15,000,000. Such a storage facility would consume significant land acreage, whose availability would pose significant hurdles.

In order to prevent an accumulation of wastewater at the facility, water would need to be hauled out in tanker trucks at the same rate it is generated. Because many disposal facilities do not accept waste on the weekends, or do so only in limited quantities, transportation would need to take place on a five-day or six-day schedule. Disposal of all the waste generated in one calendar week would require seven to nine 5,000-gallon tank trucks being shipped from the facility each weekday.

The transportation of reject water to a waste management location hypothetically just 75 miles from the chemical plant would result in roughly 328,500 additional tanker truck miles traveled consuming approximately 54,750 gallons of diesel fuel. This would generate 99 tons of nitrogen oxide emissions, 21 tons of carbon monoxide emissions, 7 tons of fine particulate matter emissions, and 3,690 tons of greenhouse gas emissions. In many cases, the trucking distance to out-of-state treatment facilities would be much greater, with attendant greater fossil fuel consumption and air emission implications.

Multiplied across Pennsylvania, it is clear that such an approach poses significant logistical, economic and environmental challenges.

Evaporation Residuals

Evaporation systems result in somewhat higher recovery rates, but still leave approximately 40% of the wastewater in the form of a concentrated brine. Thus, in a situation, such as a power plant or oil and gas produced water treatment plant, involving 1,000,000 gallons of influent wastewater, the resulting concentrated brine would equate to 400,000 gallons per day. That equates to 80+ tanker trucks per day of saturated wastewater from just one plant to be taken to some as yet unidentified location for ultimate disposition, with all associated transportation-related fuel use and air emissions as previously discussed.

Crystallization Residuals

Like the other technologies, crystallization ZLD does not make TDS go away, but instead leaves a large quantity of residuals to be managed. Depending on the influent chlorides concentration, a 1,000,000 gpd crystallization plant handling Marcellus Shale brines is anticipated to produce some ***400-520 tons per day (146,000-190,000 tons/year)*** of salt cake.

ZLD technology applied to other industrial wastewater streams would result in various volumes of solids and semi-solids containing salts, sulfates, and other constituents.

What is the Plan for Managing Residuals?

The residual challenge is substantial. Where can it go?

At this point, limited information or analysis is available as to the nature and characterization of such residuals, or whether and how such residuals might be managed. Although there has been some discussion of perhaps PennDOT or other highway organizations taking some of the salt volumes generated from oil and gas brine treatment facilities, to date the composition and characterization of the salt cake has not been fully developed, nor has its suitability for road application been evaluated and confirmed.

For all of the other industries in Pennsylvania, the residuals management issue is even murkier. For RO and evaporator reject water, the Strategy would apparently leave no in-state option. Unless a breakthrough occurs in the development of high-capacity underground injection wells (which seems unlikely), the solution which DEP apparently is assuming is to send it elsewhere – to another state.

As to the solid and semi-solid residuals from crystallization units, one cannot presume that treatment residuals can be readily processed and accepted into existing Pennsylvania landfills. The crystallized TDS cakes and sludges generated by ZLD treatment will themselves be highly soluble, and the potential for the salt in such residuals to re-dissolve when stored, transported, or introduced into landfills (that is, when they may be exposed to precipitation before they are permanently covered) presents a substantial concern to waste management facilities.

The sheer volume of residuals associated with implementing this Strategy should alone be cause for careful review. The Department has provided estimates that some 20 million gallons per day of water will be generated from development of Marcellus Shale wells (although some have noted that value will probably not be approached until fuller development of this formation is forthcoming). Given the estimate that a 1 mgd ZLD facility will generate some 400-520 tons per day of salt cake, the extrapolated production of salt waste from facilities needed to address just the wastewater from full-scale Marcellus Shale development is some 8,000-10,400 tons per day. According to landfill operators, that would be equivalent to almost 20-25% more Pennsylvania generated waste – and that is without counting the TDS residuals produced from treating any other industry's wastewaters.

Landfills already face considerable TDS challenges of their own in their existing leachate management programs. The prospect of thousands of tons of leachable salts being deposited per day may be beyond the tolerance of our existing landfill facilities.

5. The timeframe for implementation of TDS treatment is wholly unrealistic and unachievable.

Apart from the technical and economic feasibility concerns with TDS treatment technology, which are substantial, the timeframe set forth in the TDS Strategy – mandating implementation of such technology for all new or expanded high-TDS sources by January 1, 2011, is unreasonable, arbitrary, and unachievable. Furthermore, applying a new or expanded discharge blanket applicability date of April 1, 2009 is also unreasonable for wastewater generating projects recently completed or in the midst of engineering and/or construction.

Design and Pilot Testing

The wastewater treatment systems required to address the effluent limits listed in the TDS Strategy involve complex and time-consuming design, engineering, pilot testing, and permitting issues. These are not small, off-the-shelf systems. Each system must be custom designed and pilot-tested to ascertain and assure (1) its capability of handling the specific wastewater stream and its constituents (including the range and variation in those constituent concentrations over time); (2) the requirements for pre-treatment to avoid fouling, scaling, or breakdown of the main TDS treatment components (*e.g.*, RO membranes, evaporator tube heat exchanger); (3) the durability of the system components (including any requirements for use of special materials to deal with the corrosive effects of high-salinity or other constituents); (4) an accurate understanding of residuals quantities and characteristics and (5) verification of pretreatment chemistry. Such design and pilot testing work is required as a pre-requisite to developing a basis for design that can be reflected in required permit applications, and equally critical, developing plans for residuals storage, management and ultimate disposition.

Pre-Construction Permitting

The pre-construction permitting of such facilities is also multi-faceted and complicated. Far beyond "wastewater" issues, TDS-treatment facilities engender a myriad of permit requirements at the local, state and federal level. The permitting matrix for a typical evaporator/crystallization plant, for example, involves some thirty or more possible permits, many with significant processes and timeframes. Some typical timeframes for major permits are presented below. These timeframes assume no significant opposition or permit appeals.

(a) Zoning and land development approvals. Timeframes depend on local ordinances, and whether the proposed use in the applicable zoning district is a permitted use or requires either special exception or conditional use hearings. (3-9 months) (*Note: Under PaDEP land use policy, zoning approvals must typically be procured or evidence of consistence obtained prior to submission of PaDEP permits covered by the policy.*)

(b) NPDES permits. (6-12 months, more if TMDLs or load allocations)[10]

(c) Water Quality Management Part II construction permit. Application typically must follow issuance of NPDES Permit. (90-120 days)

(d) Air Quality Plan Approval. Construction permit required for facility involving air emissions or air pollution control equipment, except sources of minor significance. Depending on the heat source for the evaporation/crystallization processes, such a plan approval may well be required. (6-12 months; plus potentially 12 months of pre-application studies if PSD background monitoring and modeling required)

(e) Erosion and sedimentation control plan approvals/NPDES permits for stormwater associated with construction activities, including post-construction stormwater management plans (90-120 days)

(f) Water obstructions and encroachments permits / Clean Water Act §404 permit for stream crossings, outfalls, intakes, and other stream encroachments (180-270 days)

(g) Residual waste

- Beneficial use general permits – *e.g.*, for salt use (200 days for new general permits; 60 days for eligibility determination under existing general permits)
- Residual waste facility disposal permits for landfill or disposal impoundments (24 months or more)

Procurement, Fabrication and Construction

Equipment procurement, fabrication, and facility construction is also time-consuming for such facilities. Due to the special materials required in some key equipment, including corrosive-resistant steel, long lead times are involved in equipment fabrication and delivery. For ZLD evaporation/crystallization, a typical project schedule would involve 12-month equipment manufacturing, followed by 9-12 months for installation and startup commissioning.

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[10] Time frames for permits issued by PaDEP are primarily based on PaDEP's published processing timeframes assuming submission of a complete application. In most instances, technical questions or requests for additional information will extend such a permit review timeframe. *See* PaDEP, *Guide to DEP Permits and Other Authorizations* (2007), available at: http://www.depweb.state.pa.us/dep/cwp/view.asp?a=3&q=461114&depNav=|

Total time

Given the foregoing considerations, realistically, a minimum 30 to 36-month timeframe is involved in development of high-TDS treatment facilities – and that assumes that all design and testing prove that the technology is feasible and that the residuals challenge can be met. That 2.5 to 3-year timeframe has been borne out by the experience of one of the Chamber's members, which recently completed an RO pretreatment unit for one of its facilities; and has been reflected in engineering estimates for other facilities in several industries.

The Environmental Quality Board cannot arbitrarily ignore the realities of such design, testing, fabrication and construction timeframes. A regulatory wand cannot be waved to sweep these issues away. The proposed Ch. 95 rules call for a schedule that appears destined to create a regulatory train wreck.

6. The TDS Strategy leaves a number of serious and unresolved questions in terms of applicability and implementation.

Chamber members who have reviewed the TDS Strategy have posed a number of questions and concerns as to applicability and implementation – issues as to which the Strategy is largely silent. The following are some of those concerns:

(a) Facilities with Multiple Wastewater Streams and Discharges.

The proposed Ch. 95 amendments are unclear on whether high-TDS discharges are determined on an outfall-by-outfall or facility basis. A number of generation and manufacturing facilities have multiple wastewater streams and outfalls, some which may qualify as high-TDS under the definition contained in §95.10 (*e.g.*, greater than 2,000 ppm or 100,000 pounds per day of TDS). How does the rule apply in such situations? Does one add up the total loading of the entire facility (all outfalls), or consider each outfall separately? What happens if a facility has a number of existing high-TDS sources via several existing outfall, and then adds a new separate source (say an FGD-wastewater stream) – do §95.10 limits apply to every outfall at the facility, or only to the new wastewater stream?

(b) High TDS Source Water.

In a number of cases, incoming source water (drawn from streams or regional groundwater) is already high in TDS. Some manufacturing and generation facilities report TDS in source water of greater than the 500 ppm limit imposed by the proposed §95.10. The proposed Ch. 95 rules offer no relief considering such situations – that is, there is no consideration of "net" additions to TDS loading, but rather only a flat concentration based limit.

(c) Penalizing Water Conservation.

As manufacturing facilities pursue increased efficiency in water use, including recirculating cooling systems and recycling of water within manufacturing processes, TDS concentrations in effluent water are likely to increase. As currently cast, the proposed 95.10 would apparently consider any such increase in TDS concentrations to be a "new or increased" TDS source, triggering application of requirements for TDS treatment. Such an approach that focuses on concentrations, rather than total TDS loading, effectively penalizes those who engage in beneficial water conservation.

(d) Determining Baselines and "Increases" in TDS Concentrations and Loadings.

The proposed Ch. 95 rules do not indicate how DEP will determine the current baseline of TDS concentrations and loadings, or how the Department will ascertain whether a facility has triggered being a "new or increased" high-TDS source. For a range of facilities, data regarding TDS, total chloride and/or total sulfate concentrations and loadings are simply not available, as monitoring and reporting of such constituents is not currently required in many NPDES permits. This situation is similar to the challenge in the Chesapeake Bay watershed, where many industries have historically not been required to monitor for nutrient constituents of total nitrogen and phosphorus. As with the Chesapeake Bay program, without a clear definition and determination of the baseline, facilities cannot know if they trigger the requirements of the Strategy.

This issue is compounded by the present severe recession conditions in our national and global economy. Such economic conditions result in current production levels that are low. Such decreased production, in a number of instances, will result in lower constituent loading as opposed to full-scale production conditions.

Clearly, data will need to be generated and evaluated in order to determine the applicability of any strategy, and these issues must be tackled upfront before the Strategy is put into implementation. Economic conditions resulting in lower production capacity must be considered, and existing facilities should not be penalized (or prevented from returning to normal production) by any such policy. Variations in production levels must be taken into consideration in defining the baselines.

(e) Stormwater Runoff Considerations.

Stormwater runoff (both point and non-point sources) may be a source of high TDS in the Monongahela River and other streams. However, the proposed regulations do not discuss how stormwater will be accounted for and addressed.

7. As significant changes in the proposal are inevitable, the process for moving forward should include a re-publication of proposed rulemaking or at least an advanced notice of final rulemaking.

The Department has indicated in meetings with the TDS Stakeholders Group that any final TDS rule may well be different than the current proposal, potentially significantly different. The Chamber, therefore recommends that DEP consider either re-issuing a proposed rule for public comment, or publishing an Advanced Notice of Final Rulemaking ("ANFR") for a 30-day public comment period. While the Chamber fully recognizes that the Department is under no legal requirement to provide opportunity for comment on final rules if no substantive changes are made, it appears that this will not be one of those situations. Since the proposed Chapter 95 rule has gone through a substantive stakeholder review and input process, and there is considerable statewide interest in this rule and the TDS issue overall, the Chamber believes that it would best serve the public interest to publish an ANFR, if not a revised proposed rulemaking, so the regulated and environmental communities have an opportunity to review and provide feedback on DEP's changes.[11]

8. TDS management should realistically address the instream needs and requirements of particular Pennsylvania streams, adopting a targeted watershed approach.

The Chamber believes that the more appropriate way to address the "TDS issue" is to focus on the instream and downstream uses to be protected, and to establish a framework for developing management arrangements that consider particular conditions on watersheds that face a potential TDS challenge. One size does not fit all streams.

The Chamber believes that a watershed-based approach, including many of the concepts discussed by the TDS Stakeholders Group, warrants serious consideration. That approach would identify target watersheds based on a scientifically valid evaluation of actual and projected loadings from point and non-point sources, and their impact on the assimilative capacity of watersheds. That evaluation would include a combination of information from the water quality monitoring network together with NPDES permits, DMR data, permit applications and other information sources. Where baseline plus trend data indicate that TDS, Sulfate and/or Chloride loadings are anticipated to exceed a trigger percentage of the watershed's assimilative capacity under low flow (Q_{7-10}) conditions, the watershed would be identified as a "Target Watershed." In each Target Watershed, the Department would develop and implement a Watershed TDS/Sulfates/Chlorides Management Plan ("Watershed Management Plan") that (i) would identify the significant sources and loadings of TDS and/or Chlorides (as applicable); and (ii) provide coordinated, targeted and timely actions to avoid exceedance of the assimilative capacity. Working with stakeholders in each watershed, the Department would develop a plan that could consider and utilize a variety of "tools" to address the particular TDS challenges in each such watershed.

In framing such a watershed-based approach, the Department should consider a more flexible approach to regulating TDS and constituent discharges, considering assimilative capacity under differing flow conditions. It appears that certain types of discharges to potential

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[11] The Department recently embraced this approach when it published an ANFR for changes to the Administration of the Water and Wastewater Systems Operators' Certification Program in the January 23, 2010 Pennsylvania Bulletin (40 Pa. Bulletin 560).

Target Watersheds may be interruptible or significantly curtailed. That is, the wastewater generating activities are of a type that can be reduced or suspended for a period of time, or wastewaters may be held in storage or diverted to other watersheds, when the Target Watershed is experiencing low-flow conditions and attendant TDS concerns. Examples of potentially interruptible or managed discharges include (i) discharges from some deep mines, where AMD may be held back and stored in mine pools; (ii) certain oil and gas produced fluids, which may be stored in tanks or impoundments at or near the well drilling site or diverted to other treatment facilities for some time period; and (iii) some power plant scrubber operations. We believe that a process that allows for such managed discharges would provide a more cost-effective and efficient means of protecting a number of the potential Target Watersheds.

Again, the concepts discussed at the TDS Stakeholders Group merit serious attention, as they offer opportunities to address the TDS issues in a much more focused and effective manner. We look forward to continuing to work with the Department in examining, refining and pursuing such better approaches.

Sincerely,

Gene Barr,
Vice President, Government & Public Affairs

Cc: The Honorable Camille George
The Honorable Scott Hutchinson
The Honorable Mary Jo White
The Honorable Ray Musto
Independent Regulatory Review Commission

2806

From: Stephanie Wissman [swissman@pachamber.org]
Sent: Friday, February 12, 2010 2:00 PM
To: EP, RegComments
Cc: IRRC; cgeorge@pahouse.net; shutchin@pahousegop.com; mwhite@pasen.gov; musto@pasenate.com
Subject: Comments on Proposed Amendments to Chap. 95; TDS, Chlorides and Sulfates Effluent Standards, 39 Pa. Bulletin 6467 (Nov. 7, 2009)
Attachments: 20100212132619407.pdf

Importance: High

The original copy of the PA Chamber's comments were hand carried to EQB's offices on 2/12/10.

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