#2806

**From:** Josie Gaskey [josie.a.gaskey@comcast.net]
**Sent:** Friday, February 12, 2010 9:22 AM
**To:** EP, RegComments
**Subject:** Chapter 95 Wastewater Treatment comments
**Attachments:** Exhibit A-1 - TDS data comparison between Dec and Jan.xls; Exhibit B - TDS comparisons Braddock.pdf; Exhibit C - Ch 95 Taskforce Bituminous Mining presentation.ppt; PCA comments on Ch 95.doc

Attached are comments from the Pennsylvania Coal Association regarding the above proposed rulemaking. Due to the size of attachment A, a hard copy with all attachments will be delivered to your office today.

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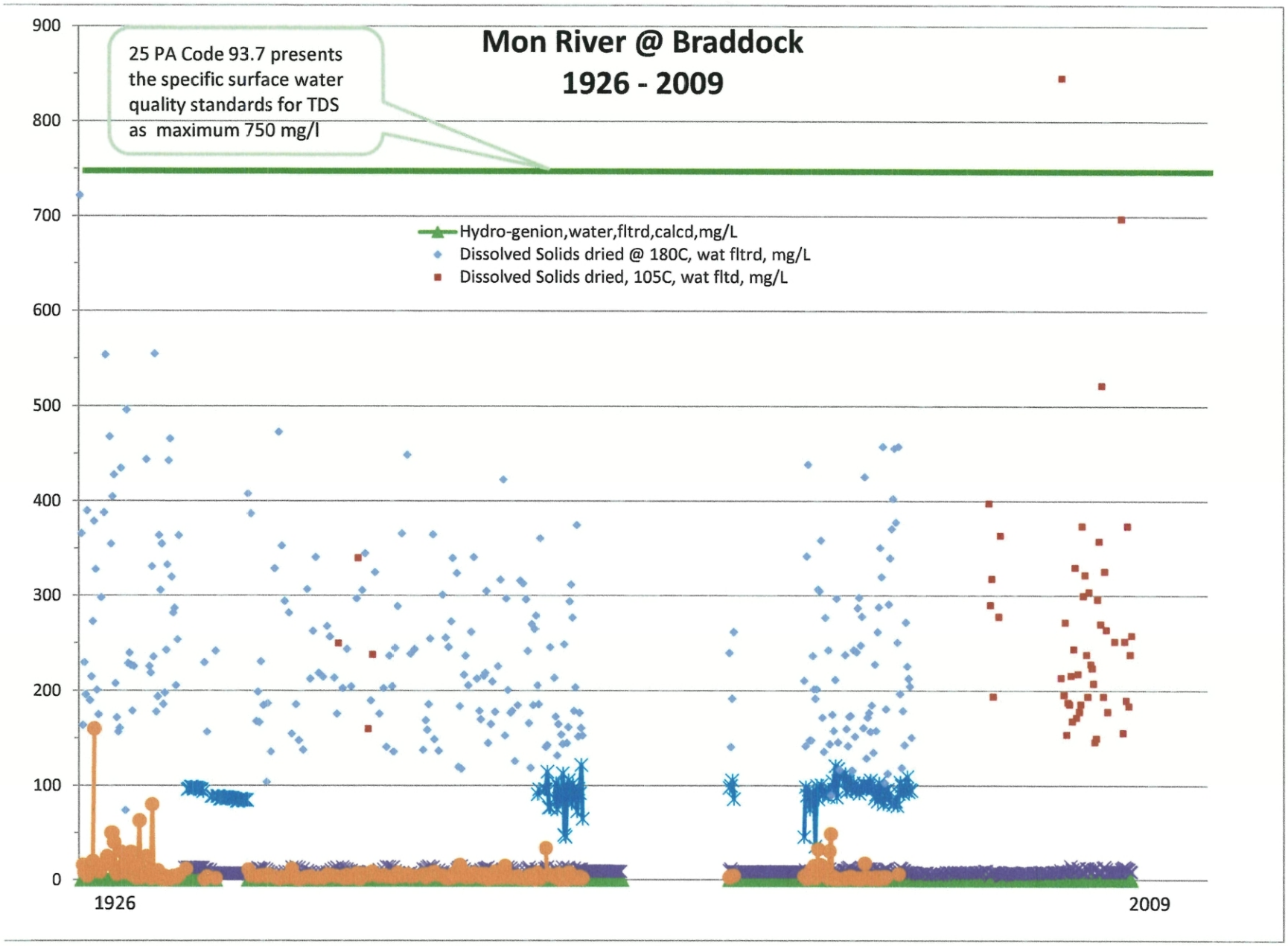
Mon River @ Braddock
1926 - 2009
25 PA Code 93.7 presents the specific surface water quality standards for TDS as maximum 750 mg/l
Hydro-genion,water,fltrd,calcd,mg/L
Dissolved Solids dried @ 180C, wat fltrd, mg/L
Dissolved Solids dried, 105C, wat fltd, mg/L
900
800
700
600
500
400
300
200
100
0
1926
2009

**Changes made to Data on DEP SW Regional Office website from what was posted in December 2009 to January 14, 2010**

| MilePoint | Samp ID | Report Date | Spec Cond | TDS | Chlorides | Sulfates |
|---|---|---|---|---|---|---|
| 88.2 | 1630-228 | December 09 | 246 | 142 | 4.89 | 79.1 |
| | | January 2010 | 246.1 | 142 | 4.89 | 79.1 |
| | 1630-240 | December 09 | same | same | 15.7 | 220 |
| | | January 2010 | same | same | 4.89 | 79.1 |
| 85.5 | 0593-030 | December 09 | 942 | 666 | 18.4 | 374 |
| | | January 2010 | NA | 147 | 32 | 230 |
| 84.0 | 0593-031 | December 09 | 812 | 580 | 16.3 | 316 |
| | | January 2010 | NA | 92 | 16 | 80 |
| 79.5 | 1630-284 | December 09 | 147 | 104 | 5.6 | 78 |
| | | January 2010 | 147 | 104 | 5.6 | 37.5 |
| | 1630-294 | December 09 | 167 | 114 | 5.74 | 52 |
| | | January 2010 | 167 | 114 | 5.74 | 52.4 |
| 71.0 | 1620-187 | October 09 | NA | 676 | 22.5 | 363 |
| | | November 09 | Sample deleted | | | |
| | | December 09 | Sample deleted | | | |
| | | January 2010 | Sample deleted | | | |
| 69.0 | 0552-873 | December 09 | 906 | 786 | 38 | 429 |
| | | January 2010 | NA | 850 | 49.9 | 428 |
| 66.0 | 0552-872 | December 09 | 895 | 794 | 39.5 | 416 |
| | | January 2010 | 991 | 756 | 37.4 | 395 |
| 57.5 | | | | | | |
| 50.5 | 1523-157 | December 09 | 298 | 194 | 11 | 77.5 |
| | | January 2010 | 115 | 194 | 11 | 77.5 |
| 46.2 | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 34.2 | 0594-126 | December 09 | 1066 | 732 | 58.7 | 362 |
| | | January 2010 | 580 | NA | NA | NA |
| 32.5 | 0594-127 | December 09 | 1090 | 738 | 62.6 | 367 |
| | | January 2010 | 240 | NA | NA | NA |
| 30.0 | 0594-128 | December 09 | 1160 | 804 | 64.5 | 399 |
| | | January 2010 | 195 | 142 | 9.97 | 47.8 |
| 26.0 | 0594-129 | December 09 | 1120 | 800 | 46 | 391 |
| | | January 2010 | 870 | 580 | 28.4 | 292 |
| 25.0 | | | | | | |
| 24.0 | no sample no | December 09 | 241 | NA | NA | NA |
| | | January 2010 | 241 | 546 | 37.5 | 254 |
| | no sample no | December 09 | 826 | NA | NA | NA |
| | | January 2010 | 826 | 576 | 36.3 | 285 |
| | no sample no | December 09 | 901 | NA | NA | NA |
| | | January 2010 | 901 | 568 | 44.2 | 279 |
| 16.7 | | | | | | |
| 12.0 | 0594-135 | December 09 | 746 | 480 | 48.1 | 225 |
| | | January 2010 | 855 | 808 | 30.9 | 207 |
| 11.0 | 0552-868 | December 09 | 666 | 524 | 52.3 | 279.2 |
| | | January 2010 | 601 | 400 | 31.2 | 100 |
| 4.5 | CMU 11 24 09 | December 09 | NA | | 45.1 | 154.3 |
| | | January 2010 | deleted | | | |
| 3.1 | | | | | | |

| Notes |
| --- |
| added CMU data |
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| |
| added CMU data |
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| |
| added CMU data |
| added 2 samples from October 09 |
| |
| added CMU data |

added CMU data

added 2 samples from October 09

added 4 samples from October 09

added CMU data

added 4 samples from October 2009

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George L. Ellis
President

February 11, 2010

Environmental Quality Board
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RE: 25 PA. CODE CH. 95
Wastewater Treatment Requirements
[39 Pa.B. 6467]

Dear Members of the Board:

The Pennsylvania Coal Association (PCA) submits these comments in response to the above referenced rulemaking.

PCA is the principal trade organization representing bituminous coal operators - underground and surface, large and small - as well as other associated companies whose businesses rely on a thriving coal economy. PCA member companies produce over 85 percent of the bituminous coal annually mined in Pennsylvania, which totaled 68 million tons in 2008.

Pennsylvania is the 4th leading coal producing state and its mining industry is a major source of employment and tax revenue. Last year, it created 59,970 direct and indirect jobs with a total payroll in excess of $2.2 billion. Taxes on these wages netted over $720 million to the coffers of federal, state and local governments. PCA appreciates the opportunity to comment on this proposed rulemaking.

**General Comment**

PCA believes that the proposed standards, coupled with an unreasonable time frame for implementation, are unworkable and threaten the vitality of the Pennsylvania coal mining industry. At a time of economic turmoil throughout Pennsylvania and the country, the coal mining industry provides high-paying, stable jobs and the most cost-effective source of electricity now (or for the foreseeable future) available to Pennsylvanians. Placing obstacles such as this proposed rulemaking in the path of an

already highly-regulated industry does nothing to achieve one of Governor Rendell's top economic priorities of retaining the jobs we have[1].

For these reasons and the specific reasons discussed below, PCA strongly opposes this rulemaking.

**Specific Comments**

**DEP has Insufficient Supporting Data to Support the Proposed Regulation**

1. The Field Data Do Not Indicate Surface Waters are at Risk

DEP's data and information do not support its proposed rulemaking. EPA has developed comprehensive water quality monitoring and assessment guidance for states to use when setting water quality standards and to support water quality management decisions. EPA's guidance requires the monitoring program to include appropriate precision levels and confidence "to control decision errors and balance the possibility of making incorrect decisions."[2] The supporting information and sampling data used by DEP in proposing these changes to Chapter 95 do not meet EPA's requirements, lack scientific integrity and statistical appropriateness, and are insufficient to justify DEP's decision to propose this rulemaking.

Furthermore, section 5 (a) of The Clean Streams Law (P.L 1987, Act 394 of 1937, as amended) requires the Department, when adopting rules and regulations to exercise sound judgment and discretion, and to consider the following:

(a) Water quality management and pollution control in the watershed as a whole;
(b) The present and possible future uses of particular waters;
(c) The feasibility of combined or joint facilities;
(d) The state of scientific and technological knowledge; and
(e) The immediate and long-range economic impact upon the Commonwealth and its citizens.

35 PA. STAT. ANN § 691.5(a).

While the Background and Purpose sections of the Preamble repeatedly reference water quality surveys, analyses and studies conducted or reviewed by the DEP as the justification for this proposed rulemaking, when asked by PCA to provide this data, DEP's response was, at best, inadequate.

Specifically, on August 4, 2009, PCA sent a letter to the DEP requesting all supporting data and information used in the development of the proposed rulemaking. A review of DEP's response confirms that it relied upon an extremely limited set of data collected from the Monongahela River during a 2 ½-month period in the fall of 2008 during an exceptionally low-flow period. This data collection apparently ceased at the end of December 2008 when tests indicated TDS and sulfates levels were no longer elevated. Nevertheless, DEP released its *Permitting Strategy for High Total Dissolved*

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[1] "Economy/Jobs", *Governor Rendell*, http://www.portal.state.us

[2] US EPA. 2003. *Elements of a State Water Monitoring and Assessment Program.* US Environmental Protection Agency, Office of Wetlands, Oceans and Watersheds. Washington, DC. EPA-841-B-03-003.

*Solids (TDS) Wastewater Discharges*, which included proposed changes to Chapter 95, on April 11, 2009, despite having ended its sampling on the Monongahela River. Only thereafter did DEP resume its monitoring activities in September of 2009.

PCA also requested information on which streams and waterways were "at risk" for sustained elevated concentrations of TDS, sulfates and chlorides. DEP's response stated there were 36 active water quality networks during the above time period— 28 of which were considered "at risk" and eight, "reference sites", which were not.[3] The eight "reference sites" are all Chapter 93 Exceptional Value streams—the best water quality streams in Pennsylvania, which creates a bias toward a finding that otherwise perfectly safe and useful, albeit not "pristine," waters are a "concern."

DEP further indicated the at-risk sites were chosen because one or more of the chlorides, sulfates or TDS concentrations were magnitudes higher than the concentrations at the eight reference sites, which is not surprising since these streams have, as noted, the best water quality in the State. The mean concentrations at the eight reference sites were as follows:

- specific conductivity less than 132 μmho/cm,
- chlorides less than 9 mg/L,
- sulfates less than 20 mg/L and
- TDS less than 96 mg/L.[4]

PCA also evaluated the mean chloride, sulfates and TDS concentration data provided by DEP for the 28 at-risk sites. Of the 28, only 6 had TDS and/or sulfate concentrations that exceeded the proposed effluent limits of 500 mg/L and 250 mg/L, respectively. In addition, sampling for the 36 sites was not conducted on a regular basis and none of the water quality sampling data provided by DEP showed a chloride concentration greater than 250 mg/L.

It was not until the fall of 2009, shortly before proposing this rulemaking, that DEP began publishing the small amount of TDS sampling information and results for the Monongahela River on the Southwest Regional Office webpage and updating it with additional information approximately on a monthly basis. However, as the update appeared, the previous version was no longer available on DEP's website, making comparisons difficult. Fortunately, PCA downloaded the revisions as they were published and was able to compare the original data posted in the fall of 2009 with the revised data appearing on DEP's website on January 14, 2010. We found the January 14th version reflected major changes to 20 of the sample results previously reported in the fall of 2009, many of which related to samples collected in the critical, low flow, time period of the fall of 2008. The following example shows the original results and the January 14 revised results for a sample collected on October 22, 2008 at mile marker 85.5 (upstream of Georges Creek)[5]:

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[3] As described in Exhibit A, these 8 reference sites included the following: Kettle Creek, Clinton County; Killbuck Run, Cambria County; Mill Run, Fayette County; Tionesta Creek, Forest County; Mill Creek, Westmoreland County; Havens Run, McKean County; Youghiogheny River, Somerset County; and First Fork Sinnemahoning Creek, Potter County. *See* Letter from Secretary John Hanger, Pennsylvania Department of Environmental Protection, to Mr. George L. Ellis, Pennsylvania Coal Association (September 3, 2009).
[4] *See id.*
[5] See PA DEP Southwest Regional Office's Community Information website, *Monongahela River TDS Chloride and Sulfate Sampling Results*, updated 1/14/2010.

| | Original (10/09) | Revised (Jan. 2010) |
|---|---|---|
| • Specific conductance | 942 | NA |
| • TDS | 666 | 147 |
| • Chloride | 18.4 | 32 |
| • Sulfate | 374 | 230 |

A summary table of all of DEP's changes to the 2008-09 Monongahela River data is attached as Exhibit A-1. Aside from the January 2010 revised values indicating constituent levels below the proposed limits, PCA questions how there can be such a disparity in the data. DEP's website gave no explanation for the changes. We do not know whether the original reports are valid, whether the new concentrations are valid *or whether either set is valid. This is but one illustration of DEP's poor data quality* management, the risks of relying upon a very small set of samples to launch a new set of regulations and the difficulty of assessing data that, due to a myriad of variables, appears to be a moving target.

In public meetings and forums, DEP has repeatedly indicated that the Beaver River and West Branch of the Susquehanna River are severely limited in their capacity to assimilate new loads of TDS and sulfates. However, data supplied in response to PCA's August 4, 2009 request reveals TDS and sulfate levels for these waterways are significantly below the proposed TDS and sulfates limits. DEP provided us with no data for the Neshannock or Moshannon rivers. A review of DEP's website and its Regional Offices' websites shows no data published publicly for any waterway except the Monongahela River.

Approximately a month after the proposed Chapter 95 revisions were published by the DEP in the Pennsylvania Bulletin (December 2009), the River Alert Information Network ("RAIN", available at http://www.3rain.org) began to provide continuous Monongahela River monitoring system data regarding specific conductivity at a number of specific locations. However, while often updated on an hourly basis, the public is unable to access any historic specific conductivity data collected by RAIN. As such, the RAIN specific conductivity data collected is useless to the public at this time.

The Preamble also makes reference to the Monongahela River Watershed being adversely impacted by discharges of TDS, sulfates and chlorides. However, the West Virginia University Water Research Institute (WVWRI) monitored and analyzed the Monongahela River at Point Marion, PA mile point 90.8, near the PA-WV border from 1999 to 2006[6]. During this time frame, the Pt. Marion monitoring location showed declining trends in chlorides, sulfates and TDS concentrations. No sulfate concentration was found to be over the proposed 250 mg/l limit and only one TDS sample was greater than the 500 mg/l proposed limit, and this occurred during lowest flow.

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[6] P. Ziemkievicz and M. O'Neal, *"TDS from Mines and Wells, WVWRI Project 119: Mon River Water Quality Monitoring and Presentation" and "Background: TDS in the Monongahela River"*, Morgantown, West Virginia University, West Virginia Water Research Institute, 2009.

Finally, pursuant to 25 PA. CODE § 109.416, every community water system in Pennsylvania is required to mail or deliver to each customer a water quality report on a yearly basis. This report is officially called the Consumer Confidence Report. Examination of the 2008 reports for the community water systems utilizing the Monongahela River indicated no mention of TDS, sulfates or chlorides violation or problems. PCA believes if a TDS, sulfates or chlorides problem existed of the magnitude claimed by DEP, there would have been at least a mention of the issue in these reports.

2. DEP's Data is Based on an Incorrect Test Method

DEP also used the wrong analytical test method to analyze its data for TDS. Pursuant to 40 CFR § 136.3(a) and 40 CFR § 143.4(b), the EPA-approved sample methodologies for determining TDS concentrations are Standard Method 2540 C and USGS Method I-1750-85, both of which require samples to be dried at 180°C. However, DEP used another method, USGS Method I-1749, which permits a sample to be dried at a far lower temperature of 105° C.[7] The temperature at which the sample is dried will influence the sampling results because different temperatures and time for drying will affect sample weight losses due to water crystallization, volatilization of organic matter, mechanically occluded water, and gases from heat-induced chemical decomposition, as well as weight gains due to oxidation. Samples dried at 103° to 105°C may retain a significant portion of water, especially if sulfates are present. Further, if the TDS sample being analyzed has a high mineral concentration, it can absorb moisture and require a longer drying time to get an accurate result. DEP's data indicates quite clearly the TDS sampling was dried at 105°C. However, DEP requires all NDPES permit holders to use the approved EPA Standard Methods 2540C (180°C) when analyzing for TDS. PCA questions why DEP did not use the approved testing method, particularly when the data was to be used to justify proposed rulemaking. We have attached a graph of the Monongahela River at Braddock summarizing TDS data from 1926 to 2009 which shows the difference between sample results dried at 180°C versus 105°C. (Exhibit B.)

In summary, DEP has not conducted enough sampling nor completed the appropriate historical analyses to determine whether there is a real sustained threat and not just a seasonal flow event from TDS concentrations, the extent of any threat, or the correct parameters and concentrations to control TDS. Based on the above, there is inadequate scientific evidence indicating a statewide TDS problem, or justifying a need for the proposed Chapter 95 regulation changes.

**TDS, Chloride and Sulfate are Secondary Water Contaminants Only**

The proposed rulemaking's "end-of-pipe" discharge limits of 500 mg/l TDS, 250 mg/l sulfates and 250 mg/l chlorides are not based on a "technology-based" evaluation of the type ordinarily done to develop effluent limits. Rather, they are derived from federal and Pennsylvania secondary drinking water standards which are designed to improve the aesthetic characteristics of public water supplies, such as color, taste and odor, and have nothing to do with protecting human health.

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[7] *See* DEP's Southwest Regional Office's "Community Information" website, which designates TDS samples as "TDS @ 105° C." *See also*, Letter from Secretary John Hanger, Pennsylvania Department of Environmental Protection, to Mr. George L. Ellis, Pennsylvania Coal Association (September 3, 2009), which is included as Exhibit A.

The federal Safe Drinking Water Act ("SDWA") protects public health by regulating the nation's public drinking water supply and protecting sources of drinking water. It authorizes EPA to set standards for contaminants in drinking water and requires annual reports (Consumer Confidence Reports) to customers on the contaminants found in their water.

Pursuant to the SDWA, EPA has established National Primary Drinking Water Regulations that set water quality standards for drinking water. These standards establish enforceable Primary and non-enforceable Secondary Maximum Contaminant Limits (MCLs) for substances in drinking water at the point of use, not at the "end of a discharge pipe," and not in the river or other raw water source of the water supply, or at the intake to a public water supply. As noted, Primary MCLs are established based on the hazard potential to human health, while Secondary MCLs are established as non-enforceable guidelines highlighting substances that may affect the aesthetic quality (such as taste, odor or color) of drinking water. EPA recommends secondary standards to water systems, but does not require systems to comply. TDS, sulfates and chlorides are Secondary MCLs because of their potential aesthetic effects, not because of any public health hazard.

To the extent that DEP implies in the Preamble that the proposed Chapter 95 effluent limits for these contaminants apply to public health because the contaminants are a potential human health risk, DEP's assertion is unproven. The DEP has not provided any evidence that these contaminants present any direct human health risk. EPA has not established primary MCLs for TDS, sulfates and chlorides, choosing instead to establish secondary MCLs at the levels of 500 mg/l TDS, 250 mg/l sulfates and 250 mg/l chlorides.[8]

Moreover, the DEP's assertion in the Preamble that the presence of elevated levels of Disinfection By-Products (DBPs) poses a health risk by creating an "increased risks of bladder cancer to their customers" misleads the public to assume that TDS, chloride, and sulfate concentrations are directly related to DBP concentrations. The DEP has not provided the mining industry with data that establishes a direct link between TDS, sulfate and chloride in surface waters of the commonwealth and the creation of DBPs. DBPs can originate from a number of sources including sanitary wastewater disinfection by publicly operated treatment works, which are not associated with coal mining activities.

Thus, DEP's proposed regulation of TDS, chloride and sulfate in Chapter 95 is not necessary to protect human health or the environment. This "jump" to drinking water standards is overly restrictive.

**DEP's Economic Analysis is Insufficient, does not Satisfy the Clean Streams Law or the Regulatory Review Act, and Ignores the Unintended Impacts of the Proposed Regulation**

1. Legal Requirements of the Clean Streams Law and the Regulatory Review Act

[8] *See* 40 C.F.R §143.3 and 25 PA. CODE § 109.202 (adopting EPA's federal Secondary MCLs).

Section 5 of the Pennsylvania Clean Streams Law, 35 PA. STAT. ANN § 691.1 et seq. requires DEP to consider the "immediate and long-range economic impact upon the Commonwealth and its citizens" when it adopts regulations. It also requires DEP to exercise "sound judgment and discretion" in doing so. DEP has not met this standard nor performed a complete socio-economic analysis. In fact, the Preamble does not provide any state-wide or industry-specific immediate or long-range economic impact analysis (other than an estimated treatment cost of 25 cents/gallon, addressed below). In addition, PCA takes issue with the statement in the Preamble that DEP is currently constrained from approving any significant portion of applications for new sources of high TDS wastewater and still protect the water quality of Pennsylvania streams. DEP has the authority to utilize its existing tools to address these new source applications.

Also, pursuant to the Regulatory Review Act, the DEP is required to provide the Independent Regulatory Review Commission with a regulatory analysis form that must include, in addition to other sections, the following:

> (a)(4) Estimates of the direct and indirect costs to the Commonwealth, to its political subdivisions and to the private sector...
> (a)(12) A description of any alternative regulatory provisions which have been considered and rejected and a statement that the least burdensome acceptable alternative has been selected.

71 PA. STAT. ANN § 745.5.

Neither the preamble to the proposed rulemaking nor its submission to IRRC contains a sufficient discussion of the costs to the Commonwealth or its various political subdivisions that will be associated with the proposal. Nor does DEP sufficiently address what less burdensome alternatives were considered. Furthermore, the analysis of the "costs" to the private sector is, at best, perfunctory.

As such, PCA holds that the DEP's regulatory analysis does not satisfy either the requirements of the Clean Streams Law or the requirements of the Regulatory Review Act.

2. Treatment Technology and Costs

The Preamble states, "The existing practice for high TDS wastewaters is the removal of heavy metals, but currently no treatment exists for TDS, sulfates and chlorides, other than dilution." In the summer of 2009, the DEP WRAC formed the Chapter 95 Taskforce to evaluate the alleged TDS issue. PCA is represented on the Taskforce and as such, on September 22, 2009 presented to DEP an impact analysis of the proposed rulemaking on the bituminous mining sector.[9] Several sectors impacted by this proposed rulemaking also made similar presentations with increased cost figures of the same magnitude as PCA. PCA's presentation was based on a September 2009 study performed by CME Engineering at PCA's request, to assess the impact of the proposed TDS rulemaking on the Pennsylvania bituminous coal mining industry. CME surveyed PCA

[9] J. Owsiany on behalf of the Pennsylvania Coal Association. *"Mining Sector: Impact Analysis of the High TDS Strategy on the Mining Industry."* Presentation, PA DEP Water Resources Advisory Committee, Ch. 95 Taskforce, Harrisburg, PA, September 22, 2009. (Exhibit C)

membership, and data received for this analysis accounts for 85 percent of the 68 million tons of coal produced annually in Pennsylvania and potential flows to be treated of 26,725 gallons per minute.

The PCA study showed that technologies available to treat high TDS waste waters are limited, depend upon the individual chemical constituents of the water to be treated, and have unique and significant technical and economic feasibility issues. These regulations are particularly problematic to mining operations because of the following distinguishing reasons:

- Volume - the average volume of wastewater from coal operations is much larger than the volume of produced water from oil and gas operations.
- Stoppage of Discharge - Oil and Gas operations can stop a discharge. Coal mining operations generally do not have the ability to shut down a discharge.
- Mining Discharges Cannot be Transported - Oil and gas operations have the ability to transport its produced fluids to disposal locations of its choice.
- Unique TDS, Chloride and Sulfate Concentrations - The treatment options for each industry will have to be specifically designed to meet the specific flows, concentrations and mass loadings of that industry's discharge.

For the bituminous coal mining industry, the only technology potentially capable of achieving the TDS levels DEP is proposing, is reverse osmosis combined with evaporation and crystallization and pretreatment. This technology is extraordinarily expensive and has not been operationally tested at any bituminous coal mining facility. Based on this study and treatment system, the cost of this proposed regulation to the bituminous coal mining industry is:

- **$1.325 billion in capital costs,**
- **$133 million every year for operation and maintenance costs, and**
- **$134 million for bonding a 500 gallon per minute zero liquid discharge treatment system, as calculated with the AMD treat and bond/trust fund calculation spreadsheets.**
- These costs **do not** include dollars for land acquisition, site development, utility extensions, etc. necessary to construct a treatment plant.

DEP has not reviewed the economic impact of this regulation on other major industrial sectors and, in particular, has not thought through all the implications of this proposed rulemaking including the adverse effects on the competitiveness of the coal industry. A specific example is a coal company with 3,000 gallons per minute combined flow and an annual coal production of 1 million tons. To meet the proposed limits, it would need to construct treatment systems costing $138 million to build and $10.8 million per year, thereafter, to operate. Thus, the regulation would add approximately **$17.70** to the price of a ton of coal produced, not including interest or inflation, which will place Pennsylvania coal at a competitive disadvantage *vis a vis* the cost of coal mined in other states. This would force coal customers to look to neighboring states or the west for their coal supply, because those states have no such effluent limits as those proposed by DEP.

As noted above, in the proposed rulemaking, DEP estimates a 25 cent per gallon increase in treatment costs to "comply" with this new proposal. However, DEP has not provided any information as to how it obtained this figure, and it is not clear if this estimate is based solely on operational cost or if it includes capital costs for construction and bonding. Even if this number was correct, it is not uncommon for a mining facility to have a discharge or combined discharges greater than 1,000 gallons per minute. Thus, even using DEP's $.25 per gallon cost, this estimate equates to $131,400,000 per year in additional costs. Such an increase in treatment costs would eliminate the surface coal mining industry in Pennsylvania and cripple the deep mining industry.

3. Treatment Cannot be Accomplished within DEP's Proposed Timeframe

Even if treatment was cost-effective (which it is not), based on our industry's experience, the January 1, 2011 compliance deadline is unreasonable, unachievable and arbitrary. Even if there were a TSD problem (which DEP has yet to show), these treatment systems are not off-the-shelf items. Most mining facilities have several discharge points with varying water chemistry. Prior to designing any facility, a feasibility study must be completed to determine the most cost- effective method for handling the wastewater. Based on the feasibility study, each system must then be custom designed and permitted (multiple permits) prior to equipment ordering and construction. In addition, some of these systems require expensive specialty steels. This coupled with an influx of orders and permitting delays will increase the lead times for compliance. PCA's study projects a minimum of 3 years lead time, assuming the treatment technology works and there are contractors to build and implement the technology and, DEP is actually able to process the necessary permit applications. The timetable for compliance is unreasonable and illustrates a gross misunderstanding of the technology required to comply with the proposed rulemaking, as well as a lack of understanding regarding the mining industry.

4. Indirect Environmental and Economic Impacts

Aside from the huge financial burden to the coal industry, the proposed regulation would cause severe indirect environmental and economic impacts which DEP has not considered.

First, the proposed revisions to Chapter 95 will force the Commonwealth to assume responsibility for treating many more acid mine discharge sites, for these reasons:

- Mining companies which operate under DEP's "Subchapter F" remining programs (*See 25 Pa Code § 87 Subchapter F: Surface Coal Mines Minimum Requirements for Remining Areas with Pollutional Discharges*) will no longer mine and then reclaim existing mine sites because the cost of treating high-TDS wastewater will simply be too high.
- Citizens and watershed protection groups will not be able to raise the money needed to treat high-TDS discharges mine drainage from abandoned mines and therefore, these valuable environmental protection projects will very likely stop.

- Some operators may be forced to forfeit bonds for post-mining discharges because they cannot afford the increase necessary to cover the orders-of-magnitude higher treatment costs for high-TDS discharges. As a result, water treatment now being performed by operators at no cost to the State, will be discontinued.

Second, PCA has concerns over the additional unresolved management and disposal challenges associated for the huge volumes of residuals that will result from treating water to meet the proposed standards. PCA's study and presentation to the WRAC Chapter 95 Taskforce outlines the following environmental concerns not addressed by DEP in the proposed rulemaking:

- The power needed to reduce billions of gallons of wastewater to a solid is huge. Energy usage is approximately 429,000 megawatts per year and a conservative cost estimate is $42.9 million. Such a huge increase in electrical power is, of course, completely inconsistent with efforts by the current Administration to "encourage" a reduction in reliance on electrical power usage[10].
- Residual solid waste will be generated at a rate of 237,000 tons per year.
- If not evaporated to a solid form, residuals will be in the form of a concentrated brine amounting to nearly 1 billion gallons every year.
- Disposal of this waste. PCA is uncertain if Pennsylvania landfills will accept this waste for disposal because these facilities may also be subject to the proposed regulations and because this waste may not be compatible with landfill liners and leachate collection systems. Therefore, the brine would most likely be trucked out of state. This would require a vast infrastructure of trucks, trains and storage facilities to accommodate the volume of residual waste created by the mining industry. PCA is uncertain if DEP's Bureau of Waste Management is even aware of the implications of the proposed rulemaking.
- $CO_2$ emissions Cap and Trade at $20/ton carbon credit is projected to cost $136,000 per year per plant.

Third, we also believe that DEP has overlooked the impacts of other major potential sources of TDS such as road salt used for deicing. Last year, PennDOT and the PA Turnpike Commission used over 1 million tons of road salt. This number does not take into account residential usage for sidewalks, softening systems and driveways or commercial uses such as parking lots. One million tons of salt is equivalent to 650,000 tons of chlorides potentially landing up in PA waterways. In reality, some salt will remain on land and leach down into the groundwater. Thus, DEP has not shown that controlling "new" industrial discharges of "high-TDS wastewater" alone will protect surface waters in view of these other, uncontrolled chloride sources.

**Conclusion**

In summary, we again reiterate that DEP has not conducted the appropriate sampling nor completed the appropriate historical analyses to determine whether there

[10] On Oct. 15, 2008, Governor Rendell signed HB 2200 into law as Act 129 of 2008, with an effective date of Nov. 14, 2008. The Act expands the Public Utility Commission's oversight responsibilities and imposes new requirements on electric distribution companies, with the overall goal of reducing energy consumption and demand.

is a real sustained TDS threat, the extent of any threat, the correct parameters and concentrations to control TDS, the impacts of the proposed rulemaking, or the available technology or potential alternative approaches to address perceived TDS issues. PCA believes this proposed rulemaking:

- is unclear and lacks sufficient support as to the need for the regulation,
- is unreasonable with respect to proven technology, cost effectiveness, and timeframes, and
- represents adverse direct and indirect effects on the cost of coal including lack of competitiveness and loss of jobs.

PCA respectfully requests DEP withdraw this regulation until DEP has collected and evaluated the appropriate current and historical data, completed a comprehensive peer-reviewed scientific and economic analysis, reviewed literature studies and performed toxicity tests to determine the appropriate in-stream standards to be regulated to protect aquatic life and waterways, and pursues a pathway that provides a balanced approach to clean streams in Pennsylvania.

Sincerely,

Josie A. Gaskey
Dir., Regulatory and Technical Affairs

CC – George Ellis

Attachments

# Impact Analysis of the High TDS Strategy on the Bituminous Mining Industry

presented to the PA DEP WRAC TDS Subcommittee

September 22, 2009

# Objective: Assess Functional, Logistic, Economic and Environmental Impacts of the TDS Strategy on the mining sector

- ✓ Using a conservative interpretation, evaluate how the mining industry would comply with the proposed limits
- ✓ Evaluate how potential solutions would be implemented, infrastructure needs, time to complete
- ✓ Evaluate the economic cost of potential solutions, both direct and indirect cost to communities
- ✓ What, if any, environmental impacts may result from implementation and compliance with proposed standards, unintended consequences

# Background PA Coal Industry

- Pennsylvania is the 4th leading coal producing state, mining 68 million tons in 2008.
- Federal Energy Information Administration (EIA) estimates that Pennsylvania has 27 billion tons of bituminous coal reserves.
- 571 active mining permits were on record as of Jan. 2009.
- The industry employs 7,649 employees, for a total of 54,000 direct and indirect jobs.
- Total payroll exceeds $2.2 billion, with paid tax revenues of $749 million.

# Operations Affected:

- **NEW and EXISTING OPERATIONS**
  - Underground Mines
  - Coal Preparation Plants
  - Coal Refuse Disposal Sites
  - Surface Mines
  - They have approved NPDES Discharges that were issued to insure water quality standards were met.
  - With regard to water treatment, the economics of these operations were predicated on meeting the requirements of 40 CFR 434.

# Operations Affected cont.

- **REMINING**
  - The program as set forth in PA law, regulations and 40 CFR 434 is predicated on pollutional loading not being increased, but hopefully in long run decreased.
  - The program was designed to improve water quality and encourage remining in areas previously impacted by mining and reduce pressure on areas not previously mined.
  - Under the regulations, TDS and sulfate levels would be tied to pollutional loading, not end-of-pipe effluent limitations.

# Operations Affected cont.

- **LEGACY MINE DRAINAGE TREATMENT**
  - Companies have completed mining, but as a result of operations are now obligated to treat water long-term.
  - Costs of maintaining these operations will increase significantly and place these operations in jeopardy, resulting in State having to treat.

# Operations Affected cont.

- **ABANDONED MINE DRAINAGE**
  - Projects involving wetland treatment of mine drainage are designed to passively treat to provide low iron, low manganese and a pH of 6-9.
  - Projects no longer viable if they have to achieve TDS effluent levels.

# Operations Affected cont.

- **MINE DRAINAGE**
  - Studies have been conducted to use mine water for low-flow augmentation.
  - In some cases, water would have been treated using passive treatment technology or minimal treatment requirements, but were not considering treating for TDS and sulfates.
  - Companies have looked at mine pools to supplement stream flow as a means of insuring adequate stream base flow while withdrawing the equivalent amount of water for power generation.

# PCA Membership Survey

- Pennsylvania Coal Association (PCA) conducted a survey to gauge the scope of ongoing treatment activities and estimate potential effects of proposed rule making.
- 85% of Pennsylvania's total bituminous coal production is represented by PCA.
- Survey information is representative of the industry, but it is not comprehensive. The total number of discharges and water quality data is incomplete due to time limitations and the nature of existing NPDES permit limits.
- Data was received concerning 41 permitted discharges related to 8 surface and 16 underground coal mines.

# PCA Membership Survey cont.

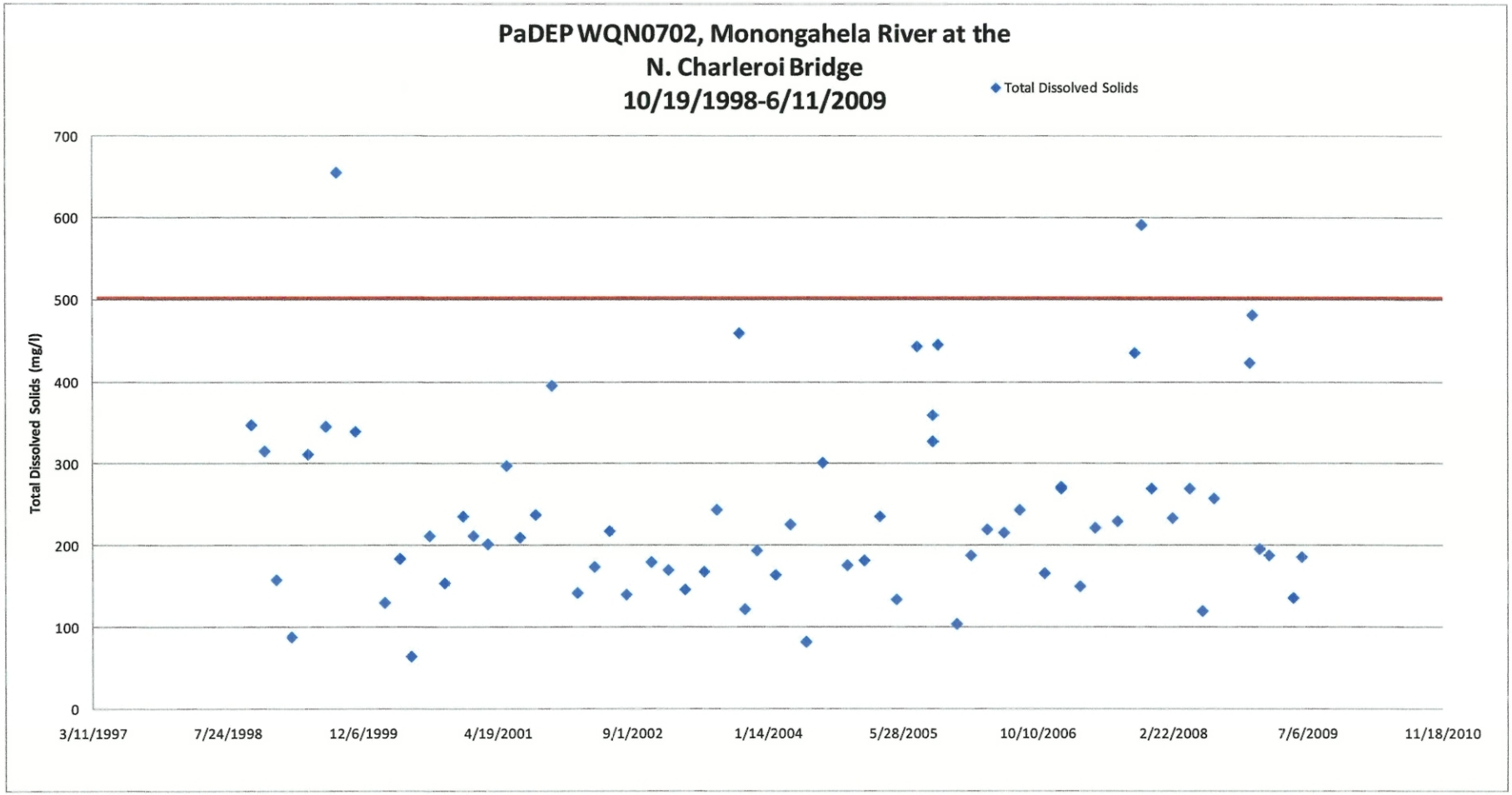
- The combined maximum flow from these discharges is approximately 26,725 gallons per minute (gpm).
- 96% (26 of 27 reporting TDS) report a maximum TDS concentration > 500 mg/l.
- 4% (1 of 27 reporting TDS) had a maximum TDS concentration < 500 mg/l.
- 78% of all discharges (32 of 41) failed to meet at least one of the proposed chapter 95 standards at the end of the pipe.

# PCA Analysis of PA DEP Data Response

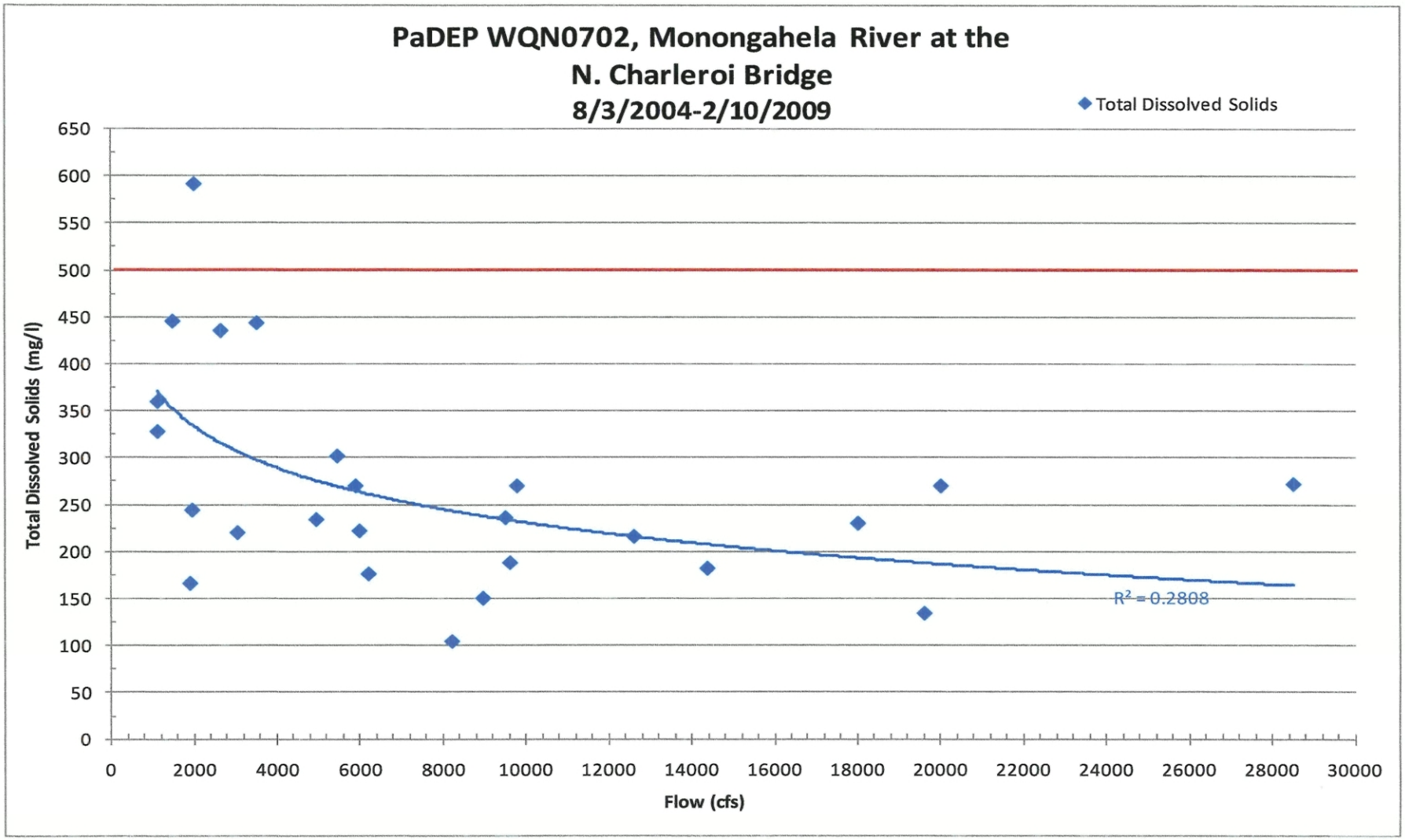
- PCA requested list of waters at risk for sustained elevated concentrations of TDS, sulfates and chlorides
  - 28 WQNs considered 'at risk' and 8 were not
  - Of 28 WQNs, only 6 had TDS and/or sulfate concentrations that occasionally exceeded the proposed effluent limits. None had chloride concentrations > 250 mg/l.
  - Sampling at these 36 WQNs not conducted on regular basis
  - Sampling ceased in December 2008
  - Analytical method used to determine TDS for the Monongahela sampling is not an EPA-approved method.
  - Data provided by DEP is insufficient to support its claim that watersheds statewide are impaired by high concentrations of TDS, sulfates and chlorides.

# Monongahela Water Quality Trends

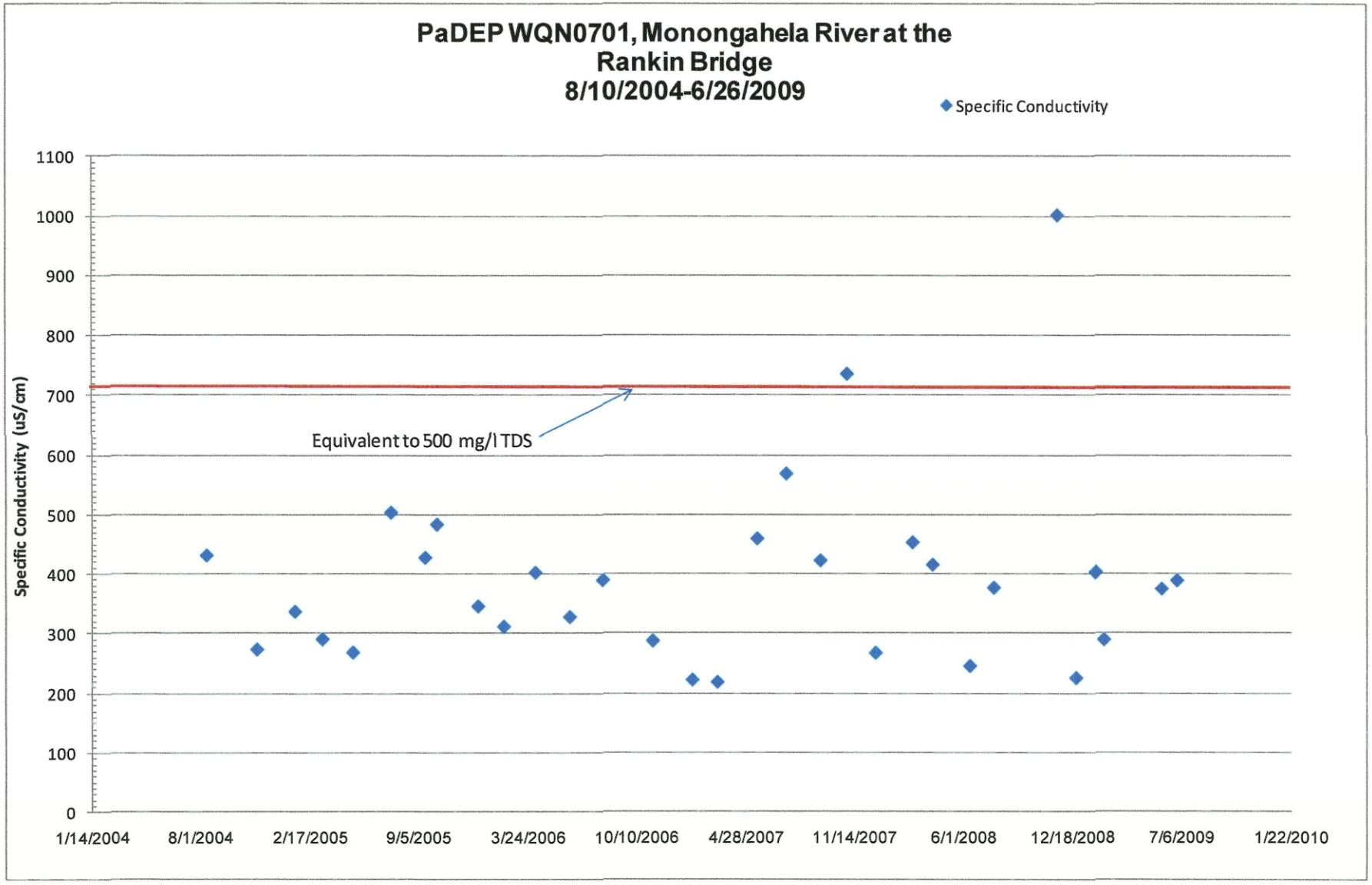
- Most Comprehensive Collection of PaDEP Mon. River Data from Site WQN0702
- Long-Term Data Indicates Exceedances of 500 mg/l TDS Limit are Sporadic
- TDS Exceedances Correspond to Low Flow Conditions



# Monongahela Water Quality Trends cont.

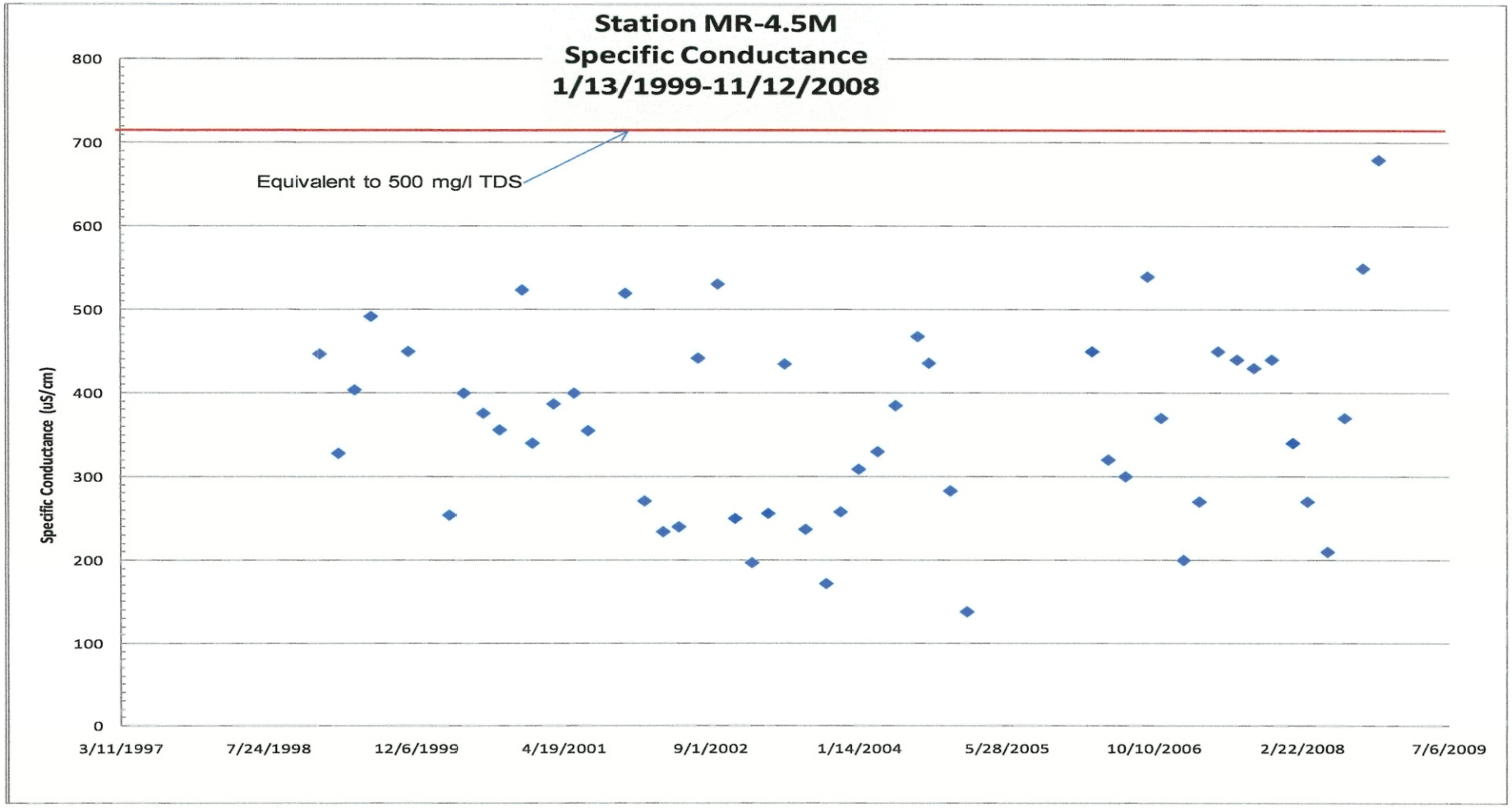


# Monongahela Water Quality Trends cont.



# Monongahela Water Quality Trends cont.

- Long-Term Specific Conductivity Data From Near Pittsburgh Location Suggests No TDS Exceedances



# TDS Treatment Alternatives

- A variety of treatment alternatives were examined, moving from low-intensity alternatives to high-intensity approaches:
  - Managed Discharge / Utilization of assimilative capacity
  - Managed Treatment / Protection of assimilative capacity
  - Electro-dialysis
  - Precipitation
  - Liquid-Liquid Extraction
  - Reverse Osmosis (RO)
  - Evaporation Crystallization

# TDS Treatment Alternatives cont.

- Managed Discharge / Real Time Monitoring Network
  - This approach would primarily utilize holding capacity or mine pool storage to reduce or eliminate AMD treatment discharges during low-flow periods of the year when water quality attainment is at risk.
  - Facilities would actively discharge during high-flow periods when excess capacity exists and TDS levels are at seasonal lows.
  - Advantages – protects designated stream uses, utilizes existing capital assets with little modification, low-cost alternative, limited impact on the states economic competitiveness, avoids value chain cost implications
  - Disadvantages - not suitable for all mining activities, cyclic drought conditions may affect "normal" discharge operations, dependent upon dilution, may adversely affect water quality, potential loading shift

# TDS Treatment Alternatives cont.

- Managed Treatment / Real Time Monitoring Network
  - This approach would utilize a limited treatment capacity during low- flow periods of the year when water quality attainment is at risk.
  - Facilities would only operate and actively discharge during low flow periods when excess assimilative capacity is lacking and TDS levels are increasing.
  - Advantages – protects designated stream uses, decreases capital requirements and cost exposure though the use of smaller treatment facilities, targeted solution focusing on problem times, decreased secondary waste streams
  - Disadvantages - not suitable for all mining activities, significant capital impact on smaller operators, unknown operational impacts on treatment plants shuttered for long periods, solids disposal

# TDS Treatment Alternatives cont.

- Electro-dialysis
  - This approach utilizes selectively permeable membranes and applied current to promote the movement of soluble ions, separating them by their electric charge.
  - Well suited to soluble ions but not iron, manganese or hydrogen sulfide
  - Does not remove non-polarized ions and molecules
  - More expensive than RO at volumes greater than 1000 gpm and typically exhibits problems with membrane fouling in calcium- and magnesium- enriched waters
  - Not appropriate for the treatment of mine waste waters in Pennsylvania

# TDS Treatment Alternatives cont.

- Precipitation
  - This approach is an option for discharges high in sulfate, removing the sulfate through the precipitation of gypsum.
  - Well suited to conventional AMD treatment as a post metals removal step
  - ph is increased and excess calcium is added to create a super saturated condition with respect to gypsum, which then precipitates as a solid removing sulfate from the water.
  - Well suited to high sulfate waters associated with some types of mining
  - Unable to remove sulfate to proposed effluent limits of 250 mg/l, or address other contributors to elevated TDS
  - Rejected as a suitable treatment approach

# TDS Treatment Alternatives cont.

- Liquid – Liquid Extraction
  - This is an approach where acid mine drainage water laden with sulfate and iron feeds into a treatment circuit where it sequentially contacts, in a counter-current flow path, an extractant solution formulated to efficiently pull these ions from the aqueous phase solution into the extractant phase solution.
  - The extractant, now containing the iron and sulfate ions, overflows an exit weir from the treatment circuit to another chamber where it separates cleanly from the water phase, which underflows the same weir and exits as a separate stream with proportionately less iron and sulfate.
  - Experimental / pilot stage of development
  - Only recently resolved intellectual property litigation
  - Untried on a commercial scale
  - Costs and reliability on a commercial scale unknown
  - Rejected as a suitable treatment option

# TDS Treatment Alternatives cont.

- Reverse Osmosis (RO)
  - RO is process where pressure is used to force a solution through a permeable membrane in order to separate the solute from the solution.
  - It's an effective treatment for TDS with concentrations less than 40,000 mg/l. (Some manufacturers claim higher concentrations, but pressures are limited by membrane strength.)
  - Requires a rigorous pretreatment process to remove scaling agents (metals, hardness) and biological films which produces a solid waste
  - Units should be designed for the unique chemistry of the water they will treat, not an off-the-shelf, out-of-the-box fix.
  - Certain applications require corrosion resistant specialty metals with long lead times for delivery.

# TDS Treatment Alternatives cont.

- Reverse Osmosis (RO) Cost Estimate
  - Aqua Tech 500 gpm 2000 mg/l TDS single unit
    - Design, permit, construct $ 4,140,000
    - Operation and Maintenance $ 1,062,000
    - This value does not include concentrated waste disposal or an evaporation crystallization step.
  - Concentrated Disposal Circuit: Evaporation & Crystallization
    - 60 gpm evaporator /crystallizer $ 12,000,000
    - Design, permit, construct $ 8,700,000
    - Operation and Maintenance $ 2,266,000
  - Total Cost Combined System w/O&M
    - RO system $ 5,202,000
    - Evaporator Crystallizer $22,966,000
    - Total $28,168,000
    - Ten year total O&M after construction (yrs 2 – 11) $33,280,000

# TDS Treatment Alternatives cont.

- Reverse Osmosis (RO) Cost Estimate
  - Major RO Vendor
    - Design parameters: 800 gpm at 6000 ppm TDS with evaporation circuit
    - Capital Equipment $ 13,000,000
    - O&M Cost system design, permit, construct $ 19,000,000
    - Annual operation cost $ 1,712,000
    - Solid waste generated (t/yr) 13,140
    - Waste disposal cost (90% availability @ $64/t) $ 756,000
  - Total System Cost
    - Turnkey system installation $34,468,000
    - Ten year total O&M after construction (yrs 2-11) $24,680,000

# TDS Treatment Alternatives cont.

- Time Frames for Reverse Osmosis Implementation
  - Due to variation in water quality a feasibility study would need to be conducted for **each** source to be treated
  - This would then be followed by system design, site layout, permitting and special materials acquisition
  - The following estimated time frames are for the tasks listed below
    - Feasibility study — 6 months
    - Design — 6 months
    - Permitting — 12 months
    - Equipment acquisition & construction — 18-24 months
    - Total Estimated Time Frame — 2.5 - 3 years
      - This assumes no difficulty in obtaining corrosion resistant specialty metals, additional time could range from 12 to 24 months, delaying construction
  - Difficulty obtaining bonds in trust fund situation

# TDS Treatment Alternatives cont.

- Estimated Industry Cost Impact
  - Three cost estimates were obtained for a 500 gpm zero liquid discharge (ZLD) treatment system, RO combined with evaporation and crystallization
  - These three estimates were averaged to obtain an order of magnitude technology cost, which was applied to a per gallon cost
  - **The Result: $46,000/gpm to treat, $3,600/gpm for O&M annually**
  - Treating just the volume of water reported in the PCA survey would cost the mining industry $1.325 **Billion** dollars in capital expenditures
  - O&M costs are estimated as $133 **Million** dollars annually
  - Bonding for a 500 gpm ZLD treatment system is $134 **Million** dollars using the AMD treat and bond/trust fund calculation spreadsheets

# TDS Treatment & Environmental Concerns

- Handling of resultant waste streams and their impact
  - Estimates of "average" water quality applied to just the reported discharge volume results in approximately 650 tons of solid waste per day in need of disposal
  - Estimated at 237,000 tons annually, without a proven disposal location/option, and representing a 38% increase in production of industrial waste water treatment sludge in PA
  - Resultant solid wastes will be highly soluble and difficult to landfill without significant leachate generation.
- $CO_2$ emissions Cap and Trade
  - Electricity for RO, evaporator/crystallizer and pumps — 5362 tonne/yr
  - Trucking solid waste — 255 tonne/yr
  - Pretreatment hydrated lime use — 1183 tonne /yr
  - Total (not life cycle, excluding steel & concrete) — 6798 tonne/yr
  - At $20/tonne carbon credit total cost — $136,000/yr/plant

# Conclusion

- Available water quality data indicate that in-stream TDS concentrations are strongly influenced by volumetric flow.
- Consistent and widespread exceedance of secondary non-health based MCL's is not occurring, i.e. the Monongahela is **not** affected from the WV boarder to the point at Pittsburgh.
- The only equipment that may work to treat TDS is either RO or evaporation/crystallization or a combination of both.
- The cost of a ZLD approach for TDS treatment makes this approach **economically infeasible** for the mining industry or the state for its legacy obligations.

# Conclusion cont.

- Safe viable disposal options for the secondary waste streams generated from the use of RO / Crystallization are in question, creating the potential for secondary environmental impacts.
- Carbon emissions from the thermal portion of the treatment process have environmental and economic implications for air quality attainment.
- The PCA membership consensus is that, given the lack of pervasive water quality impairment, incomplete understanding of TDS fate and actual toxicity to aquatic life, and significant economic burden and waste disposal issues, the proposed rulemaking is not feasible or justified and should be withdrawn.

# Questions??