2806

Pennsylvania Coal Association
212 North Third Street • Suite 102 • Harrisburg, PA 17101
(717) 233-7900
FAX (717) 231-7610
pacoal1@aol.com

George L. Ellis
President

February 11, 2010

RECEIVED
2010 FEB 12 PM 2:48
INDEPENDENT REGULATORY
REVIEW COMMISSION

Environmental Quality Board
Rachel Carson State Office Building
P.O. Box 8477
Harrisburg, PA 17105-8477

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. <u>The Field Data Do Not Indicate Surface Waters are at Risk</u>

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*

---

[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]:

---

[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.

[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.

---

[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. <u>Treatment Technology and Costs</u>

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. <u>Treatment Cannot be Accomplished within DEP's Proposed Timeframe</u>

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. <u>Indirect Environmental and Economic Impacts</u>

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

EXHIBIT A

Pennsylvania Department of Environmental Protection
Rachel Carson State Office Building
P.O. Box 2063
Harrisburg, PA 17105-2063
September 3, 2009

Secretary 717-787-2814

Mr. George L. Ellis
Pennsylvania Coal Association
212 North Third Street Suite 102
Harrisburg, PA 17102

Dear Mr. Ellis:

Thank you for your recent letter requesting additional information on the data and decision-making process that informed the development of the Department of Environmental Protection's (DEP) High Total Dissolved Solids (TDS) Strategy and proposed Chapter 95 amendments.

In addition to the TDS strategy and Chapter 95 amendments you note, I want to inform you about other efforts DEP is undertaking to examine this issue. On a parallel track to the proposed changes to Chapter 95, the Water Resources Advisory Committee (WRAC) has formed a subcommittee to examine the economic impacts by sector and technology available to treat TDS. This subcommittee initially met on August 27 and will likely meet through early Spring 2010 at which point the subcommittee's findings will be presented to WRAC.

In addition to this stakeholder process, DEP is working with West Virginia, the Environmental Protection Agency, and numerous regional stakeholders to address the TDS situation in the Monongahela specifically. This group met on August 24 to begin these discussions.

I have enclosed a document summarizing the monitoring results from October 2008, through December 2008, which will supplement the responses to several of your questions. This document is also available on our Web site at
http://www.depweb.state.pa.us/southwestro/lib/southwestro/monongahelarivertdschlorideandsulfatesamplingresults.pdf .

In response to your specific concerns:

1. *List of all PA streams and waterways located within the bituminous coal fields that are considered by PA DEP to be at risk for sustained elevated concentrations of TDS, sulfates and chlorides. Please provide the sampling data and results for TDS, sulfates, chlorides, specific conductance (including temperature of sample analysis), flow and sampling location for each of these streams and waterways for July 1, 2008 through April 2009.*

samples for the eight sites had specific conductivity < 132 umho/cm, chloride < 9 mg/l, sulfate < 20 mg/l, and TDS < 96 mg/l. The at risk sites were selected because one or more of their chloride, sulfate, or TDS concentrations were magnitudes higher than the concentrations observed at the eight nonrisk (reference) sites. Field temperature is included but both specific conductance (SPC @ 25°C) and TDS (TDS @105°C) are reported at standardized temperatures by the lab. The enclosed spreadsheets titled *Generalized summary listing the 28 at risk sites and mean concentrations* and *Individual sample results* provide the data you are requesting.

2. *TDS, flow, sulfates, chlorides, specific conductance (including temperature of sample analysis) and location from each public water supply intake on the Monongahela River from July 1, 2008 through April 2009.*

   From October 14, 2008, through December 30, 2008, DEP monitored TDS, flow, sulfates, chlorides, specific conductance, and location. I am also enclosing a copy of those results. The results are also available on our Web site at the address listed above. The testing ceased in December 2008, so data is not available through April 2009, as requested.

3. *TDS, sulfates, chlorides, specific conductance (including temperature of sample analysis), flow and sample location from the Monongahela River between the West Virginia border and the confluence of the Youghiogheny and the Monongahela rivers in McKeesport, Allegheny County from July 1, 2008 through April 2009.*

   The results noted in our response to Item 2 above also list the sample locations. Please see the enclosed sample results for this information.

4. *The TDS test methodology used for the data in item numbers 2 and 3 above. Please explain the decision to use that particular test methodology.*

   The analytical method used to determine TDS for the Monongahela sampling was USGS-I-1749 used by Water Quality programs for stream analysis.

5. *All water sampling data and test methodology which led the Department to conclude in its January 21, 2009 press release that TDS levels, "... in the Monongahela River have dropped and remain well below state and federal guidelines."*

   As you will note in the enclosed monitoring results, starting in early December 2008, the TDS concentration at the various monitoring stations began to decline and after several weeks of continued low concentrations of TDS at monitoring stations throughout the Monongahela, DEP issued the January 21, 2009, press release you cite.

6. *All water sampling data and test methodology which led the Department to announce in it April 16, 2009 press release that, "High TDS solids in industrial waters have been a*

problem in the Monongahela River recently and are an impending problem on a state-wide basis"; and which resulted in the Department establishing base standards for high TDS water discharges, chlorides and sulfates.

See response to Items 1 and 2 above.

7. *All information and support data that the Department used in setting the new permitting limits for discharges of high TDS wastewater (500 mg/l), chlorides (250 mg/l) and sulfates (25 mg/l).*

Much of the information you are requesting is available on our Marcellus Shale Wastewater Partnership Web page, http://www.depweb.state.pa.us/watersupply/cwp/view.asp?a=1260&Q=545730&watersupplyNav=|30160|. I am enclosing a spreadsheet containing facilities that currently accept high TDS wastewater from oil and gas wells.

Thank you for your continued interest and willingness to work with us to address this high priority area. Should you have any questions, please contact Dana Aunkst, Bureau Director, Water Standards and Facility Regulation, by e-mail at daunkst@state.pa.us or by telephone at 717-787-5017.

Sincerely,

John Hanger
Secretary

Enclosures

Individual sample results

NAME	LONGITUDE	LATITUDE	SPC @ 25 deg C	CHLORIDE -IC	Stream Flow	SULFATE - IC	TDS @ 105 deg C	Water Temp
WEST BRANCH SUSQUEHANNA RIVER	-78.10884	41.116759	458	15		181	349	11
W BR SUSQUEHANNA RV	-78.677521	40.89719	426	16	67	127	296	6
CLEARFIELD CRK	-78.405937	40.986003	586	15	64	254	449	6
MONONGAHELA RVR	-79.880989	40.405596	442	33	19789	331	295	8
MONONGAHELA RVR	-79.904123	40.15201	423	16	7703	131	285	8
YOUGHIOGHENY RVR	-79.805358	40.241192	296	36	3097	55	185	8
DUNKARD CRK	-79.972879	39.760453	2377	25	29	1198	2119	9
MONONGAHELA RVR	-79.9118	39.7268	424	12	9068	139	294	10
CASSELMAN RVR	-79.100551	39.732376	216	36	19	25	138	6
CHEAT RVR	-79.900093	39.741596	202	5	5279	64	139	9
ALLEGHENY RVR	-79.8464	40.5271	258	24	12557	43	173	12
CONEMAUGH RVR	-79.390839	40.454069	947	52	73	281	674	15
REDBANK CRK	-79.393051	40.994618	351	21	2534	90	250	8
CLARION RVR	-79.208781	41.331617	293	14	233	76	193	6
CLARION RVR	-79.554229	41.129907	327	17	130	105	212	8
MAHONING CRK	-79.006109	40.92217	427	30	42	100	290	6
QUEMAHONING CREEK	-79.109143	40.068964	490	112	7	16	310	8
SOUTH FORK PINE CRK	-79.3637	40.8473	233	20	25	60	202	11
LITTLE YELLOW CRK	-79.0058	40.5565	279	10	25	66	185	8
ALLEGHENY RVR	-79.5226	40.8126	184	14	20648	25	124	11
OHIO RVR	-80.187562	40.53337	349	26	42967	73	219	13
RACCOON CRK	-80.337151	40.628259	1136	51	19	445	887	10
BEAVER RVR	-80.316945	40.766293	456	54	2720	52	295	14
CONNOQUENESSING CRK	-80.242144	40.816759	813	65	35	92	578	10
SHENANGO RVR	-80.355902	41.003298	306	35	644	25	203	9
MAHONING RVR	-80.440405	41.018472	652	85	548	70	437	9
CONNOQUENESSING CRK	-79.965282	40.806008	1371	130	19	132	1171	13
SLIPPERY ROCK CRK	-80.233723	40.884089	466	22	86	102	313	11

Generalized summary listing the 28 at risk sites and mean concentrations

NAME	LONGITUDE	LATITUDE	DATE COLLECTED	TIME COLLECTED	CHLORIDE -IC	SPC @ 25 deg C	Stream Flow	SULFATE - IC	TDS @ 105 deg C	Water Temp
WEST BRANCH SUSQUEHANNA RIVER	-78.10884	41.116759	7/14/2008	7:10:00 AM		519.0		221.0	400.0	24.4
WEST BRANCH SUSQUEHANNA RIVER	-78.10884	41.116759	8/11/2008	7:55:00 AM		582.0		240.0	466.0	23.1
WEST BRANCH SUSQUEHANNA RIVER	-78.10884	41.116759	9/15/2008	8:15:00 AM		507.0		202.0	382.0	22.6
WEST BRANCH SUSQUEHANNA RIVER	-78.10884	41.116759	10/14/2008	8:10:00 AM		740.0		334.0	590.0	14.7
WEST BRANCH SUSQUEHANNA RIVER	-78.10884	41.116759	11/11/2008	7:20:00 AM		697.0		300.0	532.0	7.9
WEST BRANCH SUSQUEHANNA RIVER	-78.10884	41.116759	12/8/2008	7:35:00 AM		415.0		138.0	314.0	1.5
WEST BRANCH SUSQUEHANNA RIVER	-78.10884	41.116759	1/14/2009	10:06:00 AM	15.2	334.0		115.0	250.0	0.2
WEST BRANCH SUSQUEHANNA RIVER	-78.10884	41.116759	2/11/2009	10:00:00 AM	22.7	316.0		92.1	220.0	2.1
WEST BRANCH SUSQUEHANNA RIVER	-78.10884	41.116759	3/16/2009	11:00:00 AM	12.7	311.0		119.0	228.0	7.2
WEST BRANCH SUSQUEHANNA RIVER	-78.10884	41.116759	4/5/2009	4:30:00 PM	13.8	305.0		104.0	204.0	
WEST BRANCH SUSQUEHANNA RIVER	-78.10884	41.116759	4/15/2009	11:00:00 AM	11.6	317.0		124.0	250.0	8.5
W BR SUSQUEHANNA RV	-78.677521	40.89719	8/19/2008	11:15:00 AM		614.0	67.0	197.0	446.0	20.3
W BR SUSQUEHANNA RV	-78.677521	40.89719	11/18/2008	10:30:00 AM		397.0		112.0	264.0	2.3
W BR SUSQUEHANNA RV	-78.677521	40.89719	1/27/2009	10:15:00 AM	16.7	393.0		115.0	274.0	0.1
W BR SUSQUEHANNA RV	-78.677521	40.89719	3/3/2009	10:15:00 AM	14.4	298.0		84.7	200.0	0.0
CLEARFIELD CRK	-78.405937	40.986003	8/19/2008	12:00:00 PM		816.0	64.0	391.0	668.0	21.6
CLEARFIELD CRK	-78.405937	40.986003	11/18/2008	1:00:00 PM		632.0		278.0	472.0	3.3
CLEARFIELD CRK	-78.405937	40.986003	1/27/2009	12:15:00 PM	15.1	525.0		211.0	396.0	0.0
CLEARFIELD CRK	-78.405937	40.986003	3/3/2009	1:00:00 PM	14.0	372.0		134.0	260.0	0.4
MONONGAHELA RVR	-79.880989	40.405596	7/24/2008	1:30:00 PM		378.0	24300.0	99.8	252.0	25.6
MONONGAHELA RVR	-79.880989	40.405596	11/19/2008	12:00:00 PM	54.8	1014.0	5880.0	348.0	698.0	9.5
MONONGAHELA RVR	-79.880989	40.405596	12/22/2008	12:00:00 PM	21.2	221.0	27900.0	38.9	156.0	3.8
MONONGAHELA RVR	-79.880989	40.405596	1/27/2009	1:00:00 PM	37.0	393.0	10820.0	1792.0	252.0	1.1
MONONGAHELA RVR	-79.880989	40.405596	1/27/2009	1:07:00 PM	38.3	394.0	10820.0	87.1	250.0	1.1
MONONGAHELA RVR	-79.880989	40.405596	2/11/2009	12:30:00 PM	33.5	289.0	54800.0	53.7	190.0	4.3
MONONGAHELA RVR	-79.880989	40.405596	3/26/2009	12:30:00 PM	38.3	576.0	4000.0	166.0	374.0	9.9
MONONGAHELA RVR	-79.880989	40.405596	4/15/2009	1:30:00 PM	18.0	267.0		64.0	184.0	10.5
MONONGAHELA RVR	-79.904123	40.15201	7/22/2008	11:20:00 AM		415.0	2640.0	103.0	258.0	26.1
MONONGAHELA RVR	-79.904123	40.15201	12/1/2008	10:30:00 AM	26.7	636.0	2000.0	225.0	424.0	6.0
MONONGAHELA RVR	-79.904123	40.15201	12/11/2008	11:00:00 AM	28.3	700.0	9780.0	247.0	482.0	3.8
MONONGAHELA RVR	-79.904123	40.15201	1/6/2009	12:20:00 PM	12.5	292.0	4940.0	79.5	196.0	3.7
MONONGAHELA RVR	-79.904123	40.15201	2/10/2009	12:00:00 PM	15.0	267.0	20000.0	69.6	188.0	2.0
MONONGAHELA RVR	-79.904123	40.15201	3/4/2009	2:30:00 PM	17.5	425.0	6860.0	127.0	304.0	2.9
MONONGAHELA RVR	-79.904123	40.15201	4/13/2009	10:45:00 AM	8.3	227.0		62.7	144.0	9.4
YOUGHIOGHENY RVR	-79.805358	40.241192	8/26/2008	2:50:00 PM		236.0	991.0	55.9	156.0	23.8
YOUGHIOGHENY RVR	-79.805358	40.241192	11/18/2008	11:45:00 AM	26.6	325.0		74.0	206.0	5.8
YOUGHIOGHENY RVR	-79.805358	40.241192	12/4/2008	12:15:00 PM	40.9	311.0	1450.0	50.2	174.0	3.4
YOUGHIOGHENY RVR	-79.805358	40.241192	1/7/2009	12:30:00 PM	49.9	356.0	6850.0	50.6	218.0	3.7
YOUGHIOGHENY RVR	-79.805358	40.241192	2/25/2009	12:00:00 PM	27.7	241.0		42.6	156.0	0.7

NAME	LONGITUDE	LATITUDE	DATE COLLECTED	TIME COLLECTED	CHLORIDE -IC	SPC @ 25 deg C	Stream Flow	SULFATE - IC	TDS @ 105 deg C	Water Temp
YOUGHIOGHENY RVR	-79.805358	40.241192	3/31/2009	1:15:00 PM	41.3	317.0		52.7	204.0	7.7
YOUGHIOGHENY RVR	-79.805358	40.241192	4/13/2009	2:00:00 PM	30.7	287.0		56.8	180.0	8.9
DUNKARD CRK	-79.972879	39.760453	8/25/2008	10:30:00 AM		6940.0	29.0	3890.0	6780.0	22.5
DUNKARD CRK	-79.972879	39.760453	11/3/2008	2:15:00 PM		6080.0		3247.0	5478.0	11.9
DUNKARD CRK	-79.972879	39.760453	12/18/2008	12:00:00 PM		465.0		141.0	316.0	4.5
DUNKARD CRK	-79.972879	39.760453	2/18/2009	10:30:00 AM	23.6	806.0		282.0	588.0	2.3
DUNKARD CRK	-79.972879	39.760453	2/18/2009	10:35:00 AM	23.6	805.0		284.0	572.0	2.3
DUNKARD CRK	-79.972879	39.760453	3/31/2009	10:15:00 AM	23.0	628.0		211.0	448.0	7.6
DUNKARD CRK	-79.972879	39.760453	4/14/2009	10:00:00 AM	27.9	915.0		334.0	654.0	9.1
MONONGAHELA RVR	-79.9118	39.7268	8/12/2008	9:30:00 AM		496.0	650.0	169.0	352.0	24.9
MONONGAHELA RVR	-79.9118	39.7268	11/3/2008	1:30:00 PM		697.0	470.0	265.0	500.0	13.6
MONONGAHELA RVR	-79.9118	39.7268	11/3/2008	1:35:00 PM		698.0	470.0	264.0	504.0	13.6
MONONGAHELA RVR	-79.9118	39.7268	12/18/2008	10:50:00 AM		219.0	29000.0	50.8	136.0	3.8
MONONGAHELA RVR	-79.9118	39.7268	1/28/2009	10:45:00 AM	12.0	342.0		101.0	236.0	0.6
MONONGAHELA RVR	-79.9118	39.7268	2/18/2009	12:45:00 PM	9.7	271.0	5346.0	76.5	176.0	4.3
MONONGAHELA RVR	-79.9118	39.7268	3/31/2009	9:15:00 AM	18.1	432.0		124.0	298.0	10.0
MONONGAHELA RVR	-79.9118	39.7268	4/14/2009	12:15:00 PM	6.9	234.0	18470.0	65.1	152.0	9.7
CASSELMAN RVR	-79.100551	39.732376	8/18/2008	9:45:00 AM		226.0	19.0	35.4	152.0	16.4
CASSELMAN RVR	-79.100551	39.732376	11/17/2008	10:30:00 AM		251.0		25.1	160.0	2.9
CASSELMAN RVR	-79.100551	39.732376	12/16/2008	10:15:00 AM		165.8		16.8	112.0	3.5
CASSELMAN RVR	-79.100551	39.732376	1/26/2009	11:30:00 AM	49.7	278.0		28.3	182.0	0.0
CASSELMAN RVR	-79.100551	39.732376	2/26/2009	11:20:00 AM	39.4	224.0		24.4	128.0	1.4
CASSELMAN RVR	-79.100551	39.732376	3/2/2009	11:45:00 AM	33.4	201.0		23.7	128.0	0.0
CASSELMAN RVR	-79.100551	39.732376	4/28/2009	2:45:00 PM	23.1	164.9		22.4	106.0	19.0
CHEAT RVR	-79.900093	39.741596	8/12/2008	11:00:00 AM		296.0	212.0	97.6	204.0	22.8
CHEAT RVR	-79.900093	39.741596	11/4/2008	10:15:00 AM		496.0	213.0	178.0	356.0	13.3
CHEAT RVR	-79.900093	39.741596	12/18/2008	10:10:00 AM		91.3	13000.0	19.9	56.0	3.8
CHEAT RVR	-79.900093	39.741596	1/28/2009	11:30:00 AM	6.5	125.4		35.2	96.0	0.8
CHEAT RVR	-79.900093	39.741596	2/18/2009	12:00:00 PM	3.9	86.7	10000.0	21.9	60.0	4.6
CHEAT RVR	-79.900093	39.741596	3/10/2009	1:00:00 PM	6.8	222.0	250.0	71.5	142.0	6.9
CHEAT RVR	-79.900093	39.741596	4/14/2009	1:30:00 PM	3.7	93.2	8000.0	23.4	58.0	9.1
ALLEGHENY RVR	-79.8464	40.5271	8/6/2008	12:00:00 PM		274.0	5770.0	50.1	182.0	26.4
ALLEGHENY RVR	-79.8464	40.5271	12/2/2008	10:45:00 AM	34.0	305.0	14500.0	47.8	204.0	2.8
ALLEGHENY RVR	-79.8464	40.5271	3/23/2009	12:30:00 PM	19.0	195.6	17400.0	32.5	134.0	7.1
CONEMAUGH RVR	-79.390839	40.454069	8/26/2008	12:30:00 PM		1189.0	73.0	376.0	920.0	23.6
CONEMAUGH RVR	-79.390839	40.454069	11/13/2008	9:00:00 AM		1116.0		310.0	736.0	8.7
CONEMAUGH RVR	-79.390839	40.454069	3/19/2009	2:00:00 PM	52.0	537.0		156.0	366.0	11.3
REDBANK CRK	-79.393051	40.994618	8/20/2008	10:30:00 AM		424.0	97.0	105.0	312.0	20.2
REDBANK CRK	-79.393051	40.994618	11/17/2008	11:00:00 AM		526.0		139.0	340.0	4.8
REDBANK CRK	-79.393051	40.994618	1/13/2009	10:45:00 AM	24.3	274.0	835.0	73.9	194.0	0.0
REDBANK CRK	-79.393051	40.994618	3/9/2009	11:10:00 AM	17.4	180.8	6670.0	41.0	152.0	5.7

NAME	LONGITUDE	LATITUDE	DATE COLLECTED	TIME COLLECTED	CHLORIDE -IC	SPC @ 25 deg C	Stream Flow	SULFATE - IC	TDS @ 105 deg C	Water Temp
CLARION RVR	-79.208781	41.331617	8/27/2008	1:30:00 PM		420.0	233.0	114.0	280.0	21.7
CLARION RVR	-79.208781	41.331617	12/9/2008	10:30:00 AM		320.0		81.0	204.0	0.0
CLARION RVR	-79.208781	41.331617	12/9/2008	10:37:00 AM		323.0		81.1	210.0	0.0
CLARION RVR	-79.208781	41.331617	1/14/2009	9:15:00 AM	16.6	224.0		54.9	146.0	0.0
CLARION RVR	-79.208781	41.331617	3/31/2009	12:45:00 PM	11.8	176.7		47.0	124.0	6.6
CLARION RVR	-79.554229	41.129907	8/28/2008	2:10:00 PM		388.0	130.0	125.0	256.0	20.7
CLARION RVR	-79.554229	41.129907	11/25/2008	1:15:00 PM	33.2	492.0		164.0	302.0	3.7
CLARION RVR	-79.554229	41.129907	1/13/2009	1:20:00 PM	14.0	200.0		58.6	134.0	0.5
CLARION RVR	-79.554229	41.129907	3/31/2009	9:15:00 AM	13.1	228.0		72.7	154.0	5.5
MAHONING CRK	-79.006109	40.92217	8/19/2008	8:00:00 AM		542.0	42.0	129.0	374.0	20.4
MAHONING CRK	-79.006109	40.92217	11/18/2008	9:30:00 AM		410.0		91.9	272.0	2.3
MAHONING CRK	-79.006109	40.92217	1/27/2009	8:45:00 AM	31.2	429.0		107.0	294.0	0.1
MAHONING CRK	-79.006109	40.92217	3/3/2009	9:15:00 AM	28.8	327.0		73.2	220.0	0.0
QUEMAHONING CREEK	-79.109143	40.068964	7/9/2008	1:00:00 PM	108.0	497.0	1.7	13.3	290.0	19.8
QUEMAHONING CREEK	-79.109143	40.068964	8/18/2008	12:30:00 PM	120.0	551.0	0.6	13.7	372.0	17.0
QUEMAHONING CREEK	-79.109143	40.068964	9/17/2008	10:00:00 AM	106.0	494.0	1.2	16.1	334.0	12.8
QUEMAHONING CREEK	-79.109143	40.068964	10/27/2008	12:45:00 PM	139.0	605.0	0.4	17.4	372.0	7.1
QUEMAHONING CREEK	-79.109143	40.068964	11/17/2008	1:30:00 PM	134.0	584.0	0.7	18.3	370.0	3.1
QUEMAHONING CREEK	-79.109143	40.068964	12/16/2008	1:00:00 PM	88.8	382.0	23.4	16.3	238.0	3.4
QUEMAHONING CREEK	-79.109143	40.068964	1/26/2009	1:00:00 PM	154.0	604.0	4.3	17.0	372.0	0.0
QUEMAHONING CREEK	-79.109143	40.068964	2/17/2009	1:00:00 PM	83.3	375.0	17.5	14.8	242.0	0.2
QUEMAHONING CREEK	-79.109143	40.068964	3/2/2009	1:30:00 PM	110.0	456.0	12.5	15.6	280.0	0.3
QUEMAHONING CREEK	-79.109143	40.068964	4/28/2009	12:45:00 PM	74.2	354.0	4.6	15.0	228.0	15.3
SOUTH FORK PINE CRK	-79.3637	40.8473	7/16/2008	11:15:00 AM	23.9	369.0	2.0	82.0	258.0	21.2
SOUTH FORK PINE CRK	-79.3637	40.8473	7/16/2008	11:30:00 AM	0.5	1.5		1.0	20.0	
SOUTH FORK PINE CRK	-79.3637	40.8473	8/20/2008	12:45:00 PM	35.5	466.0	0.6	101.0	354.0	18.4
SOUTH FORK PINE CRK	-79.3637	40.8473	9/17/2008	11:00:00 AM	25.3	371.0	1.2	73.8	258.0	15.2
SOUTH FORK PINE CRK	-79.3637	40.8473	10/7/2008	11:15:00 AM	40.7	535.0	0.8	122.0	392.0	9.4
SOUTH FORK PINE CRK	-79.3637	40.8473	11/17/2008	1:00:00 PM	22.4	320.0	3.3	63.3	200.0	4.7
SOUTH FORK PINE CRK	-79.3637	40.8473	12/15/2008	10:30:00 AM	14.3	196.8	33.1	37.1	148.0	4.3
SOUTH FORK PINE CRK	-79.3637	40.8473	2/18/2009	11:00:00 AM	10.3	205.0	33.4	50.6	136.0	1.6
SOUTH FORK PINE CRK	-79.3637	40.8473	3/9/2009	1:30:00 PM	12.0	142.9	122.0	27.3	120.0	5.9
SOUTH FORK PINE CRK	-79.3637	40.8473	4/27/2009	10:30:00 AM	10.2	185.6	24.5	43.8	132.0	14.8
LITTLE YELLOW CRK	-79.0058	40.5565	7/21/2008	2:00:00 PM	8.0	341.0	6.5	86.8	242.0	20.3
LITTLE YELLOW CRK	-79.0058	40.5565	8/18/2008	3:30:00 PM	7.7	458.0	2.1	126.0	306.0	18.7
LITTLE YELLOW CRK	-79.0058	40.5565	9/16/2008	2:15:00 PM	8.0	343.0	3.2	84.7	232.0	15.5
LITTLE YELLOW CRK	-79.0058	40.5565	10/28/2008	1:30:00 PM	9.2	352.0	3.7	86.4	220.0	6.5
LITTLE YELLOW CRK	-79.0058	40.5565	11/18/2008	8:00:00 AM	11.8	327.0	5.4	80.3	202.0	2.3
LITTLE YELLOW CRK	-79.0058	40.5565	12/17/2008	8:00:00 AM	21.0	186.3	91.9	25.6	132.0	3.5
LITTLE YELLOW CRK	-79.0058	40.5565	2/23/2009	1:30:00 PM	9.4	178.6	21.0	38.8	116.0	0.0
LITTLE YELLOW CRK	-79.0058	40.5565	3/3/2009	8:30:00 AM	9.7	177.6	10.6	38.4	122.0	0.0

NAME	LONGITUDE	LATITUDE	DATE COLLECTED	TIME COLLECTED	CHLORIDE -IC	SPC @ 25 deg C	Stream Flow	SULFATE - IC	TDS @ 105 deg C	Water Temp
LITTLE YELLOW CRK	-79.0058	40.5565	4/7/2009	2:00:00 PM	7.3	139.2	38.1	29.6	90.0	4.4
ALLEGHENY RVR	-79.5226	40.8126	8/4/2008	2:00:00 PM		199.8	4850.0	26.7	134.0	25.0
ALLEGHENY RVR	-79.5226	40.8126	8/4/2008	2:05:00 PM		199.7	4850.0	26.8	130.0	25.0
ALLEGHENY RVR	-79.5226	40.8126	11/24/2008	11:00:00 AM		223.0	9040.0	23.3	136.0	2.5
ALLEGHENY RVR	-79.5226	40.8126	1/8/2009	1:00:00 PM	18.1	181.6	24400.0	29.7	124.0	0.8
ALLEGHENY RVR	-79.5226	40.8126	3/11/2009	1:00:00 PM	10.3	116.3	60100.0	16.8	94.0	3.7
OHIO RVR	-80.187562	40.53337	7/24/2008	11:20:00 AM		386.0	32000.0	90.1	256.0	27.2
OHIO RVR	-80.187562	40.53337	11/19/2008	10:00:00 AM	46.1	462.0	22100.0	95.4	278.0	8.2
OHIO RVR	-80.187562	40.53337	3/12/2009	11:30:00 AM	16.6	197.8	74800.0	33.6	124.0	4.4
RACCOON CRK	-80.337151	40.628259	8/11/2008	2:30:00 PM		1214.0	19.0	496.0	966.0	22.8
RACCOON CRK	-80.337151	40.628259	11/24/2008	12:00:00 AM		1355.0		560.0	1084.0	0.1
RACCOON CRK	-80.337151	40.628259	3/26/2009	2:15:00 PM	50.7	840.0		279.0	612.0	7.5
BEAVER RVR	-80.316945	40.766293	8/13/2008	11:30:00 AM		466.0	1290.0	53.2	314.0	22.2
BEAVER RVR	-80.316945	40.766293	11/5/2008	10:30:00 AM	61.7	525.0	1070.0	59.7	324.0	11.5
BEAVER RVR	-80.316945	40.766293	3/17/2009	12:45:00 PM	49.7	377.0	5800.0	43.8	248.0	6.9
CONNOQUENESSING CRK	-80.242144	40.816759	8/18/2008	10:45:00 AM		1014.0	35.0	118.0	770.0	22.0
CONNOQUENESSING CRK	-80.242144	40.816759	11/24/2008	11:20:00 AM		924.0		98.9	660.0	0.3
CONNOQUENESSING CRK	-80.242144	40.816759	3/26/2009	12:30:00 PM	65.4	500.0		58.2	304.0	6.7
SHENANGO RVR	-80.355902	41.003298	8/21/2008	2:30:00 PM		345.0	238.0	26.0	232.0	23.3
SHENANGO RVR	-80.355902	41.003298	11/20/2008	12:45:00 PM	35.8	320.0	555.0	23.5	198.0	5.5
SHENANGO RVR	-80.355902	41.003298	1/20/2009	1:40:00 PM	37.0	306.0	1000.0	25.4	192.0	0.1
SHENANGO RVR	-80.355902	41.003298	3/24/2009	12:30:00 PM	28.3	253.0	783.0	23.8	190.0	6.9
MAHONING RVR	-80.440405	41.018472	8/21/2008	10:15:00 AM		611.0	461.0	64.5	416.0	22.6
MAHONING RVR	-80.440405	41.018472	11/20/2008	10:15:00 AM		778.0		71.6	502.0	6.7
MAHONING RVR	-80.440405	41.018472	1/20/2009	11:30:00 AM	96.5	661.0	635.0	75.3	444.0	0.6
MAHONING RVR	-80.440405	41.018472	3/24/2009	10:15:00 AM	73.2	557.0		66.6	386.0	6.5
CONNOQUENESSING CRK	-79.965282	40.806008	8/27/2008	11:30:00 AM		1677.0	19.0	188.0	1548.0	20.8
CONNOQUENESSING CRK	-79.965282	40.806008	8/27/2008	11:35:00 AM		1682.0	19.0	188.0	1534.0	20.8
CONNOQUENESSING CRK	-79.965282	40.806008	11/24/2008	10:00:00 AM		1493.0		102.0	1190.0	2.3
CONNOQUENESSING CRK	-79.965282	40.806008	3/26/2009	10:45:00 AM	130.0	632.0		49.0	410.0	6.5
SLIPPERY ROCK CRK	-80.233723	40.884089	8/18/2008	1:00:00 PM		441.0	86.0	88.0	290.0	21.1
SLIPPERY ROCK CRK	-80.233723	40.884089	11/13/2008	11:30:00 AM		548.0		118.0	372.0	6.7
SLIPPERY ROCK CRK	-80.233723	40.884089	3/25/2009	12:15:00 PM	22.3	409.0		99.2	276.0	6.4

SAMPLE INFORMATION				PARAMETER (UNITS)			
				SPECIFIC CONDUCTANCE	TDS @ 105℃	CHLORIDE	SULFATE
RMI	SAMPLE LOCATION	SAMPLE ID#	DATE COLLECTED	(uS/cm)	(mg/L)	(mg/L)	(mg/L)
90.0	Mon River RMI 90.0 near Point Marion, PA	0593-011	10/14/2008	719	486	15.9	NA
		0593-027	10/22/2008	631	438	13.7	228
		NA	10/28/2008	512	NA	NA	NA
		NA	11/3/2008	550	NA	NA	NA
		0593-080	11/5/2008	531	516	16.4	255.9
		NA	11/7/2008	774	NA	NA	NA
		NA	11/10/2008	525	NA	NA	NA
		0593-083	11/12/2008	699	486	17.8	222.9
		NA	11/14/2008	550	NA	NA	NA
		NA	11/17/2008	500	NA	NA	NA
		0593-088	11/19/2008	442	416	16.8	172.9
		NA	11/21/2008	432	NA	NA	NA
		0552-881	11/25/2008	733	502	18.2	238.9
		NA	12/1/2008	846	NA	NA	NA
		0593-089	12/4/2008	954	570	22.7	269.2
		NA	12/8/2008	825	NA	NA	NA
		0552-883	12/11/2008	570	466	30.8	163.3
		NA	12/15/2008	197	NA	NA	NA
		0552-884	12/18/2008	285	148	11.1	46.9
		0552-885	12/23/2008	165	112	6.6	40.1
		0552-886	12/30/2008	188	130	6	50.3

Beginning 11/25 all specific conductance field measurements temperature corrected to 25 degree C

SAMPLE INFORMATION				PARAMETER (UNITS)			
				SPECIFIC CONDUCTANCE	TDS @ 105°C	CHLORIDE	SULFATE
RMI	SAMPLE LOCATION	SAMPLE ID#	DATE COLLECTED	(uS/cm)	(mg/L)	(mg/L)	(mg/L)
88.2	Mon River RMI 88.2 upstream of Dunkard Creek	0593-028	10/22/2008	584	406	12.4	213
		1630-166	10/22/2008	NA	486	15	226
		1620-191	10/29/2008	NA	462	14.6	233
		NA	11/3/2008	350	NA	NA	NA
		1620-210	11/5/2008	693	488	21.5	263
		1630-216	11/12/2008	513	356	11.7	189
		NA	11/14/2008	510	NA	NA	NA
		NA	11/17/2008	200	NA	NA	NA
		1630-228	11/19/2008	246	142	4.89	79.1
		1630-240	11/25/2008	567	412	15.7	220
		1630-252	12/4/2008	353	254	11.6	127
		1630-264	12/11/2008	505	354	23.2	169
		1630-276	12/18/2008	198	132	10.4	48.1
		1630-288	12/23/2008	153	112	6.55	41.2
		1630-298	12/30/2008	190	130	6.05	53
85.5	Mon River RMI 85.5 upstream of Georges Creek	0593-030	10/22/2008	942	666	18.4	374
84.0	Mon River RMI 84.0 upstream of Jacobs Creek	0593-031	10/22/2008	812	580	16.3	316

Beginning 11/25 all specific conductance field measurements temperature corrected to 25 degree C

SAMPLE INFORMATION				PARAMETER (UNITS)			
				SPECIFIC CONDUCTANCE	TDS @ 105°C	CHLORIDE	SULFATE
RMI	SAMPLE LOCATION	SAMPLE ID#	DATE COLLECTED	(uS/cm)	(mg/L)	(mg/L)	(mg/L)
83.0	Mon River RMI 83.0 downstream of Jacobs Creek	1630-162	10/22/2008	NA	630	19.6	333
		1620-189	10/29/2008	NA	602	18.7	315
		NA	11/3/2008	525	NA	NA	NA
		1620-208	11/5/2008	650	506	17.2	274
		NA	11/7/2008	812	NA	NA	NA
		NA	11/10/2008	525	NA	NA	NA
		1630-214	11/12/2008	667	474	14.3	258
		1630-226	11/19/2008	489	312	13.4	168
		NA	11/21/2008	332	NA	NA	NA
		1630-238	11/25/2008	383	268	10.9	139
		NA	12/1/2008	512	NA	NA	NA
		1630-250	12/4/2008	446	316	15.4	172
		NA	12/8/2008	475	NA	NA	NA
		1630-262	12/11/2008	425	296	15.9	147
		NA	12/15/2008	190	NA	NA	NA
		1630-274	12/18/2008	163	114	8.74	41.2
		1630-286	12/23/2008	146	104	24	45
		1630-296	12/30/2008	159	110	5.42	47.2
82.1	Mon River RMI 82.1 upstream of Grays Landing L/D	0593-017	10/15/2008	974	676	22.7	NA
		0593-032	10/22/2008	934	680	18.7	374
80.5	Mon River RMI 80.5 upstream of Whiteley Creek	0552-878	10/22/2008	759	672	20.6	384

Beginning 11/25 all specific conductance field measurements temperature corrected to 25 degree C

SAMPLE INFORMATION				PARAMETER (UNITS)			
				SPECIFIC CONDUCTANCE	TDS @ 105°C	CHLORIDE	SULFATE
RMI	SAMPLE LOCATION	SAMPLE ID#	DATE COLLECTED	(uS/cm)	(mg/L)	(mg/L)	(mg/L)
79.5	Mon River RMI 79.5 upstrm downstream of Whiteley Creek	0552-877	10/22/2008	785	696	26.1	391
		1630-158	10/22/2008	NA	734	29.9	392
		1620-187	10/29/2008	NA	574	19.9	304
		1620-206	11/5/2008	813	620	29.8	323
		1630-212	11/12/2008	734	544	22.4	296
		1630-224	11/19/2008	544	380	17.6	212
		1630-236	11/25/2008	468	312	13.4	168
		1630-248	12/4/2008	923	682	31.2	378
		1630-260	12/11/2008	369	272	14.9	131
		1630-272	12/18/2008	149	114	8.07	37
		1630-284	12/23/2008	147	104	5.6	38
		1630-294	12/30/2008	167	114	5.74	52
78.0	Mon River RMI 78.3 downstream Little Whiteley Creek	0593-021	10/15/2008	976	676	24.2	NA
		0552-876	10/22/2008	792	710	26.9	393
76.0	Mon River RMI 76.0 upstrm Middle Run near Carmichael	0552-875	10/22/2008	805	720	25.5	398

SAMPLE INFORMATION				PARAMETER (UNITS)			
				SPECIFIC CONDUCTANCE	TDS @ 105°C	CHLORIDE	SULFATE
RMI	SAMPLE LOCATION	SAMPLE ID#	DATE COLLECTED	(uS/cm)	(mg/L)	(mg/L)	(mg/L)
75.0	Mon River RMI 75.0 near Carmichael, PA	1630-170	10/22/2008	NA	800	29.9	409
		1620-193	10/29/2008	NA	702	29.7	399
		NA	11/3/2008	770	NA	NA	NA
		1620-204	11/5/2008	947	734	26.1	407
		NA	11/7/2008	916	NA	NA	NA
		NA	11/10/2008	650	NA	NA	NA
		1630-218	11/12/2008	907	638	31	342
		NA	11/14/2008	800	NA	NA	NA
		NA	11/17/2008	600	NA	NA	NA
		1630-230	11/19/2008	744	492	18.2	274
		NA	11/21/2008	312	NA	NA	NA
		1630-242	11/25/2008	421	286	13.7	139
		NA	12/1/2008	490	NA	NA	NA
		1630-254	12/4/2008	801	584	28	314
		NA	12/8/2008	497	NA	NA	NA
		1630-266	12/11/2008	410	272	16.4	135
		NA	12/15/2008	183	NA	NA	NA
		1630-278	12/18/2008	164	116	8.87	39.9
		1630-290	12/23/2008	141	100	6.1	40.2
		1630-300	12/30/2008	193	132	6.42	53.3
73.5	Mon River RMI 73.5 dwnstrm of Wallace Run	0552-874	10/22/2008	847	770	27.1	420

Beginning 11/25 all specific conductance field measurements temperature corrected to 25 degree C.

SAMPLE INFORMATION				PARAMETER (UNITS)			
				SPECIFIC CONDUCTANCE	TDS @ 105℃	CHLORIDE	SULFATE
RMI	SAMPLE LOCATION	SAMPLE ID#	DATE COLLECTED	(uS/cm)	(mg/L)	(mg/L)	(mg/L)
71.0	Mon River RMI 71.0 near Crucible, PA	1630-174	10/22/2008	NA	768	26.2	388
		1620-187	10/29/2008	NA	676	22.5	363
		1620-202	11/5/2008	867	638	23.7	320
		1630-220	11/12/2008	854	592	26.2	313
		1630-232	11/19/2008	794	586	22	328
		1630-244	11/25/2008	424	278	13.1	138
		1630-256	12/4/2008	679	300	27.2	254
		1630-268	12/11/2008	659	452	23.1	229
		1630-280	12/18/2008	160	122	8.64	37.6
		1630-302	12/30/2008	177	128	5.82	47.7
69.0	Mon River RMI 69.0 upstream of Pumpkin Run	0552-873	10/22/2008	906	786	38	429
66.0	Mon River RMI 66.0 upstream of Tenmile Creek	0552-872	10/22/2008	895	794	39.5	416

SAMPLE INFORMATION				PARAMETER (UNITS)			
				SPECIFIC CONDUCTANCE	TDS @ 105°C	CHLORIDE	SULFATE
RMI	SAMPLE LOCATION	SAMPLE ID#	DATE COLLECTED	(uS/cm)	(mg/L)	(mg/L)	(mg/L)
64.5	Mon River RMI 64.5 downstream of Tenmile Creek	0593-023	10/15/2008	2009	852	45.4	NA
		1630-178	10/22/2008	NA	874	50.6	440
		0552-870	10/22/2008	958	844	51.1	436
		0592-201	10/26/2008	904	812	47.9	415
		1620-197	10/29/2008	NA	850	49.9	428
		NA	11/3/2008	850	NA	NA	NA
		1620-200	11/5/2008	991	756	37.4	395
		NA	11/7/2008	1133	NA	NA	NA
		NA	11/10/2008	775	NA	NA	NA
		1630-222	11/12/2008	956	696	32.5	364
		NA	11/14/2008	825	NA	NA	NA
		NA	11/17/2008	600	NA	NA	NA
		1630-234	11/19/2008	852	554	28.6	308
		NA	11/21/2008	639	NA	NA	NA
		1630-246	11/25/2008	650	438	23.8	231
		NA	12/1/2008	912	NA	NA	NA
		1630-258	12/4/2008	508	266	20.9	172
		NA	12/8/2008	615	NA	NA	NA
		1630-270	12/11/2008	549	374	26.4	181
		NA	12/15/2008	236	NA	NA	NA
		1630-282	12/18/2008	200	116	14.3	42
		1630-292	12/23/2008	203	126	13.9	47
		1630-304	12/30/2008	249	180	10.9	60

Beginning 11/25 all specific conductance field measurements temperature corrected to 25 degree C

SAMPLE INFORMATION				PARAMETER (UNITS)			
RMI	SAMPLE LOCATION	SAMPLE ID#	DATE COLLECTED	SPECIFIC CONDUCTANCE (uS/cm)	TDS @ 105°C (mg/L)	CHLORIDE (mg/L)	SULFATE (mg/L)
60.5	Mon River Pool-4 RMI 60.5 upstream of Kelly Run	0594-123	10/22/2008	1012	862	44.9	455
57.5	Mon River Pool-4 RMI 57.5 upstream of Dunlap Creek	0594-122	10/22/2008	993	858	46.3	458
		0585-158	10/22/2008	NA	908	45	460
		1523-061	10/30/2008	NA	820	45.6	431
		1523-073	11/5/2008	1229	832	51.4	427
		1523-087	11/12/2008	952	784	34.7	408
		1523-099	11/19/2008	865	606	31.6	325
		1507-278	11/25/2008	832	574	23.9	307
		1523-112	12/4/2008	652	492	34.2	263
		1523-123	12/11/2008	549	318	17.7	158
		1523-135	12/18/2008	164	104	10.7	40.7
		1523--159	12/30/2008	115	136	7.21	55.1
55.5	Mon River Pool-4 RMI 55.5 upstream of Redstone Creek	0594-121	10/22/2008	985	864	42.1	455
52.5	Mon Riverl RMI 52.5 downstream of Redstone Creek	0594-119	10/22/2008	988	862	45.9	460

SAMPLE INFORMATION				PARAMETER (UNITS)			
				SPECIFIC CONDUCTANCE	TDS @ 105C	CHLORIDE	SULFATE
RMI	SAMPLE LOCATION	SAMPLE ID#	DATE COLLECTED	(uS/cm)	(mg/L)	(mg/L)	(mg/L)
50.5	Mon River RMI 50.5 near Newell, PA	0594-118	10/22/2008	969	830	49.8	431
		1630-185	10/23/2008	NA	844	49.3	433
		1523-063	10/30/2008	NA	832	49.9	431
		NA	11/3/2008	900	NA	NA	NA
		1523-075	11/5/2008	1155	816	48	423
		NA	11/10/2008	800	NA	NA	NA
		1523-085	11/12/2008	952	842	53.9	429
		NA	11/14/2008	900	NA	NA	NA
		NA	11/14/2008	725	NA	NA	NA
		1523-097	11/19/2008	978	676	34.6	384
		1507-280	11/25/2008	931	616	37.1	320
		1523-109	12/4/2008	707	542	29.6	285
		NA	12/8/2008	440	NA	NA	NA
		1523-121	12/11/2008	549	446	26.3	211
		NA	12/15/2008	370	NA	NA	NA
		1523-133	12/18/2008	360	194	15.8	77.2
		1523-145	12/23/2008	281	188	11.6	68.2
		1523-157	12/30/2008	298	194	11	77.5

Beginning 11/25 all specific conductance field measurements temperature corrected to 25 degree C

SAMPLE INFORMATION				PARAMETER (UNITS)			
				SPECIFIC CONDUCTANCE	TDS @ 105℃	CHLORIDE	SULFATE
RMI	SAMPLE LOCATION	SAMPLE ID#	DATE COLLECTED	(uS/cm)	(mg/L)	(mg/L)	(mg/L)
46.0	Mon River RMI 46.0 near Fayette City, PA	0594-117	10/22/2008	865	708	49.2	351
		0585-156	10/22/2008	NA	708	49.9	351
		1523-053	10/30/2008	NA	850	47.8	448
		1523-065	11/5/2008	1060	862	51.3	424
		1523-083	11/12/2008	1095	852	49.3	417
		1523-095	11/19/2008	925	698	37.6	367
		1507-276	11/25/2008	980	678	41.5	331
		1523-107	12/4/2008	599	400	27.3	197
		1523-119	12/11/2008	666	520	32.1	264
		1523-131	12/18/2008	224	138	15.4	52.1
		1523-143	12/23/2008	224	144	9.53	51.9
		1523-155	12/30/2008	258	196	11.3	77.9
43.0	Mon River RMI 43.0 upstream of Charleroi, PA	0585-154	10/22/2008	NA	696	47.6	348
		1523-058	10/30/2008	NA	842	49.3	451
		1523-067	11/5/2008	1165	854	51.8	433
		1523-081	11/12/2008	1115	838	49.2	425
		1523-093	11/19/2008	980	730	40.3	391
		1507-274	11/25/2008	977	646	39.3	331
		1523-105	12/4/2008	558	378	26.4	183
		1523-117	12/11/2008	614	504	29.6	254
		1523-129	12/18/2008	185	112	13.3	42.4
		1523-141	12/23/2008	180	108	7.78	44.4
		1523-153	12/30/2008	276	184	10	75

SAMPLE INFORMATION				PARAMETER (UNITS)			
				SPECIFIC CONDUCTANCE	TDS @ 105°C	CHLORIDE	SULFATE
RMI	SAMPLE LOCATION	SAMPLE ID#	DATE COLLECTED	(uS/cm)	(mg/L)	(mg/L)	(mg/L)
42.0	Mon River RMI 42.0 Charleroi, PA	0594-116	10/22/2008	838	682	40	354
		0585-152	10/22/2008	NA	644	42	341
		1523-055	10/30/2008	NA	860	48.4	455
		1523-069	11/5/2008	1161	856	47.9	436
		1523-079	11/12/2008	1133	854	45.7	420
		1523-091	11/19/2008	973	730	38.8	401
		1507-272	11/25/2008	871	648	39.2	350
		1523-103	12/4/2008	515	362	27	176
		1523-115	12/11/2008	662	500	28	249
		1523-127	12/18/2008	177	112	12.5	41.8
		1523-139	12/23/2008	183	132	8.08	45.8
		1523-151	12/30/2008	241	174	9.61	69
41.0	Mon River RMI 41.0 downstream of Charleroi, PA	0552-864	10/15/2008	934	752	62	411.3
		NA	10/25/2008	734	NA	NA	NA
		0592-198	10/26/2008	783	726	55.4	381.2
		NA	10/27/2008	1065	NA	NA	NA
		NA	10/28/2008	1141	NA	NA	NA
		NA	10/29/2008	1196	NA	NA	NA
40.0	Mon River RMI 40.0 near Monessan, PA	0594-124	10/22/2008	1018	722	46.1	356

Beginning 11/25 all specific conductance field measurements temperature corrected to 25 degree C

SAMPLE INFORMATION				PARAMETER (UNITS)			
				SPECIFIC CONDUCTANCE	TDS @ 105℃	CHLORIDE	SULFATE
RMI	SAMPLE LOCATION	SAMPLE ID#	DATE COLLECTED	(uS/cm)	(mg/L)	(mg/L)	(mg/L)
36.0	Mon River RMI 36.0 near Donora, PA	0594-125	10/22/2008	1053	738	54.9	363
		0594-152	11/3/2008	1203	NA	NA	NA
		NA	11/5/2008	1212	NA	NA	NA
		NA	11/7/2008	1188	NA	NA	NA
		NA	11/10/2008	1195	NA	NA	NA
		NA	11/12/2008	820	NA	NA	NA
		NA	11/14/2008	1210	NA	NA	NA
		NA	11/17/2008	825	NA	NA	NA
		NA	11/19/2008	768	NA	NA	NA
		NA	11/21/2008	678	NA	NA	NA
		NA	11/25/2008	960	NA	NA	NA
		NA	12/1/2008	669	NA	NA	NA
		NA	12/4/2008	450	NA	NA	NA
		NA	12/8/2008	763	NA	NA	NA
		NA	12/11/2008	779	NA	NA	NA
		NA	12/15/2008	204	NA	NA	NA
		NA	12/18/2008	184	NA	NA	NA
		NA	12/23/2008	166	NA	NA	NA
		NA	12/30/2008	228	NA	NA	NA
34.2	Mon River RMI 34.2 upstream of Sunfish Run	0594-126	10/22/2008	1066	732	58.7	362
32.5	Mon River RMI 32.5 upstream of Pigeon Creek	0594-127	10/22/2008	1090	738	62.6	367
30.0	Mon River RMI 30.0 upstream of Mingo Crk	0594-128	10/22/2008	1160	804	64.5	399
26.0	Mon River RMI 26.0 upstream of Kelly Run	0594-129	10/22/2008	1120	800	46	391

SAMPLE INFORMATION				PARAMETER (UNITS)			
				SPECIFIC CONDUCTANCE	TDS @ 105°C	CHLORIDE	SULFATE
RMI	SAMPLE LOCATION	SAMPLE ID#	DATE COLLECTED	(uS/cm)	(mg/L)	(mg/L)	(mg/L)
25.0	Mon River RMI 25.0 near Elrama, PA	0585-150	10/22/2008	NA	828	51.3	388
		1523-060	10/30/2008	NA	742	55.9	362
		NA	11/3/2008	1088	NA	NA	NA
		1523-071	11/5/2008	1067	860	53.7	416
		NA	11/7/2008	1263	NA	NA	NA
		NA	11/10/2008	1267	NA	NA	NA
		1523-077	11/12/2008	1156	900	56.7	467
		NA	11/14/2008	1261	NA	NA	NA
		NA	11/17/2008	900	NA	NA	NA
		1523-089	11/19/2008	973	862	54.9	439
		NA	11/21/2008	798	NA	NA	NA
		1507-270	11/25/2008	977	778	43.6	403
		NA	12/1/2008	808	NA	NA	NA
		1523-101	12/4/2008	614	472	28.9	227
		NA	12/8/2008	580	NA	NA	NA
		1523-113	12/11/2008	399	400	31.4	187
		NA	12/15/2008	240	NA	NA	NA
		1523-125	12/18/2008	211	138	15.4	50.8
		1523-137	12/23/2008	195	142	9.97	47.8
		1523-149	12/30/2008	258	178	12.9	69.4

Beginning 11/25 all specific conductance field measurements temperature corrected to 25 degree C

SAMPLE INFORMATION				PARAMETER (UNITS)			
				SPECIFIC CONDUCTANCE	TDS @ 105℃	CHLORIDE	SULFATE
RMI	SAMPLE LOCATION	SAMPLE ID#	DATE COLLECTED	(uS/cm)	(mg/L)	(mg/L)	(mg/L)
24.0	Mon River RMI 24.0 USGS Gage Sta Elizabeth	NA	10/22/2008	1110	NA	NA	NA
		NA	10/29/2008	1080	NA	NA	NA
		NA	10/30/2008	1080	NA	NA	NA
		NA	10/31/2008	1050	NA	NA	NA
		NA	11/1/2008	1050	NA	NA	NA
		NA	11/2/2008	1060	NA	NA	NA
		NA	11/3/2008	1070	NA	NA	NA
		NA	11/4/2008	1070	NA	NA	NA
		NA	11/5/2008	1090	NA	NA	NA
		NA	11/6/2008	1160	NA	NA	NA
		NA	11/7/2008	1220	NA	NA	NA
		NA	11/10/2008	1280	NA	NA	NA
		NA	11/12/2008	1260	NA	NA	NA
		NA	11/14/2008	1260	NA	NA	NA
		NA	11/17/2008	1250	NA	NA	NA
		NA	11/19/2008	1200	NA	NA	NA
		NA	11/25/2008	1100	NA	NA	NA
		NA	12/1/2008	873	NA	NA	NA
		NA	12/4/2008	686	NA	NA	NA
		NA	12/8/2008	586	NA	NA	NA
		NA	12/11/2008	609	NA	NA	NA
		NA	12/15/2008	229	NA	NA	NA
		NA	12/18/2008	196	NA	NA	NA
		NA	12/23/2008	181	NA	NA	NA
		NA	12/30/2008	241	NA	NA	NA

SAMPLE INFORMATION				PARAMETER (UNITS)			
				SPECIFIC CONDUCTANCE	TDS @ 105℃	CHLORIDE	SULFATE
RMI	SAMPLE LOCATION	SAMPLE ID#	DATE COLLECTED	(uS/cm)	(mg/L)	(mg/L)	(mg/L)
23.0	Mon River RMI 23.0 below dam	0594-130	10/22/2008	1120	762	56.5	384
20.5	Mon River RMI 20.5 upstream of Peters Creek	0594-131	10/22/2008	1097	752	55.8	368
17.5	Mon River RMI 17.5 near Glassport, PA	0594-132	10/22/2008	1152	776	64.9	384
16.7	Mon River RMI 16.7 @ W.D. Mansfield Memorial Bridge	NA	10/25/2008	1200	NA	NA	NA
		NA	10/26/2008	1140	NA	NA	NA
		NA	10/27/2008	1141	NA	NA	NA
		NA	10/28/2008	1145	NA	NA	NA
		NA	10/29/2008	1253	NA	NA	NA
		NA	11/3/2008	1160	NA	NA	NA
		NA	11/5/2008	1174	NA	NA	NA
		NA	11/7/2008	1118	NA	NA	NA
		NA	11/10/2008	1122	NA	NA	NA
		NA	11/12/2008	880	NA	NA	NA
		NA	11/14/2008	1317	NA	NA	NA
		NA	11/17/2008	900	NA	NA	NA
		NA	11/19/2008	883	NA	NA	NA
		NA	11/21/2008	819	NA	NA	NA
		NA	11/25/2008	1162	NA	NA	NA
		NA	12/1/2008	898	NA	NA	NA
		NA	12/4/2008	855	NA	NA	NA
		NA	12/8/2008	516	NA	NA	NA
		NA	12/11/2008	536	NA	NA	NA
		NA	12/15/2008	240	NA	NA	NA
		NA	12/18/2008	186	NA	NA	NA
		NA	12/23/2008	182	NA	NA	NA
		NA	12/30/2008	241	NA	NA	NA

SAMPLE INFORMATION				PARAMETER (UNITS)			
				SPECIFIC CONDUCTANCE	TDS @ 105°C	CHLORIDE	SULFATE
RMI	SAMPLE LOCATION	SAMPLE ID#	DATE COLLECTED	(uS/cm)	(mg/L)	(mg/L)	(mg/L)
12.0	Mon River RMI 12.0 upstream of Turtle Creek	0594-135	10/22/2008	746	480	48.1	225
11.0	Mon River RMI 11.0 downstream of Turtle Creek	0552-868	10/17/2008	666	524	52.3	279.2
9.0	Mon River RMI 9.0 dwnstrm of dam	0594-137	10/22/2008	793	526	51.3	239
4.5	Mon River RMI 4.5 near Glenwood, PA	0594-138	10/22/2008	644	414	41.1	186
3.1	Mon River RMI 3.1 Hot Metal Street Bridge	NA	11/3/2008	797	NA	NA	NA
		0594-158	11/5/2008	737	494	55.8	194.4
		NA	11/7/2008	700	NA	NA	NA
		NA	11/10/2008	662	NA	NA	NA
		0592-225	11/12/2008	590	532	56.5	198.8
		NA	11/14/2008	752	NA	NA	NA
		NA	11/17/2008	550	NA	NA	NA
		0594-169	11/19/2008	734	750	62.6	349.1
		NA	11/21/2008	706	NA	NA	NA
		0594-178	11/25/2008	950	734	58.1	334.9
		NA	12/1/2008	872	NA	NA	NA
		0592-237	12/4/2008	677	478	52	207.2
		NA	12/8/2008	557	NA	NA	NA
		0594-189	12/11/2008	709	522	46	243
		NA	12/15/2008	243	NA	NA	NA
		0592-248	12/18/2008	225	150	19.4	42.9
		0592-249	12/23/2008	189	136	13.1	41.4
		0594-205	12/30/2008	229	166	16	51.7

From: Aunkst, Dana
Sent: Wednesday, September 09, 2009 12:38 PM
To: josie gaskey
Subject: RE: letter from Secretary Hanger

Hi Josie,

I'm not sure what happened, but it appears that there was a printing error. The first sentence from question 1 is missing. Here is the full response and an electronic copy of the letter.

There were 36 active WQNs in the bituminous coal area during the time period requested. Twenty-eight were considered at risk and eight were not. All samples for the eight sites had specific conductivity < 132 umho/cm, chloride < 9 mg/l, sulfate < 20 mg/l, and total dissolved solids < 96 mg/l. The at risk sites were selected because one or more of their chloride, sulfate, or total dissolved solids concentrations were magnitudes higher than the concentrations observed at the eight non-risk (reference) sites. Field temperature is included but both specific conductance (SPC @ 25_0 C) and total dissolved solids (TDS @105 C) are reported at standardized temperatures by the lab. The enclosed spreadsheets titled Generalized summary listing the 28 at risk sites and mean concentrations and Individual sample results provide the data you are requesting.

Hope that helps!

Dana

-----Original Message-----
From: Josie Gaskey
Sent: Wednesday, September 09, 2009 9:32 AM
To: Aunkst, Dana
Subject: letter from Secretary Hanger

Hi Dana,

We received a letter from Secretary Hanger yesterday in response to our data request letter dated August 3, 2009. It appears that something is missing between the bottom of page 1 and the top of page 2. Also, do you have all this electronically? Thanks!

Josie Gaskey
Director, Regulatory and Technical Affairs
Pennsylvania Coal Association

From: Josie Gaskey
Sent: Friday, September 11, 2009 9:43 AM
To
Cc: George Ellis
Subject: Hanger TDS 8 reference sites

Good morning,

In the letter Secretary Hanger sent in response to our TDS data request, his response to our first question regarding at-risk streams discusses 28 at-risk streams and 8 non-risk or "reference" sites. In response to my email questioning the identity of the 8 sites, they responded with the following 8 reference site identifications:

Kettle Creek- Clinton Co
First Fork Sinnemahoning Creek- Potter Co
Killbuck Run- Cambria Co
Youghiogheny River, Somerset Co
Mill Run- Fayette Co
Tionesta Creek- Forest Co
Mill Creek- Westmoreland Co
Havens Run- McKean Co

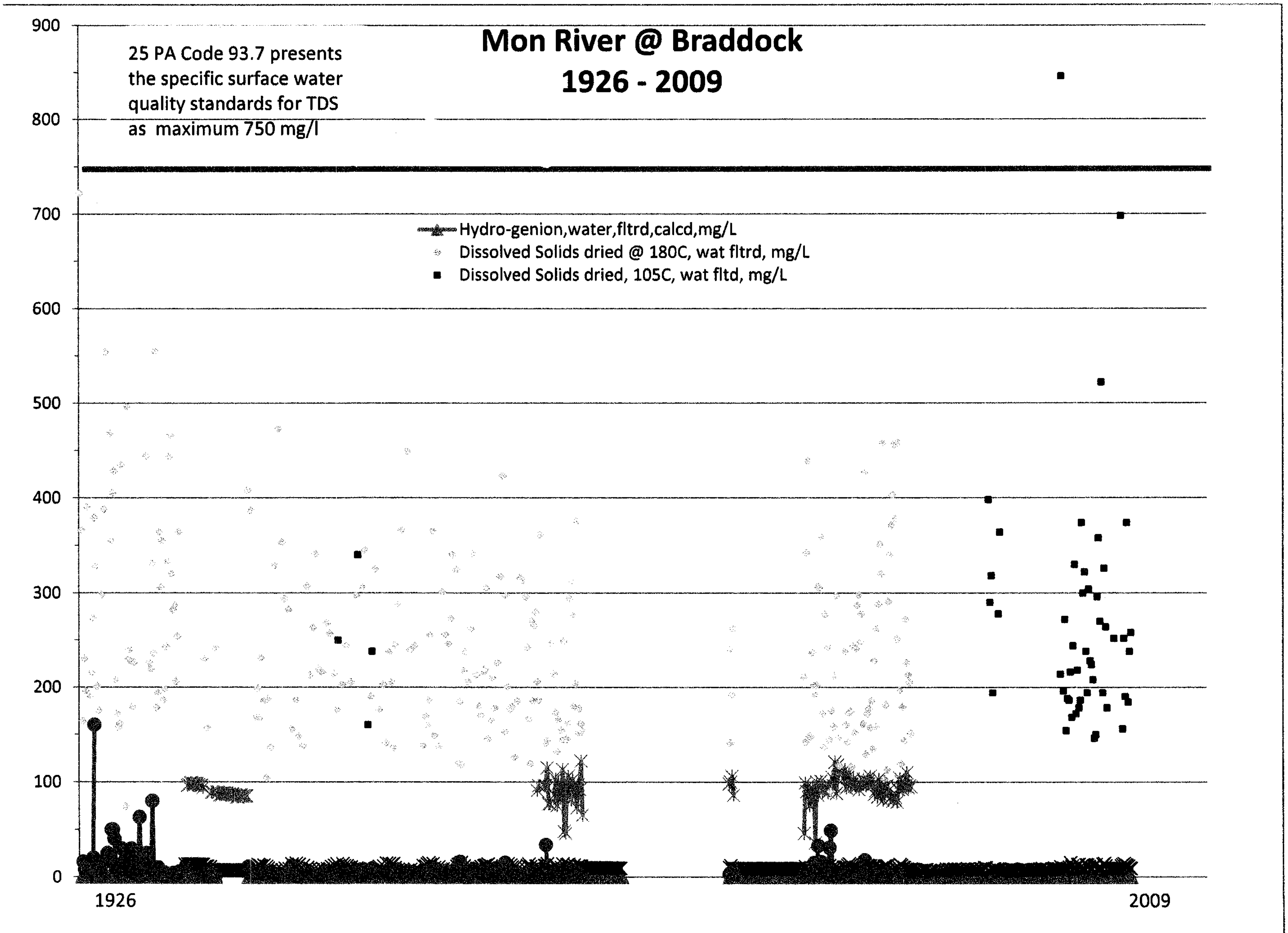
Josie Gaskey
PA Coal Association

EXHIBIT A-1

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	Notes
88.2	1630-228	December 09	246	142	4.89	79.1	added CMU data
		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	added CMU data
		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							added CMU data
50.5	1523-157	December 09	298	194	11	77.5	added 2 samples from October 09
		January 2010	115	194	11	77.5	
46.2							added CMU data

EXHIBIT B



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

EXHIBIT C

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

presented to the PA DEP WRAC TDS Subcommittee

September 22, 2009

jective: Assess Functi 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.

PCA Membership Survey

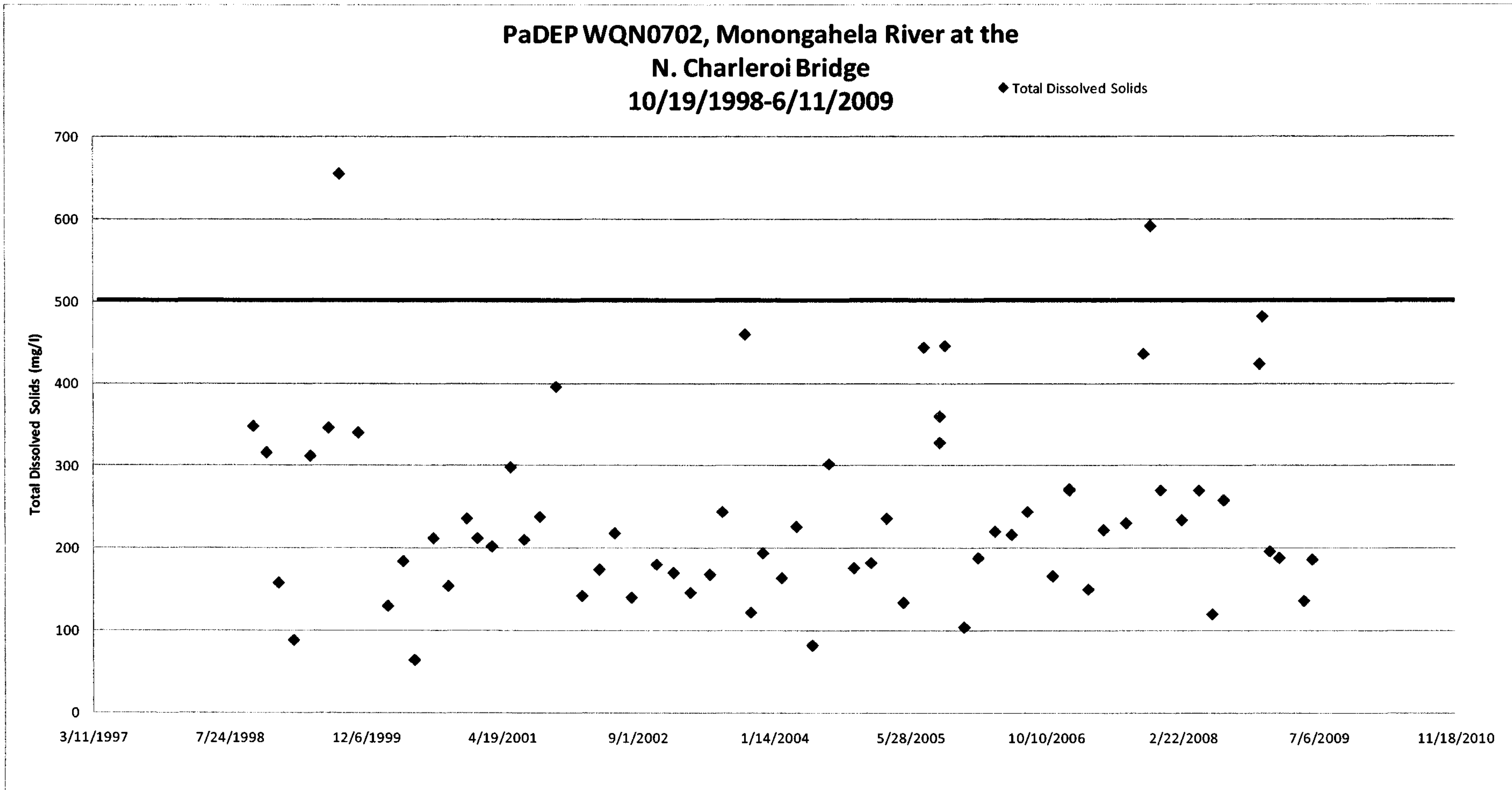
- Pennsylvania Coal Association (PCA) conducted a survey to gauge the scope of ongoing treatment activities and estimate potential effects of proposed rule making
- 84.7% of Pennsylvania's total coal production is represented by PCA
- Survey information is representative of the industry, but it is not 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.

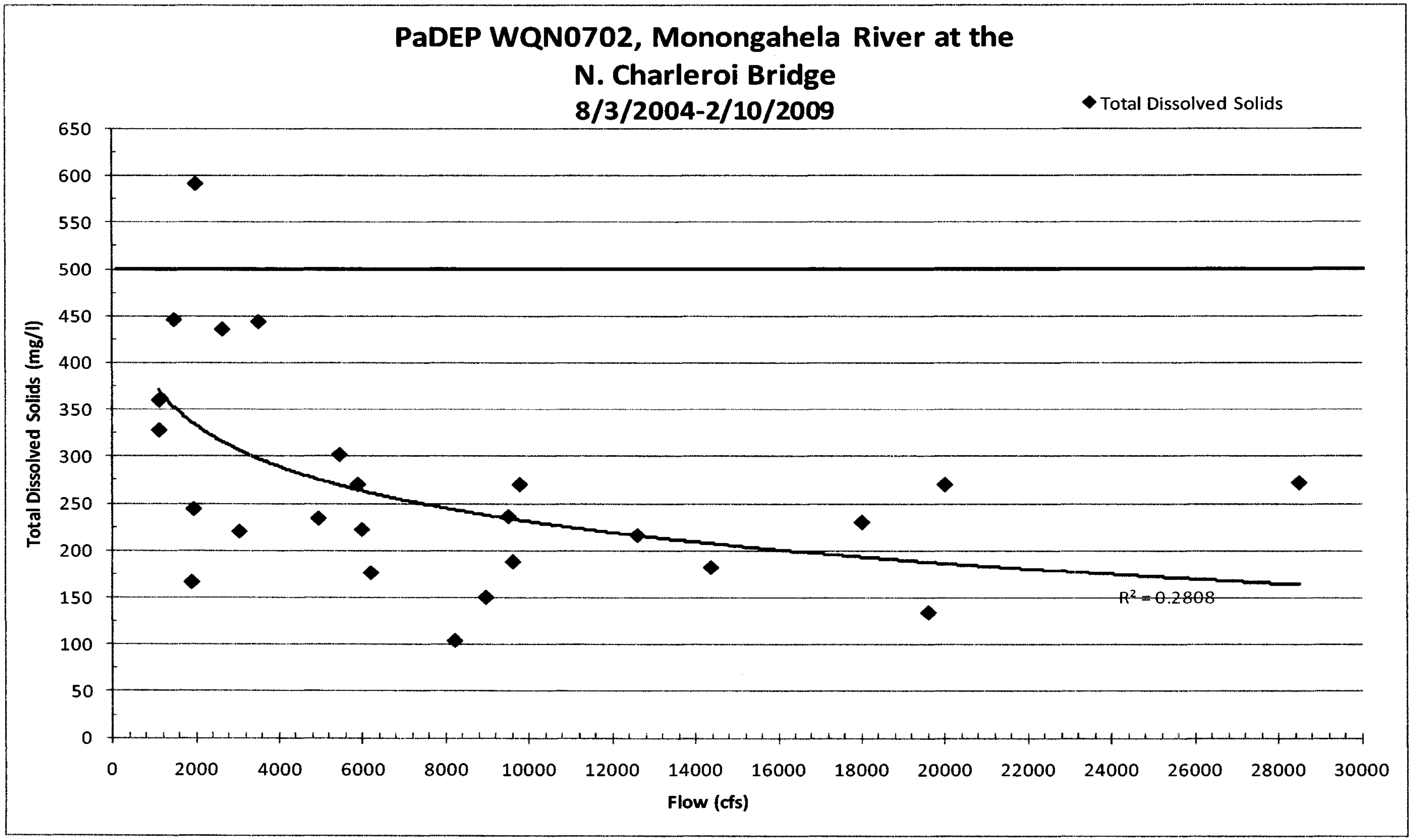
- The combined maximum flow from these discharges is approximately 26,725 gallons per minute (gpm)
- The weighted mean TDS concentration of all discharges reporting TDS is 3,004 mg/l
- 96% (26 of 27 reporting TDS) report a maximum TDS concentration > 500 mg/l
- 4% (1 of 27 reporting TDS) had a maximum 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

Monongahela Water Quality Trends

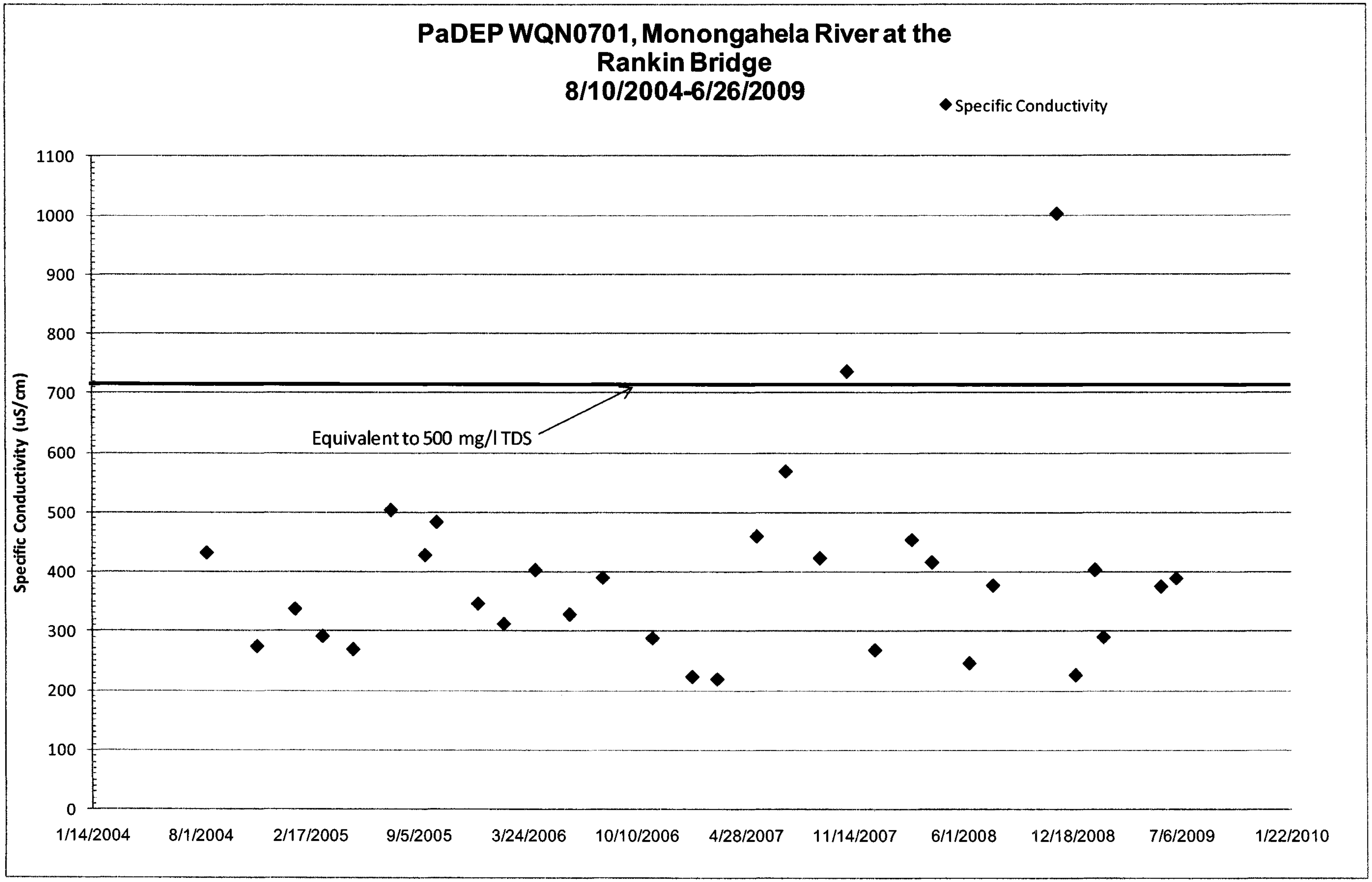
- Most Comprehensive Collection of PaDEP Mon. River Data from Site WQN0702
- Long-Term Data Indicates Exceedances of 500 mg/l TDS Limit are Sporadic
- TDS Exceedances Correspond to Low Flow Conditions



Monongahela Water Quality Trends cont.

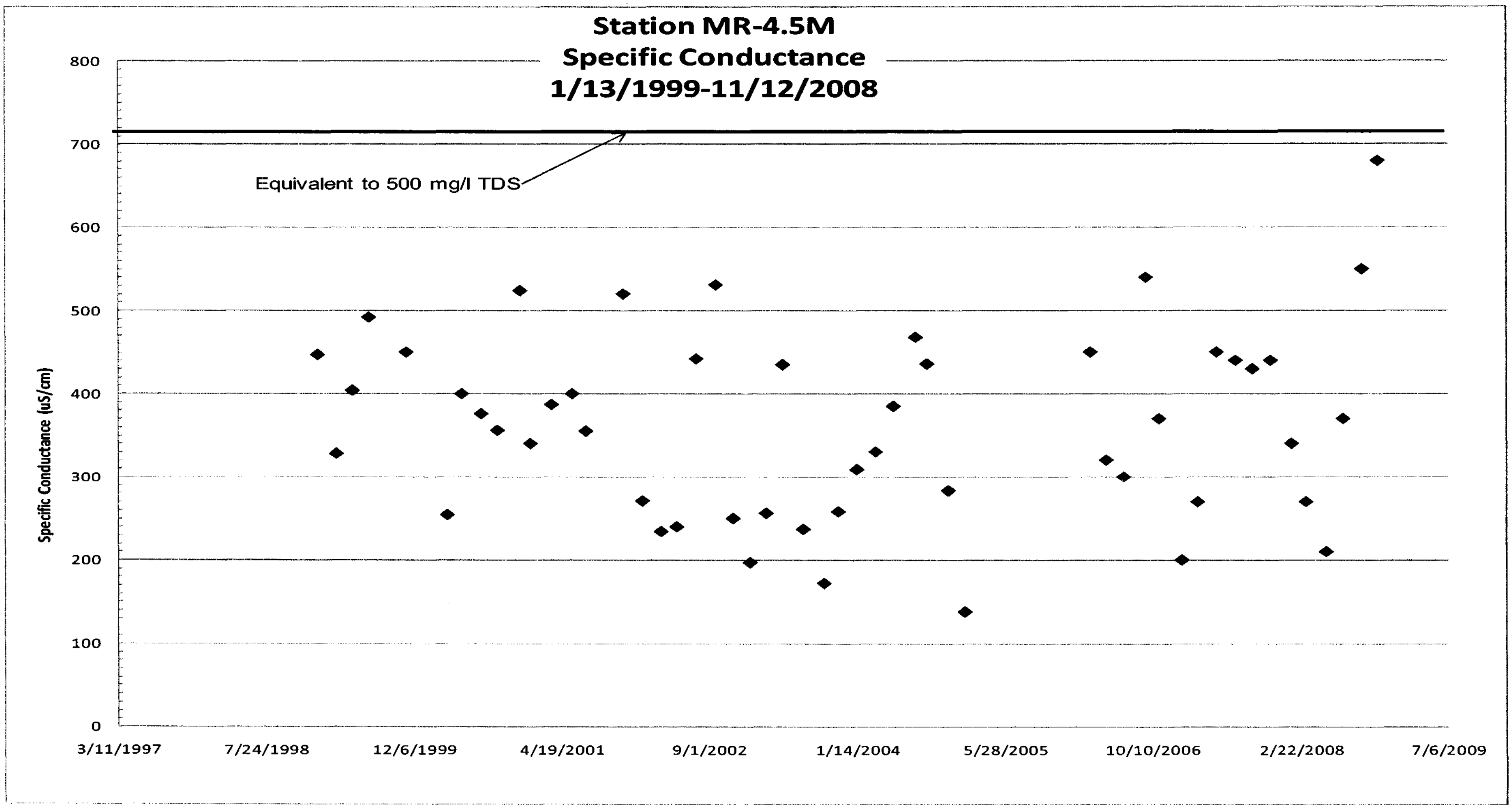


Monongahela Water Quality Trends cont.



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 alternative 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, 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 1000gpm 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 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

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.
  - Its an effective treatment for TDS with concentrations less than 40,000 mg/l. (some manufactures claim higher concentrations but pressures are limited by membrane strength)
  - Requires a rigorous pretreatment process to remove scaling agents (metals, hardness) and biological activity which promote fouling
  - 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 (in thousands)
  - Aqua Tech 500 gpm single unit
    - Design, Permitting, Construction, $4,140
    - Operation and Maintenance , $1,062
    - This value does not include concentrate waste disposal or an evaporation step
  - Concentrate Disposal Circuit: Evaporation & Crystallization
    - 60gpm evaporator /crystallizer $12,000
    - Design, permit, construct $ 8,700
    - Operation and Maintenance $2,266
  - Total Cost Combine System w/ O&M
    - RO system $5,202
    - Evaporator Crystallizer $22,966
    - Total $28,168
    - Ten year total O&M after construction (yrs 2 – 11) $33,280

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 follow 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, time frames could range from 12 to 24 months, delaying construction

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 500gpm ZLD treatment system is as 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
- 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	$136000/yr/plant