

**Overview of Deficiencies and Errors Contained in Reports Issued by
The Environmental Integrity Project Regarding
Coal Combustion Waste Disposal Impoundments in Pennsylvania**

**Pennsylvania Department of Environmental Protection
Bureau of Waste Management
November 1, 2011**

The Environmental Integrity Project (“EIP”) issued three reports which contain claims that certain coal combustion waste impoundments throughout the United States are causing groundwater and surface water contamination. The reports are entitled and dated:

“*Out of Control: Mounting Damages from Coal Ash Waste Sites.*” February 24, 2010.

“*In Harm’s Way: Lack of Federal Coal Ash Regulations Endangers Americans and Their Environment,*” August 26, 2010.

“*EPA’s Blind Spot: Hexavalent Chromium in Coal Ash.*” February 1, 2011.

DEP’s Licensed Professional Geologists in the Southwest and Northeast Regional Offices have reviewed EIP’s claims concerning the Pennsylvania facilities, and have prepared detailed point-by-point responses to EIP’s findings. This summary describes the errors in EIP’s reports in a more general format.

Several fundamental research flaws characterize EIP’s claims, which undermine the scientific validity of these reports. These recurring flaws are summarized immediately below, and are then illustrated with several examples drawn from EIP’s reports for the specific facilities.

1. **Faulty assumptions and pre-conceived conclusions show EIP’s bias.** Scientists use a common expression: "Garbage in, leads to garbage out," meaning that if a researcher begins with faulty assumptions or data, all results from the research will be just as faulty. Pre-conceived assumptions underlying a researcher’s conclusions (*e.g.*, that coal combustion waste results in groundwater contamination) will cause a researcher to rely upon weak data and ignore contrary evidence.
 - **Yet**, EIP often ignores sampling and other data which indicate that its assumptions and data are wrong. EIP makes misleading comparisons, referring to regulatory standards interchangeably and inaccurately, for example, by comparing impoundment discharge samples to drinking water standards.
2. **EIP’s groundwater studies which ignore groundwater direction are poor science.** A valid scientific study must consider the direction that groundwater is flowing in the subsurface. In this way, researchers can tell if a sample is showing contaminants

originating from a site *or* moving towards it from other locations. Contaminants in groundwater moving towards an impoundment are either naturally occurring or from other sources.

- **Yet**, EIP's reports often simply assume that all sampling results must be caused by coal combustion waste, disregarding critical facts such as the direction of groundwater flow and aquifer characteristics. These assumptions show either bias or a disregard of scientific accuracy.

3. **EIP's data is often not credible because the results cannot be reproduced by other scientists.** To be credible, scientific research data must be "reproducible," that is, if one runs a test a second or third time, similar results will be obtained. This is a critical safeguard to ensure that a single test was not performed incorrectly, or skewed by outside influences.

- **Yet**, EIP often draws conclusions from a single sample, which in many cases was inconsistent with prior and later sampling. EIP's claims therefore lack credibility, because they cannot be confirmed or were actually refuted by other data.

4. **EIP's research is largely not transparent or verifiable.** A critical element in valid scientific study is that the source of one's information be disclosed, so that others can verify the data's accuracy.

- **Yet**, EIP's reports often refer only vaguely to the sources of its data, without identifying the specific locations, dates or sampling source. EIP's conclusions are therefore not credible, because its claims are impossible to verify.

I. FAULTY ASSUMPTIONS AND PRE-CONCEIVED CONCLUSIONS SHOW EIP'S BIAS.

Scientists use a common expression: "Garbage in, leads to garbage out," meaning that if a researcher begins with faulty assumptions or data, all results from the research will be just as faulty. Pre-conceived assumptions underlying a researcher's conclusions (e.g., that coal combustion waste results in groundwater contamination) will cause a researcher to rely upon weak data and downplay or ignore contrary evidence.

- **Yet**, EIP often ignores sampling and other data which indicate that its assumptions and data are wrong. EIP makes misleading comparisons, referring to regulatory standards interchangeably and inaccurately, for example, by comparing impoundment discharge samples to drinking water standards.

Examples of these deficiencies include:

A. Bruce Mansfield Power Plant's Little Blue Run Surface Impoundment

1. EIP's February 24, 2010 report, p. 162 ("For example") claims:

Arsenic has been measured in at least two off-site residential drinking wells above the MCL of 0.01 mg/L, including a reading of 0.0146 mg/L in one family's well in 2008, and a reading of 0.021 mg/L at another family's well.

In fact, although one sample collected from a private water supply well in late 2008 did contain arsenic at a concentration of 0.013 mg/L (not 0.0146 mg/L); the homeowner was aware that his well water was muddy. Another sample from the water well early in 2009 and the analytical results concentrations of metals were much lower compared to the 2008 sample. Total arsenic was reported at 0.0025 mg/L and dissolved arsenic at <0.0025 mg/L - well below the MCL. The DEP also collected a sample from this well two months later and confirmed these results. Both total and dissolved arsenic were less than <0.003 mg/L the detection limit. In addition, the location and elevation of this water well clearly indicates the well is located up gradient (background) from the impoundment.

Further, while arsenic was reported at a concentration of 0.021 mg/L in a sample collected from a private water well in 1993, six later samples from this well were analyzed for arsenic. The greatest concentration found was 0.005 mg/L, and most of the samples were non-detect. In addition, this well did not contain other concentrations of constituents that would suggest any impacts from the impoundment. Arsenic is found in soils of Western Pennsylvania, its presence does not confirm impacts from the impoundment.

2. EIP's February 24, 2010 report, p. 166 ("On Site") claims:

On-site surface water showed an exceedance of the CCC for selenium at SW-3 (a seep in Pennsylvania just below the earthen dam).

In fact, EIP misidentifies sampling point SW-3 as a seep below the dam. SW-3 is a sampling point at the stilling basin and is a permitted discharge from the impoundment. Comparing this sampling point to WQC is not appropriate.

3. EIP's February 24, 2010 report, p. 161, "Summary" claims: ‘

Discharges to groundwater and surface water from the 1,300-acre 'Little Blue' surface impoundment have exceeded MCLs for arsenic and other parameters in multiple off-site residential drinking wells (prompting several property buyouts by FirstEnergy), exceeded Pennsylvania Water Quality Criteria (PA WQC), including the Criteria Continuous Concentration (CCC) and Criteria Maximum Concentration (CMC), in Mark's Run and other off-site surface water sources, and pervasively exceeded federal Maximum Contaminant Levels (MCLs) at many on-site groundwater monitoring wells.

In fact, there have been no confirmed concentrations in off-site residential drinking water wells located near the impoundment in excess of an MCL. Second, EIP improperly concludes that any private water well sampled by FirstEnergy or the DEP is impacted by the impoundment. This conclusion ignores the facts that many of the wells are hydrogeologically separate from the impoundment and/or may be impacted by other sources, including naturally occurring sources such as coal seams and brines, and other man-made sources such as past mining or oil and gas operations. Finally, surface water discharges are monitored and reported under the NPDES permit program and the facility is in compliance with those permits.

4. EIP's February 24, 2010 report, p. 163 claims:

Between 2008 and 2010, arsenic was found in two additional surface water points, including exceedances at S-31 (a monitoring point in Mark's Run, in a residential neighborhood in West Virginia) and at SW-5 (a spring over 2,000 feet from Little Blue), with arsenic concentrations of 0.024 and 0.028 mg/L.

In fact, EIP misidentified sampling point SW-5 as a spring over 2,000 feet from the impoundment. SW-5 is a sampling point for the wastewater collected directly from the disposal impoundment. Further, EIP fails to note that seep S-31 emanates from the Brush Creek coal, and arsenic is often found in coal seeps.

5. EIP's February 24, 2010 report, p. 162 claims:

In on-site groundwater that flows off-site, arsenic exceeded the 0.010 mg/L at least 24 times in 14 wells in 2006, 2009, and 2010, including concentrations of 0.030, 0.033, and 0.036 mg/L in three different wells. Fluoride, lead, and turbidity MCLs were also exceeded, as well as SMCLs for several other pollutants. On-site groundwater monitoring wells also had exceedances of SMCLs for chloride, iron, manganese sulfate, and turbidity.

In fact, FirstEnergy began regularly analyzing water samples for arsenic in 2006. Although arsenic was found in some samples, many of these detections were not replicated in subsequent samples from the same wells.

FirstEnergy has implemented studies to determine the reason(s) for the elevated arsenic in Well 16A and, if necessary, determine what steps may be taken to address it. Monitoring wells immediately downgradient of MW-16A do not contain arsenic above the MCLs. Therefore, groundwater leaving the Little Blue Run Impoundment downgradient of the dam does not exceed MCLs.

The other parameters that EIP indicates exceed MCLs and SMCLs occur naturally in the environment. EIP made no attempt to assess if a monitoring well contains water representative of background water quality, shows brine impacts from historic oil and gas exploration and production in the area, or contains concentrations of parameters associated with coal seams.

6. EIP's February 24, 2010 report, p. 166 claims:

In addition, a monitoring well that appears to be monitoring surface water of the impoundment itself (SW-7) measured exceedances of the PA CCC for arsenic (0.010 mg/L) twice in 2009-2010, with readings of 0.023 and 0.025 mg/L, and it also measured at least six exceedances of the boron PA CCC (1.6 mg/L), with a high reading of 15.7 mg/L

In fact, EIP is comparing concentrations measured from SW-7 which is sampled from within the disposal impoundment (prior to discharge) to Fish and Aquatic Life Criteria.

7. EIP's February 24, 2010 report, p. 162, claims:

MCLs were also exceeded in off-site groundwater wells for cadmium, barium, fluoride, lead, and turbidity.

In fact, no samples have found any private drinking water wells to contain constituents that exceed primary MCL's. Only a tiny percent of groundwater monitoring well samples have shown elevated cadmium, barium, fluoride or lead, and evidence indicates these are likely background conditions, and not the result of the impoundment. Turbidity is a function of mud and sediment in a well.

B. Allegheny Energy – Mitchell Power Station

1. EIP's February 24, 2010 report claims:

In 1997, Allegheny Power initiated preliminary groundwater investigations in the vicinity of the two CCW lagoons.... However, the initial groundwater investigation found that groundwater was being degraded by the impoundments.

In fact, the groundwater investigation demonstrated that groundwater at the station had been affected by deep mining of the Pittsburgh Coal Seam upgradient of the site, and not by the impoundments. Some parameters were elevated due to acid mine drainage from past mining of the coal seam.

2. EIP's February 24, 2010 report claims:

Boron was detected at 1.9 mg/l and 3.7 mg/l at the two downgradient wells of Lagoon No. 2.

In fact, while data presented to the Department shows that there have been rare detections of boron, these levels have been attributable to the past deep mining of the Pittsburgh Coal Seam upgradient of the site.

3. EIP's February 24, 1010 report claims:

As a result of Allegheny Energy's evidence of groundwater degradation by the lagoons, a groundwater monitoring plan was implemented with an upgradient well two downgradient wells for each lagoon.

In fact, the groundwater monitoring plan was implemented for all similar facilities as required by the Residual Waste Regulations, and not "as a result of Allegheny Energy's evidence."

4. EIP's February 24, 2010 report claims:

Analyses of quarterly monitoring data for samples collected from the two monitoring wells downgradient of Ash Lagoon No. 2 in 2007 (GW-4 and GW-5) found the following:

- Boron levels were more than twice the EPA's Child Health Advisory of 3.0 mg/l and much higher than boron levels in upgradient wells or at surface monitoring points.
- Arsenic concentrations have been 1 to 2 times the primary MCL of 0.010 mg/l at downgradient wells and exceeded the highest concentrations for arsenic in upgradient points.

- Levels of nickel, molybdenum, and manganese have also been noticeably higher at downgradient than upgradient points.

In fact, nothing in the report substantiates EIP's claims. Monitoring has been ongoing for more than 10 years and no upward trends have been established. Moreover, arsenic was detected in the upgradient (background) wells, showing that the origin is from past mining of the Pittsburgh Coal Seam.

5. EIP's February 24, 2010 report claims:

Allegheny Energy does not monitor groundwater around the ash landfill that lies west of Mitchell Power Plant. Review of a topographic map of the landfill shows that surface drainage from the landfill flows towards Lagoon No. 1, and the position of the landfill with respect to Lagoon No. 2 creates the possibility that the upgradient monitoring wells from both lagoons could be affected by groundwater flowing from the ash fill.

In fact, Allegheny Energy does have an approved groundwater monitoring system around the FGD disposal facility referenced above. Groundwater has been monitored for over 10 years. The Report makes an assumption regarding groundwater flow that is based on a topographic map and not a groundwater flow map which is based on subsurface data. Topographically, surface water from around the landfill flows in a general direction towards the power station but is diverted around it by surface water controls.

C. RRI Energy – Seward Generating Station

1. EIP's February 24, 2010 report (Summary) claims:

The Seward Generating Station's unlined coal ash and coal refuse pit, as well as its Closed Ash Sites No. 1 and No. 2, have leached and continue to leach many pollutants into the underlying aquifer at levels that far exceed both Pennsylvania and federal primary MCLs, and upgradient concentrations.

In fact, the original Seward Power Station has been demolished and a new Co-Gen plant built on site. No new fly ash is being disposed at the Seward Generating Station. As part of the permitting process for the Co-Gen plant, RRI entered into a Consent Order and Agreement (CO&A) in 2000 to remediate several old coal refuse piles on site which were discharging acid mine drainage into the groundwater and adjacent river.

All of the groundwater data referenced in the EIP report for this facility is from the monitoring wells around former coal refuse piles and not from any fly ash disposal sites. The only elevated parameters detected in the groundwater wells around the permitted flyash sites No. 1 and No. 2 has been secondary and non-health related (relating to the taste, odor or appearance of the water).

2. EIP's February 24, 2010 report claims:

Groundwater levels of antimony consistently exceeded the primary MCL of 0.006 mg/L, including a concentration of 0.1 mg/L (nearly 17 times the standard) at monitoring well MW-7 in the third quarter of 2008. Cadmium exceeded the primary MCL of 0.005 mg/L at 4 different monitoring wells, MW-5R, MW-6R, MW-7, and MW-8R, including a MW-7R reading of 0.041, over eight times the standard, in the second quarter of 2009.

In fact, the groundwater data referenced in this statement is related to the past coal refuse disposal and not fly ash.

3. EIP's February 24, 2010 report claims:

In addition, 13 of 16 quarters for which we have downstream surface water data from 2005 to 2009 contained at least one exceedance of Pennsylvania's Water Quality Criteria for Fish and Aquatic Life. There were 27 exceedances for aluminum, nickel, and zinc, including an aluminum exceedance of 5.3 mg/L (compared to a Criteria Maximum Concentration of .075 mg/L) and a nickel concentration of 30 Ug/L (compared to a Criteria Continuous Concentration of 4.05 Ug/L).

In fact, all of the references in this statement to impacted surface water quality data are related to the past coal refuse disposal and not to any fly ash disposal. As part of the remediation of the coal refuse piles, the company was required to establish up gradient and down gradient surface monitoring points on the adjacent stream. The upgradient (background) data collected prior to the removal of the coal refuse indicated that coal refuse piles were impacting the stream.

4. EIP's February 24, 2010 report claims: Demonstrated off-site damage to surface water.

In fact, the groundwater investigation indicates that it is not fly ash which has impacted the adjacent stream, but the coal refuse pile currently under remediation.

5. EIP's February 24, 2010 report claims:

In addition, groundwater monitoring results continue to exceed Primary and Secondary Drinking Water Standards (MCL). These exceedances have been consistently documented since at least 2004.

In fact, all of the groundwater data referenced in the section relates to coal refuse piles that were disposed on site decades ago and do not correlate to flyash disposal. Remediation of these coal refuse piles has occurred to reduce and cease contamination, and data shows that contaminant levels are decreasing.

6. EIP's February 24, 2010 report claims:

Surface water monitoring downstream of the ash sites contained 27 exceedances of Pennsylvania's Water Quality Criteria for Fish and Aquatic Life, with one or more exceedances occurring in 13 of the 16 quarters in downstream surface water data from 2005 to 2009.

In fact, all of the surface data referenced in this section relates to the refuse piles that are undergoing remediation, not fly ash.

7. EIP's February 24, 2010 report claims:

Coal combustion waste including more recently (after 2004), CCW from fluidized bed combustion of waste coal which is co-disposed with coal refuse.

In fact, alkaline ash has been used to help to neutralize the effect of the acidic refuse disposed of on site years ago. There has been no traditional disposal of fly ash at Seward since Ash Sites No. 1 and No. 2 were closed.

D. Allegheny Energy – Hatfield's Ferry Power Station

1. EIP's August 26, 2010 report, p. 174 claims:

An unlined CCW landfill located off-property from the Hatfield's Ferry Power Station has contaminated groundwater, polluted surface water, and damaged aquatic ecosystems since at least 2001.

In fact, a comprehensive groundwater and surface water assessment and investigation at the disposal site concluded that the past unreclaimed surface mining and the resultant acid mine drainage (and not ash disposal) within the watershed of the landfill had negatively impacted the aquifers beneath the landfill. The EIP report has not presented any supporting data that coal combustion waste has contaminated groundwater, surface water, or damaged aquatic life.

2. EIP's August 26, 2010 report, p. 175 claims:

In addition, a stream habitat and macroinvertebrate survey of four streams emanating from the landfill property shows that two streams closest to the CCW landfill are impaired by CCW leachate from the landfill.

In fact, the low benthic counts were a result of the stream size, bank erosion, and habitat disturbance and not activities related to the landfill.

3. EIP's August 26, 2010 report, p. 179 claims:

Samples collected from well MW-213A, downgradient of coal ash in the Hartley Mine and more than a thousand yards south of Phases 1 and 2 of the landfill and from MW-217A, and MW-218A, more than 500 yards east of waste placement areas in the landfill, show that arsenic concentrations well above the MCL have been measured beyond the site in downgradient groundwater since at least 2005.

In fact, only a single sample from MW-213A shows elevated levels of arsenic, rather than “samples” as EIP claims. Further, MW-213A is an upgradient well for the disposal area, and therefore would show background contaminants rather than any impact from the disposal area. This is consistent with an extensive groundwater assessment indicating that abandoned surface mining in the area has had an unrelated negative impact on groundwater. Finally, MW-217A and MW-218A were installed to monitor downgradient conditions from the leachate impoundment. These wells are screened in mine spoil, and document contaminants resulting from the nearby abandoned strip mine.

4. Damage Case Claim – p. 175

The wetland treatment system was designed to remove or reduce concentrations of iron, aluminum, manganese, and total suspended solids and to control pH - but was not specifically designed to treat other problematic constituents in CCW leachate.

In fact, the passive wetland treatment system at the disposal site is a state-of-the-art use of passive technologies to treat the discharge of the active landfill. The system was designed to remove iron, aluminum and manganese from landfill leachate. The control of pH and treatment of many other parameters occurs in passive wetland treatment technology.

5. EIP's August 26, 2010 report, p. 176, claims:

Finally there are increasing concentrations of calcium and magnesium which are highly soluble parameters frequently found in coal ashes.

In fact, calcium and magnesium are commonly found in abundance in the soils and groundwater of western Pennsylvania and are not solely related with coal combustion waste.

6. EIP's August 26, 2010 report, pp. 176-177 claims:

Of the four streams, the stream sections with the healthiest benthic macroinvertebrate community structure were the downstream portions of the unnamed tributary to the southwest (discharges to Little Whitely Creek north of the unnamed tributary that the landfill flows into) and the

unnamed tributary to the southeast (discharges to the Monongahela River)
- both being the farthest from the landfill.

In fact, while the report implies that the worst conditions are due to the proximity of the streams to the landfill, the low benthic community counts were actually due to the small stream size, substrate conditions, and available habitat.

7. EIP's August 26, 2010 report, p. 175 claims:

The PADEP in-stream Human Health Water Quality Criteria for thallium is 0.00024 mg/L, which is an order of magnitude less than the 0.0021 mg/L monthly average and 0.0042 mg/L daily maximum concentrations allowed in the NPDES permit.

In fact, the applicable regulatory standard for waters from which there is no human consumption, per regulation, is 0.013 mg/l (on a continuous basis) and 0.065 mg/l (maximum). See 25 Pa. Code Section 93.8c, Table 5. EIP's reference to human health based Water Quality is misleading.

8. EIP's August 26, 2010 report, p. 176 claims:

In addition, all three years of boron measurements in this stream also exceeded the U.S. Environmental Protection Agency's (USEPA) Child Health Advisory for boron (3 mg/L), with the 2006 and 2008 concentrations more than twice as high as this Advisory and also exceeding the Life-time Advisory for boron of 6 mg/L.

In fact, the unnamed tributary to Little Whitely Creek is not a source of public drinking water, so comparisons to EPA Health Advisories is misleading and inappropriate.

9. EIP's August 26, 2010 report, p. 177, claims:

For reference, if PA WQC were compared to the leachate sump water (to which PA WQC would not apply), concentrations of boron would be exceeding the CCC by at least a factor of 10 in every single reading in the table below.

In fact, the report first states that comparisons to Water Quality Criteria are not appropriate, and then proceeds to make this comparison.

E. PPL Martins Creek Power Plant

- 1. EIP's report, "EPA's Blind Spot: Hexavalent Chromium in Coal Ash," p. 7, item 21 claims that PPL Martins Creek as exceeding California's drinking water goal for hexavalent chromium by 5000 times.**

In fact, analytical data showed no valid data to indicate total chromium exceeded a standard. Therefore stating hexavalent chromium may exceed a presumed standard or is present is without basis. The EIP used invalid data to report chromium in groundwater exceeding a drinking water standard and further assumed all chromium tested is comprised of 100% hexavalent chromium with no basis for that assumption.

- 2. EIP's February 1, 2011 report, p. 7, item 21 claims that an unlined pond at PPL Martins Creek has groundwater contamination above 100 ug/l.**

In fact, the data does not support the claim of chromium present in groundwater at the site. Ninety five percent of the groundwater monitoring results for this disposal impoundment are reported non-detect for total or dissolved chromium.

F. Portland Generating Station's Bangor Quarry Ash Disposal Site, RRI Energy, Inc., Northampton County

- 1. EIP's February 24, 2010 report claims:**

Surface water discharges from the landfill are sending concentrations of boron, cadmium, hexavalent chromium, and selenium into Brushy Meadow Creek that are notably higher than Pennsylvania's Water Quality Criteria Continuous Concentration for Fish and Aquatic Life (CCC).

In fact, the surface water data indicates the concentration of these parameters is already found to be elevated in the upgradient surface water samples located above the disposal site's boundary. The higher concentrations for the listed parameters at the upgradient surface water location suggest that the water is impacted upstream and not impacted by discharges at the Bangor Ash site.

- 2. EIP's February 24, 2010 report claims:**

The ash that has been dumped at this landfill has sometimes been more toxic than regulations allow. Trona test ash was disposed of on-site despite having failed two of nine leachability tests for arsenic.

A letter from RRI to PADEP in 2007 reports that of nine composite samples of Trona ash (a test ash) disposed of at this site, two samples exhibited high levels of leachable arsenic in excess of Pennsylvania Class II landfill limits. Specifically, the Class II landfill limit for leachable

arsenic is 0.5 mg/L; however leach test results measured arsenic at 1.61 mg/L (more than three times the limit) and 2.02 mg/L (more than four times the limit).

In fact, the maximum concentration of a contaminant, based on chemical analysis for its leachate for a Class II Residual Waste landfill is 50 times the waste classification standard for that contaminant (§ 288.523(a)(1)). For Arsenic, the Class II limit would be 2.5 mg/L, not the 0.5 mg/L that EIP claims. None of the Trona ash samples exceeded this limit.

3. EIP's February 24, 2010 report claims:

A GAI Consultants 2006 Annual Evaluation Summary of this site, describing results collected from downgradient monitoring wells during 2006, states: Analytical results for dissolved iron, dissolved manganese, pH (field), pH (lab), sulfate, and total dissolved solids exceed the USEPA [MCLs]. Furthermore, results from GAI Consultants' trend analysis of data collected after July 1, 1995 and prior to January 1, 2007 state: Upward trends for dissolved arsenic, dissolved boron, and dissolved potassium and downward trends for pH (field) and pH (lab) are unique to downgradient monitoring wells and may be the result of actions occurring at Bangor.

In fact, the 2006 report EIP relies upon to show an upward trend for pH and sodium goes on to conclude that the upward trend is due to seasonal variation and is not attributed to the ash disposal at the facility. The report also states that any upward trend in sulfate levels is shown in wells upgradient to the facility, and is not being caused by the ash disposal facility.

4. EIPs February 24, 2010 report claims:

Unpermitted discharges of boron, cadmium, hexavalent chromium, and selenium into Brushy Meadow Creek from Outfall 001 exceeded the Pennsylvania water quality standard for the protection of aquatic life from pollutant concentrations that are chronically toxic (Criteria Continuous Concentration or CCC) in samples analyzed in October 2006. ... Unpermitted discharges of boron, cadmium, and selenium into Brushy Meadow Creek from Outfall 002 also exceeded the PA CCC in samples analyzed in November 2006.

In fact, the data shows that these parameters are already elevated in upgradient surface water samples, which shows that the disposal facility is not the cause of these contaminants. Surface discharges are regulated through a NPDES permit, and Reliant has not been in violation of their permit.

5. EIP's February 24, 2010 report claims:

Exceedances of PA CCC were documented in unpermitted discharges to surface waters in 2006. No regulatory actions required.

In fact, the exceedances in the surface water are also present in the upgradient surface water sampling. The above referenced exceedances are for Secondary Drinking Water Regulations (SWDR) that set non-mandatory water quality standards for 15 contaminants. These contaminants are not considered to present a risk to human health at the SMCL, and exceedances do not require regulatory action.

6. EIP's February 24, 2010 report claims:

There are least two public water supply wells approximately ¾-mile away from the site; Hartzell's Auction Inc. serves three families and Meadowbrook Mobile Home Park serves approximately 98 individuals.

In fact, there are three Public Water Supply Wells (PWS) that are less than a mile from the Ash Disposal Facility. However, all three wells are upgradient from the Ash Disposal Area and not affected by the ash disposal site. The well at Hartzell's Auction (ID # 3480835) is not a public water supply. The two other PWS wells at Meadow Brook Mobile Home Park (ID # 3480008) are also upgradient.

G. Phillips Power Plant Landfill, Duquesne Light Co.

1. EIP's February 24, 2010 report claims:

A groundwater assessment was conducted to determine whether the landfill was adversely affecting groundwater. As a result of the groundwater assessment, PADEP required groundwater monitoring to continue after final cover and grading of the landfill.

In fact, the Residual Waste Regulations required groundwater monitoring for all permitted disposal areas regardless of water quality.

2. EIP's February 24, 2010 report claims:

As part of the closure plan for the Phillips Ash Landfill, PADEP required quarterly groundwater monitoring due to evidence of groundwater degradation.

In fact, regardless of the groundwater quality, the 1992 Residual Waste Regulations required quarterly monitoring.

H. Fern Valley Landfill, Orion Power Holdings, Inc.

1. EIP's February 24, 2010 report claims:

A review of the Fern Valley Disposal Site maps (DPL, 1996) and the recent satellite photographs of the final fill area, reinforces the concern that none of the designated "upgradient" monitoring wells (MW12, MW15 and MW5A) can be reliably considered upgradient.

In fact, in comparing the water elevations in the seven wells, the upgradient wells have higher water level elevations than the downgradient wells. The difference in elevation between the upgradient wells and the downgradient wells is about 100 feet for MW-12 and MW-5A and about 200 feet for MW-15. This data supports the conclusion that the upgradient wells are in fact in upgradient positions.

Upgradient Wells 1st Quarter 2010 Static Water Elevations

MW-5A - 857'
MW-15 - 955'
MW-12 - 856'

Downgradient Wells 1st Quarter 2010 Static Water Elevations

MW-6 - 745'
MW-7 - 734'
MW-20 - 751'
MW-21 - 754'

Further, based on the original topography of the valley, the upgradient wells are in upgradient positions and the downgradient wells are in downgradient positions. Based upon the above, the upgradient wells at the Fern Valley Landfill are, in fact, upgradient of the site.

II. EIP'S GROUNDWATER STUDIES, WHICH IGNORE GROUNDWATER DIRECTION, ARE POOR SCIENCE.

A valid scientific study must consider the direction that groundwater is flowing in the subsurface. In this way, researchers can tell if a sample is showing contaminants originating from a site *or* moving towards it from other locations. Contaminants in groundwater moving towards an impoundment are either naturally occurring or from other sources.

Yet, EIP's reports often simply assume that all sampling results must be caused by coal combustion waste, disregarding facts such as the direction of groundwater flow and aquifer characteristics. These assumptions show either bias or a lack of scientific knowledge.

Examples of these deficiencies include:

A. Bruce Mansfield Power Plant's Little Blue Run Surface Impoundment

1. EIP's February 24, 2010 report, p. 161, claims:

Discharges to groundwater and surface water from the 1,300-acre 'Little Blue' surface impoundment have exceeded MCLs for arsenic and other parameters in multiple off-site residential drinking wells

In fact, there have been no confirmed concentrations of these parameters in off-site residential drinking water wells located near the impoundment in excess of an MCL. Many of the wells are hydrogeologically separate from the impoundment and/or may be impacted by other sources, including naturally occurring sources such as coal seams and brines, and other man-made sources such as past mining or oil and gas operations. Surface water discharges are monitored and reported under the NPDES permit program and the facility is in compliance with those permits.

2. EIP's February 24, 2010 report, p. 161-2 claims there is:

Demonstrated [arsenic] damage to off-site groundwater and off-site surface water (in domestic wells and in Marks Run and other surface waters)

In fact, EIP fails to identify the data it is relying on, making verification impossible. However, based on analysis of private water supplies around the impoundment collected by DEP over the last six years, arsenic has not been detected. (See Table 1.)

Table 1 – DEP Private Well Sampling Data

Name/Sample No.	Location	Sample Date	Appr. Dist. from Impoundment	Arsenic Data
Carpenter, M 707 833	Cullen Dr, Georgetown, PA	08/17/04 07/30/09	1600'	Non-detect (ND) ND
Cooper, C 753	Rt 30, Georgetown, PA	08/16/06	1.5 miles	ND
Cooper, J 751	Rt 30, Georgetown, PA	08/16/06	1.5 miles	ND
Cooper, P 750	Rt 30, Georgetown, PA	08/16/06	1.5 miles	ND
Cooper, T 841	Lawrenceville, WV	09/03/10	2000'	ND
Dear 708	Cullen Dr, Georgetown, PA	08/17/04	500'	ND
Flemming 717	Red Dog Rd, Georgetown, PA	09/02/04	2800'	ND
Halisy 711	Cullen Dr, Georgetown, PA	08/24/04 10/18/04	700'	ND ND
Kavals, M 733	Cullen Dr, Georgetown, PA	09/19/05	1200'	ND
Kolmer 700	Cullen Dr, Georgetown, PA	08/02/04	1500'	ND
McCoughlin 843	Lawrenceville, WV	09/03/10	1500'	ND
McHaffery 712 722	Cullen Dr, Georgetown, PA	08/24/04 10/18/04	500'	ND ND
Milliron 706	Cullen Dr, Georgetown, PA	08/17/04	700'	ND
Pollicastro, A 727	Georgetown Rd, Georgetown, PA	04/04/05	3100'	ND
Pollicastro, C 728	Georgetown Rd, Georgetown, PA	04/04/05	3000'	ND
Ponnis 734	Little Blue Run Rd, Georgetown, PA	09/22/05	3500'	ND
Reed 820	Crummit Ln, WV	05/15/09	2000'	ND
Richards 701	Cullen Dr, Georgetown, PA	08/02/04	2000'	ND
Sharp 752	Rt 30, Georgetown, PA	08/16/06	1.5 miles	ND
Skavinski 729	Lawrenceville, WV	04/11/05	400'	ND
Smith 735	Little Blue Run Rd, Georgetown, PA	09/22/05	3500'	ND
Stipec 730 736	Crummit Ln, WV	05/27/05 11/08/05	2800'	ND ND
Stout 718	Cullen Dr, Georgetown, PA	09/09/04	1000'	ND
Tudor 705	Red Dog Rd, Georgetown, PA	08/17/04	2500'	ND
Walters 749	Rt 30, Georgetown, PA	08/18/06	1.5 miles	ND
Wilkenson 710	Cullen Dr., Georgetown, PA	08/24/04	500'	ND
Young 709	Cullen Dr, Georgetown, PA	08/17/04	500'	ND

3. EIP's February 24, 2010 report, p. 166, claims:

On February 16, 2010, PADEP sent a letter to FirstEnergy regarding high arsenic levels at 10 groundwater and surface water monitoring points, stating, "According to the data, elevated levels of Arsenic were detected in Monitoring Wells MW-13A, MW-15B, MW-16C, MW-17A, MW-20B, MW-23B, SW-5, SW-7, S-17, and S-31."

In fact, the referenced sampling data shows that elevated arsenic concentrations showing impacts from the impoundment were comparable to concentrations in background monitoring wells. More recently, arsenic levels have continued to drop.

4. EIP's February 24, 2010 report, p. 167, claims:

In 1994, FirstEnergy was required to provide a water supply to a private residence, and a PADEP letter to Penn Power admits that the impoundment contaminated and made unusable a private well (PADEP, 1994):

This result indicates a continuing upward trend in levels of sodium, chloride and sulfate which has persisted since 1991. . . . This trend represents a measurable increase in the concentration of these contaminants and therefore is defined as groundwater degradation. Since the groundwater gradient is probably from the impoundment supernatant at elevation of 1050' toward the [XXXX] well water elevation at approximately 985', it is very probable that the impoundment is responsible for this adverse effect on the water supply. This letter is notice from the Department that the operator, Pennsylvania Power Company, is responsible for adversely affecting the water supply of Mr. [XXXX].

In fact, later data demonstrated that this preliminary conclusion was simply wrong. Concentrations of sodium, chloride and sulfate in the water well referenced in the EIP report showed an increase between November 1993 and March 1994, because FirstEnergy's consultant used improper sampling techniques. Later laboratory analyses showed the water quality in this well improved and confirmed that the well had exhibited increases in contaminants after the homeowner used household bleach to treat his well for bacterial contamination late in 1993.

B. Allegheny Energy – Hatfield's Ferry Power Station

1. EIP's August 26, 2010 report, p. 176, claims:

A 2006 habitat and stream survey shows that CCW leachate from Phases 1 and 2 of the landfill have degraded the two streams closest to the landfill.

In fact, the survey (conducted in 2001 not 2006) makes clear that the suboptimal stream habitat scores were due to such things as insufficient desirable in-stream cover, moderately eroded stream banks and less than optimal frequency of pool area - none of which are due to the fly ash landfill.

2. EIP's August 26, 2010 report, p. 178, claims:

MW-206A and MW-207A are situated where groundwater flows radially to the west, north, and east from the crest of the landfill property, in addition to being downgradient from a portion of the strip mine where ash was placed. Neither the easterly nor westerly groundwater flow component is completely monitored.

In fact, sampling wells MW 206A and MW-207A have been abandoned and replaced with wells MW-212A, MW-213A, and MW-215A. All groundwater flow regimens are properly monitored in accordance with the regulations.

3. EIP's August 26, 2010 report, p. 179, claims:

The concentrations of CCW parameters in MW-217A and MW-218A and their locations show an easterly groundwater flow direction beyond the landfill, a flow direction that was not monitored until 2005. This easterly flow is still not monitored for the newest phase of the landfill (Phase 3). Further, there are no wells downgradient from MW-217A and MW-218A defining the horizontal extent of the contamination towards the Monongahela River from Phases 1 and 2.

In fact, the original disposal area for Hatfield was constructed on an abandoned, unreclaimed strip mine from the pre-regulation era. A comprehensive groundwater and surface water assessment and investigation at the disposal site concluded that the past unreclaimed surface mining and the resultant acid mine drainage (not ash disposal) within the watershed of the landfill had negatively impacted the groundwater beneath the landfill.

C. Fern Valley Landfill, Orion Power Holdings, Inc.

1. EIP's February 24, 2010 report claims:

The Fern Valley CCW Landfill, on the west side of the Monongahela River across from Elizabeth PA, received coal ash from the Elrama Power Plant from 1989 to 2003. Arsenic levels 2.8 times higher than primary MCL (0.010 mg/L) were first noted in groundwater monitoring in 1995, and peaked in 2001 when the arsenic concentration was 36 times the primary MCL in one downgradient well and 29 times the primary MCL in another. Concentrations of boron, chloride, sulfate and total dissolved

solids (TDS) in monitoring wells regularly exceeded health-based levels or secondary MCLs.

In fact, the Fern Valley landfill was constructed down gradient of an abandoned surface coal mine and adjacent to an old unlined municipal waste landfill (Clairton Landfill). In 1995 a groundwater assessment was conducted and the Department concluded that both of these past activities have had a negative impact on groundwater and surface water upgradient and sidegradient of the landfill, as evidenced by background groundwater monitoring.

2. EIP's February 24, 2010 report claims:

Arsenic has been a troublesome contaminant in the groundwater at the landfill as have boron, sulfate, chloride, and TDS. (Data from GAI, 2002 and GAI 2002-2007)

Total arsenic was identified in downgradient MW-20 in June 1995 at 0.028 mg/L, 2.8 times the primary MCL.

In fact, sporadic low levels of arsenic have been identified in upgradient wells, and this has been shown to have come from acid mine drainage upgradient of the landfill. In addition, with over 10 years of groundwater data collected, this is the only data point presented with an elevated level of arsenic for MW-20. No statistical analysis or trends have been demonstrated.

3. EIP's February 24, 2010 report claims:

The degradation of surface water quality downstream from the CCW landfill has had an adverse impact on aquatic organisms. A benthic study commissioned by the operator in 1995 found that for two key environmental indexes, mean species diversity and equitability, the downstream location (SW-2) was degraded relative to the upstream sampling location near SW-1 (Norris, 2002).

In fact, an abandoned municipal landfill discharges untreated leachate upstream of surface sampling point SW-2, and is the likely cause of this finding.

D. Portland Generating Station's Bangor Quarry Ash Disposal Site, RRI Energy, Inc., Northampton County

1. EIP's February 24, 2010 report claims:

Surface water discharges from the landfill are sending concentrations of boron, cadmium, hexavalent chromium, and selenium into Brushy Meadow Creek that are notably higher than Pennsylvania's Water Quality Criteria Continuous Concentration for Fish and Aquatic Life (CCC).

In fact, the surface water data indicates the concentration of these parameters is already found to be elevated in the upgradient surface water samples located above the disposal site's boundary. The higher concentrations for the listed parameters at the upgradient surface water location suggest that the water is impacted upstream and not impacted by discharges at the Bangor Ash site.

2. EIP's February 24, 2010 report claims:

The ash that has been dumped at this landfill has sometimes been more toxic than regulations allow. Trona test ash was disposed of on-site despite having failed two of nine leachability tests for arsenic.

A letter from RRI to PADEP in 2007 reports that of nine composite samples of Trona ash (a test ash) disposed of at this site, two samples exhibited high levels of leachable arsenic in excess of Pennsylvania Class II landfill limits. Specifically, the Class II landfill limit for leachable arsenic is 0.5 mg/L; however leach test results measured arsenic at 1.61 mg/L (more than three times the limit) and 2.02 mg/L (more than four times the limit).

In fact, the maximum concentration of a contaminant, based on chemical analysis for its leachate for a Class II Residual Waste landfill is 50 times the waste classification standard for that contaminant (§ 288.523(a)(1)). For Arsenic, the Class II limit would be 2.5 mg/L, not the 0.5 mg/L that EIP claims. None of the Trona ash samples exceeded this limit.

3. EIP's February 24, 2010 report claims:

A GAI Consultants 2006 Annual Evaluation Summary of this site, describing results collected from downgradient monitoring wells during 2006, states: Analytical results for dissolved iron, dissolved manganese, pH (field), pH (lab), sulfate, and total dissolved solids exceed the USEPA [MCLs]. Furthermore, results from GAI Consultants' trend analysis of data collected after July 1, 1995 and prior to January 1, 2007 state: Upward trends for dissolved arsenic, dissolved boron, and dissolved potassium and downward trends for pH (field) and pH (lab) are unique to downgradient monitoring wells and may be the result of actions occurring at Bangor.

In fact, the 2006 report EIP relies upon to show an upward trend for pH and sodium goes on to conclude that the upward trend is due to seasonal variation and not attributed to the ash disposal at the facility. The report also states that any upward trend in sulfate levels is shown in wells upgradient to the facility, and is not being caused by the ash disposal facility.

4. EIP's February 24, 2010 report claims:

Unpermitted discharges of boron, cadmium, hexavalent chromium, and selenium into Brushy Meadow Creek from Outfall 001 exceeded the Pennsylvania water quality standard for the protection of aquatic life from pollutant concentrations that are chronically toxic (Criteria Continuous Concentration or CCC) in samples analyzed in October 2006. ... Unpermitted discharges of boron, cadmium, and selenium into Brushy Meadow Creek from Outfall 002 also exceeded the PA CCC in samples analyzed in November 2006.

In fact, the data shows that these parameters are already elevated in upgradient surface water samples, which shows that the disposal facility is not the cause of these contaminants. Surface discharges are regulated through a NPDES permit, and Reliant has not been in violation of their permit.

5. EIP's February 24, 2010 report claims:

Exceedances of PA MCLs in groundwater on-site have occurred in 2001, 2002, 2005, and 2006, with an upward trend detected between 1995 and 2006. Exceedances of PA CCC were documented in unpermitted discharges to surface waters in 2006. No regulatory actions required.

In fact, the exceedances in the surface water are also present in the upgradient surface water sampling. The above referenced exceedances are for Secondary Drinking Water Regulations (SWDR) that set non-mandatory water quality standards for 15 contaminants. These contaminants are not considered to present a risk to human health at the SMCL, and exceedances do not require regulatory action.

6. EIP's February 24, 2010 report claims:

There are least two public water supply wells approximately ¾-mile away from the site; Hartzell's Auction Inc. serves three families and Meadowbrook Mobile Home Park serves approximately 98 individuals.

In fact, there are 3 Public Water Supply Wells (PWS) that are less than a mile from the Ash Disposal Facility. However, all 3 wells are upgradient from the Ash Disposal Area and not affected by the ash disposal site.

III. EIP'S DATA IS NOT CREDIBLE BECAUSE THE RESULTS CANNOT BE REPRODUCED BY OTHER SCIENTISTS.

To be valid, scientific research data must be "reproducible," that is, if one runs a test a second or third time, similar results will be obtained.

This is a critical safeguard to ensure that a single test was not performed incorrectly, or skewed by outside influences.

But in many of its claims, EIP draws conclusions from a single sample, which was not reproduced with confirmatory sampling and which in many cases was inconsistent with prior and later sampling. EIP's claims therefore often lack credibility, because they can't be confirmed or were actually refuted by other data.

Examples of these deficiencies include:

A. Bruce Mansfield Power Plant's Little Blue Run Surface Impoundment

1. EIP's February 24, 2010 report, p. 162 ("For example") claims:

Arsenic has been measured in at least two off-site residential drinking wells above the MCL of 0.01 mg/L, including a reading of 0.0146 mg/L in one family's well in 2008, and a reading of 0.021 mg/L at another family's well.

In fact, although one sample collected from a private water supply well in late 2008 did contain arsenic at a concentration of 0.013 mg/L (not 0.0146 mg/L); the homeowner was aware that his well water was muddy. Another sample from the water well early in 2009 and the analytical results concentrations of metals were much lower compared to the 2008 sample. Total arsenic was reported at 0.0025 mg/L and dissolved arsenic at <0.0025 mg/L - well below the MCL. The DEP also collected a sample from this well two months later and confirmed these results. Both total and dissolved arsenic were less than <0.003 mg/L the detection limit. In addition, the location and elevation of this water well clearly indicates the well is located up gradient (background) from the impoundment.

Further, while arsenic was reported at a concentration of 0.021 mg/L in a sample collected from another private water well in 1993, six later samples from this well were analyzed for arsenic. The greatest concentration found was 0.005 mg/L, and most of the samples were non-detect. In addition, this well did not contain other concentrations of constituents that would suggest any impacts from the impoundment. Arsenic is found in soils of Western Pennsylvania; its presence does not confirm impacts from the impoundment.

2. EIP's February 24, 2010 report, p. 166 ("On Site") claims:

On-site surface water showed an exceedance of the CCC for selenium at SW-3 (a seep in Pennsylvania just below the earthen dam.)

In fact, EIP misidentifies sampling point SW-3 as a seep below the dam. SW-3 is a sampling point at the stilling basin and is a permitted discharge from the impoundment. Comparing this sampling point to WQC is not appropriate.

3. EIP's February 24, 2010 report, p. 162 claims:

In on-site groundwater that flows off-site, arsenic exceeded the 0.010 mg/L at least 24 times in 14 wells in 2006, 2009, and 2010, including concentrations of 0.030, 0.033, and 0.036 mg/L in three different wells. Fluoride, lead, and turbidity MCLs were also exceeded, as well as SMCLs for several other pollutants. On-site groundwater monitoring wells also had exceedances of SMCLs for chloride, iron, manganese sulfate, and turbidity.

In fact, FirstEnergy began regularly analyzing water samples for arsenic in 2006. Although arsenic was found in some samples, many of these detections were not replicated in subsequent samples from the same wells.

FirstEnergy has implemented studies to determine the reason(s) for the elevated arsenic in these wells and, if necessary, determine what steps may be taken to address it. Arsenic levels in all drinking water wells sampled by the Department have been "non-detect" for arsenic.

The other parameters that EIP indicates exceed MCLs and SMCLs occur naturally in the environment. EIP made no attempt to assess if a monitoring well contains water representative of background water quality, shows brine impacts from historic oil and gas exploration and production in the area, or contains concentrations of parameters associated with coal seams.

B. Allegheny Energy – Mitchell Power Station

1. EIP's February 24, 2010 report claims:

Analyses of quarterly monitoring data for samples collected from the two monitoring wells downgradient of Ash Lagoon No. 2 in 2007 (GW-4 and GW-5) found the following:

- Boron levels were more than twice the EPA's Child Health Advisory of 3.0 mg/l and much higher than boron levels in upgradient wells or at surface monitoring points.

- Arsenic concentrations have been 1 to 2 times the primary MCL of 0.010 mg/l at downgradient wells and exceeded the highest concentrations for arsenic in upgradient points.
- Levels of nickel, molybdenum, and manganese have also been noticeably higher at downgradient than upgradient points."

In fact, monitoring has been ongoing for more than 10 years and no upward trends have been established for these or other contaminants.

C. RRI Energy – Seward Generating Station

1. EIP's February 24, 2010 report claims:

The No. 1 Ash Disposal Site was forced to be closed due to pollutants leaching from the ash pile.

In fact, Ash disposal site No. 1 was closed when the power station shut down. The site was capped and monitoring wells were installed.

2. EIP's February 24, 2010 report claims:

RRI has discharged pollutants in excess of permit limits for iron, manganese, aluminum, and pH from Outfall 012, on a monthly basis for the past five years. A surface water monitoring point downstream of the site has recorded at least 27 exceedances of Pennsylvania's Water Quality Criteria for Fish and Aquatic Life in the last five years for aluminum, nickel, and zinc. In addition, this downstream point regularly recorded higher concentrations of sulfate, total dissolved solids and many other pollutants than concentrations of these pollutants recorded upstream of the site in this period.

In fact, EIP's information does not reflect any impact from the flyash disposal sites No. 1 and No. 2. EIP has relied on data relating to the remediation activities associated with several old coal refuse piles, not these flyash disposal sites.

3. EIP's February 24, 2010 report claims:

Also, pollutants including iron, manganese, pH, and aluminum are being discharged from the "remediated" coal ash and coal refuse pile directly into the Conemaugh River through NPDES permitted Outfall 012 in violation of permit limits.

In fact, EIP's report presents no data to substantiate its claims about Outfall 012. Nor is there a remediated coal ash pile on site.

D. Allegheny Energy – Hatfield’s Ferry Power Station

1. EIP’s August 26, 2010 report, p. 179, claims:

None of the new wells were located east or west of Phase 3 in the indicated direction of groundwater flow that mimics the ground surface, according to Allegheny.

In fact, the locations of these monitoring wells were based on a comprehensive analysis of proper upgradient and downgradient monitoring around the new leachate storage impoundment. The data table accompanying this claim lists data for one sample event (December 2009), and no conclusions can be drawn from an isolated sample.

2. EIP’s August 26, 2010 report, p. 179 claims:

Samples collected from well MW-213A, downgradient of coal ash in the Hartley Mine and more than a thousand yards south of Phases 1 and 2 of the landfill and from MW-217A, and MW-218A, more than 500 yards east of waste placement areas in the landfill, show that arsenic concentrations well above the MCL have been measured beyond the site in downgradient groundwater since at least 2005.

In fact, only a single sample from MW-213A shows elevated levels of arsenic, rather than “samples” as EIP claims. Further, MW-213A is an upgradient well for the disposal area, and therefore would show background contaminants rather than any impact from the disposal area. This is consistent with an extensive groundwater assessment indicating that abandoned surface mining in the area has had an unrelated negative impact on groundwater. Monitoring wells MW-217A and MW-218A are for the new leachate storage impoundment, and are screened in mine spoil from past surface mining activities.

E. PPL Martins Creek Power Plant

1. EIP’s February 1, 2011 report, p. 7, item 21 claims:

An unlined pond at PPL Martins Creek has groundwater contamination above 100 ug/l.

In fact, analytical data from 1997 to the present for groundwater monitoring wells at Basin 1 does not indicate groundwater contamination. DEP files include correspondence documenting invalidation of the referenced result. Ninety five percent of the groundwater monitoring results for this disposal impoundment reported non-detect for total or dissolved chromium.

IV. EIP'S RESEARCH IS NOT TRANSPARENT OR VERIFIABLE.

A critical element in valid scientific study is that the source of one's information be disclosed, so that others can verify the data's accuracy.

However, EIP's reports often refer only vaguely to the sources of its data, without identifying the specific locations, dates or sampling source.

EIP's conclusions are therefore not credible, because its claims are impossible to verify.

Examples of these deficiencies include:

A. Bruce Mansfield Power Plant's Little Blue Run Surface Impoundment

1. EIP's February 24, 2010 report, p.161 ("Summary") claims:

Discharges to groundwater and surface water from the 1,300-acre "Little Blue" surface impoundment have exceeded MCLs for arsenic and other parameters in multiple off-site residential drinking wells (prompting several property buyouts by FirstEnergy), exceeded Pennsylvania Water Quality Criteria (PA WQC), including the Criteria Continuous Concentration (CCC) and Criteria Maximum Concentration (CMC), in Mark's Run and other off-site surface water sources, and pervasively exceeded federal Maximum Contaminant Levels (MCLs) at many on-site groundwater monitoring wells.

In fact, there have been no confirmed concentrations in off-site residential drinking water wells located near the impoundment in excess of an MCL. Although EIP concludes that any private water well sampled by FirstEnergy or the DEP is impacted by the impoundment, this conclusion ignores the facts that many of these wells are hydrogeologically separate from the impoundment and/or may be impacted by other sources, including naturally occurring sources such as coal seams and brines, and other man-made sources such as past mining or oil and gas operations. Third, the Department has never found any drinking water wells to be contaminated by MCL's (primary drinking water contaminants). Finally, surface water discharges are monitored and reported under the NPDES permit program and the facility is in compliance with those permits.

2. EIP's February 24, 2010 report, p. 162, claims:

MCLs for cadmium, barium, fluoride, lead, and turbidity were also exceeded in off-site residential drinking wells, as were Secondary MCLs (SMCLs) for aluminum, chloride, iron, manganese, pH, sulfate, and total dissolved solids (TDS).

In fact, EIP's report does not cite specific names, locations or sample dates for the alleged "off-site" residential drinking water well contamination. Further, the primary constituents of lead, cadmium and barium are only found in trace amounts in the waste and could not be producing high concentrations in the groundwater.

3. EIP's February 24, 2010 report, p. 162 ("Off-Site Surface water") refers to "Chart 1" and claims:

Off-site surface water contamination includes exceedances of both continuous/chronic (CCC) and maximum acute (CMC) limits set forth in Pennsylvania Water Quality Criteria (WQC).

In fact, none of the claims are substantiated. Specific dates and locations are not listed in the EIP report. The report's "Chart 1" is filled with deficiencies which make verification impossible:

a. For every parameter listed in the "Contaminant" column that corresponds to a groundwater monitoring or drinking well, the specific well number(s) or location(s) is not listed. There is also no reference to whether the well(s) is hydrologically upgradient or downgradient of the facility. The "Exceedances" numbers cannot be correlated to a specific monitoring point, nor is the specific data provided.

b. In the "Medium" column, groundwater monitoring wells and drinking wells are undifferentiated, and the "Highest Exceedance Number" is not assigned to one or the other, making it ambiguous and appearing that it is attributed to both a drinking water well and a monitoring well.

c. This table also fails to reference sampling numbers, nor does it have a compendium of data to verify the summary.

4. EIP's February 24, 2010 report, p. 163, claims:

Cadmium, thallium, selenium, and boron also exceeded WQC in off-site creeks, springs, and seeps.

In fact, no specific analytical data related to alleged exceedances of cadmium, thallium, selenium, and boron is provided for any of the referenced water sources. Therefore no verification can be conducted.

5. EIP's February 24, 2010 report, p. 165, claims:

On-site groundwater moving "off-site" - on-site groundwater contamination includes extensive arsenic contamination, with at least 24 MCL exceedances in at least 14 different wells that were more than 150 feet away from the closest part of Little Blue. All of these samples were

taken between 2006 and 2010, after FirstEnergy's expansion of Little Blue. See Chart 2.

In fact, EIP's chart contains no specific verifiable information (such as specific well locations and sampling dates). The Department's sampling of 28 residential wells over the past six years from around the impoundment show no MCL exceedences of arsenic.

6. EIP's February 24, 2010 report, p. 165, claims:

In 1996, lead exceeded the Federal Action Level of 0.015 mg/L with readings of 2.69 mg/L (538 times the MCL) and 1.41 mg/L (282 times the MCL). There were also numerous violations of SMCLs for turbidity, chloride, iron, manganese, and sulfate, and pH was cited for showing an increasing trend at one well in 2003.

In fact, EIP's report contains no identification of the wells sampled for lead exceedences, or their physical location in reference to the impoundment. Therefore, it is impossible to make conclusions regarding hydrologic connection to the impoundment. Lead is not present in any appreciable amount in the waste within the impoundment and therefore elevated lead in an off-site well is likely from another source, such as the home's plumbing or soil.

7. EIP's February 24, 2010 report, p. 166 ("At Risk Population") claims:

At least 22 private wells have already been contaminated with CCW pollutants above the primary or secondary MCLs, including the township building's well.

In fact, this statement is simply irresponsible. There are no names, dates, specific locations, or specific parameters for the 22 private water supplies alleged to be contaminated by the impoundment in the report, except an obscure reference to a township building's well. The Department has no data supporting claims that any private wells have been contaminated. However, the Department did sample the Greene Township well on October 10, 1993. The well is not hydrologically connected to Little Blue Run and no parameters associated with the impoundment were detected at elevated levels.

8. EIP's February 24, 2010 report, p. 166, claims:

Because Greene Township has no public water supplies, every single resident - 2,705 people, according to 2000 census data - is drinking private well water. In addition, there are many affected citizens in West Virginia, although comprehensive well data was unavailable for this region. Water degradation may also be migrating across the Ohio River into Ohio, but the community there is on public water.

In fact, this statement is total speculation by EIP, and there is no data presented in the report to demonstrate that any West Virginia citizens' drinking well supply is contaminated by the

impoundment. Recent testing by the Department of several water private water wells on September 3, 2010 in Lawrenceville, WV (Cooper and McCaughlin) indicated non-detect for Primary MCL's (including arsenic).

9. EIP's February 24, 2010 report, p.166 ("Incident and Date") claims:

The Pennsylvania Department of Environmental Protection (PADEP) has long documented the contamination flowing from the Little Blue surface impoundment. From at least 1989 to the present day, FirstEnergy (and previously, Penn Power) has been exceeding permit limits and both State and federal drinking water and surface water standards due to the irresponsible disposal of CCW in the Little Blue impoundment.

In fact, none of the specific monitoring wells, surface water points, and analytical data, nor dates and times are presented to substantiate this claim. The groundwater monitoring well surface points are sampled on a quarterly basis and are within the permit limits established in the PA Residual Waste regulations. The site is also in compliance with its NPDES discharge permits.

B. Allegheny Energy - Mitchell Power Station

1. EIP's February 24, 2010 report claims:

However, the investigation found degradation of groundwater downgradient from the two lagoons by multiple parameters. Most significantly, concentrations of arsenic were measured at twice the federal primary MCL and concentrations of boron reached more than twice the EPA Child Health Advisory of 3.0 mg/l.

In fact, nowhere in the Report is there a list of the monitoring well(s) or sample date(s) or analytical data that show arsenic levels were detected at twice the federal primary MCL of 10 ug/l. Further, nowhere in the Report is the supposed monitoring well, date of sampling, or analytical data for the claim that boron reached more than twice the EPA Child Health Advisory of 3.0 mg/l. In fact, the Department's review of the data indicates no upward trends in arsenic or boron levels.

2. EIP's February 24, 2010 report claims:

Groundwater monitoring data for the year 2007 shows that maximum levels of arsenic and boron are twice as high as the maximum levels found in 1998."

In fact, the data to make this claim is not presented in the Report. Indeed, the Department's review of the historical groundwater data submitted by the company, as required by the permit, shows no upward trends in arsenic or boron levels.

3. EIP's February 24, 2010 report claims:

Demonstrated damage to groundwater moving off-site toward the Monongahela River.

In fact, the Report contains no data which supports EIP's claims.

4. EIP's February 24, 2010 report claims:

Elevated levels of molybdenum and nickel were detected in some downgradient wells.

In fact, there are no monitoring well(s) or sample date(s) or value(s) listed in the Report to substantiate this statement. The Department's tracking of the groundwater data shows that the facility has been and remains in compliance for the referenced parameter.

5. EIP's February 24, 2010 report claims:

Compared to surface water samples of the Monongahela River along the shoreline near the lagoons, twelve parameters were reported at consistently higher concentrations in the groundwater samples; specific conductance, total alkalinity, chemical oxygen demand, ammonia, chloride, sulfate, total dissolved solids, calcium, iron, potassium, manganese, manganese and sodium.

In fact, the groundwater monitoring wells, surface water points and analytical data are not listed to make this claim nor are the sampling periods referenced in the Report. The Department's ongoing review and tracking of the groundwater data concludes that the facility has been and remains in compliance for the referenced parameter.

6. EIP's February 24, 2010 report claims:

Seepage and groundwater flowing through the lagoons. There is a possibility that upgradient monitoring wells for the lagoon receive contaminants from the ash landfill to the west.

In fact, EIP presents no hydrogeologic data to support that "seepage and groundwater" are flowing through the lagoons. There is no data presented in the Report to support the statement that the lagoons receive contaminants from the FGD landfill as well.

C. RRI Energy - Seward Generating Station

1. EIP's February 24, 2010 report claims with regard to the No. 1 Ash Disposal site:

Recent groundwater monitoring data indicate that gross exceedances of primary and secondary MCLs and higher concentrations of ash constituents at downgradient than upgradient monitoring points continue to occur.

In fact, the only exceedances in the groundwater from around Ash Site No. 1 have been secondary, non-health based parameters. Overall, contaminant levels have shown improvement due to site remediation activities of the coal refuse piles.

D. Hatfield's Ferry Power Station

1. EIP's August 26, 2010 report, p. 174, claims:

Demonstrated damage to groundwater moving off-site and to off-site surface water and aquatic life (in Little Whitely Creek and tributaries)"

In fact, the report fails to provide documentation or data to demonstrate that the disposal of fly ash at Hatfield is damaging the groundwater, surface water, or aquatic life.

2. EIP's August 26, 2010 report, p. 174, claims:

Federal groundwater Maximum Contaminant Levels (MCLs) standards for arsenic, aluminum, boron, chromium, manganese, molybdenum, sulfate, and total dissolved solids (TDS) have been exceeded since at least 2001.

In fact, the report does not identify any specific sample times, dates, or monitoring locations to support the claim that CCW has contaminated the groundwater with the referenced parameters.

3. EIP's August 26, 2010 report, p. 174, claims:

Concentrations of groundwater contaminants mirror those in CCW leachate samples from the landfill collected at the same time. The horizontal extent of contamination has not yet been defined.

In fact, there is no data presented in the report to support this claim, and DEP's review of the groundwater assessment has concluded that there is no impact on the groundwater from the disposal of CCW. The assessment showed that any impact originated from past unreclaimed surface coal mining activities on site.

4. **EIP's August 26, 2010 report, p. 177, claims:**
The data show what parameters and concentrations were likely discharged continually into the unnamed tributary for the beginning of the landfill's operation in 1984 to 2001, before the wetland treatment system was installed.

In fact, there is no data presented in the report to substantiate this claim.

E. Phillips Power Plant Landfill, Duquesne Light Co.

1. **EIP's February 24, 2010 report claims that there is:**

Demonstrated off-site damage to public drinking water supply (ash ponds)

Demonstrated damage to groundwater moving off-site (ash landfill)

In fact, EIP identifies no upward trends over the past ten years for these secondary parameters which only affect the aesthetics of the water, and are not health related drinking water parameters.

2. **EIP's February 24, 2010 report claims:**

A review of quarterly groundwater monitoring data from 2006 and 2007 found the following (EarthJustice, 2008):

- Groundwater discharging from the closed landfill has noticeably higher levels of chloride, sodium, and fluoride, and generally higher manganese, aluminum, sulfates, TDS and Specific Conductance.
- Levels of chloride frequently exceeded secondary drinking water standards (DWS) and high levels of sodium (exceeding 200 mg/L) were usually found in such samples.
- Levels of manganese, aluminum, and fluoride (2.0 mg/L) exceeded secondary DWS in many samples as well as many exceedances of the secondary DWS for TDS of 500 mg.

In fact, EIP fails to disclose any specific parameter value(s), or monitoring well(s) for the years referenced, so the data cannot be verified. Moreover, DEP's review has determined that any sporadic exceedances are all of secondary, non-health related parameters.

F. Fern Valley Landfill, Orion Power Holdings, Inc.

1. EIP's February 24, 2010 report claims:

Leachate from the CCW landfill has degraded surface quality with high levels of arsenic, boron, chloride, sulfate and TDS compared to upstream surface waters."

In fact, EIP presents no analytical data presented to substantiate this statement. The leachate being treated is discharged under an NPDES permit. The permit limits were established based on the fact that the stream in which the treated leachate flows into discharges to the Monongahela River. The facility is in compliance with its NPDES discharge permit.

2. EIP's February 24, 2010 report claims:

While concentrations of arsenic have not exceeded water quality standards for aquatic organisms, they have been several times higher than the primary MCL in several measurements, and sulfate and TDS concentrations have commonly exceeded secondary MCLs by two or three times downstream of the landfill."

In fact, the report does not present any specific analytical data for arsenic, sulfate, and TDS.

3. EIP's February 24, 2010 report claims there has been:

Demonstrated damage to groundwater and surface water moving off-site.

In fact, EIP has presented no data to validate this claim.

4. EIP's February 24, 2010 report claims:

From around 1997 to 2006 chloride, sulfate and TDS levels generally ranged two to five times higher at SW-2 than at upstream sampling locations (SW-1 and SW-3), and sulfate and TDS concentrations at SW-2 commonly exceeded the secondary MCL by two or three times.

In fact, EIP's report contains no analytical data presented for the years referenced to make these claims.

5. EIP's February 24, 2010 report claims:

In 2001 and 2002, selenium levels downstream of the landfill were six to ten times the Pennsylvania surface water quality standard for the protection of aquatic life.

In fact, there has been no specific analytical surface data for selenium for the 2 years referenced in EIP's report.

G. PPL Martins Creek Power Plant

- 1. EIPs February 1, 2011 report, p. 7, item 21 claims that an unlined pond at PPL Martins Creek has groundwater contamination above 100 ug/l.**

In fact, the report does not identify any well or monitoring period as evidence of chromium contamination.

IV. SUMMARY

In summary, due to the inaccuracies and flaws contained in the reports identified above, they should not be used to make any findings of damage associated with the studied facilities or provide the foundation for designating Coal Combustion Residuals as a hazardous waste.