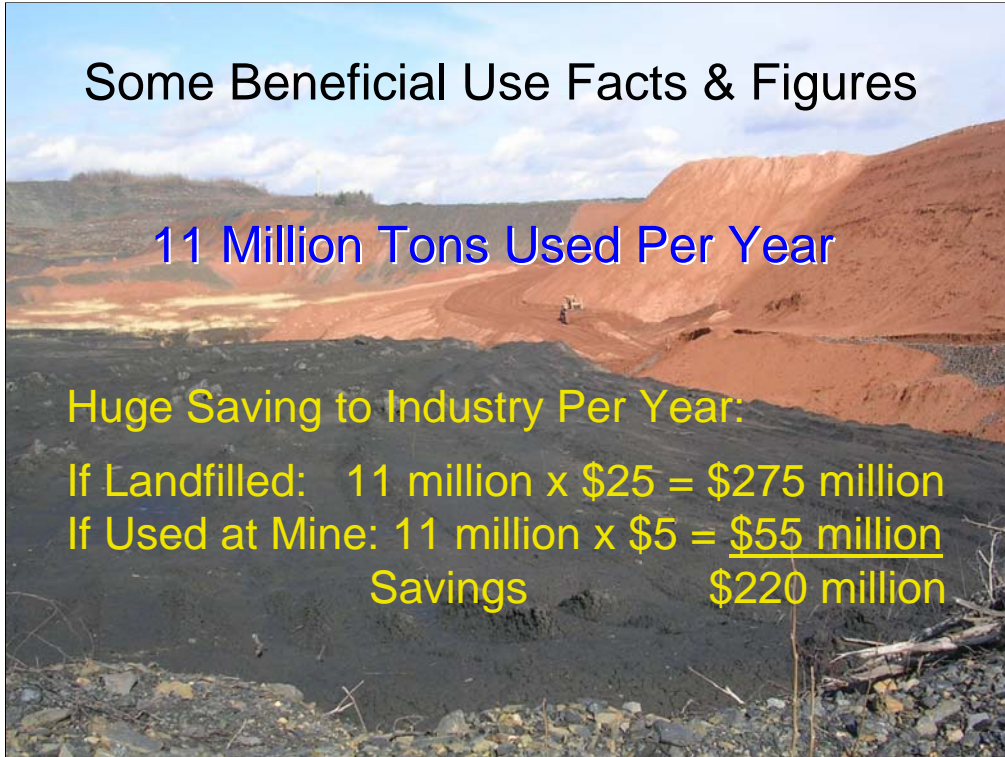


Coal Ash Beneficial Use at Mine Sites



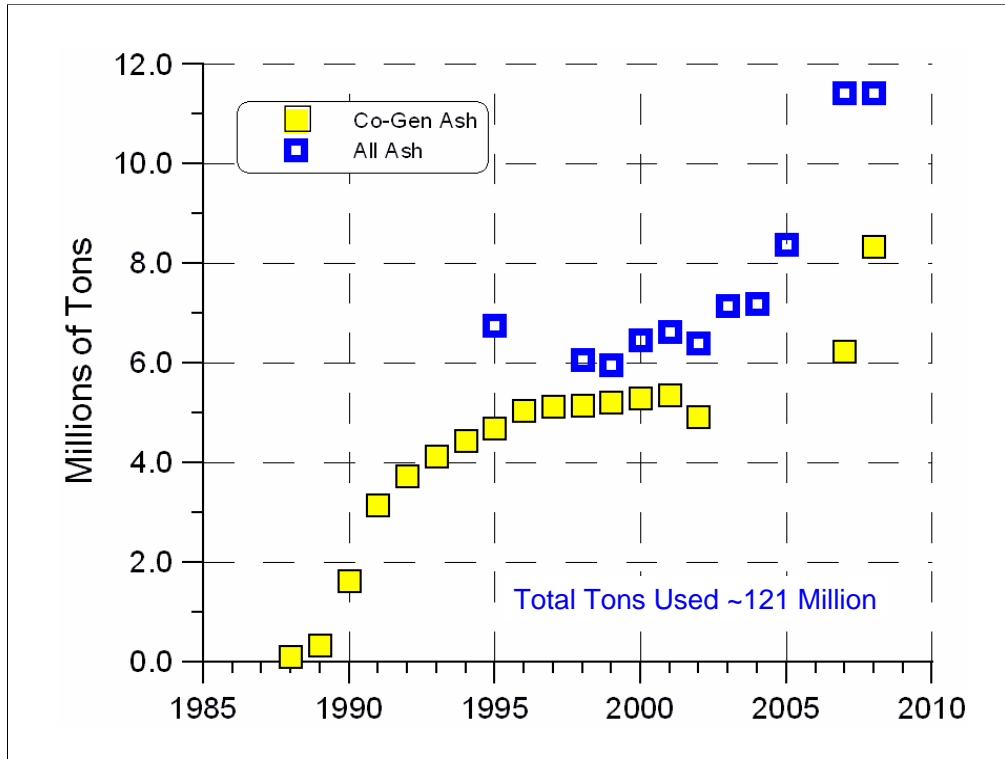
Keith Brady & Sharon Hill

DEP – Bureau of Mining and Reclamation



A note on the background picture. The site is near Gilberton, PA. The reddish coal ash is from the Schuylkill Energy power plant. The black material in the foreground is waste coal that will eventually go to the power plant. The dozer is placing and compacting the ash in 2 ft lifts. The area depicted was drastically disturbed abandoned mine lands that are being reclaimed with coal ash. The ash material is covered with four feet of material and revegetated.

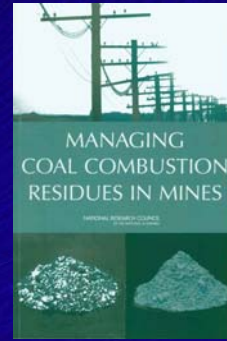
The cost savings that is calculated is likely conservative. Landfilling can be \$35 or more per ton and use at mines can be as little as \$3.50 per ton.



The jump in “all ash” use from 2005 to 2007 is due to better record keeping, not a massive increase in the program.

Why New Policy & Regs

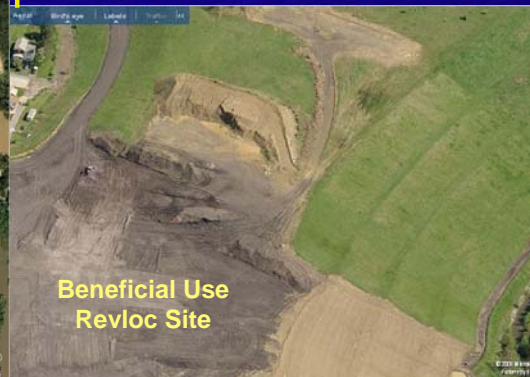
- Process improvements (Clear standards. Reduce confusion, inefficiency, potential oversights)
- Expanded monitoring requirements (# of points, frequency, parameters & limits)
- Constant public scrutiny
- High-level national focus
 - EPA, OSM, NAS



Not All Coal Ash is Created Equal

Doesn't Meet Specs
It's Residual Waste &
Goes to a Landfill

Meets Specs
Can be Beneficially
Used at Mines



Beneficial Use is NOT Disposal

- Mines are not to be used as an excuse for getting rid of a waste material
- There must be a benefit to mine site - reclamation &/or water quality



“Alternate Fuels”
Need General Permit

Not “Coal Ash”



Summary of Policy Changes

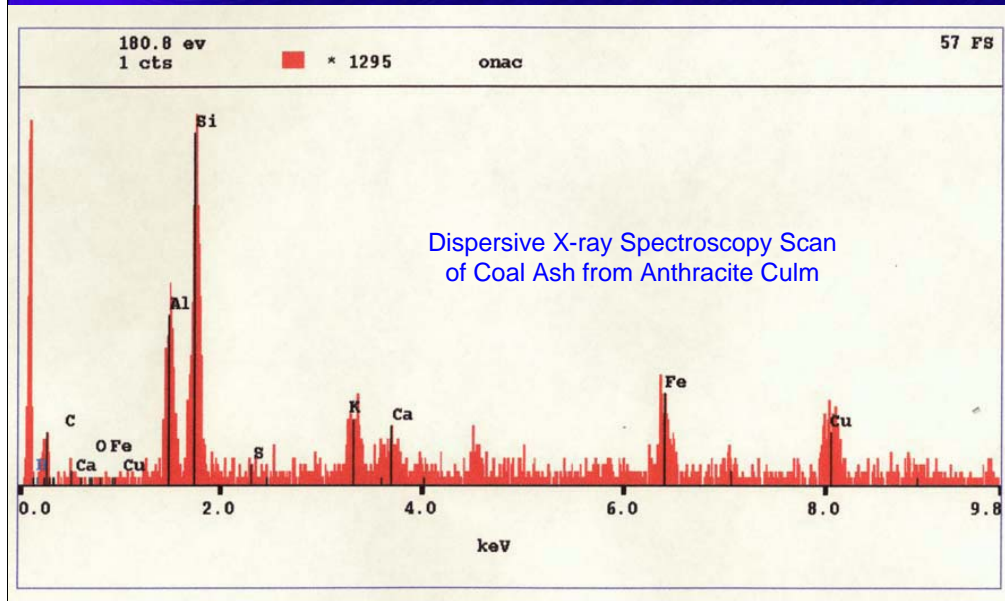
Ash Monitoring

- 20 → 32 parameters
- 2 samples/yr to 4 samples/yr
- Lowered As from 1.25 to 0.25 mg/L
- Lowered Se from 1.0 to 0.5 mg/L
- Central certification process

Water Monitoring

- 26 → 36 parameters
- 1 full sample/yr to 4 samples/yr
- Filtered samples
- Purged wells
- 6 → 12 background samples
- 3 downgradient & 1 upgradient monitoring pts
- 10 yrs post placement monitoring

Coal Ash Chemistry



Sampling Parameters

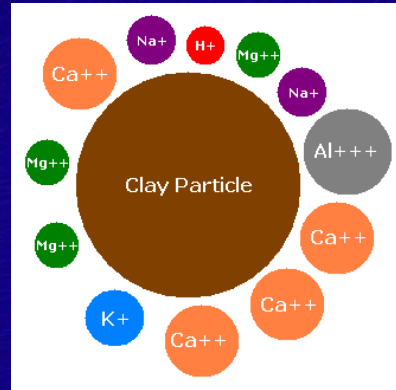
*Ag	Hg	*F
Al	Mn	Cl
As	Mo	Na
B	Ni	pH
Ba	Pb	*Ca
*Be	S	*Mg
Cd	Sb	*K
*Co	Se	*NO₃
Cr	*Tl	*NO ₂
Cu	*V	*NH ₄
Fe	Zn	

Parameters discussed below

* New parameter

Leaching Limits

- Cations: 25 times the MCL
Allows for attenuation
Reason for 8 ft separation
from water table
- Anions: equal to the MCL
Assumes no attenuation



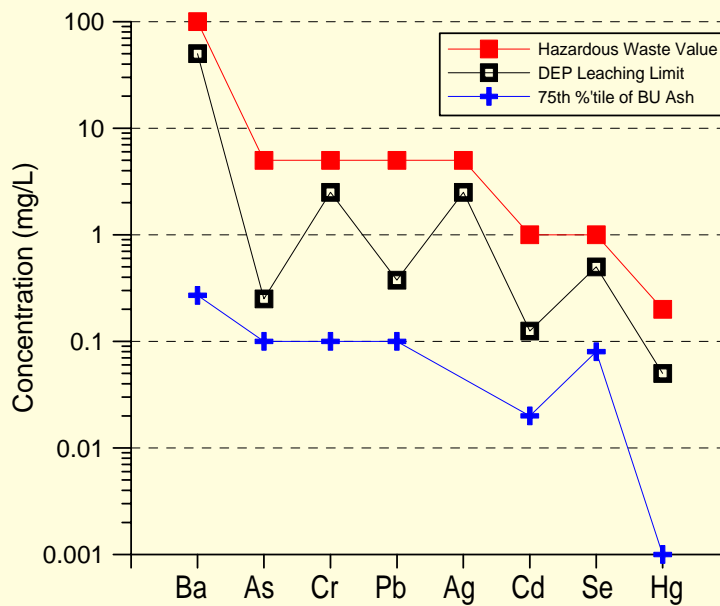
A Comparison of Numbers

Parameter	Hazardous	DEP	75 th Percentile		
	TCLP	SPLP	PC	A-FB	B-FB
Arsenic	5.0	0.25	0.10	0.05	0.05
Barium	100	50	0.25	0.26	0.27
Cadmium	1.0	0.125	0.005	0.02	0.02
Chromium	5.0	2.5	0.08	0.10	0.08
Lead	5.0	0.375	0.05	0.1	0.1
Mercury	0.2	0.05	0.0002	0.0004	0.001
Selenium	1.0	0.5	0.08	0.05	0.06
Silver	5.0	2.5	not enough data yet		

Units are mg/L

Units are mg/L. TCLP is Toxicity Characteristic Leaching Procedure. SPLP is Synthetic Precipitation Leaching Procedure. PC is pulverized coal ash. A-FB is anthracite fluidized bed combustion ash. B-FB is bituminous fluidized bed combustion ash. 75th Percentile is the value where 75% of the data is less than or equal to this value. For example, 75% of measured SPLP results are less than 0.08 mg/L chromium. Because so many values are below detection, even the 75th percentile is often influenced by detection limits.

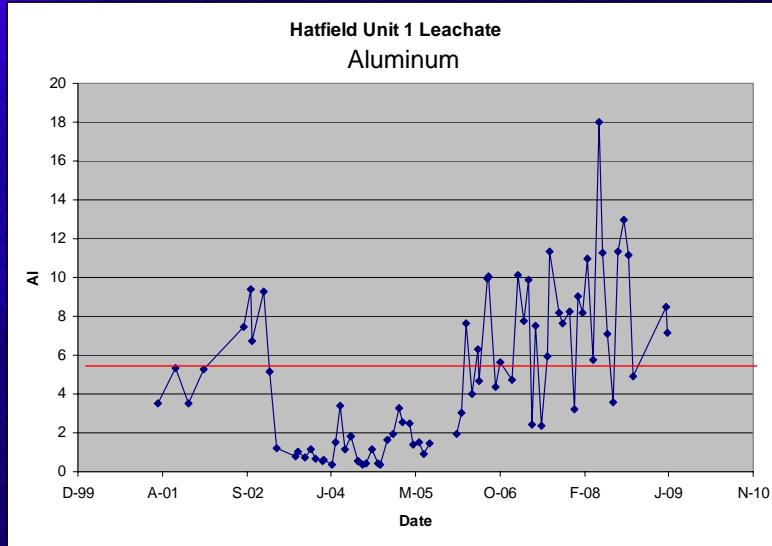
Is Beneficially Used Ash Toxic? The answer is NO. Coal ash is more than an order of magnitude less than "toxic" values

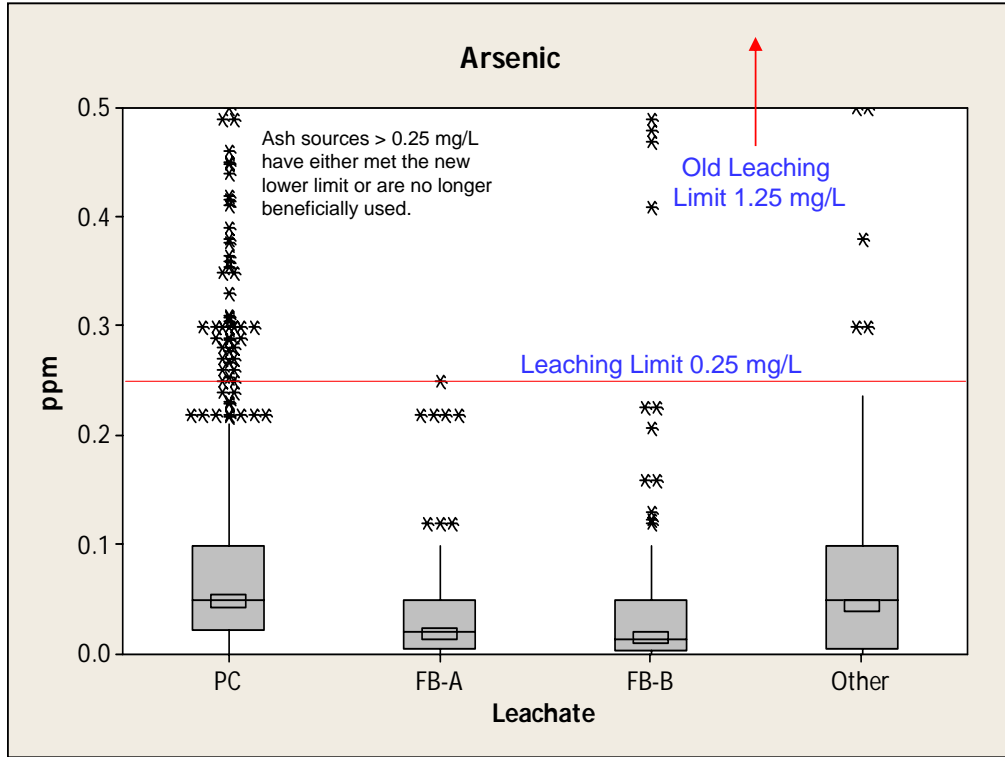


Note that the actual ash values are consistently an order of magnitude or more lower than the levels that define "toxic" waste. Also note that the DEP leaching limit is never greater than 50% of the toxic waste number. Actual values of ash are consistently less than the acceptable leaching values.

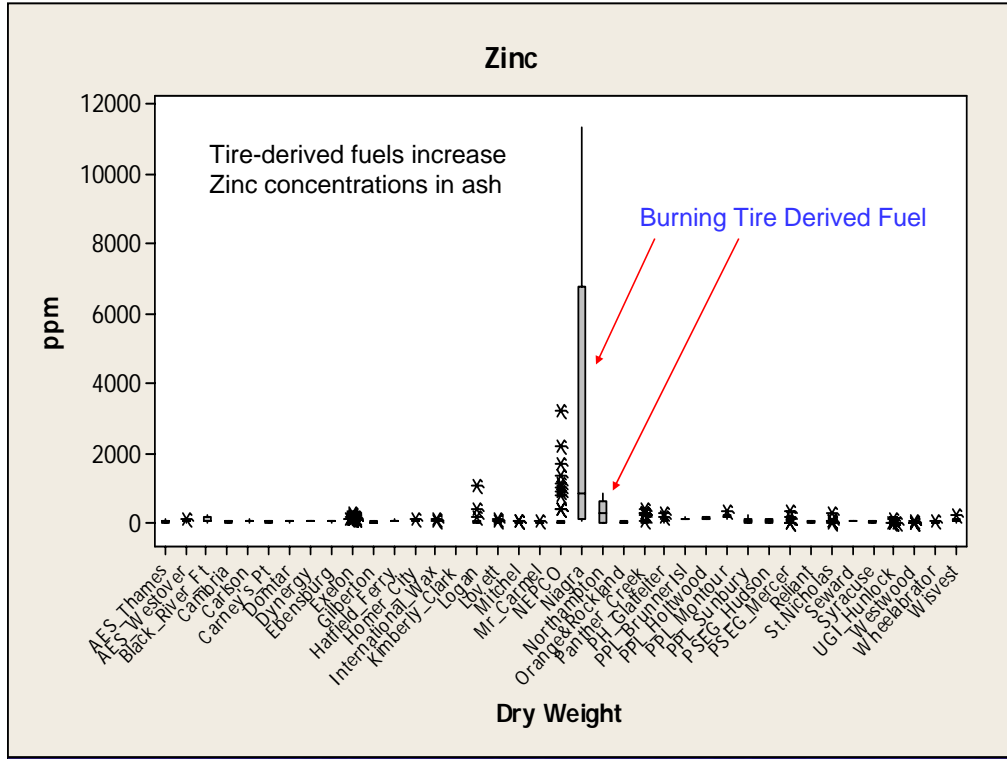
Evaluating Leaching Data

Trends through Time

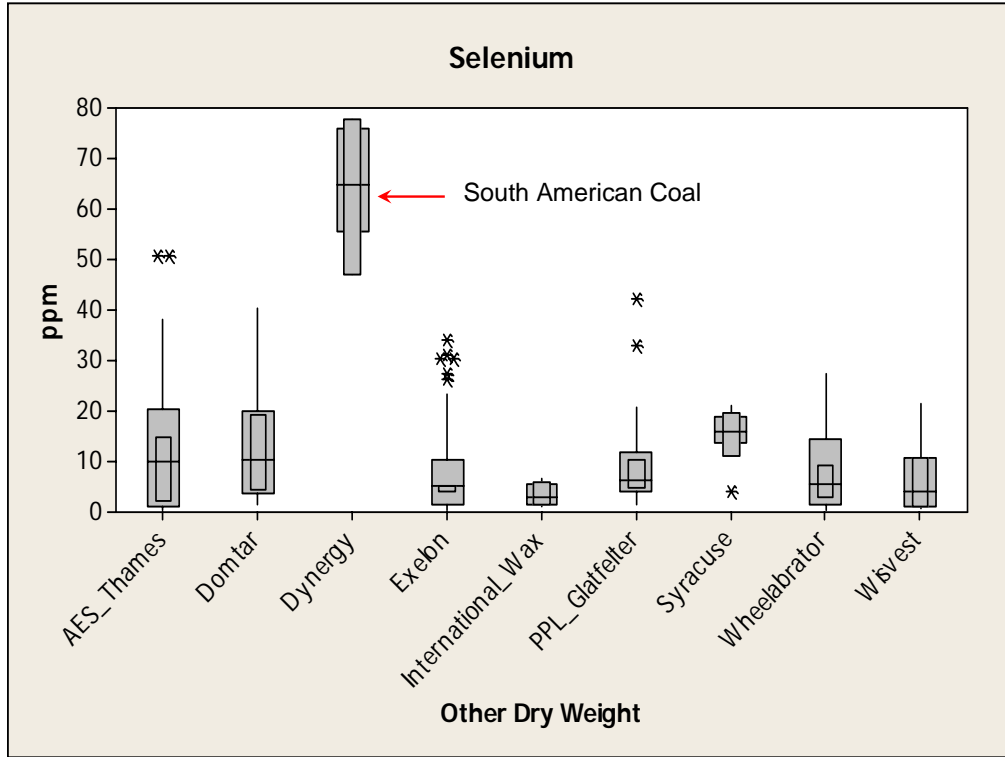




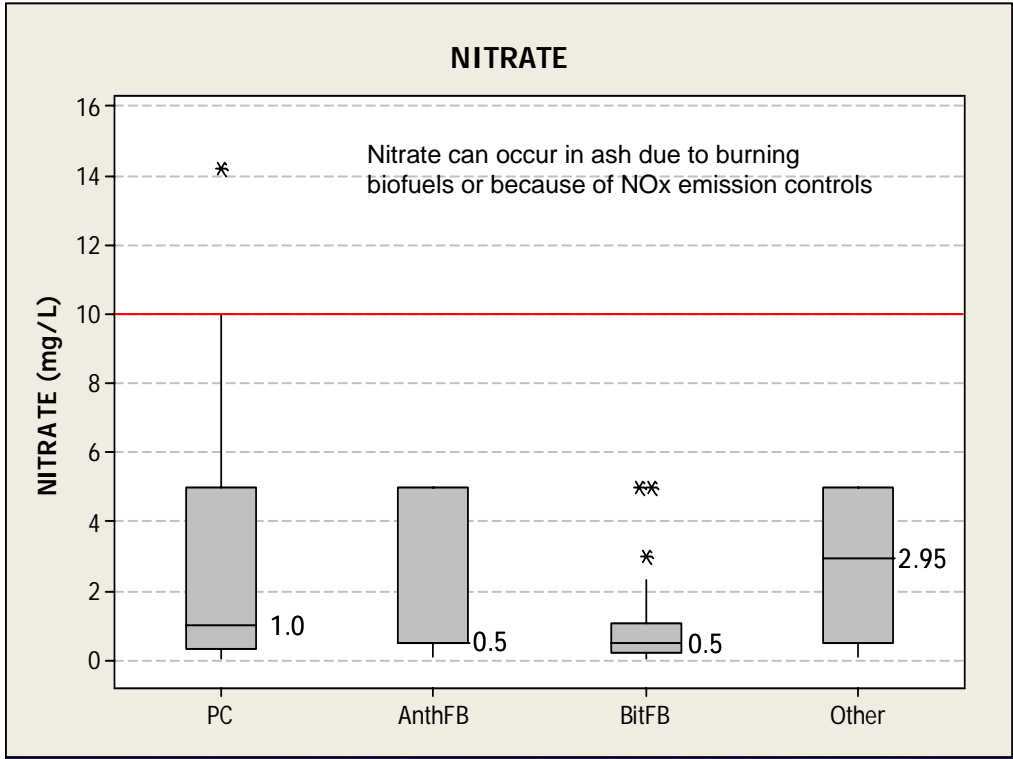
Power plants that were not meeting the new arsenic leaching limit of 0.25 mg/L have either found ways to comply or are no longer being beneficially used.



Tire-derived fuel results in higher zinc concentrations in ash.



Pennsylvania coals are low in selenium compared to some other coals, such as the South American coal illustrated here.



Regulations

- Existing Regs – 287.661-665
- Being Revised – Ash its own Chapter 290
- Incorporating Technical Guidance
- Draft Regs found at:
<http://is.gd/39q3Z>

“2009 EQB meeting schedule – July 21, 2009”

(<http://www.depweb.state.pa.us/pubpartcenter/cwp/view.asp?a=3&q=544036#07212009>)

More questions to be asked and answered

In order to continue this program,

- Industry Must Step Up and Do Research - and publish results
- Sound scientific findings must be established
- Responsible site management must be the standard

Beneficial use is NOT disposal

Therefore, be prepared to show

Water Quality Benefits

287.663(c): The use of coal ash as part of the mining reclamation activity shall be designed to

- achieve an overall improvement in water quality or
- shall be designed to prevent the degradation of water quality

Reclamation Benefits

287.663(b): The request for use at coal mining activity sites shall be addressed in the reclamation plan...

287.663(b)(1): Beneficial use as a soil substitute or additive

Two-Step Process

Source approval – certification BMR
(TGD 563-2112-224 Ash quality)



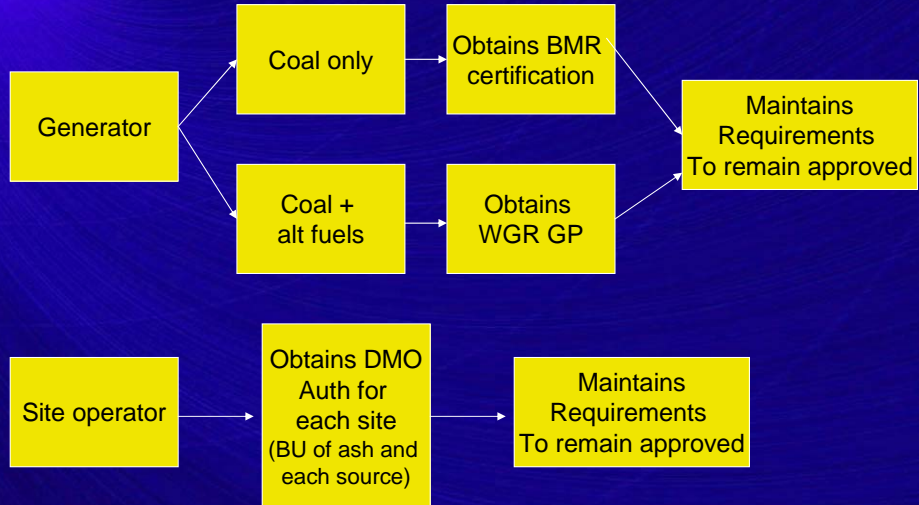
Site approval – permit/contract DMO
(563-2112-225 Mine sites)



Interim Final - April 6, 2009

BMR – Harrisburg Mining & Rec
WGR – Harrisburg waste mgmt
DMO – District Mining Office

Ash process



Certification

Responsibility of generator



Tested at generation site

Can be prepared, but not submitted, by other party



Assumed ash will continue to meet standards and be used at mine sites

Certification Criteria

Characterization of ash

Quality

- Meets parameters
- Consistent

Process

- Must be coal ash
- Not mixed with any waste
- Not historically “impounded”

What Does *Certification* Provide

- Consistency in review and approval
- On the list statewide for mine reclamation uses
- Regular submission of samples and volume reports
- Centralized: Improved tracking of sources statewide, better quality control

Single-Site-Specific Approvals

- Given by the DMOs for GP materials and ash that exceeds some secondary parameter.
- Requires justification (groundwater evaluation, enhanced reclamation plan, etc.)
- Additional performance standards set in permit or contract (quality limits for ash/gw)

Ash Testing

Representative

At the generation station

2 times in 6 months (quarterly)

Submitted to BMR on proper forms (MR0012) with lab reports

Can be submitted via email: RA-coalash@state.pa.us



Water Testing

Comprehensive ground-water & surface water pts

Quarterly for entire suite

Submitted to DMO for each permit on proper forms (MR0014)

Check with individual DMO to see if it can be submitted electronically. New Department system in development.



Paperwork

MR0011 = BU certification form

Used for new certs, revisions, QGP material.

MR0012 = Quality assessment

Used for ash samples (background and quarterly, other)

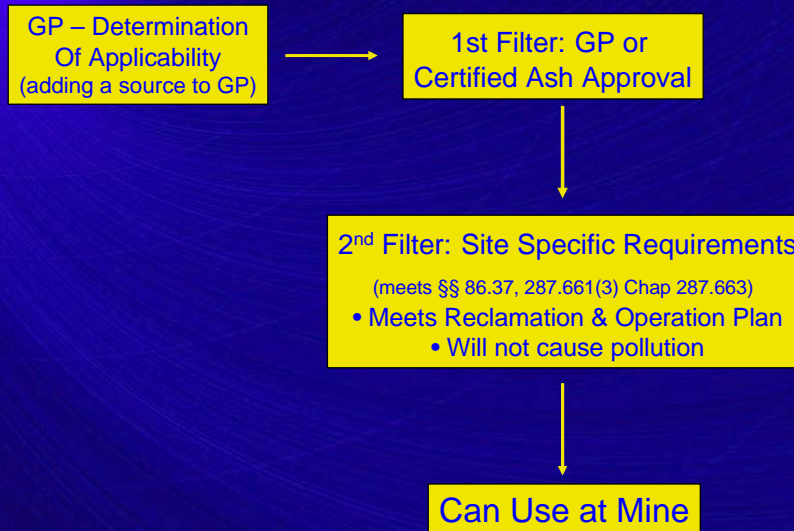
Form MR0011 to be revised in the next few weeks. Do not need to resubmit.

Asking for

- source information
- anything mixed with ash
 - GPs or at the mine site
- new parameters
 - as appropriate per type of use
- volume info from generators
 - placed at mine sites



Environmental Filters & Decision Making



Contact

Keith Brady or Sharon Hill

(717) 787-5103

kbrady@state.pa.us or shill@state.pa.us

RA-coalash@state.pa.us

<http://tinyurl.com/d75pja>

(Beneficial Use web page)