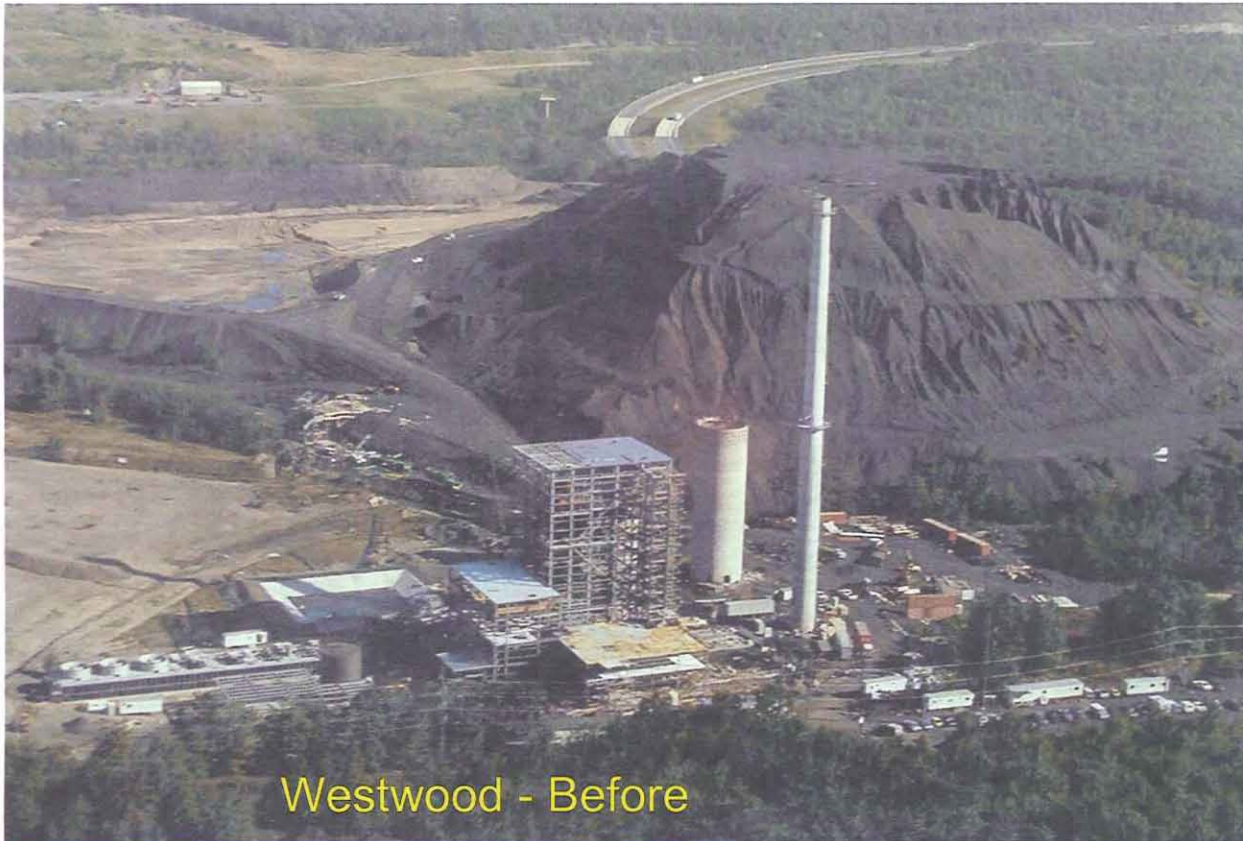


# Coal Ash Beneficial Use at Mine Sites

Keith Brady, Sharon Hill, Richard Morrison  
DEP – Bureau of Mining and Reclamation





Westwood - Before

## Reasons we want to explain our program to OSM

- OSM oversight
- 10-day notices re: ash
- OSM potentially working on regs
- ALJ Decision



Westwood - After



Revloc -Before



Revloc - After

# Outline

- Legal stuff
- Some statistics
- Figuring out “coal ash”
- Policy changes
- Chemistry
- The review process

The background of the slide features a pair of golden scales of justice, symbolizing law and equity. The scales are set against a deep red background. The central pillar and the pans are rendered in a warm, golden-yellow hue, with some highlights and shadows that give them a three-dimensional appearance. The overall composition is centered and balanced, with the scales occupying most of the frame.

# Legal Framework

- PA Solid Waste Management Act (1980)
- 1986 Amendments to Solid Waste Mgt Act
- 1992 Residual Waste Regulations
- 1992 Coal Ash Regulations
- 1997 Amendments to Coal Ash Regulations in Chapter 287

# PA Solid Waste Mgt Act (1980)

- Three categories of “solid waste”

- ❖ Municipal: residential garbage



- ❖ Residual: industrial waste which is not hazardous



- ❖ Hazardous: RCRA definition for hazardous waste



Coal combustion wastes considered residual waste

# 1986 Amendments to Solid Waste Management Act

Added definition for “coal ash”

- “COAL ASH --- Fly ash, bottom ash or boiler slag resulting from the combustion of coal, that is or has been beneficially used, reused or reclaimed for a commercial, industrial or governmental purpose.”

Definition for “beneficial use”

- “BENEFICIAL USE” – “use or reuse of residual waste for commercial, industrial or governmental purposes where the use does not harm or threaten public health, safety, welfare or the environment”

Amended definition of “solid waste” (the “term does not include ‘coal ash’”)

# 1986 Amendments to Solid Waste Management Act (continued)

Added provisions defining beneficial use of coal ash

“Beneficial use, reuse or reclamation of coal ash shall include, but not be limited to,” list of seven specified uses, e.g.,

- use of bottom ash as an anti-skid material;
- use as a raw material for another product;
- use for mine subsidence, mine fire control and mine sealing;
- use as structural fill, soil substitutes or soil additives

## 1986 Amendments to Solid Waste Management Act (continued)

- Dept may establish siting criteria and design and operating standards for storage of coal ash prior to beneficial use
- Dept may establish siting criteria and design and operating standards for use of coal ash as structural fill, soil substitute or soil additive



## 1986 Amendments to Solid Waste Management Act (continued)

### **Certification provision**

“The department may, in its discretion, **certify** coal ash that is used as structural fill, soil substitutes and soil additives.”

Certification based on department’s consideration of the following data:

- (i) the facility from which the coal ash is originating
- (ii) the combustion and operating characteristics of the facility
- (iii) the physical and chemical properties of the coal ash, including leachability.

Significant alterations in generator process require recertification

# 1992 Residual Waste Regulations

- 25 Pa. Code Chapter 287
- General Permits for Beneficial Use of Residual Waste Other Than Certain Uses of Coal Ash §§ 287.601-652
- Provisions for Beneficial Use of Coal Ash §§ 287.661 to 287.666

## 1992 Coal Ash Regulations (continued)

### Reclamation as a Beneficial Use Included

- Section 663 authorizes use of coal ash for “reclamation at an active or abandoned coal mine site” if person proposing this beneficial use complies with specified requirements in §§ 663 and 664, Clean Streams Law and
  - (i) PASMCRRA and Ch. 86-90 for active mine sites or
  - (ii) for abandoned mine sites, provisions Dept deems necessary to protect public health and environment as set forth in an agreement or a contract

## 1992 Coal Ash Regulations (continued)

Detailed reqmts for content of a request to use coal ash for reclamation in § 663

- chemical analysis (used for residual waste disposal facility applications)
- water quality monitoring plan (used for residual waste landfills)
- six months of groundwater monitoring data in addition to monitoring data required by mining regs

Detailed operational requirements for placement of coal ash at mine sites in § 664

- “placement of coal ash as part of a mining or reclamation activity shall achieve an overall improvement in water quality”
- Placement as part of coal refuse disposal operation not considered a beneficial use unless certain additional reqmts met including: coal ash must be returned to crda used by the coal prep activity that supplies coal to ash generator

# 1997 Amendments to Coal Ash Regulations in Chapter 287

## More Flexibility in Review and Approval Process

- Removed detailed reqmts for content of request in § 663
- Required request for use of coal ash to be addressed in reclamation plan of mining activity permit
- Established certification process for acceptable physical and chemical characteristics of coal ash and reqmt for generator to demonstrate coal ash quality meets certification guidelines prior to beneficial use

## 1997 Amendments to Coal Ash

### Regulations in Chapter 287 (continued)

Expanded Scope of Operations Where Beneficial Use for Reclamation Could be Approved

- Removed many of the detailed operating requirements in § 664
- Committed Dept to developing TGD to facilitate review of beneficial uses of coal ash at coal mining activity sites
- Use of coal ash as part of mining reclamation activity shall be designed to achieve an overall improvement in water quality or designed to prevent the degradation of water quality

# DEP's Coal Ash Program



# Some Beneficial Use Facts & Figures

11 Million Tons Used Per Year

Huge Saving to Industry Per Year:

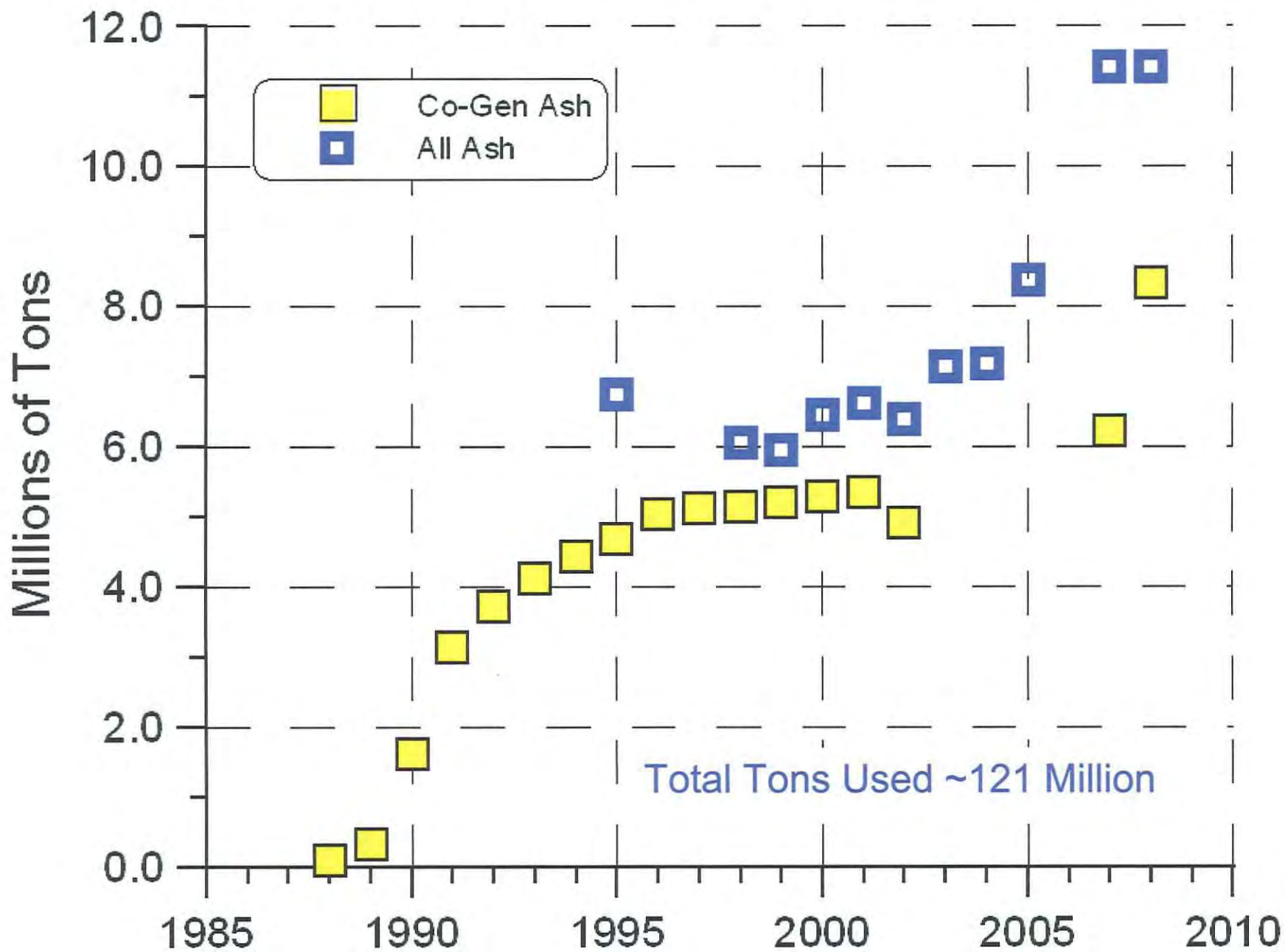
If Landfilled: 11 million x \$25 = \$275 million

If Used at Mine: 11 million x \$5 = \$55 million

Savings

\$220 million





What is coal ash?

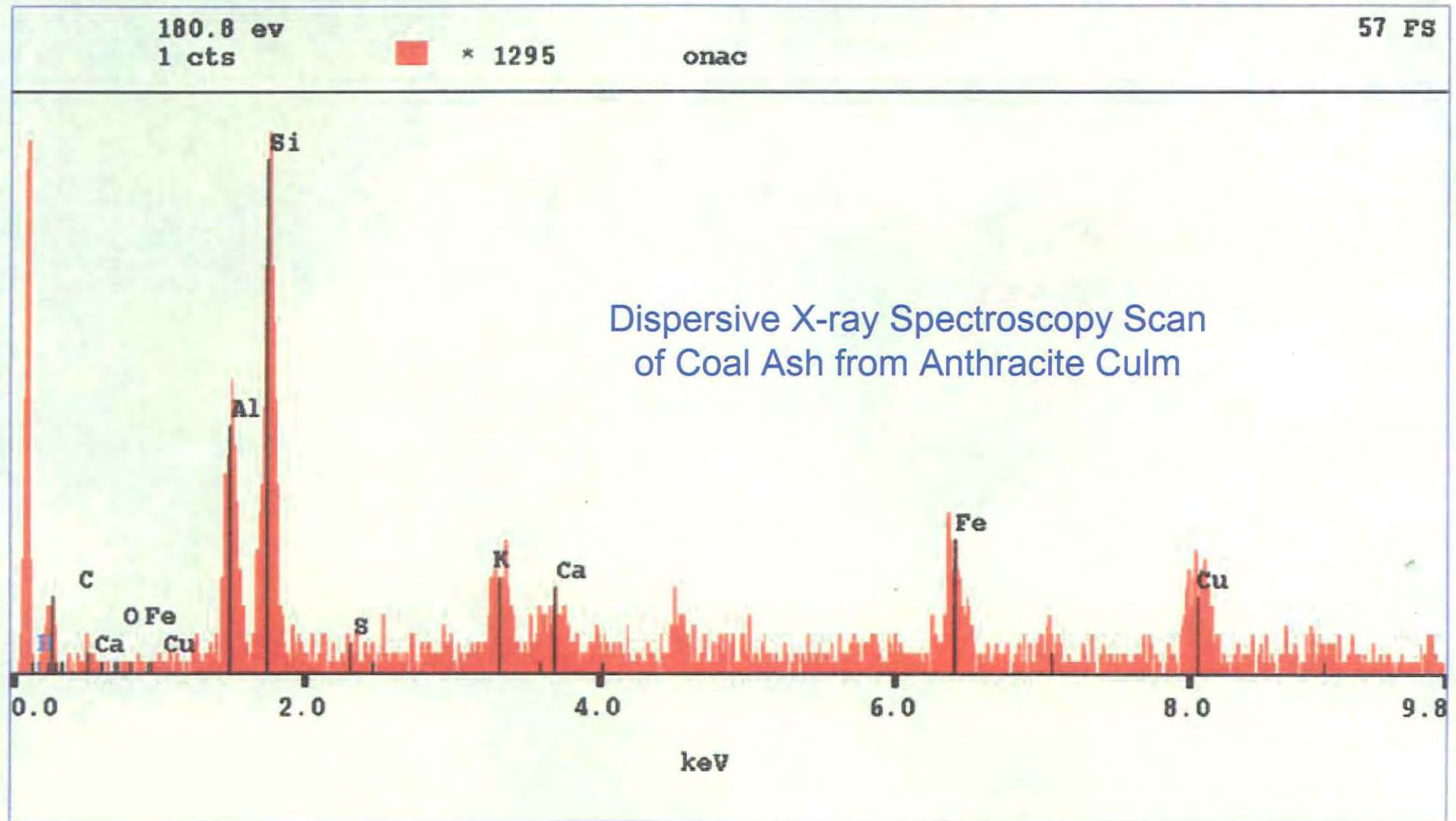
What is not coal ash?

What's in coal ash?

How do we evaluate coal ash?

How is ash approved for BU?

# Coal Ash Chemistry

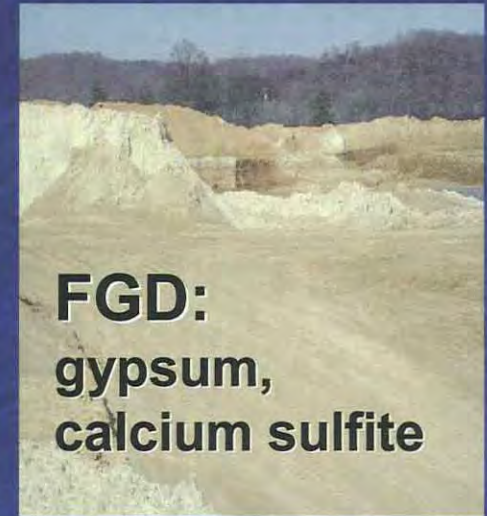
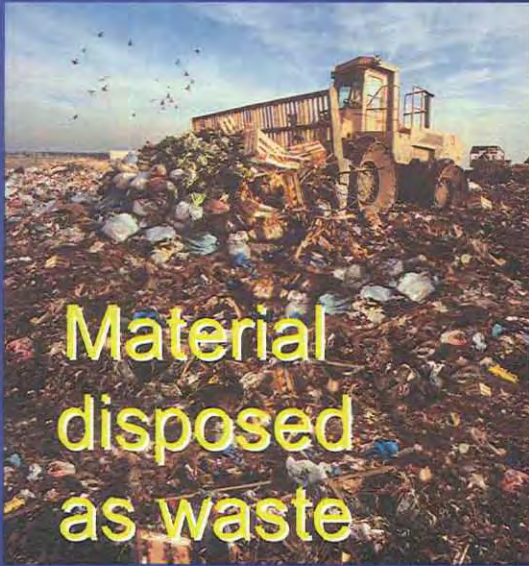


# Not All Coal Ash is Created Equal

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

Meets Specs  
Can be Beneficially  
Used at Mines





**“Alternate Fuels”  
Need General Permit**

**Not “Coal Ash”**



# 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

# 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

There are known knowns. These are things we know that we know. There are known unknowns. That is to say, there are things that we now know we don't know. But there are also unknown unknowns. These are things we do not know we don't know.

Donald Rumsfeld, Feb. 12, 2002

## Things we wish we'd known sooner

- Not all Power Plant Ash is “Coal Ash”
- Ash generators know their processes (so ask them)
- Generators can often adjust processes to change chemistry (arsenic & pH)
- Fluoride
- Storage & Disposal vs. Hot Steaming Ash
- Difficult to overcome preconceived notions



# Confounding issues

- FGD – Flue Gas Desulfurization Products
- Beneficial use is not *disposal*
- Run when you hear “Win-Win”

# Sampling Parameters

\*Ag

Al

**As**

B

Ba

\*Be

Cd

\*Co

Cr

Cu

Fe

Hg

Mn

Mo

Ni

Pb

S

Sb

**Se**

\*Tl

\*V

**Zn**

**\*F**

Cl

Na

pH

\*Ca

\*Mg

\*K

**\*NO<sub>3</sub>**

\*NO<sub>2</sub>

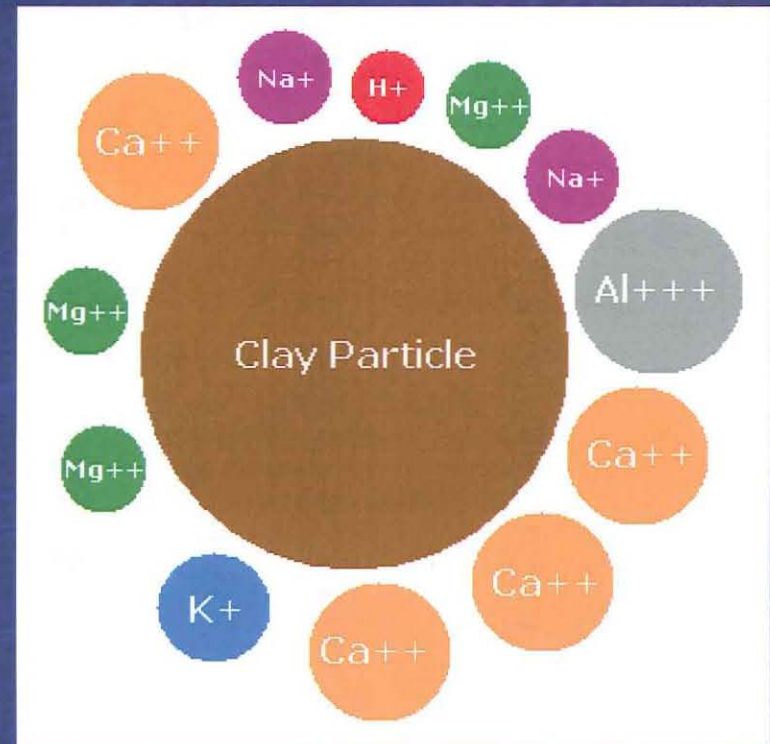
\*NH<sub>4</sub>

Parameters discussed below

\* New parameter

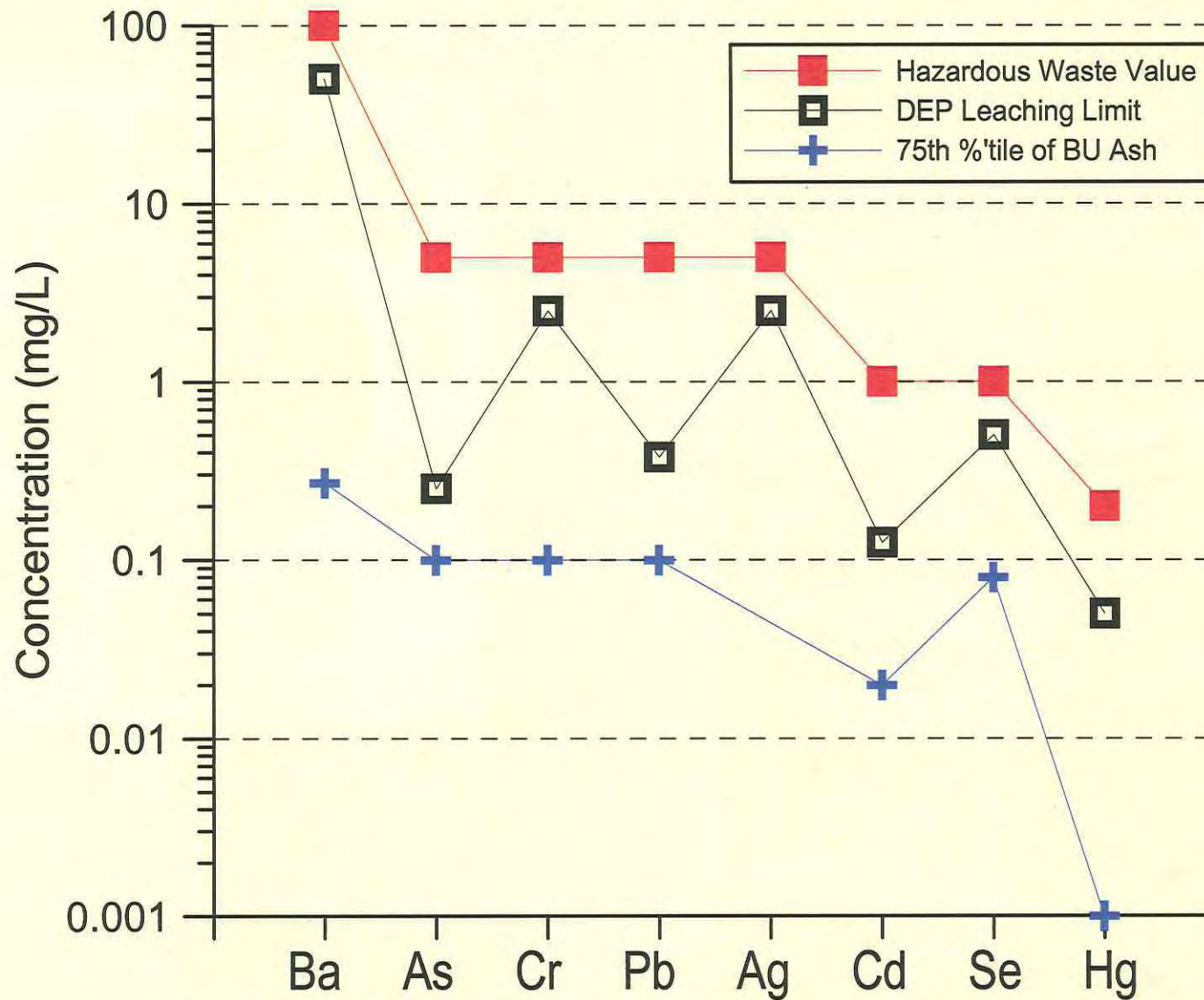
# Leaching Limits

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



# Is Beneficially Used Ash Toxic? The answer is NO.

Coal ash is more than an order of magnitude less than "toxic" values



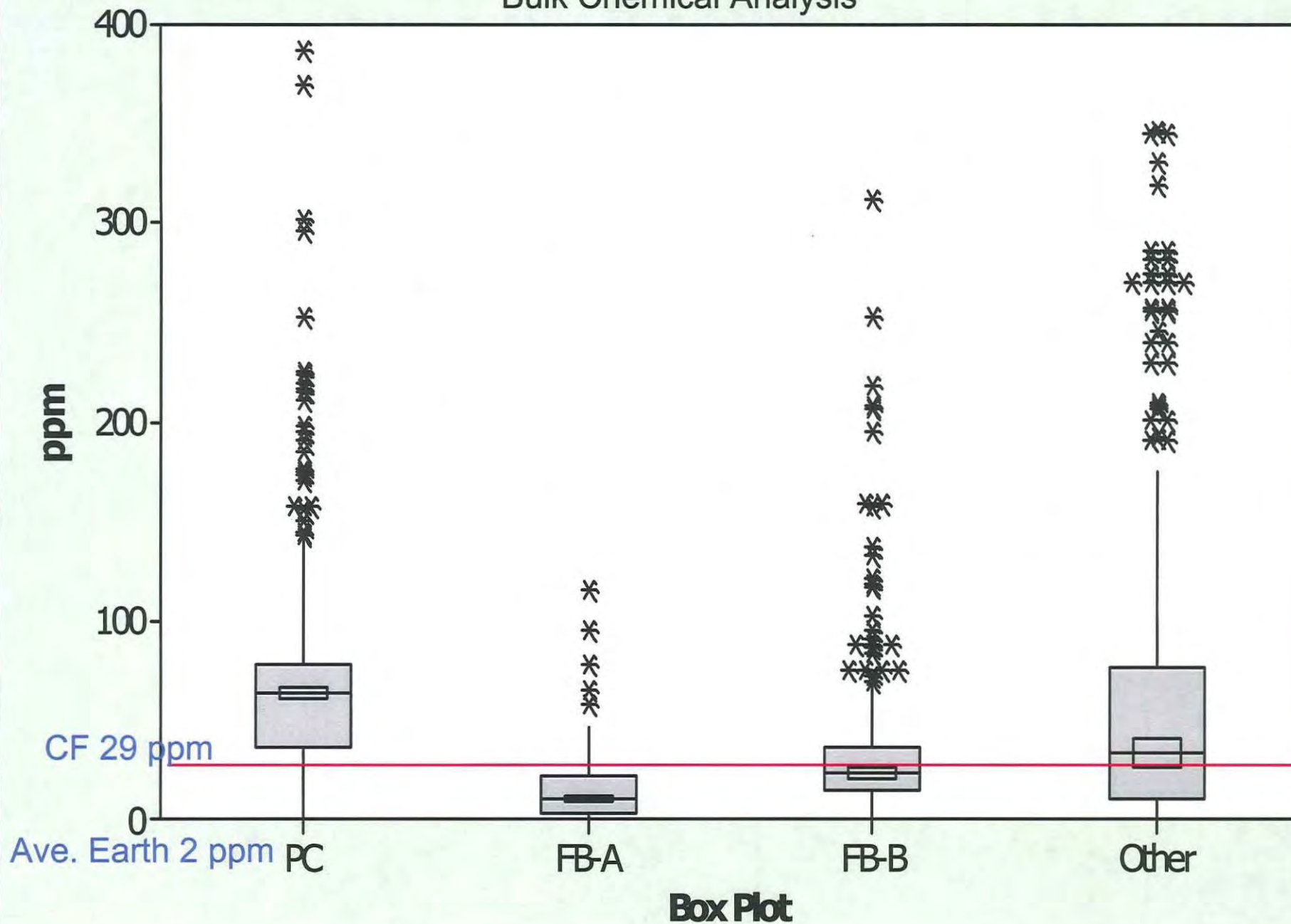
# A Comparison of Numbers

Parameter	Hazardous	DEP	75 <sup>th</sup> 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		

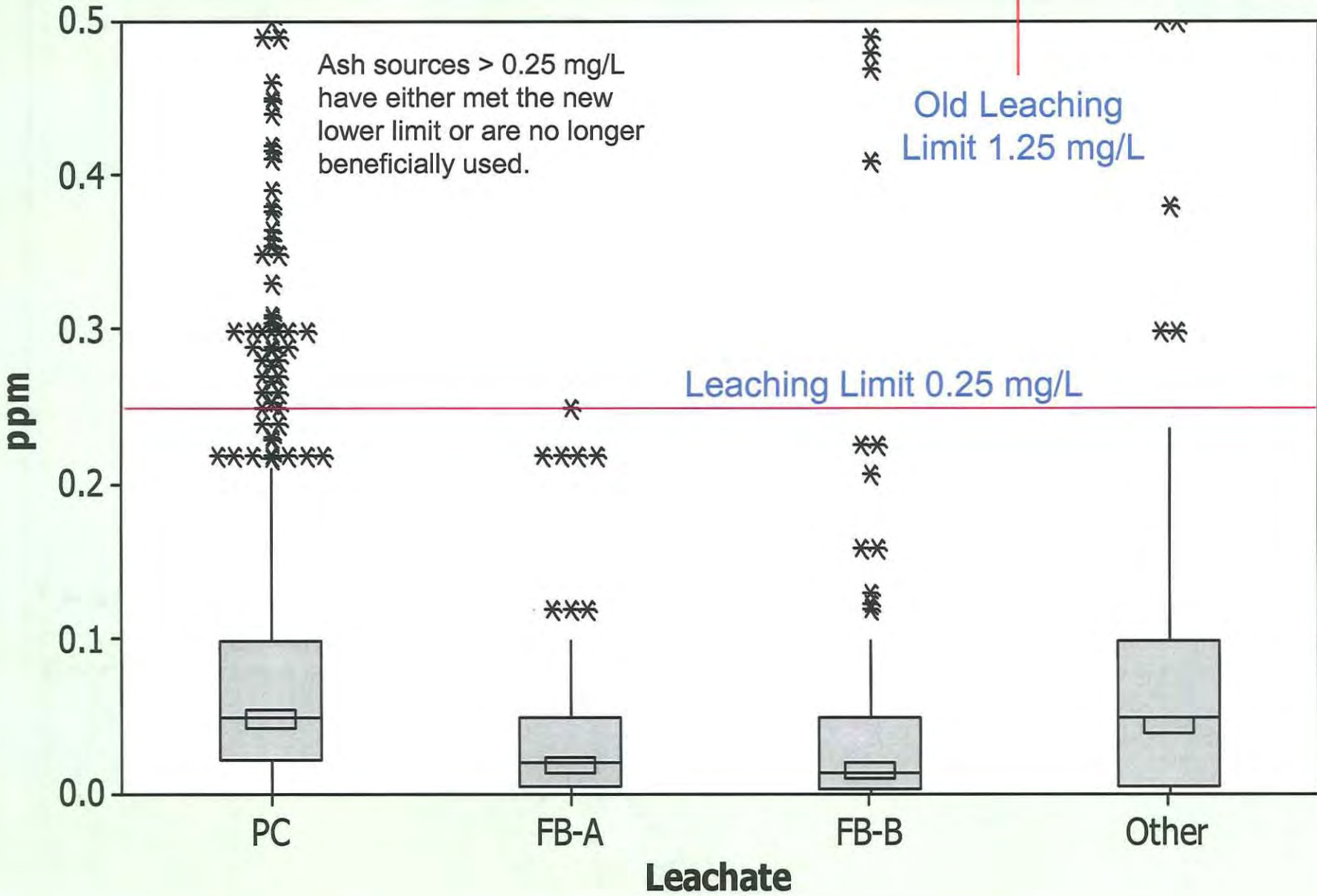
Units are mg/L

# Arsenic

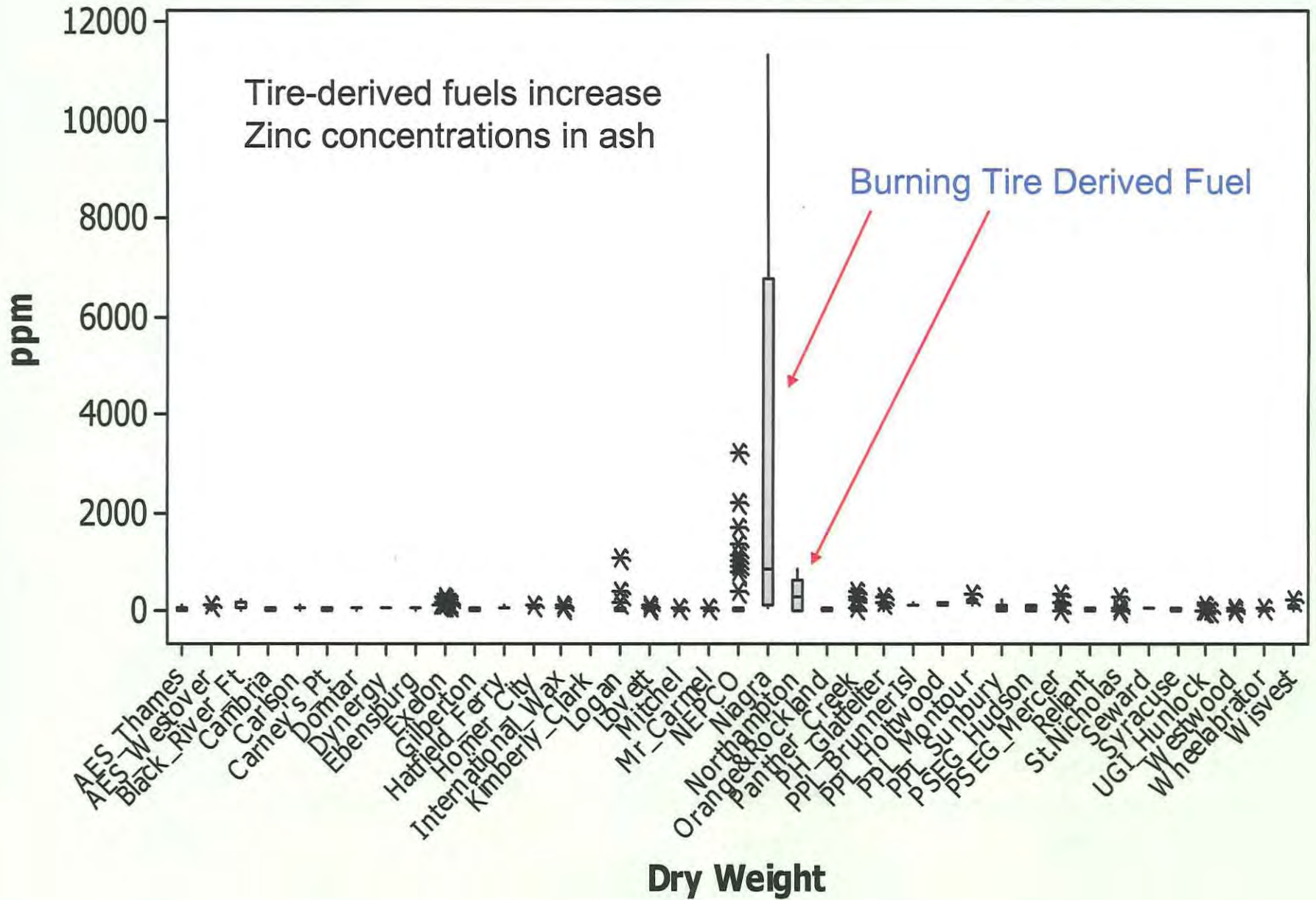
## Bulk Chemical Analysis



# Arsenic



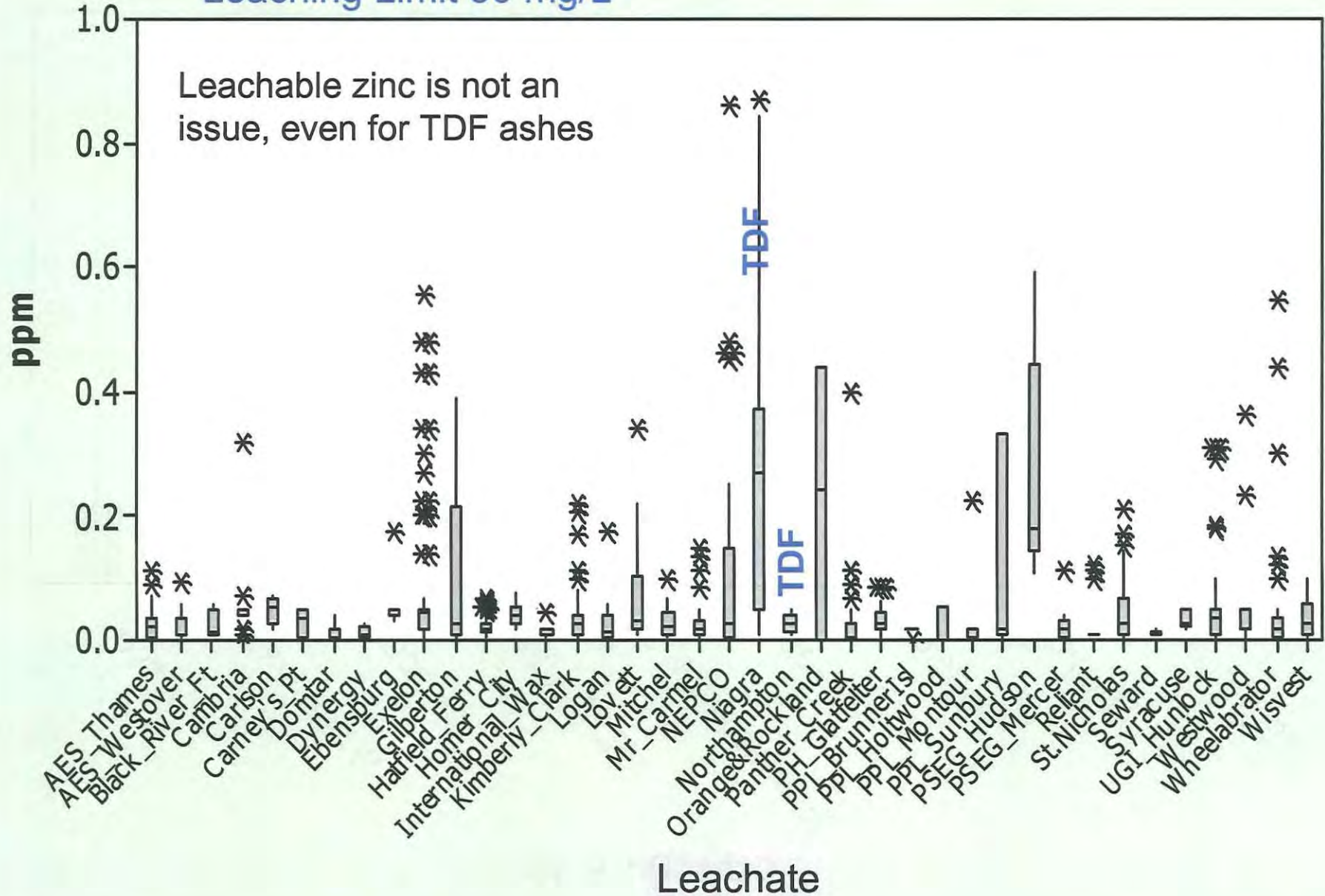
# Zinc



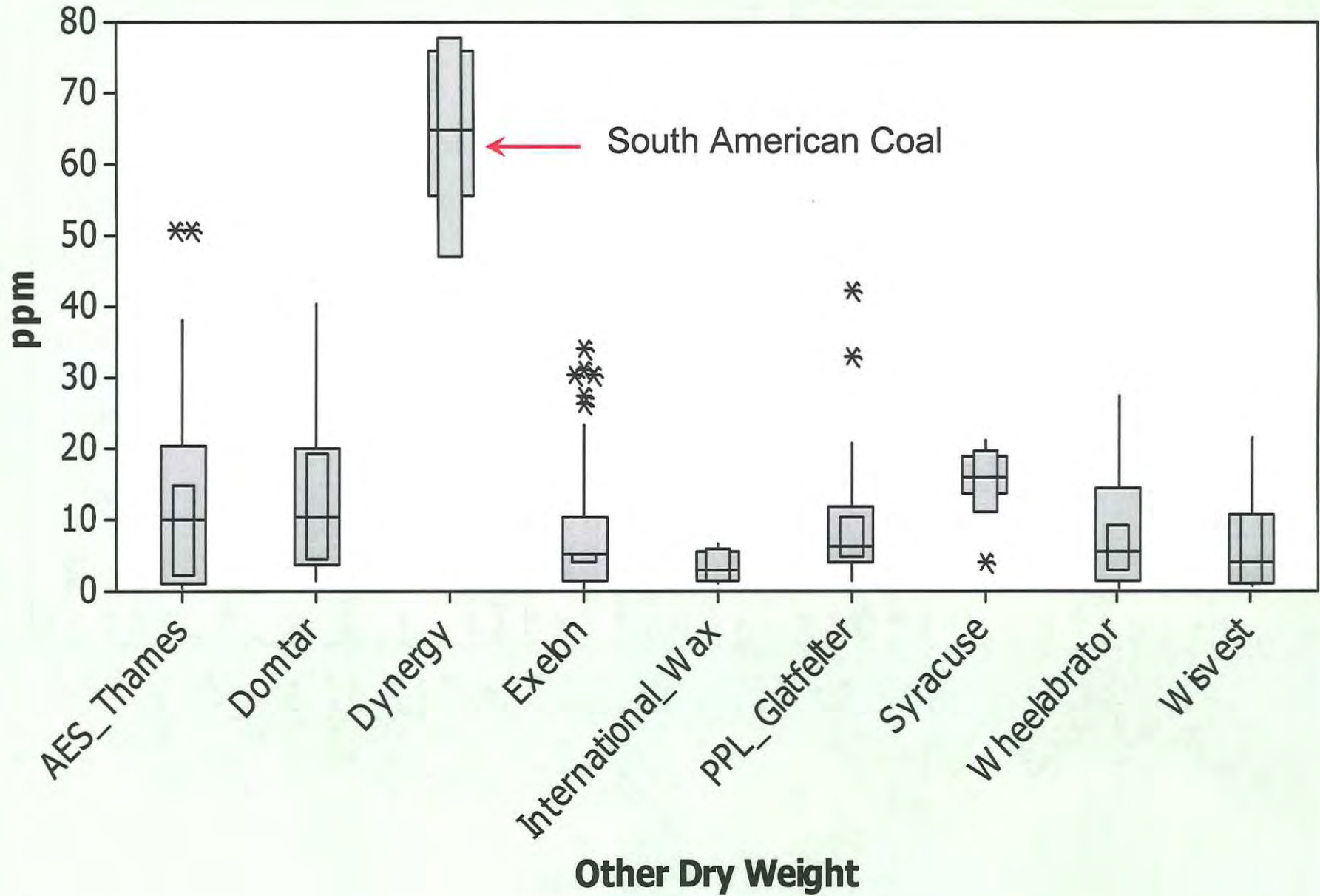


# Zinc

Leaching Limit 50 mg/L

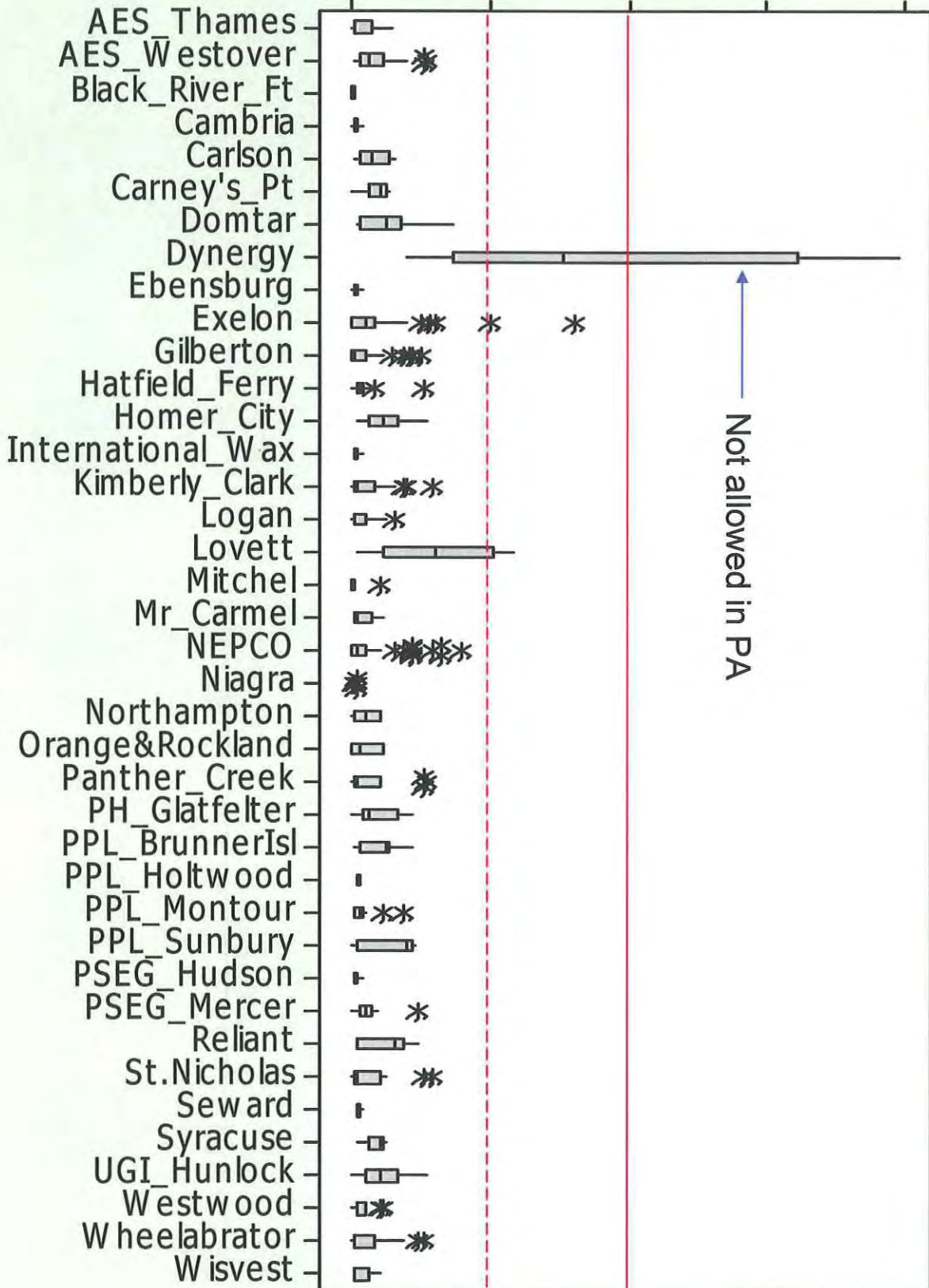


# Selenium



ppm

0.0 0.5 1.0 1.5 2.0



Leachate

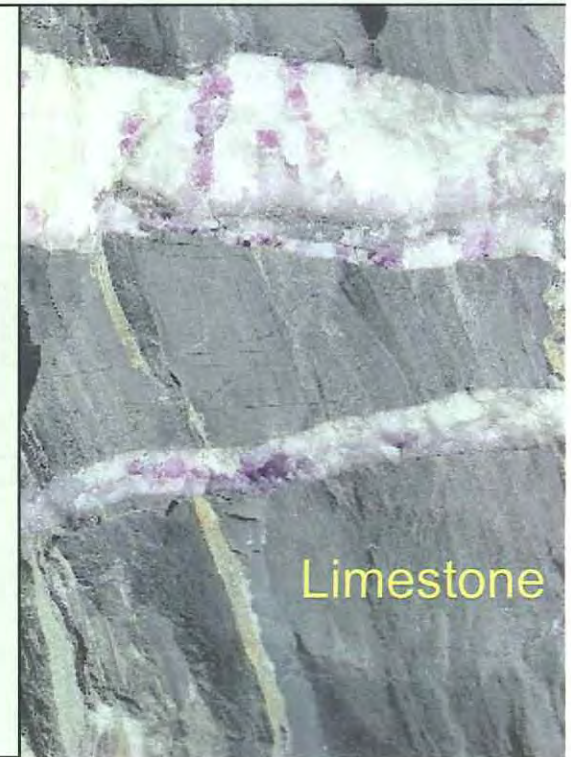
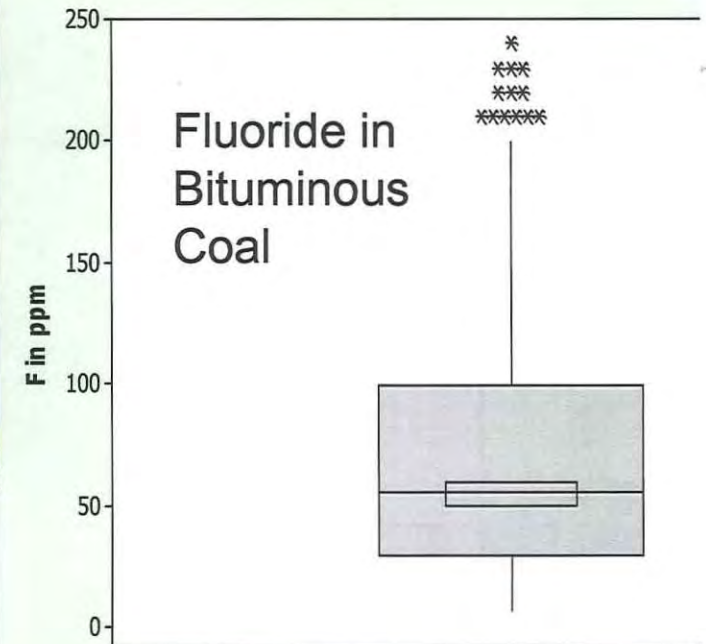
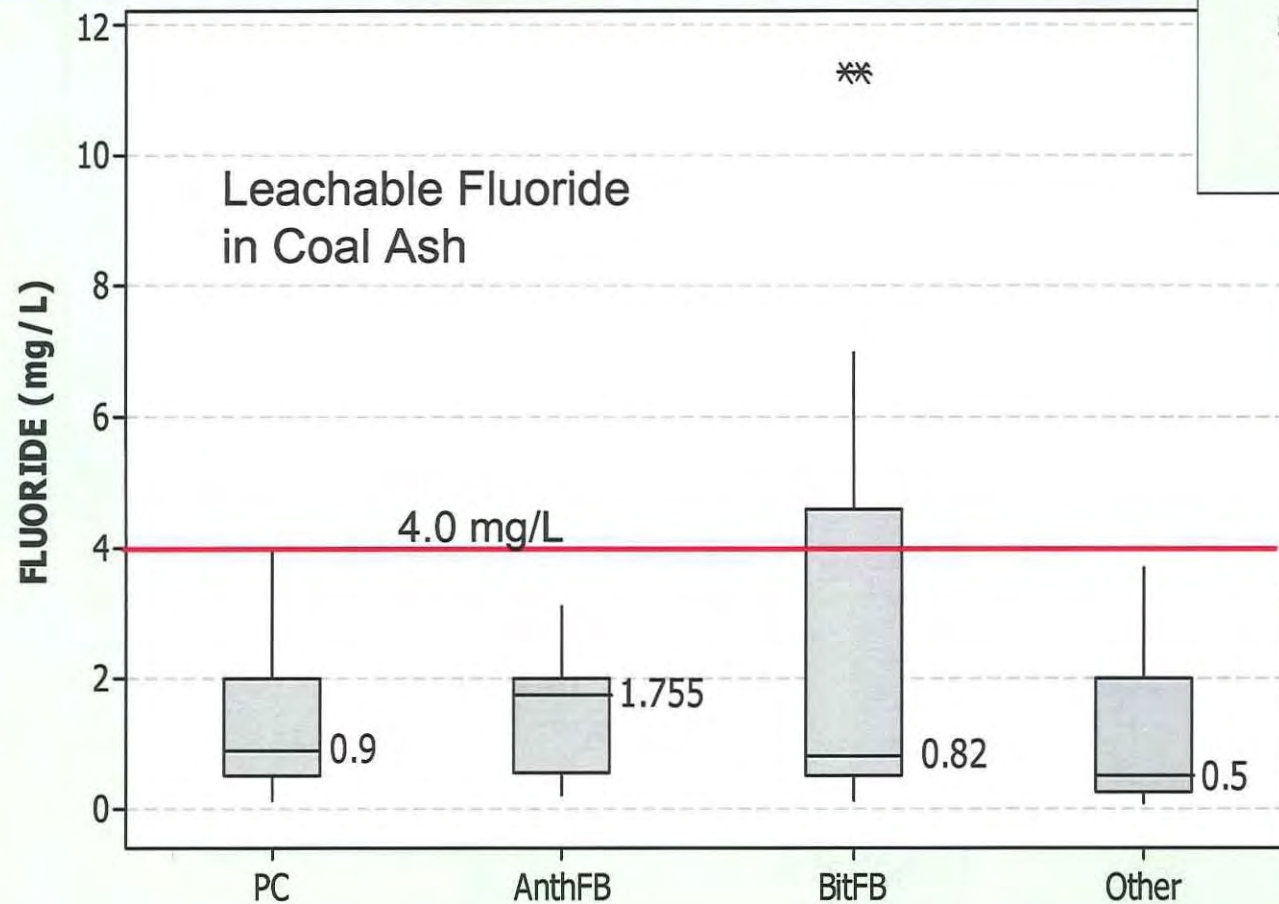
Selenium

Not allowed in PA

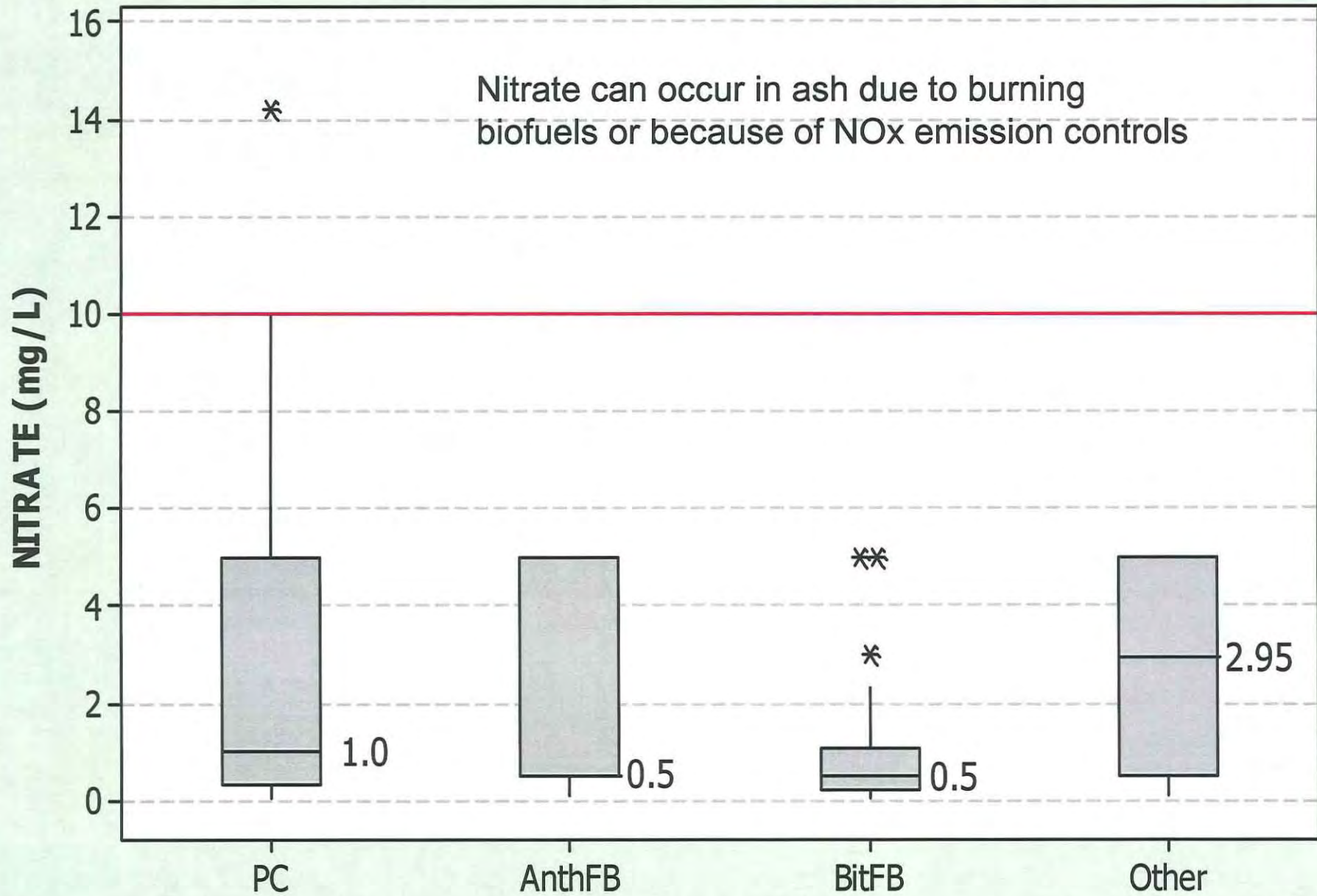
# Fluoride

Where does it come from?

- Coal
- Limestone



# NITRATE

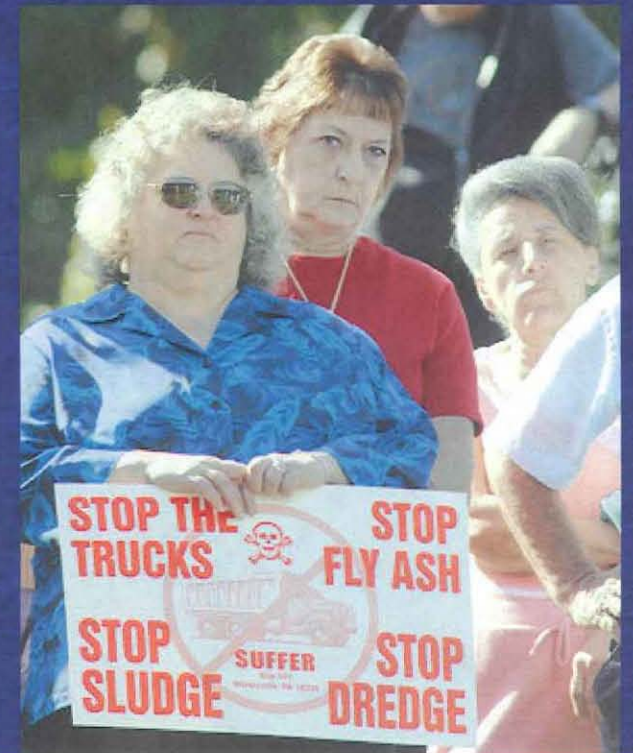
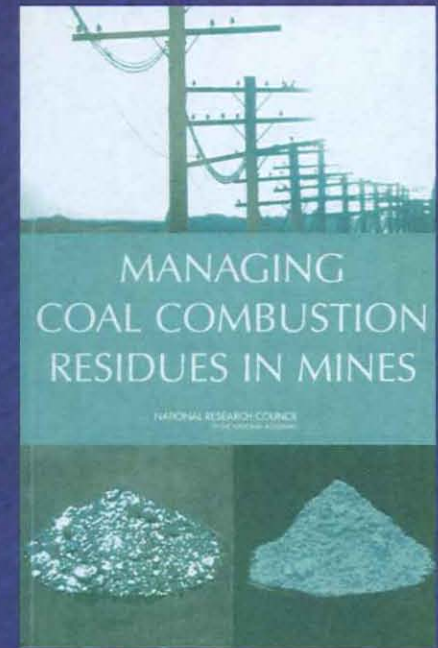


# Policy & Regs



# 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



# Regulations

- Existing Regs – 287.661-665
- Being Revised – Ash its own Chapter 290
- Incorporating Technical Guidance
- Draft Regs currently found at: <http://is.gd/39q3Z>  
“2009 EQB meeting schedule – July 21, 2009”

**To be published November 7 in PA Bulletin and  
opened for public comment.**



# The Approval Process



BD Mining – Anthracite Region

10 17 2002

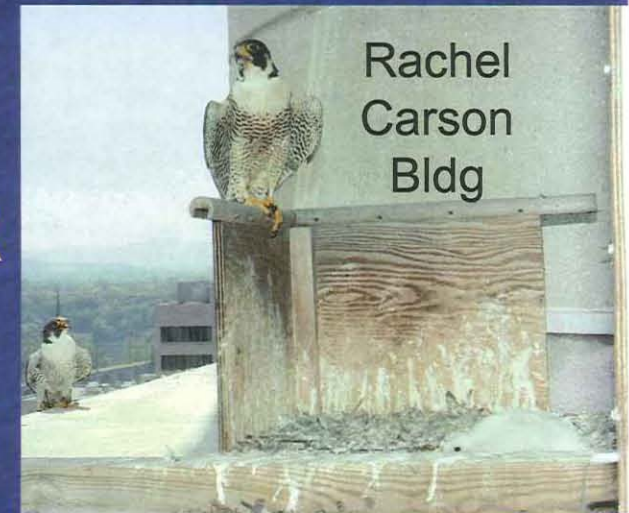
# Two-Step Process

BMR & DMO

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

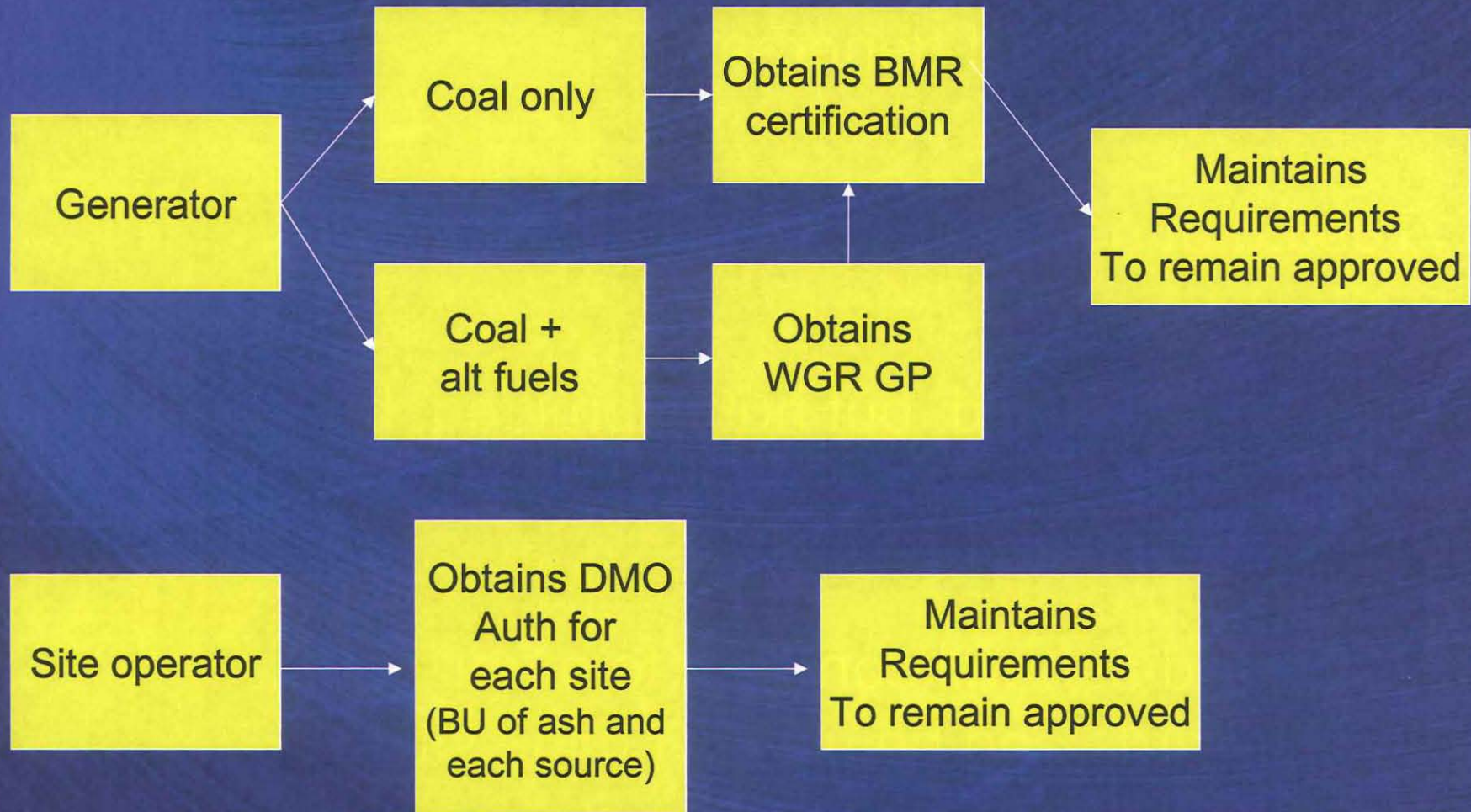
Site approval – permit/contract DMO  
(563-2112-225 Mine sites)

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

# 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](mailto:RA-coalash@state.pa.us)



# Evaluating Leaching Data

Does the ash meet the guidelines --

At the initial request for certification?

And

Every quarter afterwards?







# 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.



# GP material restrictions

287.611(e) Department will not issue a GP to use residual waste to fill open pits from coal or noncoal mining **except for coal ash mixed with residual waste**

BUT, the use

- must not present a safety hazard,
- will improve the overall quality of the area,
- is limited to the filling to natural contours of the land
- will not present a threat to public health or the environment.

Same requirements as Chap 87, just worded differently

# Use of GP materials

- DMOs approve respective of each site for proposed use
- Must not cause pollution
- Demonstrate usefulness (not just \$ or convenience)
- In accordance with reclamation plan
- Permit contains conditions regarding use of material
- BMR can look at quality of material and help flag problems but can not certify material.

# BMR Certification or BWM GP approval does not automatically mean the ash is appropriate for use at a Mine

## Must Meet Chapter 86.37 Requirements:

- 86.37(a)(2) The applicant has demonstrated that the coal mining activities can be...accomplished ...under the operation and reclamation plan...
- 86.37(a)(3) The applicant has demonstrated that there is no presumptive evidence of potential pollution of the waters of the Commonwealth
- 86.37(a)(4) ...the activities proposed...have been designed to prevent material damage to the hydrologic balance outside the proposed permit area

# Environmental Filters & Decision Making

GP – Determination  
Of Applicability  
(adding a source to GP)

1st Filter: GP or  
Certified Ash Approval

2<sup>nd</sup> Filter: Site Specific Requirements

(meets §§ 86.37, 287.661(3) Chap 287.663)

- Meets Reclamation & Operation Plan
- Will not cause pollution

Can Use at Mine

# 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)

Questions?

