

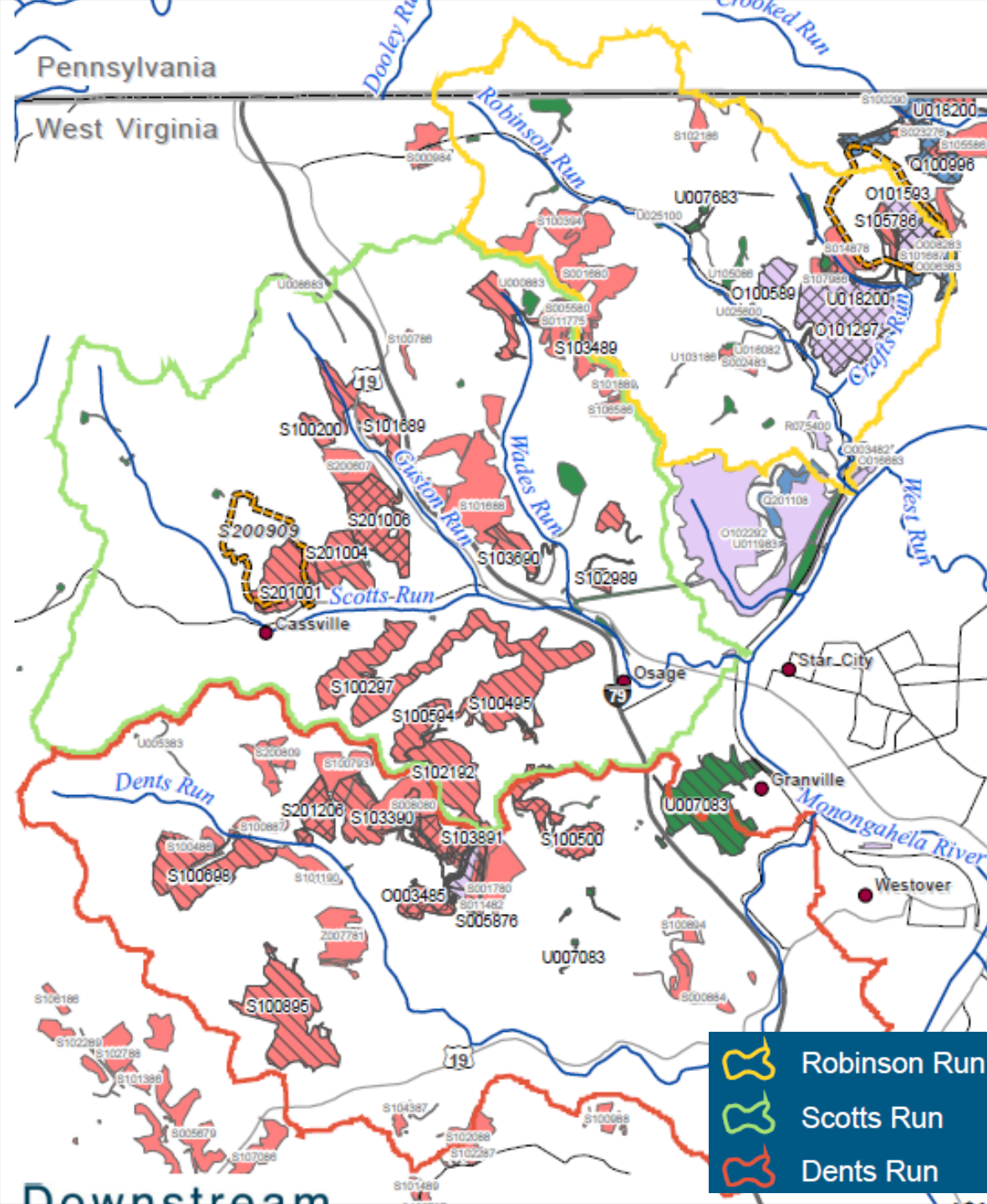
coal combustion waste disposal sites thru 2003

- extensive use in northern West Virginia minefills

- as of 2004, 88 more sites in WV, ~2/3 in 2 northern WV counties

-Figure 1.5 from: National Academy of Sciences. 2006. Managing coal combustion residues in mines. The National Academies Press, Washington, D.C. 238pp

FIGURE 1.5 Coal combustion residue mine placement sites in the United States.
 SOURCE: National Research Council; data collected through individual state surveys.



CCW disposal in part of Monongalia County, WV

- ~3,500 acres CCW in 3 watersheds
- 18% of land area in Scott's Run

- up to 10,000 tons / acre

Many new minefills in the works

355 acre SMCRA permit with NO mining (ash dump)

- 3.8 million tons/yr
- 25-30 yrs
- unlined pile 500ft deep



Many families are and will be affected by ash in minefills

New 225 acre mine with ash -- New Hill Surface Mine (pink area)

-14 homes within 300 ft of mine edge

- 500 homes within 0.7 mi

Figure 3 of 14



I-79

Existing mines
with ash use
~2 miles long
**(homes along
boundary)**

many nearby
homes





acres of exposed coal ash

- on surface of mine
- on coal face
- in mine pit



fugitive dust -- fly ash, coal and other dust, diesel fumes
- from mine pit, heavy equipment, blasting



Fugitive dust

- street sweeper stirs up particulates (left photo)
- coal (100 per day) and ash (1 per 7 minutes) trucks on roads (many homes along rds)
- particulates pile up along edge of road



Particulate build-up on sills and siding of a home ~1 mi away

Water quality concerns

- selenium concentrations in fish tissue downstream of ash ponds 4 to 6X greater than EPA criterion of 8ppm
- reference stream concentrations much lower

Excerpt from Table 1 of report: West Virginia Department of Environmental Protection. 2009. Selenium bioaccumulation among select stream and lake fishes in West Virginia. 39pp.

Site	Stream Code	Avg. Water Column Conc. (ppb)	Avg. Fish Tissue Conc. (ppm)	Avg. Sunfish Tissue Conc. (ppm)	Avg. Minnow Tissue Conc. (ppm)	Avg. BAF (L/kg)
Fly Ash Influenced Streams		39.65	33.21	15.83	41.23	914
*Daugherty Run	WVMC-19	1.00	1.48	1.56	1.49	1476
Little Scary Creek	WVK-31	31.50	40.43	6.20	54.69	1283
Conner Run	WVO-77-A	47.80	25.99	25.46	27.76	544
Reference Stream		0.94	2.50	NA	2.50	2500
Ash Fork	WVKG-5-H	0.94	2.50	NA	2.50	2500

- Coal ash effluent concentrations 2 to 140X greater than WV State water quality standards (WQS)

Table 3 from report: Hansen, E. and Christ M. 2005. Water quality impacts of coal combustion waste disposal in two West Virginia coal mines. Downstream Strategies, LLC, Morgantown, WV. 31pp.

Table 3: Summary of results for selected metals at Stacks Run Refuse Site Extension

Metal	Site 1	Site 2	Site #010 vs. Site #006
Antimony	Samples mostly at MDL, but MDL sometimes substantially above WQS.	Samples all at MDL, but MDL sometimes substantially above WQS.	Most samples at both sites at MDL. Upstream peaks at 2 x WQS. Downstream peaks at 20 x WQS.
Arsenic	One sample at more than 2 x WQS.	All samples meet WQS.	Mostly at or close to MDL at both sites. Upstream peaks at 2 x WQS. Downstream meets WQS.
Lead	One sample just above WQS. Some MDLs at 3 x WQS.	Some MDLs at 3 x WQS.	Upstream meets WQS. Downstream peaks at 3 x WQS.
Selenium	Two samples near 8 x WQS. MDLs approach 4 x WQS.	Samples as high as 120 x WQS. MDLs approach 4 x WQS.	Upstream mostly at MDL, with one peak to 10 x WQS. Downstream peaks at 44 x WQS.
Thallium	Samples as high as 80 x WQS. Some MDLs at 22 x WQS.	Samples as high as 140 x WQS. Some MDLs at 22 x WQS.	Upstream all at MDL, but MDL sometimes about 20 x WQS. Downstream peaks at about 130 x WQS.

Note: WQS = water quality standard.

MDL = method detection limit

Millions of pounds of non-encapsulated toxic waste dumped on mines

EPA Toxic Release Inventory data reported by Morgantown Energy Associates (MEA) power generating facility as offsite transfers to Patriot Mining Company, and the data reported by Patriot Mining Company at seven northern West Virginia reclaimed surface mines as releases to the environment, 1998-2009.

Chemical or Chemical Category	Patriot Mining Company Surface Mines		
	MEA Reported Offsite Transfer	Patriot Reported Release to the Environment ^a	Difference Between MEA Transfer and Patriot Release
	pounds	pounds	%
Arsenic	282,297	166,903	59
Barium	58,194	931,591	1,600
Chromium	— ^b	254,709	—
Copper	—	111,711	—
Lead	20,158	1,714,467	8,505
Manganese	634,951	791,644	125
Mercury (inorganic)	2,302	12,326	535
Nickel	—	241,307	—
Vanadium	109,454	336,020	307
Zinc	230,417	689,038	299
Total	1,337,773	4,841,914	392

- Offsite transfers to surface mines significantly different from reported releases

[no one really knows amounts!]

- No groundwater monitoring

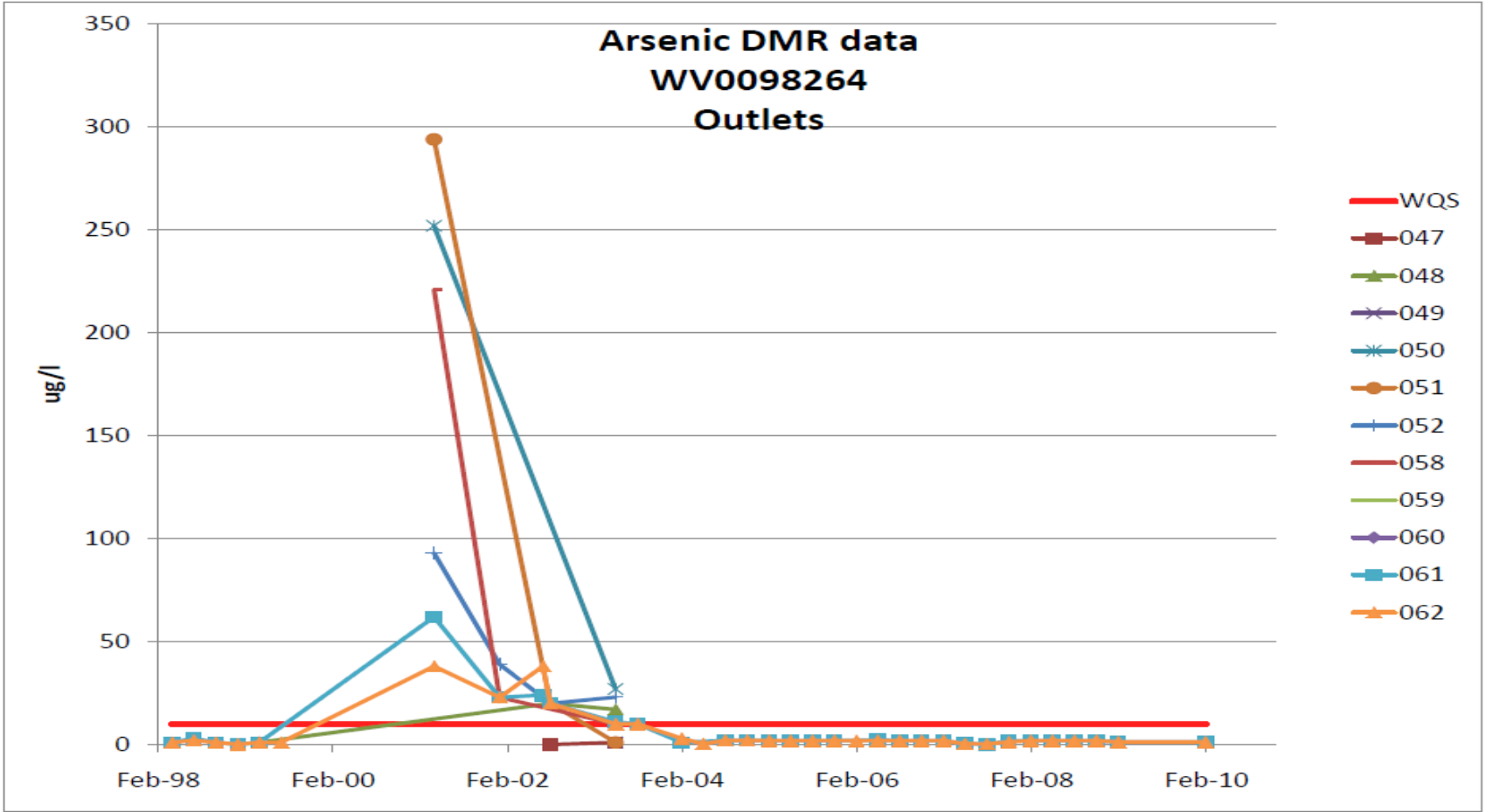
^a A facility is not required to report a particular chemical or chemical category if the facility has less than 10 full-time employees and processes less than 25,000 pounds of a chemical or chemical category specified in the regulations, or uses less than 10,000 pounds of any designated chemical or category.

^b Not reported.


Source: <http://www.epa.gov/enviro/html/tris/tris_query.html>

Scott's Run instream and outlet data from 5-10 year old minefills with ash addition (from WVDEP database)

- arsenic tested at only 11 of 62+ outlets
- levels often exceeded water quality standards (WQS red line)



Water quality analysis of a spring that emanates from a coal ash surface mine

	Applicant: PATRIOT MINING COMPANY INC Reference ID: New Hill West Surface Mine (01/29/2009)	Type: Surface Mine Application Permit ID: S200909 Status: ERIIS - SMA # Issued
	J-4: Baseline Ground Water Sample Information	Printed: Oct. 29, 2009 8:03 AM

Company:	Patriot Mining Company/Active Permits	Elevation (ft):	Field Sampler:	HS
Location:	Surveyor & Associates	Latitude:	Sampled By:	Surveyor & J
Outlet/Site:	S9 Unknown Site Type	Longitude:	Date Sampled:	04/01/2009
Outlet Name:	S9	Rain Fall 24Hr Prior:	Date Received:	04/07/2009
State Permit #:	09.510	Rain Fall 72Hr Prior:	Date Completed:	04/10/2009
DOE Permit/Article:			Time Sampled:	13:36:00
Laboratory #:	000-00601		Report Date:	04/13/2009

- manganese exceeds monthly limit of 2.0 mg/l

- high conductivity, sulfates, and TDS

- WV DEP requires no monitoring of the coal ash parameters (arsenic, selenium, etc.)

Id	Parameter Name	Result	Unit	Method	MDL	Analyst	Date Analyzed	Time Analyzed	Analysis Comment
95	Conductance, Specific	3550.0	UMHO/CM	SM-2510 B	4.8	KF	4/09/2009	10:30:00	
403	pH, Lab	7.78	Std. Unit	SM 4500-H+ B	1.00	TE	4/08/2009	16:00:00	
410	Alkalinity, Total (As CaCO ₃)	111.00	mg/l	SM-2320 B	2.00	TE	4/08/2009	16:00:00	
435	Acidity, Total (As CaCO ₃)	< 2.00	mg/l	SM-2310 B	2.00	TE	4/08/2009	16:40:00	None Detected at the reporting level (MDL)
530	Solids, Suspended Total	8.00	mg/l	SM-2540 D	3.00	KF	4/09/2009	11:30:00	
945	Sulfates, Total (As SO ₄)	2400	mg/l	ASTM D516-90, 03	2	KF	4/09/2009	10:45:00	
1045	Iron, Total	0.059	mg/l	EPA 200.7 Rev. 4.4	0.004	VH	4/10/2009	13:00:00	
1055	Manganese, Total (Mn)	12.467	mg/l	EPA 200.7 Rev. 4.4	0.002	VH	4/10/2009	13:00:00	
1105	Aluminum, Total (As AL)	0.055	mg/l	EPA 200.7 Rev. 4.4	0.008	VH	4/10/2009	13:00:00	
70296	Solids, Total Dissolved	2996	mg/l	SM-2540C	10	KF	4/09/2009	11:00:00	

- Diversity (number of genera) greater upstream of coal ash than downstream
- Water quality (conductivity, sulfates, TDS) better upstream of coal ash than downstream

Benthic macroinvertebrate and water quality data collected in Scotts Run by WVDEP for the Watershed Assessment Program at points located upstream and downstream of the New Hill mine complex.


	upstream	upstream	downstream	downstream
mile point:	5.4	5.5	0.6	0.6
date:	10-Jun-03	22-Jul-09	22-Jul-09	15-Sep-99
spec cond uS/cm:	264	432	1854	1282
sulfate mg/L:	42	61	983	940
TDS mg/L:	na	251	1590	na
total # of genera:	34	22	15	15
# sensitive <300 uS/cm:	6	3	0	0
# sensitive >300 uS/cm:	5	4	3	2
# sensitive overall	11	7	3	2

Genus sharply declined below 300 uS/cm

Genus sharply declined but at levels higher than 300 uS/cm

(based on TITAN analysis, Bernhardt et al., under review)

- WV DEP requires just one baseline laboratory analysis of these coal ash constituents from a single, 100g sample
- WV DEP has required no during- or post-mining field monitoring of coal ash constituents in groundwater

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J-4. B. As in J-4-A, provide one time analyses for all Baseline Ground Water sites the following set of parameters:

- | | |
|------------------------|-------------------------------|
| Total Acidity (mg/l) | Total Alkalinity (mg/l) |
| Total Aluminum (mg/l) | Antimony (mg/l) |
| Arsenic (mg/l) | Beryllium (mg/l) |
| Cadmium (mg/l) | Total Chlorides (mg/l) |
| Chromium (mg/l) | Copper (mg/l) |
| Cyanide (mg/l) | Total Dissolved Solids (mg/l) |
| Field pH (Std. Units) | Flow (cfs or gpm) |
| Total Iron (mg/l) | Lead (mg/l) |
| Total Manganese (mg/l) | Mercury (mg/l) |
| Nickel (mg/l) | Nitrates (mg/l) |
| Phenols (mg/l) | Selenium (mg/l) |
| Silver (mg/l) | Specific Conductance (Åµmhos) |
| Total Sulfates (mg/l) | Total Suspended Solids (mg/l) |
| Temperature (C) | Thallium (mg/l) |
| Turbidity (mg/l) | Zinc (mg/l) |