

# FACT SHEET: Waste Coal

## What is waste coal?

Waste coals are the low-energy-value discards of the coal mining industry. Waste coal is called "culm" in the eastern PA anthracite region and "gob" or "boney" in the bituminous coal mining regions (western PA, WV and elsewhere).

Waste coal piles accumulated mostly between 1900 and 1970. The piles look like hills or small mountains that are dark and barren. Hundreds of millions of tons of waste coal and rock litter the landscape in mining states.

## Why is it a problem?

Waste coal piles leach iron, manganese and aluminum pollution into waterways and cause acid drainage that kills neighboring streams. These piles sometimes even catch fire, releasing toxic pollution into the air.

The 1977 Surface Mining Control and Reclamation Act (SMCRA) recognizes waste coal as potential "toxic forming material" due to the high sulfur levels that contribute to acid drainage. The SMCRA law states that burying waste coal is the best way to reduce acidity from these piles.

## The Power Industry's Answer to Waste Coal: Fluidized Bed Combustors

Hardly a "state of the art" technology, fluidized bed combustor (FBC) boiler technology is over 30 years old. It can be used to burn a wide range of fuels, including very poor fuels like waste coal. Some have been used to burn tires and other waste streams. FBC boilers weren't used to burn waste coal until 1987, when the first waste coal plant went online in eastern Pennsylvania.

## Poor Economics

According to 2004 testimony by the waste coal burner trade association, waste coal burners are uneconomical and require subsidies, for a few reasons. First, the large volumes of low-Btu fuel require extra handling (more fuel; more ash). The fact that they're burning a fuel that is half-rock leads to higher maintenance and repair costs (\$1-3 million/year in repairs for smaller plants). FBC burners are more complicated than normal pulverized coal power plants. Finally, the lucrative power purchase agreements signed years ago under the PURPA law are starting to expire, leaving plants to compete on the open market. The nation's first waste coal burner – Westwood Generating Station in Tremont, PA – reported losing \$4 million/year once they had to compete fairly. The operator has since curtailed operation, running the plant only when electricity prices are highest. Most of the new waste coal plants being proposed would be 4 to 7 times larger than most existing plants, in order to get the economy of scale to compete in today's market.

## Where is waste coal being burned?

There are 18 waste coal burning power plants, and 13 more that use it as a secondary fuel, with bituminous coal as their primary fuel. Fourteen of the 18 waste coal plants are in PA, 3 are in WV and one is in UT. New ones have been proposed in PA, WV, KY, IN, IL, CO and VA.

## Low energy value

Nationally, waste coal has an average of 60% of the BTU value of normal coals. It can take up to twice as much waste coal to produce the same amount of electricity. This means that -- in most places -- waste coal burners can only be economically built where huge volumes of waste coal exist. It would cost too much to truck far-away low-BTU fuel to a centralized burner. Consequently, even if



Nemacolin Gob Pile in Greene County, PA

waste coal burning were a clean solution, it couldn't deal with waste coal piles in more isolated locations.

## Waste Coal has More Mercury

Waste coal has higher concentration of mercury than normal coals. In WV and nationally, gob has 4 times more mercury than bituminous coal. In PA, gob has 3.5 times more mercury than bituminous coal. Culm has 19% more mercury than anthracite coal.

Bituminous waste coal also has higher levels of sulfur. Data on other metals in waste coal is sparse, but single metals tests on PA culm and gob show both to have about 4 times more chromium and 3 times more lead.

## More Mercury Per Megawatt

Since more waste coal must be burned to produce the same amount of electricity as normal coal would, this means that – in the states most affected by waste coal burning – over 6 times as much mercury must be fed into a waste coal burner to produce the same amount of energy as a traditional coal power plant. For culm vs. anthracite coal, it takes nearly twice as much mercury.

## More Air Pollution than New Coal Plants

Older coal power plants could not handle waste coal. In the late 1980's "circulating fluidized bed" (CFB) style power plants were built which could burn the low-energy waste coal. Because they were built after the 1970 Clean Air Act, these CFB power plants have pollution control equipment that the old ones don't have. This makes it easy for the waste coal industry to make the claim that their air emissions are cleaner than 1950s-era coal power plants.

Comparing apples to apples, it is more accurate to compare air emissions from waste coal burners to the new coal power plants being proposed. The large new waste coal burning power plants planned for western PA were granted permits in 2005 to release higher levels of SO<sub>2</sub>, NO<sub>x</sub> and other air pollutants than the normal pulverized coal power plant proposed near Morgantown, WV.

## Creating Cancer: PAH Pollution

Combustion creates problems that simply don't exist if the waste coal is left unburned. Anytime you burn coal or waste coal, polycyclic aromatic hydrocarbons (PAHs) are created that were not present in the unburned waste coal. Polycyclic aromatic hydrocarbons are a group of over 100

different chemicals that are formed as byproducts of combustion. They have a range of toxicity. Most PAHs are known to cause cancer in animals and are suspected to cause cancer, birth defects and a wide variety of other health problems in humans. Fluidized bed combustors form PAHs more than normal coal burners due to their use of limestone injection, their lower combustion temperature range, the low-rank coal being burned and the higher levels of sulfur and chlorine in the fuel.

## Global Warming Pollution: Worse Than Coal

CFB boilers used to burn waste coal convert more of the nitrogen in the exhaust into nitrous oxide ( $N_2O$ ), as opposed to nitrogen oxides ( $NO_x$ ).  $N_2O$  is a potent global warming pollutant, 296 times more potent than  $CO_2$ . According to the National Coal Council: " $N_2O$  is emitted from fluidized bed coal combustion...  $N_2O$  emission from the FBC is equivalent to... an increase of about 15% in  $CO_2$  emissions for an FBC boiler."

## Toxic Ash

Burning waste coal doesn't make the waste go away. If 100 tons of waste coal are burned, 85 tons will remain as waste coal ash.

Since far more mercury and other toxic contaminants enter a waste coal burner to produce a given amount of electricity, these high levels of toxic contaminants have to come out somewhere. Toxic metals cannot be destroyed by burning them. To the extent that they are captured in pollution controls (protecting the air), they are then concentrated in the highly toxic ash that ultimately threatens the groundwater wherever this ash is dumped. Waste coal burners have cleaner air emissions than antiquated coal plants due to their better pollution controls, but this only means that the ash is far more toxic, since the highly toxic particulates captured in pollution control equipment end up in the ash. The industry claims that 99.8% of the mercury in the fuel is captured and ends up in their ash.

Waste coal ash is dumped in communities not far from the waste coal burners, threatening the groundwater and nearby rivers and streams. Waste coal ash does far more damage than unburned waste coal piles, leaching many pollutants, including aluminum, arsenic, cadmium, chromium, iron, lead, manganese, molybdenum, nickel, selenium and sulfates.

Power plant waste is allowed to be dumped without the basic groundwater protections (landfill liners) that are required for dumping household trash, a practice harshly criticized by a 2006 National Academy of Science report which found inadequate monitoring, dismal enforcement and a general lack of groundwater protection standards in mine fill programs where coal and waste coal ash is used to fill mines. When burning any solid fuel, the resulting ash has a higher surface area than the raw, unburned material. Just like with coffee, running water over coffee grounds leaches far more coffee out than if you ran water over whole coffee beans.



Deep erosion gullies from erosion of "cement-like" waste coal ash dump in Schuylkill County, PA

The industry claims that by injecting limestone into the ash, the ash becomes impervious to leaching. Groundwater monitoring data shows this to be a lie, as groundwater around waste coal ash dumps has become more contaminated – even by acid drainage in some cases – after ash dumping occurs.

The waste coal burning industry's own data shows that waste coal ash does in fact leach metals into groundwater, despite their public assertions. Ash at 2 of 12 facilities studied in Pennsylvania were shown to contain levels of arsenic higher than the maximum allowable concentration set forth for land application of sewage sludge. Of 221 samples of leachate from waste coal ash at the ash dumps, lead contamination in 23 samples (10.4%) exceeded a level 10 times higher than EPA's maximum contaminant level (MCL) for drinking water. Six samples exceeded this "10 times the drinking water standard" level for cadmium, as did single samples for chromium and selenium. Data sitting in state regulatory agency files shows far more evidence of groundwater damage.

## Beach Grass: the Safe and Affordable Alternative to Burning Waste Coal

Researchers at the Natural Resources Conservation Service found a very cheap and viable alternative to the conventional waste coal pile remediation method of grading, topsoiling, seeding and mulching. They found that beach grass, native to sandy beaches, thrives in waste coal piles and can establish enough plant cover to enable native plants to take root. This method has been shown to bring life back to long-dead waste coal piles for only 6-10% of the cost of conventional methods. Within a few years, beach grass enabled native plants to take over, allowing organic matter to accumulate around plants, forming a plant layer that stopped erosion, held water, cooled the surface, and looked better.

## Public Policies Must Aim Higher

The waste coal industry has been pushing to include their facilities in state Renewable Portfolio Standards (and succeeded in PA), despite the fact that waste coal is not renewable and that waste coal is a dirtier fuel than normal coal. Renewable energy laws should not include any technologies that require air pollution permits.

The waste coal industry argues that the best solution to waste coal piles is burning them, while other cleaner and safer alternatives exist. Rather than liberate the toxic contaminants by burning them, it is preferable to remediate the waste coal piles in a way that reduces the problems associated with the piles without creating new problems.