

# Electric Power Generation and TRI

This diagram illustrates the operation of a “typical” large coal-fired electric power plant, and notes those chemicals that may be reported for such a facility under the EPA’s Toxics Release Inventory (TRI) program. Under TRI, designated facilities must report annually on the amounts of listed chemicals released to the air, water, and land. A facility is required to report if it “manufactures” or “processes” 25,000 pounds or more, or “otherwise uses” 10,000 pounds or more of any listed chemical. In May 1997, EPA added seven new industries—including electric utilities that burn coal or oil—to begin reporting 1998 releases in July 1999. This diagram indicates the primary TRI chemicals which a “typical” plant is likely to report.



## Incoming Coal

Coal is typically shipped to a power plant by rail car or barge. The incoming coal may contain trace amounts of the following chemicals:

- arsenic
- barium
- beryllium
- chlorides
- chromium
- cobalt
- copper
- fluorides
- lead
- manganese
- nickel
- selenium
- sulfides
- zinc

## Coal Preparation

The coal is usually pulverized into a fine powder before being sent to a furnace.

## Flue Gas Treatment System

Particulate matter (ash) is removed from the combustion gases and, in some cases, a sulfur removal process is used.

## Power Generation

The coal powder is then burned, yielding hot gases which boil water to create steam. The steam spins a turbine which, in turn, drives a generator to produce electricity.

## Cooling Water System

Steam from power generation is condensed by cooling water and then reused in the boiler. Various chemicals are used to treat the cooling water to minimize corrosion, fouling, and scaling. This treatment process can result in certain wastewaters and waste solids.

## Releases to Air



Treated gases are discharged to the air through a stack. As a result of the combustion of coal, the following TRI chemicals are produced:

- hydrochloric acid
- sulfuric acid
- hydrogen fluoride
- possibly some metals

## Releases to Land

Ash from the burning process is typically sent to an ash pond, landfill, or used commercially. Other waste solids may also be sent to the land. TRI releases can include various metals contained in the incoming coal, including:

- arsenic
- barium
- beryllium
- chromium
- cobalt
- copper
- lead
- manganese
- nickel
- selenium
- zinc



## Releases to Water



Releases to water may involve chemicals from water treatment as well as the coal itself, including such TRI chemicals as:

- ammonia
- possibly some metals

This diagram was produced by **Dr. J. Winston Porter**, president of the Waste Policy Center in Leesburg, VA, and a former assistant administrator of the U.S. EPA. He can be reached at:

Phone: 703-777-9800  
 Fax: 703-777-3733  
 jwp@winporter.com