Given the long lifespan of most power plants, it is a simple fact in power plant operations that some parts are going to wear out under the pressure and stress of the high temperature steam operations that are essential for generating electricity. By repairing or replacing degraded components, utilities are able to keep their plants operating safely and efficiently, thus ensuring that they can provide adequate electricity for their customers.

Between November 1999 and December 2000, the U.S. Department of Justice, acting on behalf of the Environmental Protection Agency (“EPA”), filed lawsuits or comparable actions against nine utilities and 120 generating units. The agency alleges that the repairs utilities have undertaken over the past 20 to 30 years are not “routine” and instead constitute “modifications” of electric generation units that require permits under the New Source Review (“NSR”) program.1

This simplified diagram is illustrative of operations at a large coal-based power plant. It highlights examples of components that utilities have routinely maintained and repaired for the past 30 years without undergoing NSR. (These actions are now at the root of EPA’s enforcement actions.) It also explains how these components function and maintain the efficiency of power plants.

1 Created by the federal Clean Air Act, NSR requires electric utilities and any other “major source” to undergo pre-construction review for environmental controls if the companies build new plants. NSR also applies if major sources incorporate major modifications to their existing plants that result in a significant increase in emissions. Routine maintenance and repair activities are excluded from the definition of a major modification. NSR review includes a lengthy permitting review, including an analysis of the economic and technical feasibility of installing additional pollution control technology.

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1. Steam Generator (Boiler):
   - Boiler (Furnace) Tubing: Steel pipes (commonly 1½ to 3 inches in diameter) welded together to form panels that are used to construct the boiler walls.
   - Superheater: High alloy steel tubing formed in a serpentine manner within the boiler tubing used to raise the boiler steam temperature above the saturated temperature level to obtain higher operating efficiency.
   - Reheater: A section of the boiler similar to the superheater that takes steam exhausted from a higher-pressure section of the turbine, reheats it to a higher temperature, and injects it into a lower pressure stage of the turbine to improve overall unit efficiency.
   - Economizer: The final heat exchanger within the boiler that recovers heat from the boiler exhaust gases to raise the temperature of water being fed into the boiler. This improves boiler efficiency.

2. Air and Fuel Systems:
   - Primary Air Fan/Pulverizer: Devices used to prepare coal for burning by grinding it to a fine powder, drying and mixing it with hot air to create an efficiently combustible fuel.
   - Burner: A nozzle device, generally located in the lower boiler walls, which introduces the pulverized coal into the boiler and mixes with the correct amount of additional air to burn the fuel efficiently and to reduce nitrogen oxides (NOx) and carbon monoxide emissions.

3. Combustion and Turbine Systems:
   - Forced Draft Fan: This fan provides air to the boiler for the coal-combustion process and helps push exhaust gas through the boiler.
   - Air Fan Motor: An electric motor used to power the air fan.
   - Turbine: A device consisting of fan-type blades attached to a shaft that is spun by expanding steam, converting the kinetic energy of the steam into mechanical energy.

4. Power Generation and Cooling Systems:
   - Air Heater: A heat exchanger that recovers heat from the boiler exhaust gases to preheat incoming combustion air. This cools the exhaust gases before they pass to the precipitator and also increases the efficiency of the coal-firing process.
   - Condenser: Cooling water passes through copper alloy tubes to condense steam, exhausted from the turbine, back into water before it is returned to the boiler.
   - Induced Draft Fan: This fan draws flue gas out of the boiler and through the pollution control equipment.
   - Stack: Discharges exhaust gases into the atmosphere.
   - Transformer: Converts the high-voltage electricity into a lower-voltage electricity suitable for distribution.

5. Pollution Control Systems:
   - Precipitator: A device that removes particulate matter from flue gas.
   - Scrubber: Cools and cleans stack gases, removing nitrous oxides (NOx).
   - Condenser: Cooling water passes through copper alloy tubes to condense steam, exhausted from the turbine, back into water before it is returned to the boiler.