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Coking Wastewater Treatment

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WesTech's **STM-Aerotor™ Biological Nutrient Removal** compact treatment system uses integrated fixed film and activated sludge (IFAS) technology as part of a process that provides biological nutrient removal for industrial wastewater treatment. With each rotation the STM-Aerotor™ captures atmospheric air, transfers it down into mixed liquor, and slowly releases it as coarse bubble aeration. During the rotation, additional cascade aeration elevates the dissolved oxygen in the upper layer of the basin. The slow rotation, intense air release, and peripheral mixing paddle of the STM-Aerotor™ create the optimum biological conditions for nutrient removal.

Coke Wastewater Treatment

Heating coal over 1100 C° in the absence of oxygen produces metallurgical coke. This process provides both heat and carbon (coke) required for iron production. During this process the volatile materials contained in the coal are driven off, leaving coke as the product.

Gas produced by coking is withdrawn by means of blowers to recover energy-rich byproducts, including methane. Ammonia stills are the principal means of recovery. Recycled scrubber water is used as a coolant. Scrubber waste streams contain tars, organic matter, sulfides, cyanides, inorganic salts, suspended solids, phenols, and ammonia. Treatment of this wastewater involves removal of suspended solids and chemicals that are toxic to biological systems, followed by biological treatment.

Primary Clarifier

Coking wastewater is fed into a rectangular decanter to remove large particles, including tar. Wastewater exiting the decanter is treated with polymer and coagulant before entering a primary clarifier. The primary clarifier facilitates suspended solids settling out from the wastewater stream. This unit is normally covered to prevent the escape of ammonia and volatile organics, which are regulated by EPA and may be explosive.

STM-Aerotor™

The primary clarifier effluent flows to biological treatment in an STM-Aerotor™. The STM-Aerotor™ removes the ammonia and organics from the wastewater with a fixed film and activated sludge

process. Supplementing this wastewater with phosphate promotes proper microbial growth. WesTech recommends an STM-Aerotor™ instead of an activated sludge system for the following reasons:

- **It has lower operating costs.**
- **It is easier to operate since no blowers are needed.**
- **The combination of fixed film and activated sludge makes the system more robust and more resistant to toxic shock.**

COP™ Clarifier

Wastewater exiting the STM-Aerotor™ flows to a COP™ Clarifier for organic matter removal. COP™ Clarifier underflow is split into return activated sludge (RAS) and waste activated sludge (WAS). RAS flows to the STM-Aerotor™, while WAS is sent to a thickener. COP™ Clarifier effluent may be recycled or safely discharged. This effluent may also be polished by a multimedia filter for better clarity.

The primary clarifier's underflow and the waste activated sludge from the COP™ Clarifier are treated with polymer and then fed into a thickener to thicken the solids. The thickener effluent overflow is recycled back into the primary clarifier. The thickener's underflow is again treated with polymer and sent to a filter press for dewatering. Filter pressate is recycled back into the primary clarifier while the solids are disposed of.