United States
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SITE
SUPERFUND INNOVATIVE
TECHNOLOGY EVALUATION

Demonstration Bulletin

The Plasma Centrifugal Furnace

Retech, Inc.

Technology Description: The plasma centrifugal furnace is a thermal technology which uses the heat generated from a plasma torch to decontaminate metal and organic contaminated waste. This is accomplished by melting metal-bearing solids and, in the process, thermally destroying organic contaminants. The molten soil forms a hard, glass-like non-leachable mass on cooling. The major components of the process, shown in the figure below, are the plasma torch, rotating reactor well, afterburner, secondary combustion chamber, and off-gas treatment system.

The process operates as follows: contaminated soil is placed in a bulk screw feeder and gradually fed into the rotating reactor well. Solid material is retained in the tub by centrifugal force while a plasma arc heats the material to temperatures on the order of 3000°F. At this temperature organic contamination is volatilized from the soil. Any combustible gases remaining after volatilization and oxidation are incinerated by an afterburner located downstream of the reactor well. At the conclusion of processing, the feeder is stopped, the rotating well is slowed, the afterburner is shut off, and the molten mass of treated solids flows through the secondary chamber and into a slag collection chamber.

The exhaust from the furnace is passed through a gas treatment system that consists of a quench tank, a venturi scrubber, a packed-bed scrubber and a demister. A mildly caustic solution is supplied to the quench tank and scrubbing unit to help remove acidic gases and particulates in the off-gas. Moisture droplets entrained in the flow are removed by the demister. A stack blower maintains a vacuum on the system and draws the cleaned gases into the exhaust stack.

Waste Applicability: This process is designed to treat soils and sludges contaminated with heavy metals and/or organic hazardous compounds.

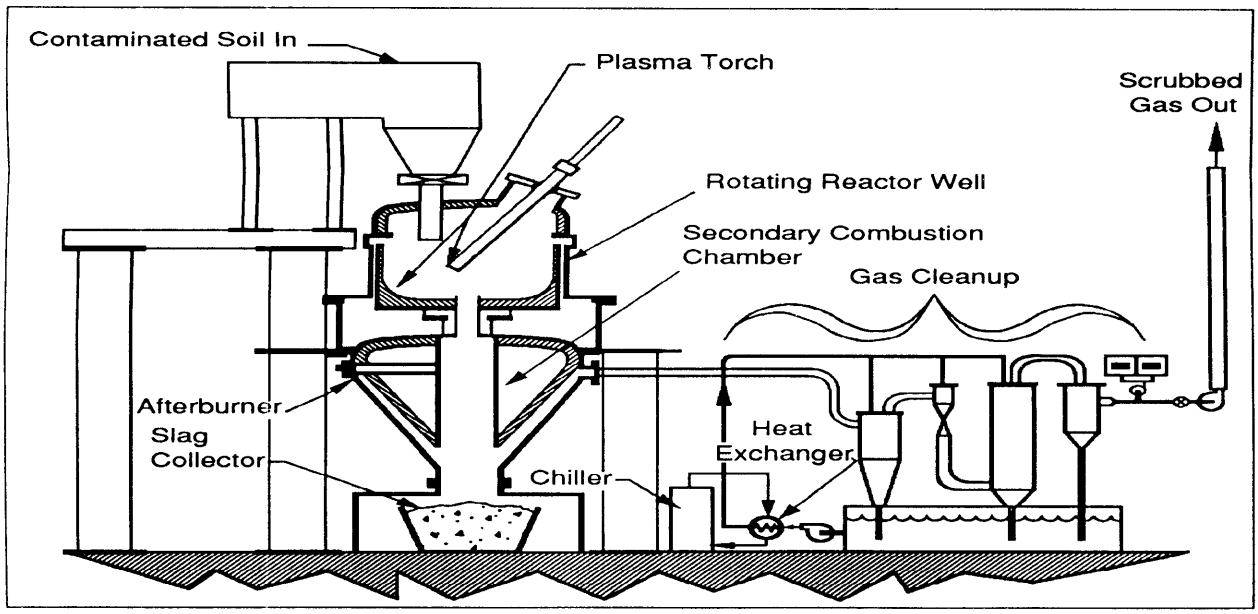

Figure 1. Simplified diagram of the Retech plasma centrifugal furnace system.

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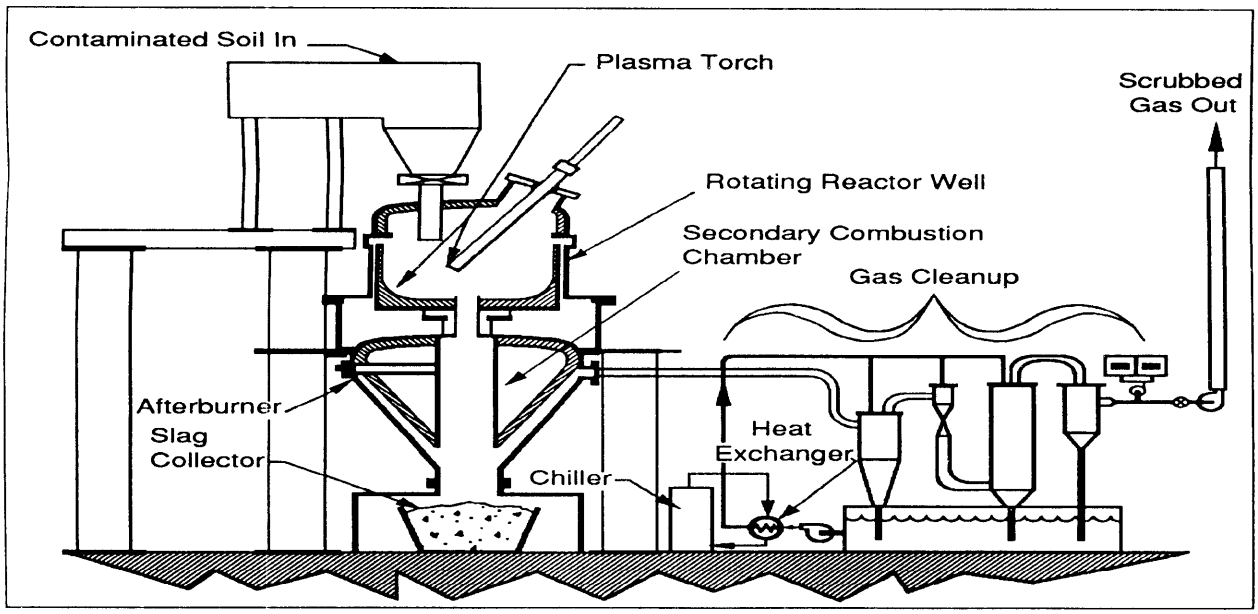

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