POWERLINE NEWS

VSEP Technology Offers Breakthrough Solution to Fly Ash Leachate Liability

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A growing environmental threat tied to coal-fired power plants may finally have a viable solution. Fly ash leachate—an often toxic byproduct of coal combustion—has long posed risks to groundwater, ecosystems, and public health. Now, a Nevada-based company says its advanced treatment technology can eliminate the need for leachate storage ponds altogether.

A National Problem Decades in the Making

In 2007, the U.S. Environmental Protection Agency (EPA) conducted a risk assessment in Wyoming, identifying 17 coal ash storage ponds at five power plant sites. Eleven of those ponds were over 30 years old, and four had surpassed 40 years—raising serious concerns about structural integrity and environmental safety. Four ponds lacked any lining, and two relied solely on clay barriers, increasing the risk of groundwater contamination.

Two years later, the EPA listed 44 high-hazard coal ash storage sites across the country, including 12 in North Carolina, 9 in Arizona, 6 in Kentucky, and 6 in Ohio. A *New York Times* investigation in 2009 revealed over 1,300 surface impoundments nationwide, some as large as 1,500 acres. States with the highest concentration of leachate ponds included Ohio, Kentucky, Georgia, and Alabama.

What Is Fly Ash Leachate—and Why It's Dangerous

Fly ash is a fine particulate byproduct of burning pulverized coal. These particles, ranging from 0.1 μm to 100 μm, are captured from flue gases using electrostatic precipitators and stored on-site. Rainwater percolates through these ash piles, creating leachate—a toxic liquid that can contain arsenic, mercury, lead, cadmium, sulfates, and other heavy metals. The U.S. produces an estimated 1 billion tons of fly ash annually, and improper leachate management has led to numerous environmental disasters.

A History of Accidental Leachate Spills

Over the past two decades, the U.S. has witnessed multiple large-scale leachate spills, many triggered by infrastructure failures or natural disasters such as hurricanes. Notable incidents include:

- 2000 – Martin County, KY: Dam failure released 300 million gallons of leachate
- 2008 – Roane County, TN: Berm failure led to a catastrophic spill of 1.1 billion gallons
- 2014 – Eden, NC: Structural failure resulted in a 27 million gallon release
- 2018 – Hurricane Florence caused a 27 million gallon spill in North Carolina
- 2021 – Groundwater contamination reported near Caddo Lake, TX

These events have cost taxpayers and utilities billions in cleanup and remediation.

A Technological Solution Emerges

New Logic Research, headquartered in Minden, Nevada near Lake Tahoe, has developed a promising solution. The company's Vibratory Shear Enhanced Processing (VSEP) technology has already been successfully deployed in 25 landfill leachate treatment systems—projects often more complex than fly ash leachate treatment.

Large scale pilot tests at coal-fired power plants have demonstrated VSEP's ability to:

- Precipitate gypsum
- Remove heavy metals
- Produce clean water suitable for safe discharge

When paired with a compact evaporator, the system can achieve zero-liquid discharge (ZLD)—eliminating the need for leachate storage ponds entirely.

A Cost-Effective Alternative to Disaster

The 2008 Roane County spill in Tennessee cost over $1 billion in remediation. In contrast, a complete VSEP membrane/crystallizer system with evaporator could have been implemented for just $30 million—less than 3% of the cost of post-spill cleanup.

"Storing leachate indefinitely is a high-risk gamble," said Greg Johnson, CEO for New Logic. "Our technology offers a proactive, cost-effective path forward for utilities and regulators seeking to mitigate environmental liabilities."

About New Logic

Founded in 1987, **New Logic** is a trusted leader in advanced water purification solutions, specializing in Reverse Osmosis membrane technology. Over the past 38 years, they have partnered with many of the world's leading power plants, delivering high-performance systems and expert support. For more information, visit: http://www.vsep.com/ or email the company at info@vsep.com