ENVIREMED
Simple Solutions to Complex Environmental Problems

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# Remediate Heavy Metal Contaminants from Coal Ash Effluent

## Who is **EnviRemed**?

**EnviRemed** is a consortium of top scientists, engineers, contractors and businessmen who united to offer the best available technology to provide safe and natural solutions creating a cleaner future for our planet.

## How can **EnviRemed** help meet new EPA regulations?

Coal ash is stored on site at the energy production facilities, in containment ponds or dams or stored in landfills, mostly without liners. Pollutants continually leach from the ash into the environment. Heavy metal contaminants in coal ash include arsenic (As), selenium (Se), lead (Pb), mercury (Hg), cadmium (Ca), chromium (Cr), thallium (Ti), and aluminum (Al).

## **EnviRemed** will cost effectively reduce the heavy metals found in FGD effluent, coal ash lagoons and landfills.

**EnviRemed** applies a specially formulated slurry to bind metals that are found in water and soil. The metals are permanently bound in a crystalline structure in the solids that is not leachable according to the Toxicity Characteristic Leaching Procedure (TCLP) standards. The bond created only strengthens with time. These solutions help protect the environment and your bottom line.

**EnviRemed** reduces the harmful heavy metal contaminants through revolutionary patented process. The reagents have excellent heavy and trace metal binding capacity. We'll reduce metals from the effluent waters from the plant and from the pond that enters back to the environment. Results from studies indicate that reagents are effective in binding metals from aqueous solutions with heavy metals removal rates up to 99%.

## Coal Ash Remediation

Coal ash contamination can be remediated through several treatment scenarios: (1) after the scrubbers or in the slurry discharge system, (2) in the containment pond, (3) by filtering the effluent from the containment pond to capture the heavy metals, (4) treating landfill leachate or (5) treating fly ash itself.

## Benefits of **EnviRemed**'s technology

- Heavy Metal remediation is available in one product.
- It has the ability to permanently and irreversibly bind metals into non-bio-available forms.
- Minimum disposal requirements for heavy metal sorption due to non-leaching capacity.
- Can be landfilled immediately or left in place.
- Minimal upfront capital requirement for heavy metal remediation.
- Total low cost solution for heavy metal remediation.

## Conduct a Treatability Study

**EnviRemed** will conduct a site visit to assess needs and collect samples of water and/or soil to be treated. Laboratory tests will then be conducted to determine the most effective reagents to meet the treatment targets. The next step is a field study, followed by treatment protocol. The technology is easy to install and simple to implement, is easy to operate and does not require the handling or application of hazardous chemicals, and is an environmentally safe and effective way to treat heavy metal contaminated flue gas blowdown waste water.

## Case Studies

Our technology has been applied to the treatment of both flue gas scrubbing and FGD blowdown water at several power plants in North America and Australia.

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# CASE STUDY 1: Flue Gas Desulfurization blowdown water, North Carolina, USA

At a power plant in North Carolina, the technology was applied to FGD blowdown wastewater. The plant had to meet stringent treatment targets, as presented in the table below.

| Parameter | Existing Treatment Target | Untreated Sample | Test Phase 1 | Test Phase 2 | Test Phase 3 |
|---|---|---|---|---|---|
| pH | 7.2 | 7.2 | 7.12 | 6.7 | 7.2 |
| Arsenic | 10 | 130 | 95 | 22 | <10 |
| Copper | 7 | 23 | 8 | 6 | BDL |
| Antimony | 5.6 | 8.3 | 3.9 | 2 | BDL |
| Mercury | 0.012 | 9 | BDL | 1 | BDL |
| Silver | 0.06 | <5 | <5 | BDL | BDL |
| Thallium | 0.24 | 1.9 | 1.4 | 0.4 | BDL |
| Lead | 25 | 159 | 1 | BDL | BDL |
| Cadmium | 2 | 2 | 2 | 2 | BDL |
| Zinc | 50 | 42 | 22 | 44 | BDL |

BDL=below detection limits All levels are in µg/l

# CASE STUDY 2: Flue Gas Desulfurization blowdown water, Queensland, Australia

| Parameter | Targets | Untreated Sample | Treatment 1 | Treatment 2 | Treatment 3 |
|---|---|---|---|---|---|
| pH | 7.0-9.0 | 7.2 | 7.9 | 9.6 | 8.9 |
| Al | 0.08 | 0.3 | BDL | BDL | 0.1 |
| Cd | 0.0004 | 0.05 | BDL | BDL | BDL |
| Cu | 0.0018 | <0.005 | BDL | BDL | BDL |
| Fe | No limit | 0.04 | BDL | BDL | BDL |
| Ni | 0.0013 | 0.02 | BDL | BDL | BDL |
| Zn | 0.015 | 0.04 | BDL | BDL | BDL |
| TSS | 200 | 374 | 265 | 180 | 13 |
| $SO_4$ | 1,000 | 1,273 | – | – | 937 |

BDL=below detection limits All levels are in µg/l

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