

CASE STUDY

Advanced PFAS Destruction Through Custom Reactivation of Spent GAC

NORIT® Demonstrates Industry-Leading PFAS Removal in Thermal Reactivation

NORIT
ACTIVATED CARBON

KEY FINDINGS



Safe for Reuse

PFAS testing confirmed that the reactivated GAC met performance standards for reuse in water treatment applications.



Regulatory Compliance

NORIT demonstrated zero release of PFAS into the environment, aligning with EPA and state regulations on PFAS management.



Sustainable Solution

NORIT provides utilities with a circular economy option, reducing costs and eliminating the need for landfill disposal of PFAS-laden GAC.



Large-Scale Adoption

The trial validated NORIT's ability to handle custom reactivation of high-PFAS GAC while ensuring complete destruction of contaminants.

BACKGROUND

Water treatment plants rely on granular activated carbon (GAC) to remove per- and polyfluoroalkyl substances (PFAS) from drinking water. As regulations tighten and disposal options become more limited, utilities face increasing challenges in managing spent GAC loaded with PFAS.

Traditional landfill disposal is not sustainable, and incineration presents environmental concerns. Recognizing the need for a sustainable, cost-effective, and regulatory-compliant solution, NORIT conducted a reactivation trial at its Pryor, OK facility.

CHALLENGE

Spent GAC from water treatment plants retain high concentrations of PFAS, requiring a validated destruction pathway before reactivation and reuse. Utilities need assurance that:

- PFAS is fully destroyed in the reactivation process.
- No PFAS escapes into the air or water during treatment.
- Reactivated GAC maintains its performance for future adsorption cycles.

SOLUTION

NORIT conducted a comprehensive PFAS reactivation trial at the Pryor Activated Carbon Production Facility. This trial utilized spent GAC sourced from industrial and municipal water treatment applications.

KEY PROCESS CONTROLS ENSURING PFAS DESTRUCTION



High-Temperature Kiln Processing

- Spent GAC was processed at $>1750^{\circ}\text{F}$ for 3+ hours, ensuring maximum PFAS breakdown.
- The afterburner operated at $\sim 1650\text{--}1750^{\circ}\text{F}$, further decomposing residual emissions.



Advanced Emissions Treatment

- A caustic scrubber neutralized fluorinated byproducts before release.
- Ambient air monitoring confirmed no detectable PFAS emissions above regulatory limits.



Comprehensive Mass Balance Analysis

- NORIT conducted input-output tracking to quantify PFAS removal across all process streams.
- Over 99.98% of PFAS was destroyed, with negligible concentrations detected in outputs.



Rigorous Sampling & Monitoring

- PFAS samples were taken from:
 - Spent GAC feed before reactivation.
 - Reactivated GAC and fines to confirm no residual PFAS.
 - Off-gas before and after scrubber treatment.
 - Scrubber blowdown water to ensure proper PFAS containment.
- Ambient air at three outdoor locations to validate safe operations.

VIRGIN VS. REACTIVATED CARBON

A critical component of this study was to evaluate whether reactivated activated carbon (GAC) maintains its PFAS removal performance compared to virgin carbon. To confirm performance retention, rigorous side-by-side testing was conducted using performance jar testing with PFAS contaminated water sources of 20 ng/L of PFOA and 2.5 ppm of TOC.

The results demonstrated that reactivated carbon exhibited no significant degradation in PFAS adsorption performance when compared to virgin GAC. These findings validate that reactivated carbon is a viable and sustainable alternative to virgin carbon, offering water treatment plants a cost-effective and environmentally responsible solution. Utilities can confidently integrate reactivated GAC into their treatment systems without compromising performance, further reinforcing the benefits of a circular economy approach to PFAS remediation.

CONCLUSION: NORIT IS AN INDUSTRY LEADER

The Pryor PFAS Reactivation Trial confirms that custom reactivation of spent GAC is a viable, sustainable solution for water treatment plants. NORIT's advanced high-temperature thermal treatment, robust emissions control, and rigorous testing protocols ensure that PFAS is permanently destroyed, not just transferred.

Water utilities can now confidently partner with NORIT to:

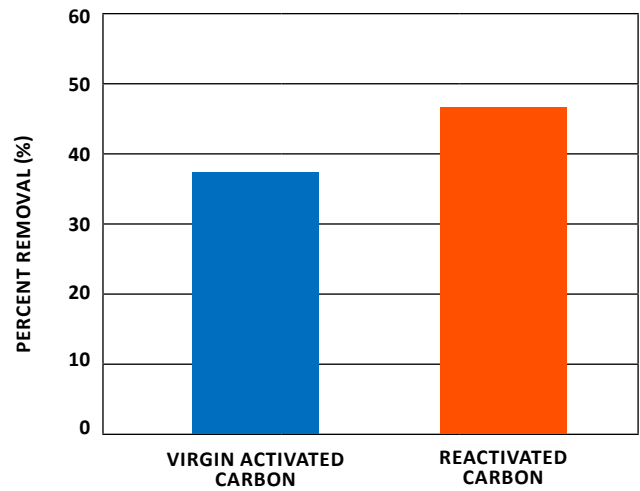
- Reactivate spent GAC without environmental risk.
- Meet regulatory requirements for PFAS destruction.
- Adopt a circular economy model for long-term sustainability.

With NORIT's proven technology, custom reactivation is the future of PFAS management—delivering environmentally responsible, cost-effective solutions for the water industry.

COST SAVINGS WITH REACTIVATION

- A sustainable and cost-efficient solution to replace virgin activated carbon, reducing reliance on new raw materials.
- Restores high adsorption capacity while significantly lowering environmental impact through carbon reactivation.
- Optimized for municipal and industrial GAC systems, ensuring long-term performance and regulatory compliance.
- Proven PFAS destruction – reactivation process at our Pryor facility achieves 99.98% PFAS destruction, providing a reliable solution for contaminated carbon treatment.

PFOA REMOVAL FROM SURFACE WATER



RESULTS

99.98%
total PFAS destruction across the system

97.19%
PFAS destruction in the kiln alone before emissions treatment

99.30%
destruction of PFAS in kiln off-gas via afterburner and scrubber

99.90%
removal of PFAS in scrubber water, confirming no liquid contamination

