

SourceStop Prevents PFAS Migration at Alaska Cargo Facility

PFAS Barrier Implemented During Airport Infrastructure Development





Summary

An Alaska Cargo facility was expanding to include a new climate-controlled cargo and cold storage warehouse and the development project required construction across a peat bog wetland where PFAS contamination from historical AFFF use had been identified in soil and groundwater. To stabilize the site, surcharging of the peat deposits was necessary, creating the potential for displaced PFAS-impacted water during earthwork activities. To address this risk, the project team incorporated SourceStop® into structural fill, forming a permeable sorptive barrier integrated directly into the site development. The installed barrier effectively captures PFAS in water displaced during construction and prevents downstream groundwater impacts, while requiring no pumping and generating no waste streams.

Site type	Airport infrastructure development – cargo and cold storage warehouse facility
Project driver	Regulatory compliance – Soil and groundwater concentrations exceeding Alaska Department of Environmental Conservation (ADEC) cleanup levels under 18 AAC 75
Contaminants of concern	Per- and polyfluoroalkyl substances (PFAS) associated with historical aqueous film-forming foam (AFFF) releases
Site conditions	Peat bog wetland requiring land surcharging to stabilize soils for development
Remediation	Permeable adsorptive barrier for construction-integrated PFAS migration control
Technologies applied	SourceStop incorporated into non-frost susceptible structural (NFS) fill



Background

The airport development project was initiated to expand cargo and climate-controlled warehouse capacity. The project site is approximately 29 acres and lies within a peat bog wetland located adjacent to the airport's Aircraft Rescue and Fire Fighting (ARFF) facility.

Historical use of AFFF at the ARFF facility resulted in PFAS contamination in soil, surface water, and groundwater in the surrounding area. Site investigations confirmed that PFAS impacts extend into portions of the bog development area. Representative concentrations identified during site characterization exceeded the ADEC cleanup levels.

The site consists of saturated peat deposits overlying a confining clay layer, resulting in perched water conditions throughout the bog. Construction of the cargo warehouse requires surcharging the peat soils with structural fill to increase load-bearing capacity and reduce settlement. As the peat compresses, pore water is displaced laterally through the bog deposits, creating the potential for PFAS-impacted water to migrate off-site if not controlled.

Figure 1

PFAS Sampling Results – Bog Area

PFAS soil and groundwater sampling across the bog area identified widespread PFAS impacts associated with historical AFFF releases near the airport ARFF facility.

Source: DOWL





Remedial Strategy

The remediation approach involved creating a permeable adsorptive trench barrier using SourceStop mixed into NFS fill material at the downgradient edge of the construction footprint.

The barrier is designed to intercept shallow PFAS-impacted groundwater moving toward the project boundary. SourceStop provides strong sorptive capacity for PFAS compounds, allowing dissolved PFAS to be captured as groundwater flows through the barrier. Once applied, SourceStop releases micron-scale carbon particles that coats the fill material and penetrates lower permeability zones in surrounding soils.

Design Modeling

Predictive modeling was completed to guide the design and dosing using REGENESIS PlumeForce, a proprietary modeling software program developed to determine effective dosing rates. Starting concentrations used for modeling included PFOA – 1,000 µg/L and PFOS – 6,000 µg/L. These concentrations represent conservative, worst-case conditions used to evaluate barrier performance.

Figure 2

SourceStop Barrier Layout

SourceStop barrier applied to downgradient edge of planned construction footprint.
Image source: Google Earth



Construction Benefits of SourceStop-Amended Fill

In addition to providing effective PFAS sorption capacity, the use of SourceStop provided several practical advantages during construction.

Low Dust Application for Improved Handling

SourceStop minimized airborne carbon dust compared to commodity activated carbon materials, improving site conditions and visibility during placement.

Compatibility with Earthwork Operations

The amendment process was integrated directly into standard fill placement activities, requiring no specialized installation equipment or workflow changes.

Enhanced Contact with Soil Matrix

Colloidal carbon particles provide increased surface area and improved distribution within the fill, supporting effective interaction with migrating PFAS in pore water.

These characteristics supported efficient field implementation and helped maintain construction productivity while installing the PFAS barrier.

Construction and Application

SourceStop was incorporated into the NFS structural fill using a controlled, field-scale mixing and placement process designed to ensure uniform distribution within the treatment zone. On-site activities began with staging and coordination between the installation team and equipment operators to determine amendment volumes and batching requirements. NFS material was segregated into controlled volumes and amended with SourceStop Solid, a dustless activated carbon blend containing CAC.

SourceStop was applied directly to the staged NFS material followed by mechanical mixing using an excavator to achieve a homogeneous blend. Mixing continued until the material was uniformly coated and the target amendment dose was achieved. The amended fill was then transported and placed within the trench footprint. Final grading and shaping were performed using standard earthwork equipment to achieve the specified barrier geometry.

This construction-integrated approach allowed the SourceStop barrier to be installed simultaneously with site earthwork activities to minimize disruption to construction operations.

Application Details

Site Conditions	• Peat bog with perched groundwater • Peat thickness approximately 3–13 ft • Groundwater velocity estimated <0.5 ft/day
SourceStop Barrier Geometry	380 ft × 4 ft × 6 ft
SourceStop Applied	50,400 lbs



Results

The implementation of the barrier strategy provided an effective, construction-integrated solution to manage PFAS migration during development of the ACCS facility. As peat soils were compressed during surcharging, displaced water was directed through the SourceStop trench barrier, where PFAS compounds are adsorbed onto activated carbon, reducing the potential for contaminant migration beyond the project boundary.

This passive remediation minimizes off-site PFAS transport and limits potential exposure to surrounding environmental receptors during and after construction. Because the approach relies entirely on passive sorption processes, it requires:

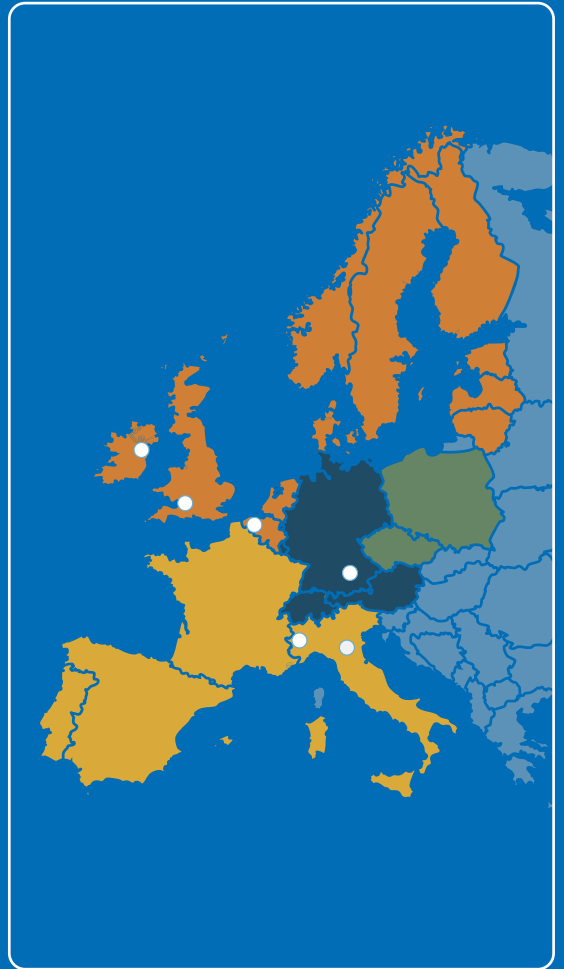
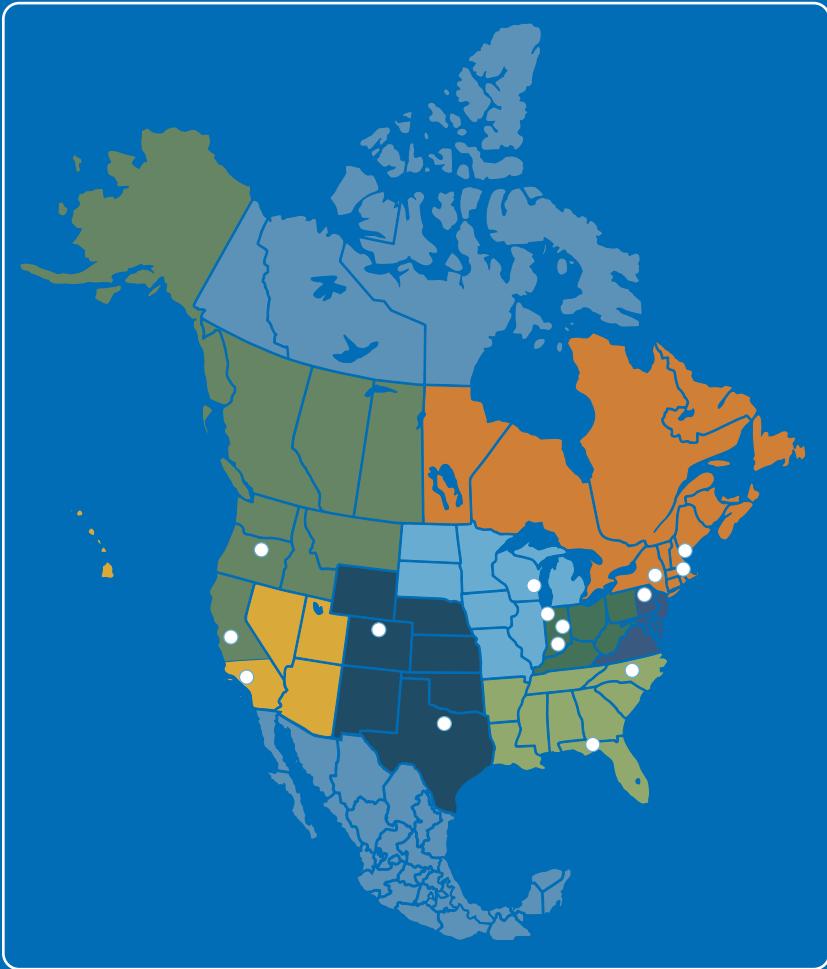
- ✓ no pumps
- ✓ no electrical power
- ✓ no ongoing operational maintenance
- ✓ no ongoing PFAS waste management

The remediation was implemented seamlessly alongside planned earthwork and surcharging operations, allowing treatment measures to be installed concurrently with construction. This eliminated the need for separate treatment infrastructure or schedule disruptions, helping to keep the project on track while proactively managing PFAS migration risk.

By combining geotechnical ground improvement with in situ sorptive treatment, the project demonstrates how infrastructure development and environmental protection can be aligned through thoughtful design, resulting in a passive remediation strategy that reduces migration potential, limits exposure pathways, does not generate PFAS waste materials, and supports long-term site stability.

Have a challenge? Let's solve it together.

Contact us today to discuss your specific needs.



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