Jacobs

Challenging today.
Reinventing tomorrow.

BofA Securities 2021 PFAS Water Summit

Treatment & Remediation Outlook

Disclaimer

Forward-Looking Statement Disclaimer

Certain statements contained in this presentation constitute forward-looking statements as such term is defined in Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended, and such statements are intended to be covered by the safe harbor provided by the same. Statements made in this presentation that are not based on historical fact are forward-looking statements. Examples of forward-looking statements include, but are not limited to, statements regarding our expectations as to our future growth, prospects, financial outlook and business strategy for fiscal 2021 or future fiscal years, which are based, in part, on estimates and assumptions regarding the potential continued effects of the COVID-19 pandemic on our business, financial condition and results of operations. Although such statements are based on management's current estimates and expectations, and currently available competitive, financial, and economic data, forward-looking statements are inherently uncertain, and you should not place undue reliance on such statements as actual results may differ materially. We caution the reader that there are a variety of risks, uncertainties and other factors that could cause actual results to differ materially from what is contained, projected or implied by our forward-looking statements. Such factors include the magnitude, timing, duration and ultimate impact of the COVID-19 pandemic and any resulting economic downturn on our results, prospects and opportunities, the timeline for easing or removing “shelter-in-place”, “stay-at-home”, social distancing, travel restrictions and similar orders, measures or restrictions imposed by governments and health officials in response to the pandemic, or if such orders, measures or restrictions are re-imposed after being lifted or eased, including as a result of increases in cases of COVID-19; the development, effectiveness and distribution of vaccines or treatments for COVID-19; and the timing and scope of any government stimulus programs enacted in response to the impacts of the COVID-19 pandemic. The impact of such matters includes, but is not limited to, the possible reduction in demand for certain of our services and the delay or abandonment of ongoing or anticipated projects due to the financial condition of our clients and suppliers or to governmental budget constraints; the inability of our clients to meet their payment obligations in a timely manner or at all; potential issues and risks related to a significant portion of our employees working remotely; illness, travel restrictions and other workforce disruptions that could negatively affect our supply chain and our ability to timely and satisfactorily complete our clients’ projects; difficulties associated with hiring additional employees or replacing any furloughed employees; increased volatility in the capital markets that may affect our ability to access sources of liquidity on acceptable pricing or borrowing terms or at all; and the inability of governments in certain of the countries in which we operate to effectively mitigate the financial or other impacts of the COVID-19 pandemic on their economies and workforces and our operations therein. The foregoing factors and potential future developments are inherently uncertain, unpredictable and, in many cases, beyond our control. For a description of these and additional factors that may occur that could cause actual results to differ from our forward-looking statements see our Annual Report on Form 10-K for the year ended October 2, 2020, and in particular the discussions contained therein under Item 1 - Business; Item 1A - Risk Factors; Item 3 - Legal Proceedings; and Item 7 - Management's Discussion and Analysis of Financial Condition and Results of Operations, and our Quarterly Report on Form 10-Q for the quarter ended January 1, 2021, and in particular the discussions contained under Part I, Item 2 - Management's Discussion and Analysis of Financial Condition and Results of Operations; Part II, Item 1 - Legal Proceedings; and Part II, Item 1A - Risk Factors, as well as the Company’s other filings with the Securities and Exchange Commission. The Company is not under any duty to update any of the forward-looking statements after the date of this presentation to conform to actual results, except as required by applicable law.

Non-GAAP Financial Measures

To supplement the financial results presented in accordance with generally accepted accounting principles in the United States (“GAAP”), we present certain non-GAAP financial measures within the meaning of Regulation G under the Securities Exchange Act of 1934, as amended. These measures are not, and should not be viewed as, substitutes for GAAP financial measures. More information about these non-GAAP financial measures and reconciliations of these non-GAAP financial measures to the most directly comparable GAAP financial measures can be found at the end of this presentation. Reconciliation of the adjusted EPS, adjusted EBITDA and free cash flow outlook for fiscal 2021 and beyond to the most directly comparable GAAP measure is not available without unreasonable efforts because the Company cannot predict with sufficient certainty all of the components required to provide such reconciliation, including with respect to the costs and charges relating to transaction expenses, restructuring and integration and other non-recurring or unusual items to be incurred in such periods.

Pro Forma Figures

During this presentation, we may discuss comparisons of current period results to prior periods on a pro forma adjusted basis. Prior fiscal periods are presented as if the acquisitions of KeyW, the Wood Nuclear business and The Buffalo Group and divestiture of Energy, Chemicals and Resources business had occurred prior to the comparable periods, as adjusted for the exclusion of restructuring and other related charges and transaction expenses and other adjustments described on the Non GAAP Financial Measures slides as the end of this presentation. We believe this information helps provide additional insight into the underlying trends of our business when comparing current performance against prior periods.

Jacobs Guest Speakers

Jan Walstrom
Senior Vice President, Strategy & Solutions, and Global Environmental Market Director, People & Places Solutions

Scott Grieco
Global Technology Leader for Groundwater Treatment & Emerging Contaminants

Sharon Minchak
Global Solutions Director for Remediation & Regeneration

Jacobs: Challenging today, Reinventing tomorrow

Compelling investment thesis with strong track record of execution

- Global infrastructure modernization, advanced facilities and national security
- End-to-end sustainable solutions embedded throughout global offerings
- Effectively deploying capital to maximize long-term value for shareholders
- Annualized ESG related revenue approaching **$5 billion**

Resilient environments

Environmental stewardship and climate change are the defining issues of our time.

Scientific discovery

We solve some of the most complex challenges of exploration — both in space and closer to home.

Thriving cities

Prosperous communities. Healthy cities. A brighter future. By working together we build a better future.

Mission critical outcomes

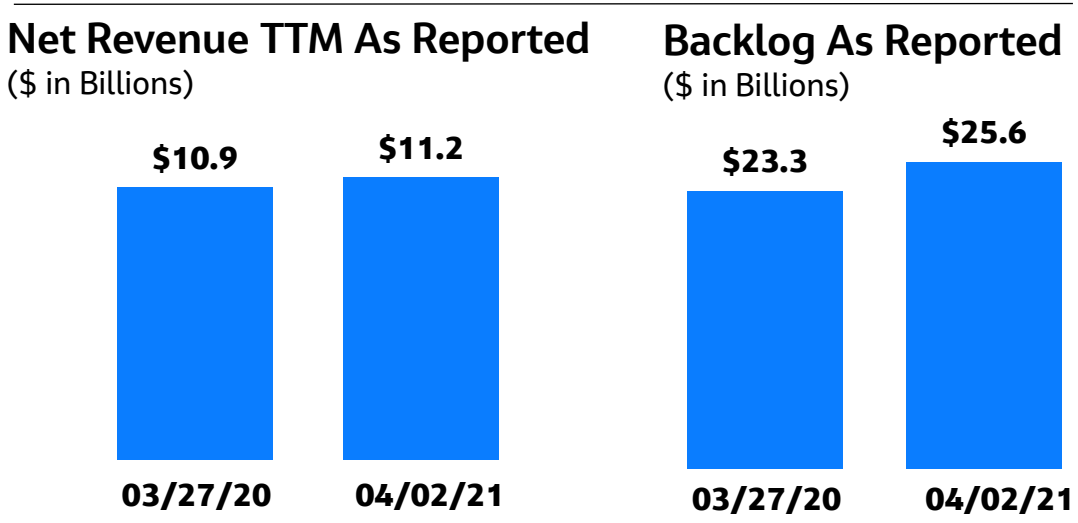
For the first time in history, security and defense threats have no borders.

Cutting-edge manufacturing

Rapidly evolving, complex facilities require fast-paced, innovative solutions.

Operational advancement

It is one thing to dream up new solutions. At Jacobs, we also deliver them.



Historical Perspective on Emerging Contaminants

Solution Timeline in Decades (e.g., trichloroethylene)

1970s	1980s	1990s	2000s	2010s	2020s
Widespread Discovery	**Initial Assessment**	**Investigation & Feasibility Studies**	**Implementation of Initial Remedies**	**Optimization of Remedies**	**Widespread Availability of Good Solutions**

Technologies of this era were energy intensive with high costs, maintenance issues, and not overly effective.

Industry pivots to biological in-situ solutions that are more sustainable and cost-effective.

Jacobs is investing in developing PFAS solutions in this category.

Solution Timeline in Years (PFAS)

2014-2020					2021-2030	
2014 Widespread Discovery	**2016 Initial Assessment**	**2017 Remediation Experimentation & Technology**	**2019 Widespread DoD Investigations; State-level Drinking Water Regulations Begin**	**2020 Municipal Drinking Water Treatment Begins**	**2021 Private Sector Investigations Begin**	**2022-2025 Anticipated DoD Remedial Actions**

State drinking water regulations and social justice pressures are accelerating mitigation actions.

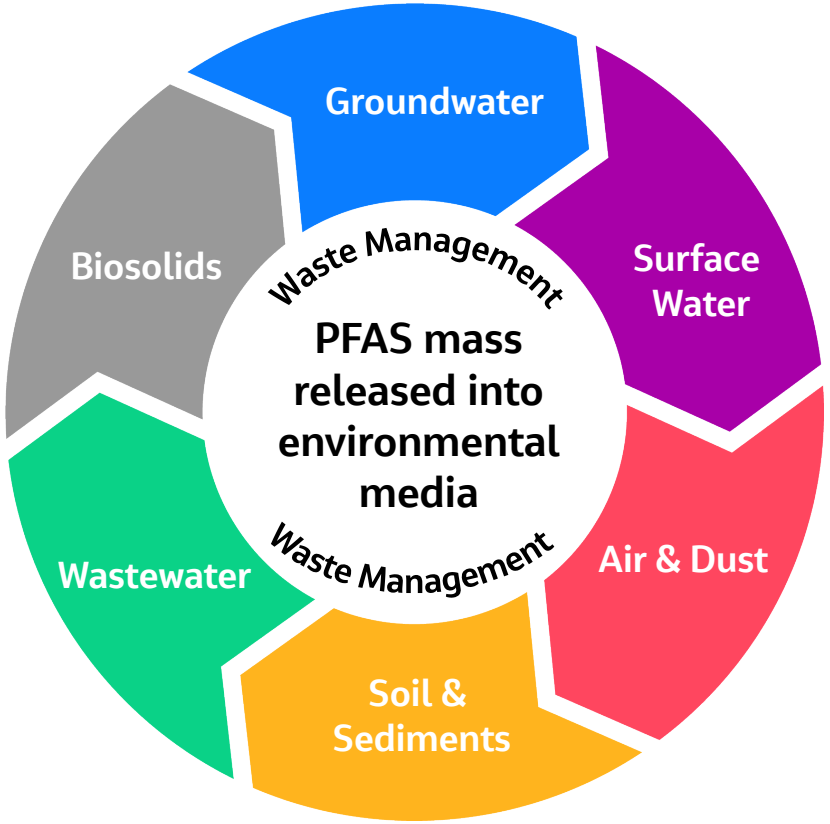
Improvements needed in:

- **Toxicology**
- **Fate & Transport**
- **Remedial Solutions**

Complexity of the Problem

PFAS Prevalent in Vital Industries

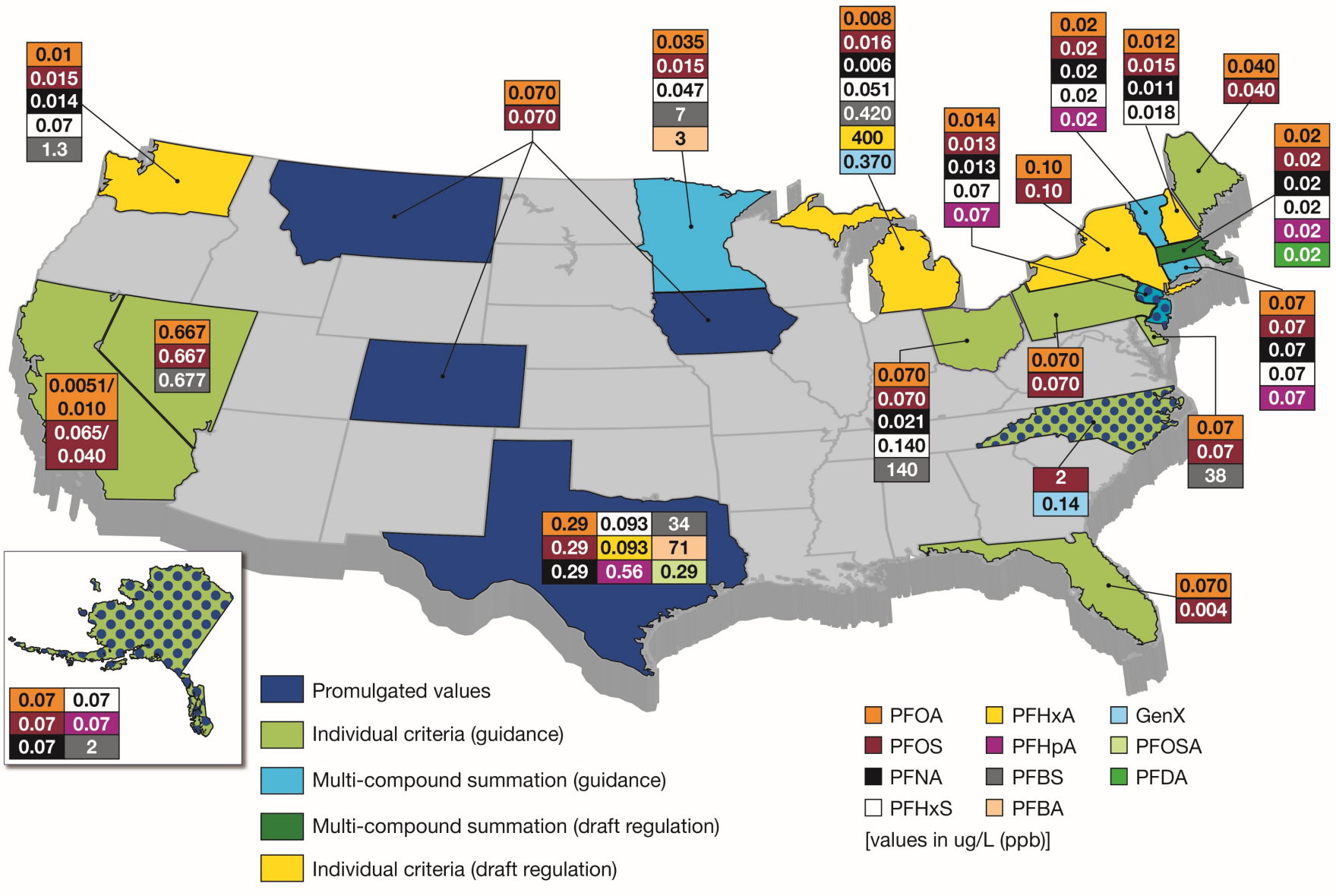
- Aerospace
- Alternative Energy
- Automotive
- Buildings/Construction
- Chemical/Pharma
- Electronics
- First Responders
- Healthcare
- Military
- Oil & Gas
- Outdoor apparel
- Semiconductors



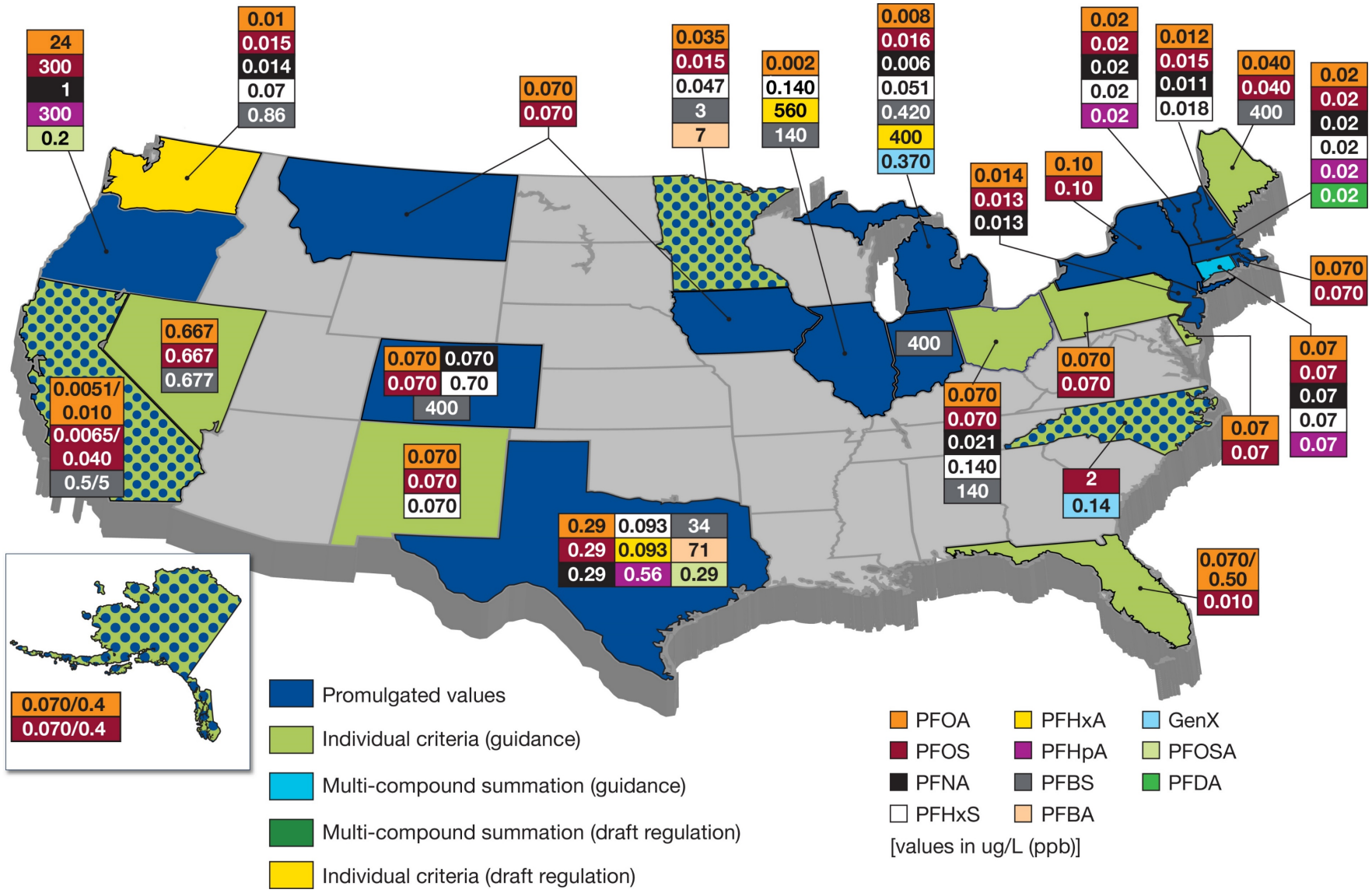
Risks & Mitigation

- Human
- Ecological
- Degraded Resources

PFAS in Drinking Water – U.S. Regulations as of July 2020



PFAS in Drinking Water – U.S. Regulations as of June 2021



PFAS Water Treatment Options

Conventional Technologies

Conventional	Description	Jacobs Experience
Carbon Sorption	Carbon sorption is a well-proven method for removal of regulated PFAS. Reactivation of spent carbon is feasible.	✔
Ion Exchange Sorption	Ion exchange media are effective sorbents for PFAS. Incineration or disposal is needed for spent resin.	✔
Membrane Filtration	Membrane filtration, including reverse osmosis, uses a partially permeable membrane to remove ions, such as PFAS. Can be effective but costly due to high energy usage. Reject water (10-20% flow) needs further treatment or disposal.	✔
Alternative Absorbents	Surface Modified Clay, Cyclodextrin, Customized Engineered Adsorbents are showing promise to provide higher adsorption capacity, greater selectivity, and possibility for regeneration and reuse.	✔

Developing Technologies

Developing	Description	Jacobs Research
Advanced Oxidation-Reduction	Oxidation involves adding chemical reagents either aboveground or into the subsurface to destroy organic contaminants. There is some evidence of PFAS oxidation; no full-scale field demonstrated technologies yet.	✔
In Situ Sequestration	In situ sequestration involves the injection of colloidal activated carbon, polymers, or combinations to prevent plume migration. PFAS sorption moved underground, used as a containment option. Limited field tests.	✔
Biotreatment	Biotreatment is the processing of waste or hazardous substances using living organisms such as bacteria, fungi or protozoa. There is some evidence of PFAS degradation under certain conditions; unlikely to be a complete solution, but perhaps a green portion of an optimized treatment train.	✔

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Safeguarding the Orange County Water Basin

Large Bench and Pilot Program to Identify a Local Treatment Remedy for Removing PFAS from Groundwater

Jacobs and the Orange County Water District in California tested 8 different types of granular activated carbon (GAC), 4 ion exchange (IX) products, and 2 novel adsorbents just emerging in the market to determine which applications are best suited for the County's diverse aquifer water quality and geochemistry.

Groundwater Contamination Mitigation

Fast-track Design and Installation of a 6.5 MGD Granular Activated Carbon System

Jacobs collaborated with the City of Woodbury, Minnesota, and AE2S Engineers to characterize and address PFAS groundwater contamination impacts in the city drinking water supply wells. The centralized GAC facility treats 4 of the Woodbury's 19 wells using multiple lead-lag GAC trains.

What is the future of PFAS regulations for other media?

Example PFAS Soil Guidance Values

Location	PFOA	PFOS	PFBS	PFNA
EPA RSL	0.172	0.378	1.94	---
Alaska	1.7	3.0	---	---
Connecticut [a]	1.4	1.4	---	1.4
Florida	2.0	7.0	---	---
Hawaii [b]	1.2	7.5	3.1	0.78
Maine	9.5	21	7100	---
Massachusetts	0.72	2	---	0.32
Nebraska	0.60	0.78	---	---
New York	1.1	3.7	---	---
North Carolina	17	---	910	---
Texas [c,d]	1.5 – 3.0	25 - 50	53 - 110	1.5 – 3.0

a. Includes PFHxS and PFHpA at 1.4
b. Includes 14 other PFAS at various levels
c. Range based on 30 acre – 0.5 sources
d. Includes 12 other PFAS at various levels

- The eventual "regulation" of all the PFAS mass in natural systems is going to drive the market wave of remediation
- Regulating bodies have generally not leaned forward on regulating non-drinking water environmental media
- A few states have issued soil guidance values presumed to be protective of groundwater

PFAS Impacted Media Remediation Options

Conventional Technologies

Conventional	Description	Jacobs Experience
Capping	Capping involves placing a cover over contaminated material to prevent migration of precipitation into and migration of leachate out of a mass of contaminated soil or other waste materials. Soil (and liability) remains on site in perpetuity.	✔
Stabilization	Stabilization involves mixing waste with binding agents like clays or other proprietary blends to make them less likely to be released into the environment. Questions remain about permanence. Soil (and liability) remains on site in perpetuity.	✔
Disposal	Excavation and transport offsite to a permitted landfill. Liability is transferred to landfill. Landfills starting to refuse such wastes.	✔
Incineration	Incineration is the process of burning PFAS soils at temperatures high enough to destroy contaminants (>1,000 C). Highest cost option, depending on volume and distance to facility. May not be permitted PFAS incinerators available. Complete destruction not proven yet.	✔

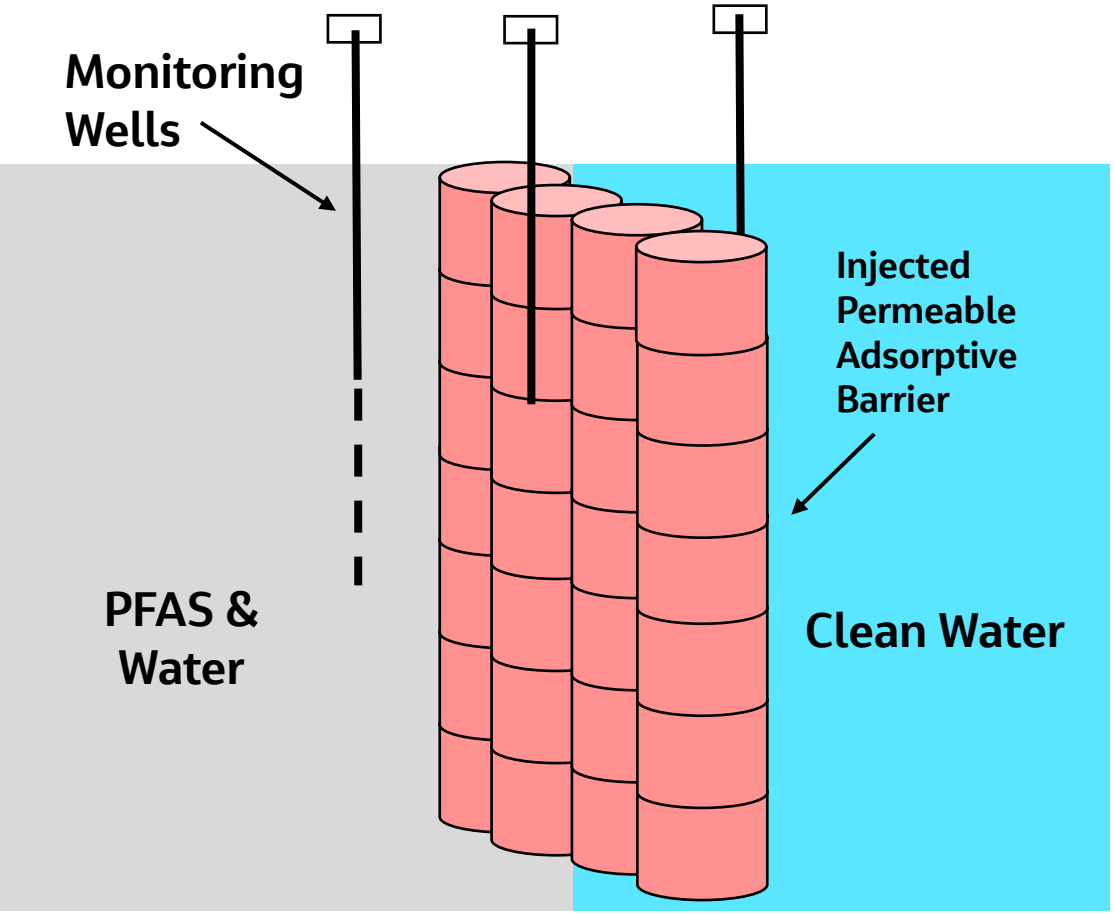
Developing Technologies

Developing	Description	Jacobs Research
Thermal Desorption	Thermal desorption utilizes heat to increase the volatility of contaminants such that they can be removed (separated) from the solid matrix (typically soil, sludge or filter cake). Demonstrated in field; offers potential for on-site destruction.	✔
Size Segregation/ Soil Washing	Size segregation can be as simple as dry sieving out coarse materials which do not typically sorb PFAS. Soil washing is a more involved process to separate PFAS containing particles (clays and fine organic matter) through rinsing, chemical separation, etc. Soil washing requires treatment of multiple waste streams to address “end of life” pathways.	✔
Natural Solutions	Harness or enhance natural in-situ processes to drive degradation of PFAS to a predicted end state where contaminant mass can be optimally removed from environment.	✔

Green & Sustainable PFAS Plume Remediation

Stabilizing PFAS Plumes and Preventing Downstream Impacts to Humans and the Environment

Jacobs is collaborating with university researchers to create adsorbents that can be injected into the subsurface water table to adsorb PFAS. The material has a much higher adsorptive capacity than current commercial products and can be deployed in a passive adsorptive barrier that prevents the migration of the PFAS in groundwater.



Green & Sustainable PFAS Source Zone Remediation

World's first field-scale Biogeochemical Reactor Pilot Project

Our in situ (in place) remediation approach at Travis Air Force Base in California harnesses big data and machine learning to identify a diverse and highly specialized microbial ecosystem of naturally occurring bacteria and fungi that work in concert to break down PFAS contaminants.

Multimedia Management of PFAS

Enabling CAPEX Projects and Continuation of Airport Operations

Jacobs provided PFAS investigations, civil design, and water treatment for the Taxiway Zulu and Northern Access Route projects. This included designs for a temporary storage area for PFAS-impacted soils/concrete and a construction water treatment system incorporating solids settling, filtration, and adsorption.

Advancing the Science with the Environmental Community

- **Research Programs:**
  - Strategic Environmental Research and Development Program (SERDP)
  - Environmental Security Technology Certification Program (ESTCP)
  - Navy Environmental Sustainability Development to Integration (NESDI) Program
  - Environmental Research & Education Foundation (EREF)
  - USEPA Office of Research and Development (ORD)
  - Jacobs Innovation Grant Funding
- **PFAS Research Topics:**
  - Carbon/ion exchange sorption
  - Low temperature thermal treatment
  - Biodegradation
  - Plasma destruction landfill leachate treatment
  - PFAS sequestration
  - Treatment of PFAS in biosolids
  - Rapid site profiling
  - Human & ecological toxicity
  - Vapor intrusion
  - Passive stormwater treatment
- **Partnering for Success:**
  - Clients
  - Federal & State Agencies
  - Academic Institutions
  - Professional Organizations & Coalitions (ITRC, GWI, etc.)
  - Remediation Vendors
  - Environmental Consulting Firms

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Industry Leadership

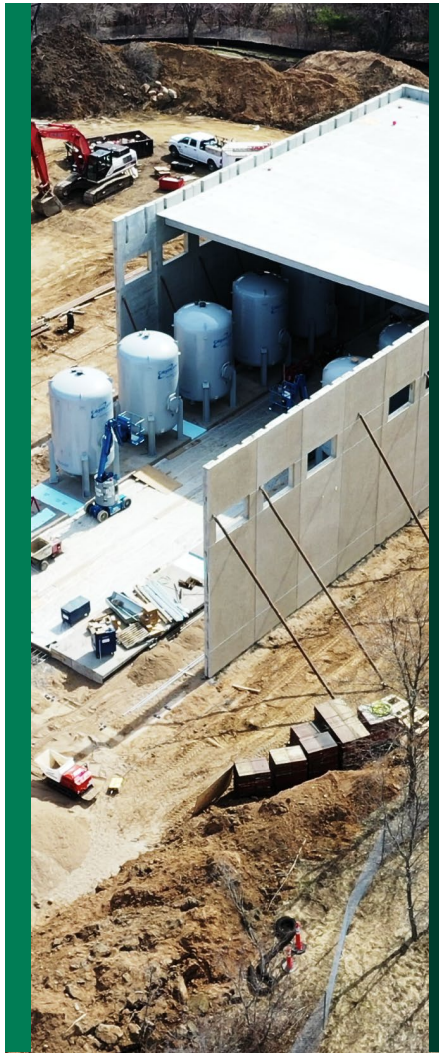
#1 Hazardous Waste
- Site Assessment & Compliance
- Clean Air Compliance
- Wastewater Treatment Plants
- Sewer & Waste
- Water Transmission & Aqueducts

#2 Chemical & Soil Remediation
- Water Supply
- Environmental Science
- Water Treatment/Desalination Plants
- Airports

Source: *Engineering News-Record*

PFAS Capabilities/Solutions

- PFAS Remediation Technology
- Source Identification & Sampling Investigation
- Treatability Studies & Source Control
- Human & Ecological Risk Assessment
- Waste Management & Disposal
- Regulatory Advisory
- Remediation Management & Solutions
- Water Treatment – Small to Very Large Scale
- Wastewater & Biosolids
- Landfill Leachate



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