United States Environmental Protection Agency

PFAS Innovative Treatment Team (PITT)

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National Association of Clean Air Agencies
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Progress for a Stronger Future

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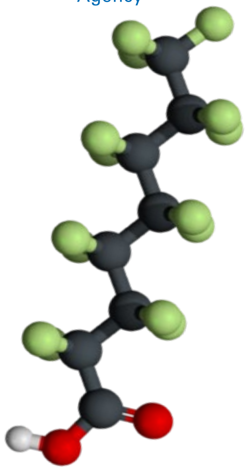
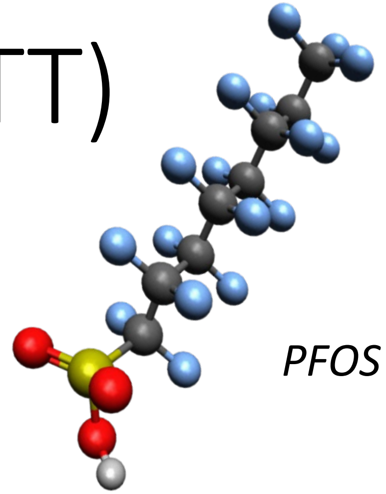
PFAS Innovative Treatment Team (PITT)



PFOA



PFOS

- Full-time, multi-disciplined research staff
    - 6-month timeline

- Single Focus:

How to Destroy PFAS-Contaminated Media and Waste

- Assess current and emerging destruction methods
- Explore the efficacy of methods
    - Including potentially hazardous by-products
- Evaluate feasibility, performance and costs

“Skunk Works”

"**skunk works**" or "**skunkworks**" describes a group within an organization given a *high degree of autonomy* and unhampered by bureaucracy, with the task of working on advanced or secret projects

PITT was provided:

- Priority access within ORD
- Direct access to ORD management
- Resources needed to perform the work

PITT Charge from ORD

- "Toolbox" of solution(s) for the destruction of PFAS in contaminated waste to meet the needs of EPA programs and regions, states and tribes, federal agencies, and industry
  - traditional destruction methods (e.g., incineration)
  - novel (high-risk) approaches
- residuals of incomplete destruction that may be released to the air, water and land
  - methods to measure these residuals

PFAS-Containing Wastes

- Aqueous film forming foam (AFFF)
  - Concentrated
  - Contaminated Soils
- Landfill Leachate, Municipal Waste Combustors (MWCs), Landfills
- Sludge and Biosolids
- Granular activated carbon (GAC) and Ion Exchange Resins

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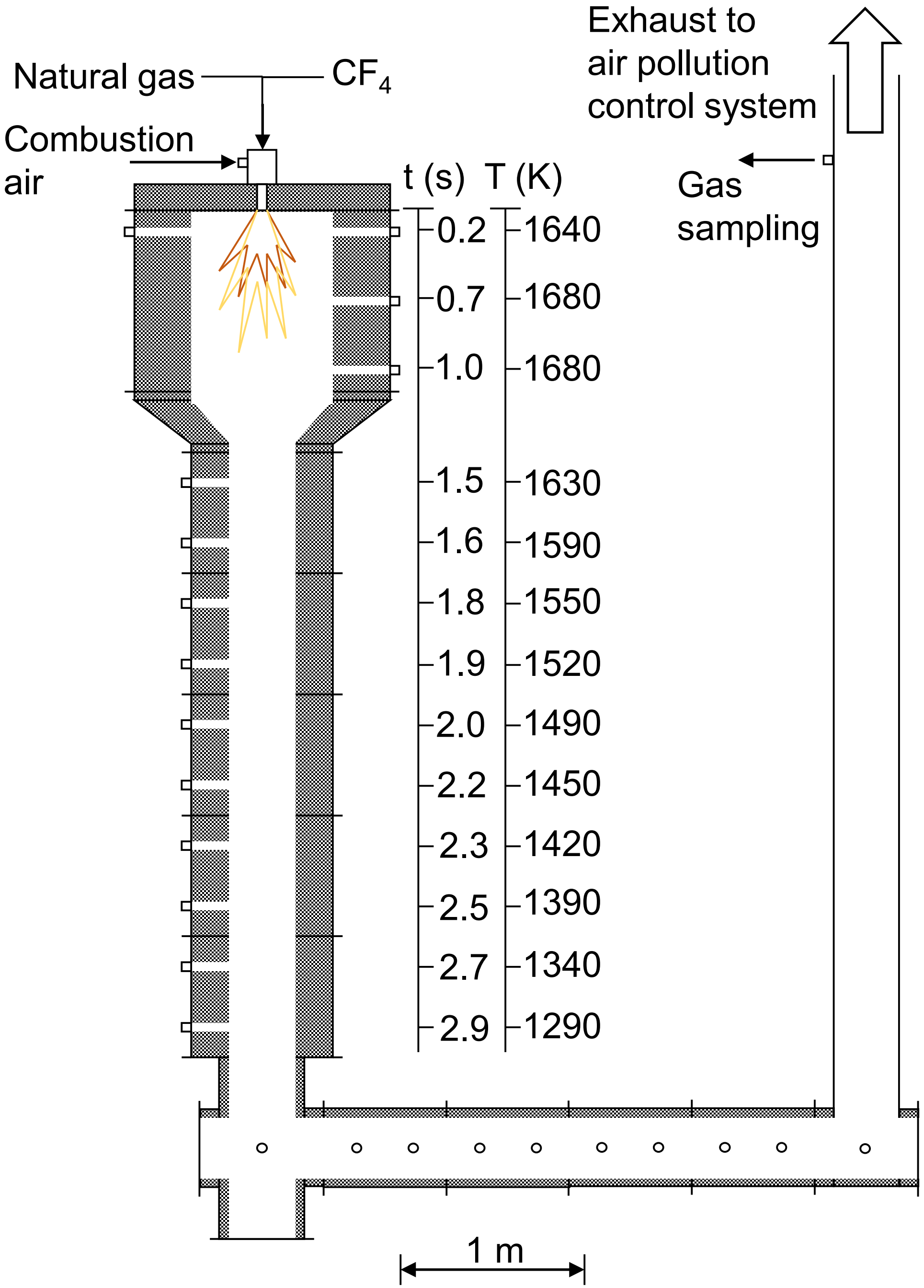
Incineration Technologies

- Collaborative projects with
  - DOD
  - Universities
  - Industry Partners
- Modeling
  - Products of Incomplete Combustion (PICs)
  - Temperature/Time
  - Fuel



Incineration Technologies

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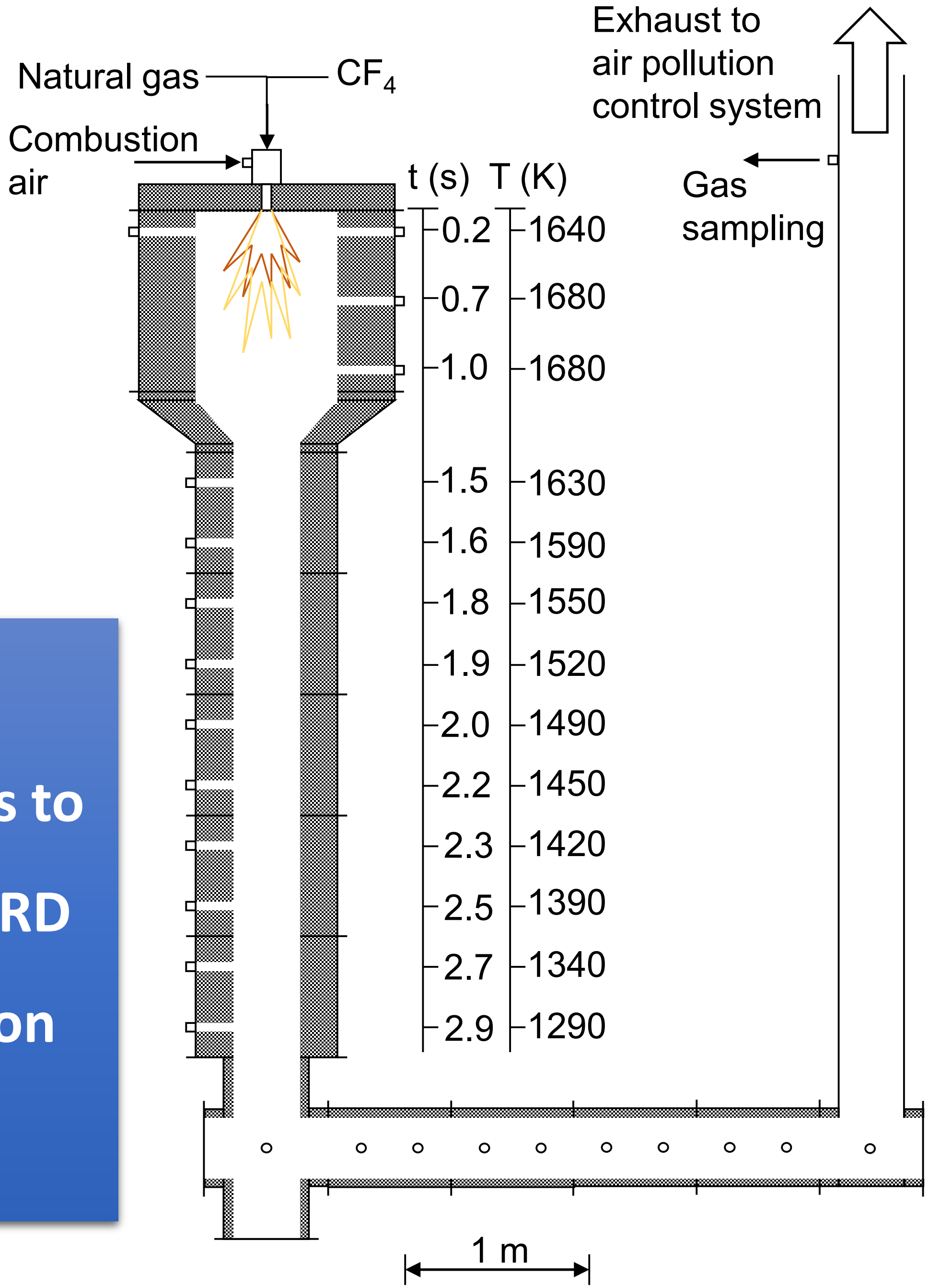
PITT provided additional resources to advance ongoing ORD work on incineration technologies



Non-Incineration Technologies Reviewed

- Chemical
- Biological
- Plasma
- Mechanochemical
- Sonolysis
- Ebeam
- UV
- Supercritical water oxidation
- Deep well injection
- Sorption/stabilization
- Electrochemical
- Landfill
- Land application
- Pyrolysis

Assessment Factors:

- Technology readiness
- Applicability
- Cost
- Required development remaining
- Risk/reward of technology adoption

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4 technologies selected for further investigation

- What waste streams can they be used on?
- How effective are they at destroying PFAS?
- What residual PFAS molecules remain
  - Are any gaseous / volatile PFAS released?
- Can we advance these technologies?

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Innovative Ways to Destroy PFAS

PER- AND POLYFLUOROALKYL SUBSTANCES

- Challenge launched by EPA Administrator Andrew Wheeler on August 25, 2020

https://www.epa.gov/innovation/innovative-ways-destroy-pfas-challenge

- Partnership with DOD (SERDP/ESTCP), states
- Concentrated AFFF focus
- Up to $50K for the best design concept for non-thermal technologies
- 99% destruction

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Challenge Timeline

Date	Action
August 25, 2020	Challenge Launch
November 23, 2020	Challenge Closes
Early 2021	Challenge Phase 1 Awarded

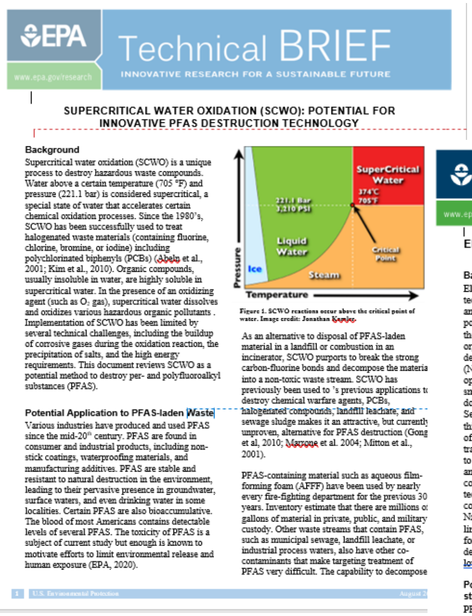
Obstacles

- COVID-19
  - Building closures
  - Lab closures
  - Restricted partner access to labs
  - Closure of suppliers
  - Unavailable instrument repairs
- Thermal Treatment Testing Options
- Concurrent field sampling and sampling methodology development

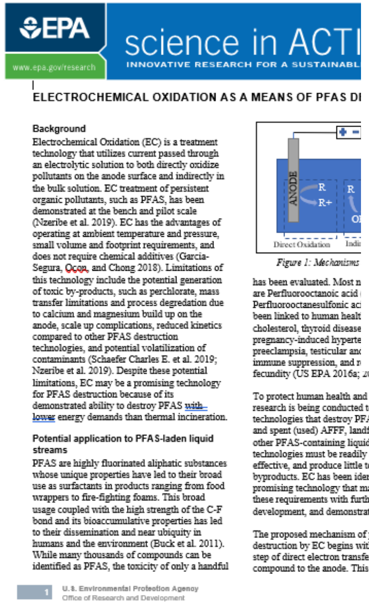
Products and Outcomes of PITT

- Methods Development
  - Gasification/Pyrolysis (FTIR)
  - Electrochemical
  - Supercritical water oxidation
  - Mechanochemical
- Co-Sponsored Methods work
  - REI Model
  - Tube Furnaces with Partners
  - EPA Incineration- Rainbow Furnace
- Multiple Journal Articles in the works
- TBD Ideas from PFAS Destruction Challenge

Technical Briefs and Fact Sheets



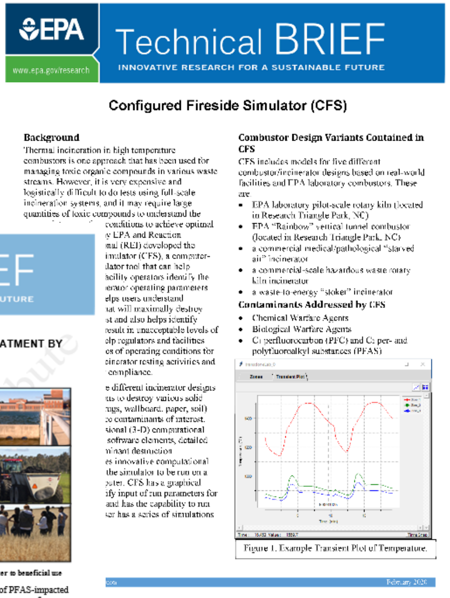
SCWO



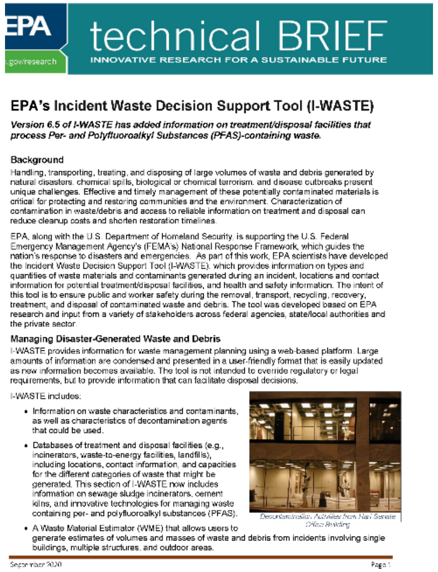
Electrochemical Oxidation

Ball Milling

Pyrolysis & Gasification



CFS Model



I-WASTE Tool

EPA United States Environmental Protection Agency

Find more information on EPA PFAS Data and Tools

EPA PFAS Research

https://www.epa.gov/chemical-research/research-and-polyfluoroalkyl-substances-pfas

EPA PFAS Action Plan:

https://www.epa.gov/pfas/pfas-action-plan-program-update-february-2020

Research on Per- and Polyfluoroalkyl Substances (PFAS)

Per- and polyfluoroalkyl substances (PFAS) are a group of synthetic chemicals that have been in use since the 1940s. PFAS are found in a wide array of consumer and industrial products. PFAS manufacturing and processing facilities, facilities using PFAS in production of other products, airports, and military installations are some of the potential contributors of PFAS releases into the air, soil, and water. Due to their widespread use and persistence in the environment, most people in the United States have been exposed to PFAS. There is evidence that continued exposure above specific levels to certain PFAS may lead to adverse health effects.

Related Topics

- Learn more about Per- and polyfluoroalkyl subtances (PFAS)
- List of PFAS EPA is currently researching
- Reducing PFAS in Drinking Water with Treatment Technologies Science Matters Article
- EPA Toxicologists Focus Innovative Research on PFAS Compounds Science

https://www.epa.gov/pfas

Questions?

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