

PFAS Mitigation at BGNDRF

Zachary Stoll

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Outline

- **BGNDRF infrastructure and how water moves around**
- **Story of how PFAS ended up at BGNDRF**
- **Implications of PFAS being at BGNDRF**
- **Challenges**
- **Our plan**
- **Current research efforts**



Well 4

Evap. Ponds

Well 3

**Indoor & Outdoor
Test Pads**

Storage Tanks

Well 2

Well 1

Lavelle Rd

Lavelle Rd



Timeline of PFAS at BGNDRF

Dec - BGNDRF Analyzed Evaporation Ponds for PFAS

July - NMED adds PFOS and PFOA to list of regulated toxic pollutants

March– PFAS discovered
in Well 2

2017

2018

2019

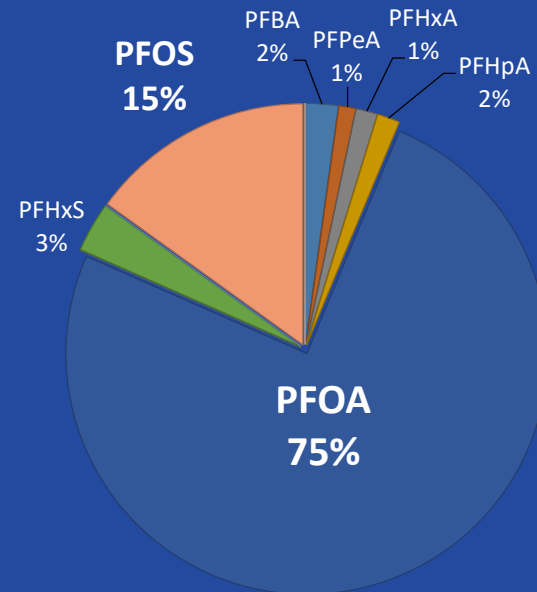
Feb – Initial NM DoH sampling at BGNDRF
(Wells 1 and 2)

April – PFAS discovered in Well 4

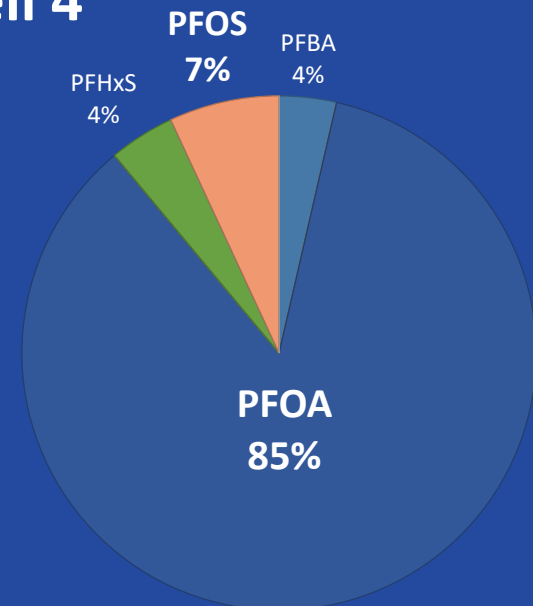
Canon/Holloman AF PFAS issues “begin”

Compound	Well 2 (ng/L)	Well 4 (ng/L)
PFBA	3.5	4
PFPeA	1.8	ND
PFHxA	2.3	ND
PFHpA	2.4	ND
<u>PFOA</u>	<u>120</u>	<u>95</u>
PFNA	ND	ND
PFDA	ND	ND
PFUnA	ND	ND
PFDoA	ND	ND
PFTriA	ND	ND
PFBS	ND	ND
<u>PFHxS</u>	<u>5.3</u>	<u>4.6</u>
PFHpS	ND	ND
<u>PFOS</u>	<u>24</u>	<u>7.7</u>
PFDS	ND	ND
FOSA	ND	ND
NMeFOSAA	ND	ND
NEtFOSAA	ND	ND
6:2 FTS	ND	ND
8:2 FTS	ND	ND
<u>Total PFAS</u>	<u>159.3</u>	<u>111.3</u>
<u>% PFOA + PFOS</u>	<u>90.4</u>	<u>92.3</u>

Well 2



Well 4



Timeline of PFAS at BGNDRF

Dec - BGNDRF Analyzed Evaporation Ponds for PFAS

July - NMED adds PFOS and PFOA to list of regulated toxic pollutants

March— PFAS discovered
in Well 2

May – Discharge Permit
Expired

(You are here)

2017

2018

2019



Feb – Initial NM DoH sampling at BGNDRF
(Wells 1 and 2)

April – PFAS discovered in Well 4

May – Met w/ NMED &
began PFAS mitigation
efforts

Canon/Holloman AF PFAS issues “begin”

What to do and what not do?

- **Thou shall not:**

- **Discharge water containing PFAS above 70 ppt to the City of Alamogordo.**
- **Apply water containing PFAS to the soil at BGNDRF such that the mass loading exceeds 1.5 mg/kg.**

- **Thou shall:**

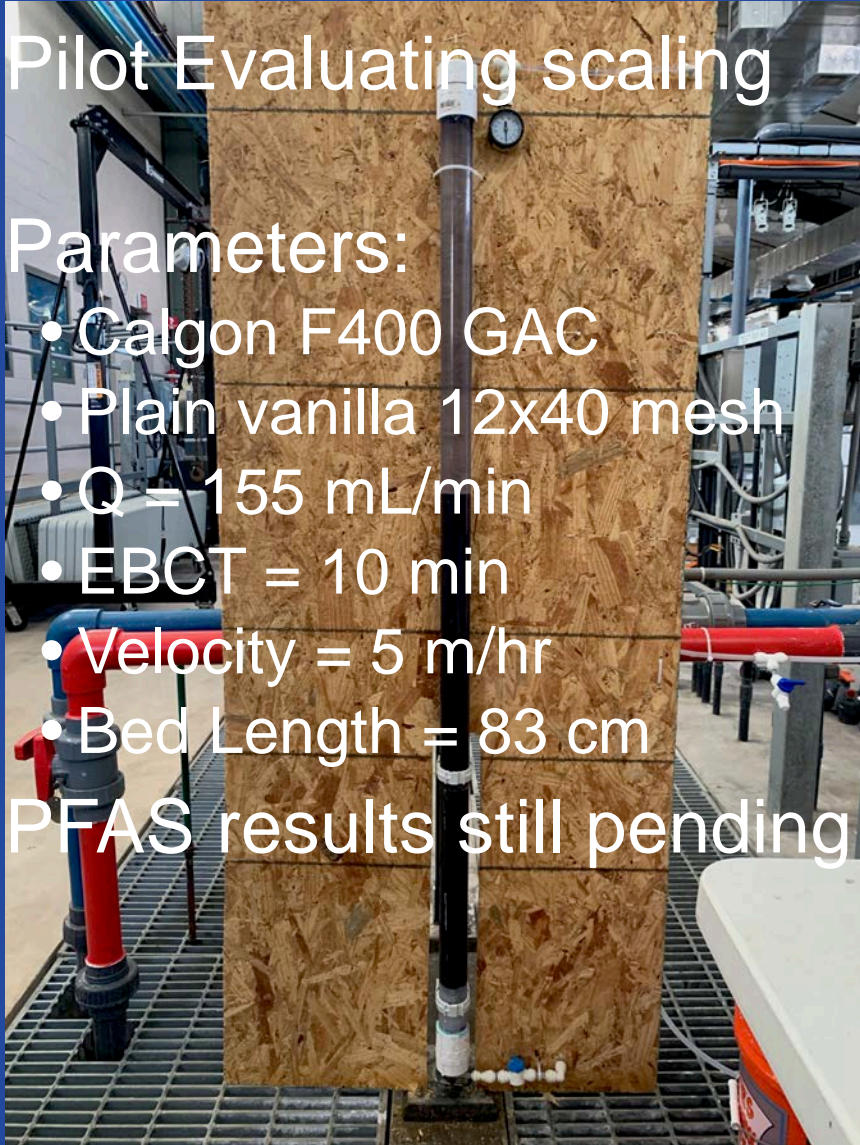
- ***** Develop a PFAS mitigation plan for accidental discharges to the City (>70 ppt) or on the soil (>1.5 mg/kg).**

Our Plan

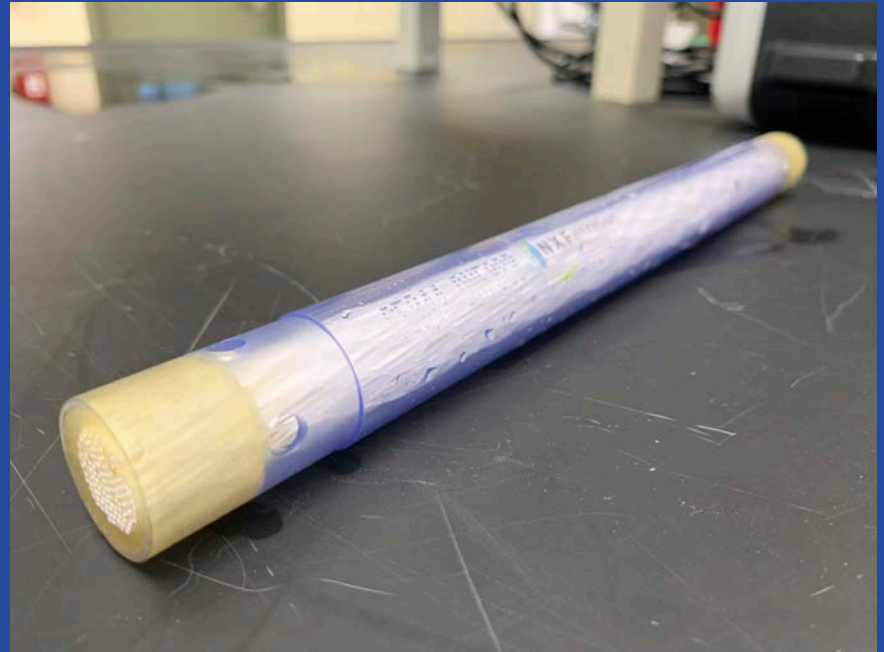
- Step 1: Figure out what we don't know and develop collaborations.
- Step 2: Intermediate Operational and Facility Changes
 - Close gate valves on evaporation ponds
 - Transfer water and solids from small ponds to large pond.
 - Only discharging Well 2 and 4 waters to large pond.
- Step 3: Design and test wellhead treatment with GAC
 - Doesn't change water quality
 - Can remove > 99% so PFAS won't accumulate anywhere
 - Reducing human exposure
 - Protects environment
 - Can continue normal operations
 - Is modular
 - Maintain access to raw well water for research purposes
- Step 4: Finalize
 - Contract and install full scale system for Wells 2 and 4
 - Dry down large pond and pumping/hauling away solids

Current Research Efforts

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- A photograph of a small-scale Reverse-Scale Surface Turbulent Column (RSSCT) experimental setup. The apparatus is mounted on a blue base and features a vertical glass column with a blue cap and a pressure gauge. It is connected to various tubes and valves. The background is a wooden panel with a sign that reads "TEST BAY #6".
- RSSCT Evaluating breakthrough
 - Parameters:
 - Calgon F400 GAC
 - Custom milled 60x80 mesh
 - $Q = 35 \text{ mL/min}$
 - EBCT = 0.53 min
 - Velocity = 5 m/hr
 - Bed Length = 19 cm
 - PFAS results still pending

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- A photograph of a pilot-scale experimental setup. It shows a much taller vertical glass column, also with a blue cap and a pressure gauge, mounted on a metal grate. The background is a wooden panel. The setup is more complex, with additional piping and a red valve visible.
- Pilot-Evaluating scaling
 - Parameters:
 - Calgon F400 GAC
 - Plain vanilla 12x40 mesh
 - $Q = 155 \text{ mL/min}$
 - EBCT = 10 min
 - Velocity = 5 m/hr
 - Bed Length = 83 cm
 - PFAS results still pending

Current Research Efforts Cont.



QUESTIONS?

Zachary Stoll

zstoll@usbr.gov



RECLAMATION
Managing Water in the West