RECLAMATION
Managing Water in the West

PFAS Mitigation at BGNDRF

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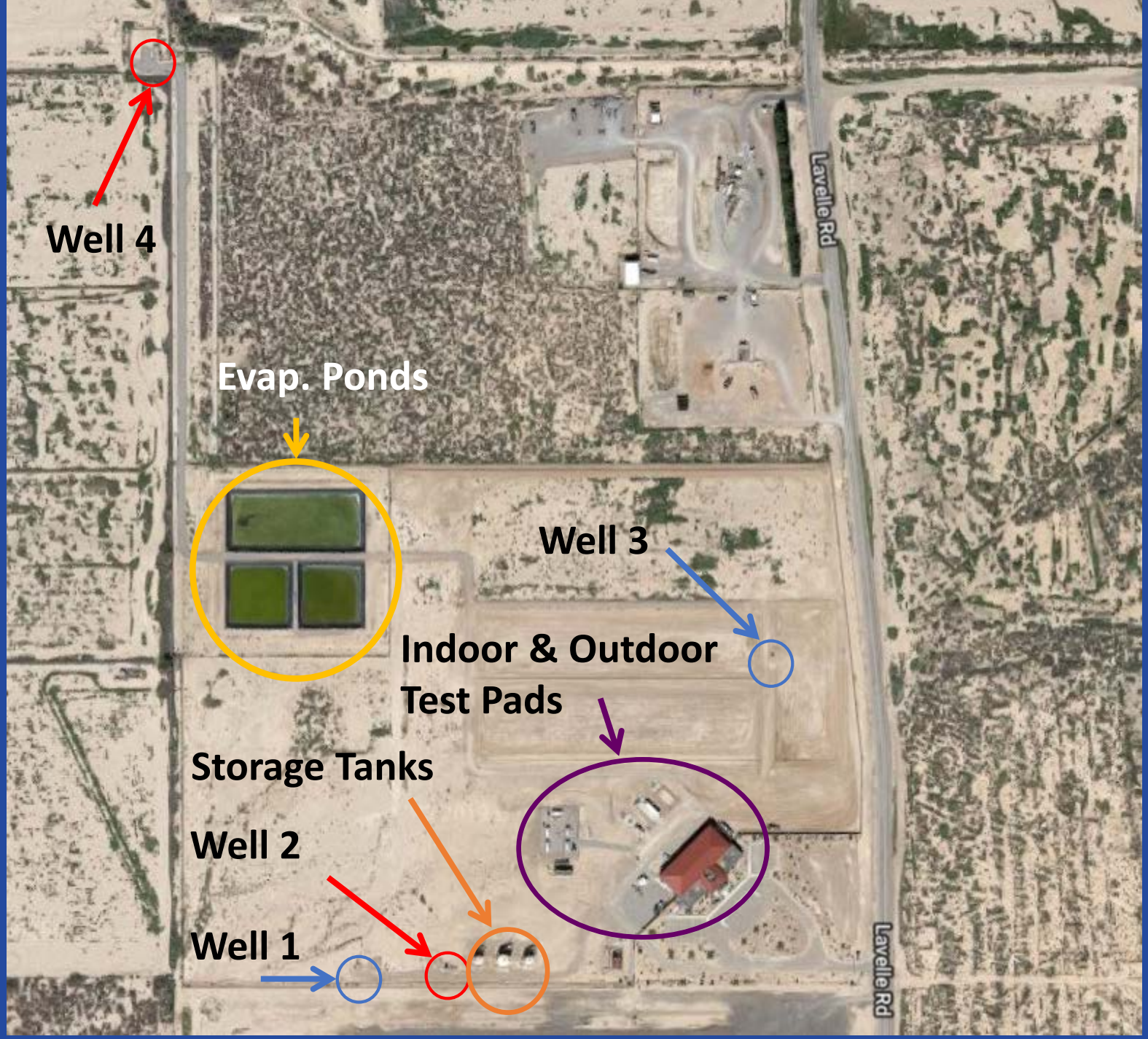
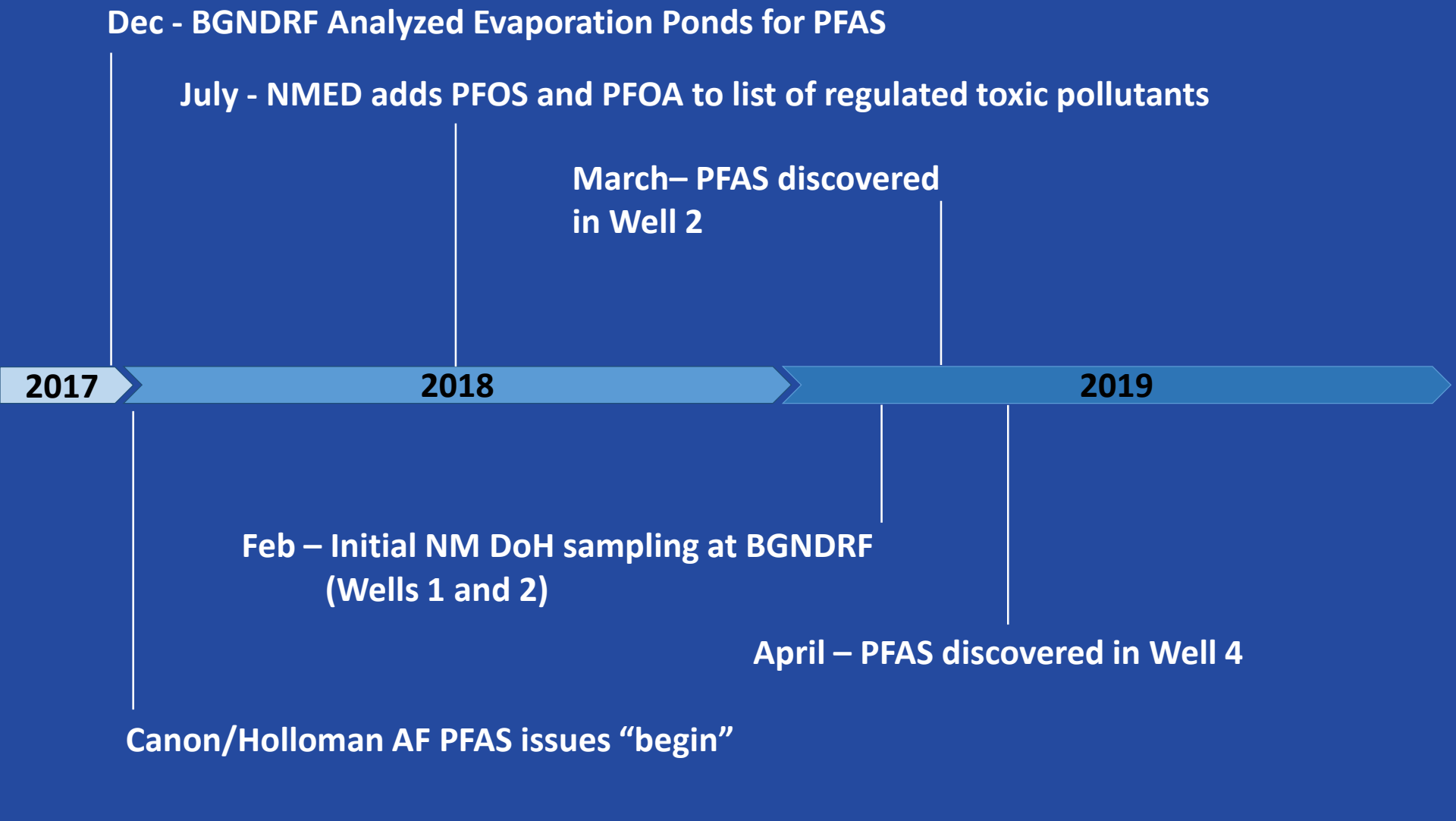
10-28-19

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

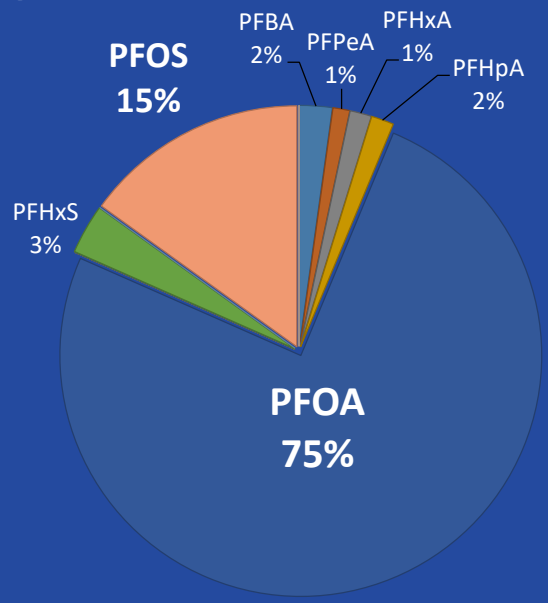

Well 4
Evap. Ponds
Well 3
Indoor & Outdoor
Test Pads
Storage Tanks
Well 2
Well 1
Lavelle Rd
Lavelle Rd

Timeline of PFAS at BGNDRF

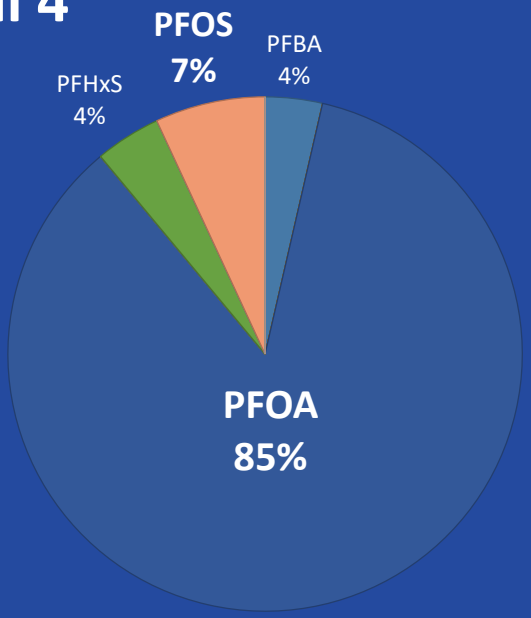


Compound	Well 2 (ng/L)	Well 4 (ng/L)
PFBA	3.5	4
PFPeA	1.8	ND
PFHxA	2.3	ND
PFHpA	2.4	ND
PFOA	**120**	**95**
PFNA	ND	ND
PFDA	ND	ND
PFUnA	ND	ND
PFDoA	ND	ND
PFTriA	ND	ND
PFBS	ND	ND
PFHxS	**5.3**	**4.6**
PFHpS	ND	ND
PFOS	**24**	**7.7**
PFDS	ND	ND
FOSA	ND	ND
NMeFOSAA	ND	ND
NEtFOSAA	ND	ND
6:2 FTS	ND	ND
8:2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

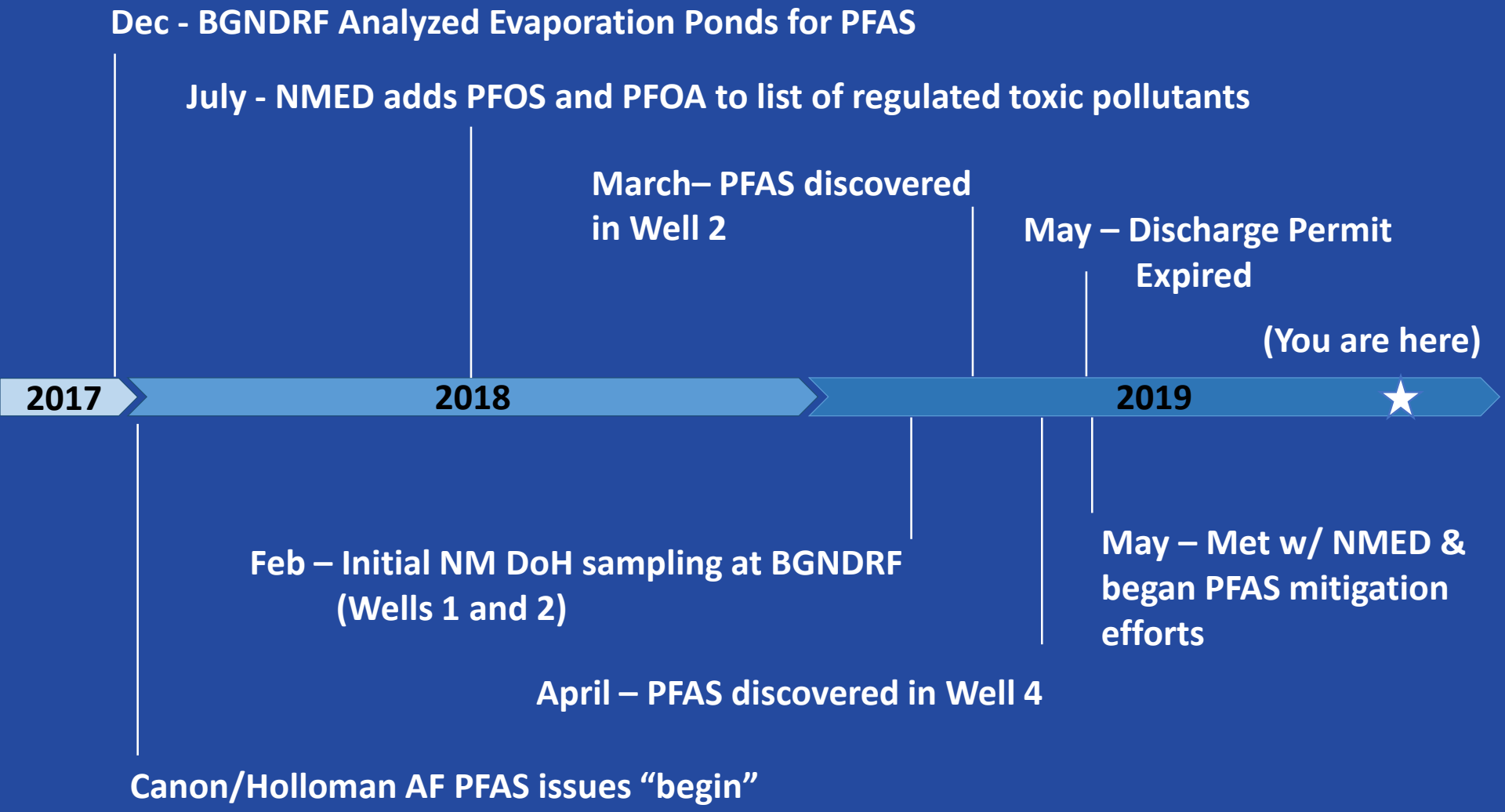
Well 2



Well 4



Timeline of PFAS at BGNDRF



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).**

Challenges to Account for	Implications

Our Plan

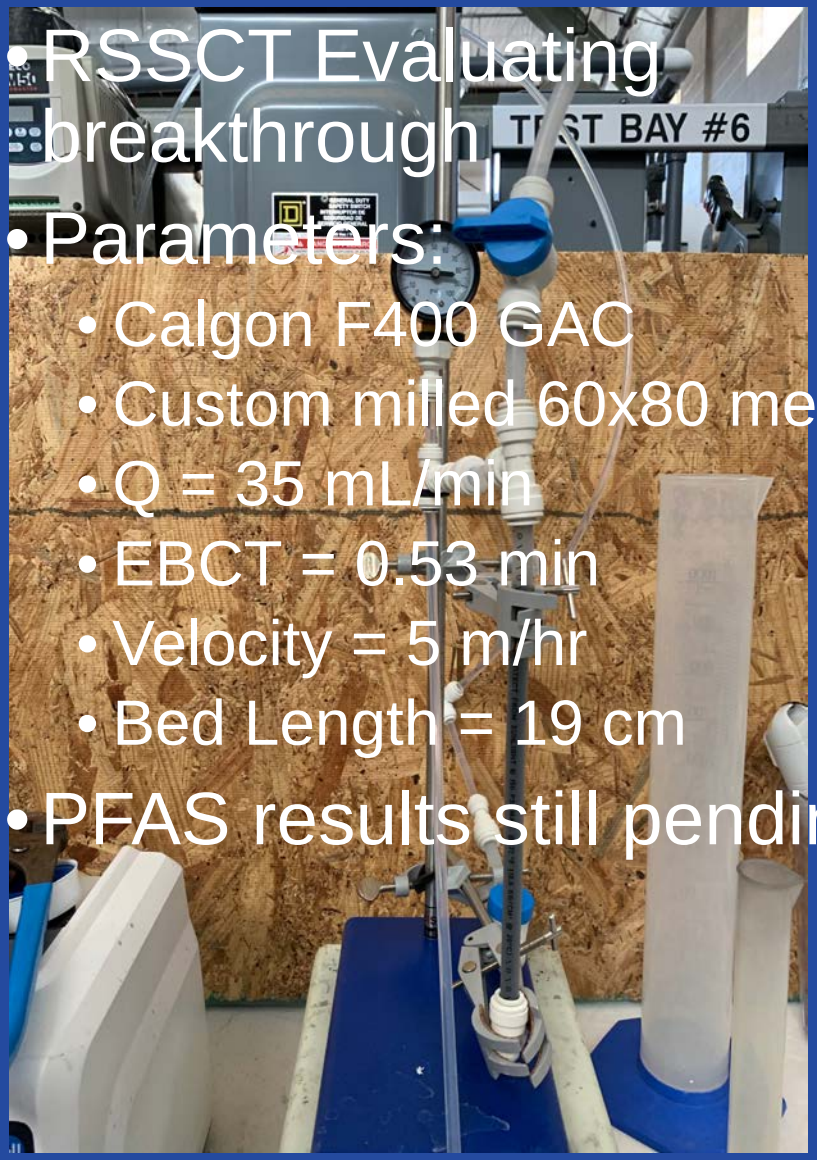
- Step 1: Figure out what we don’t know and develop collaborations.

- 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.

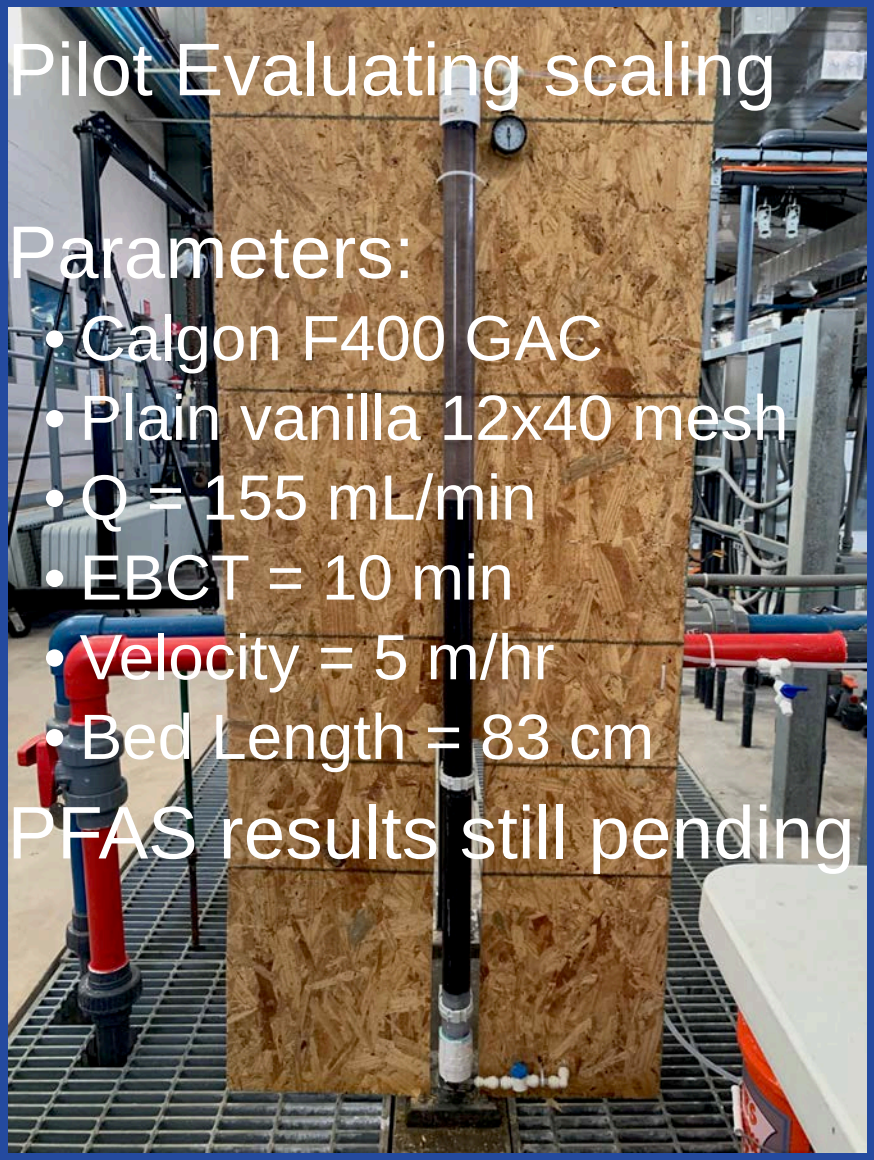
- Step 3: Design and test wellhead treatment with GAC
  - Doesn’t change water quality
  - Can remove > 99% so PFAS won’t accumulate anywhere
  - Reducing human exposure
  - Protects environment
  - Can continue normal operations
  - Is modular
  - Maintain access to raw well water for research purposes

- 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

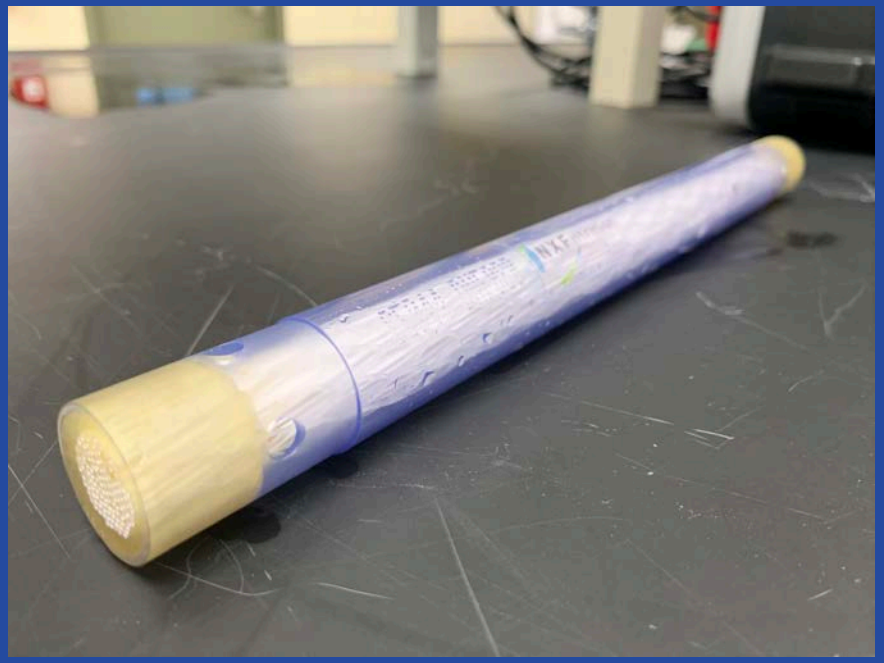


- RSSCT Evaluating breakthrough
- Parameters:
  - Calgon F400 GAC
  - Custom milled 60x80 mesh
  - Q = 35 mL/min
  - EBCT = 0.53 min
  - Velocity = 5 m/hr
  - Bed Length = 19 cm
- PFAS results still pending



- Pilot Evaluating scaling
- Parameters:
  - Calgon F400 GAC
  - Plain vanilla 12x40 mesh
  - Q = 155 mL/min
  - EBCT = 10 min
  - Velocity = 5 m/hr
  - Bed Length = 83 cm
- PFAS results still pending

Current Research Efforts Cont.



QUESTIONS?

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