PFAS INVESTIGATION ON THE GRANDVIEW FARM

Johnson County, Texas

Linda Lee, PhD, Purdue University & Mary Martis, PE, Parsons Inc.
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OUTLINE

Overview: Grandview Farm PFAS Investigation

Site Investigation Approach

Data Evaluation

Summary of Findings

Conclusion

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OVERVIEW: GRANDVIEW FARM PFAS INVESTIGATION

ALLEGED PFAS CONTAMINATION ON FARMS RESULTING FROM LAND APPLICATION OF GRANULITE® ON AN ADJACENT FARM

Dec. 8-10, 2022: Granulite® was stockpiled on Grandview Farm.

Dec/ 29, 2022: Granulite® land application began on the Grandview Farm.

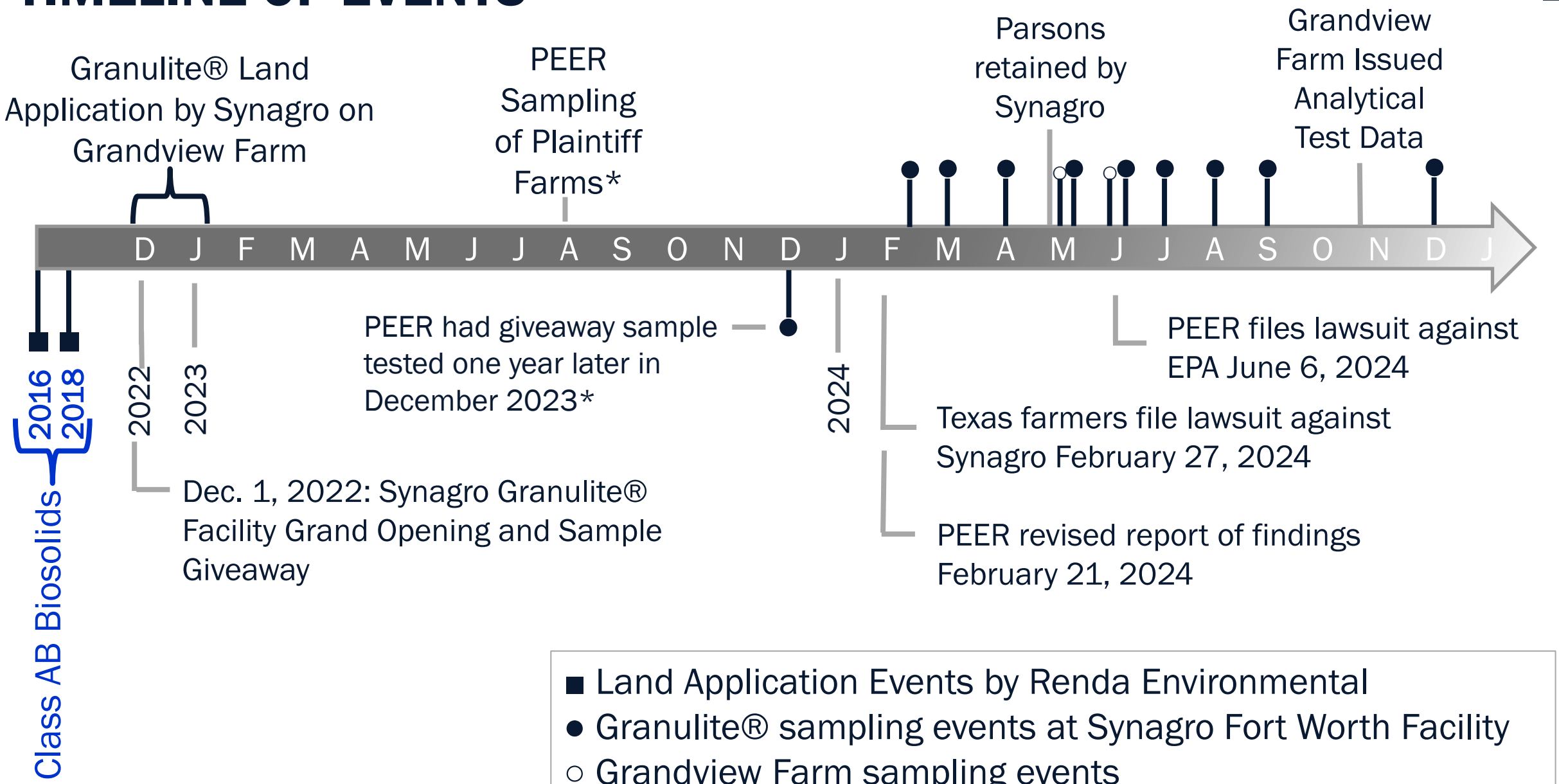
Dec. 29, 2022: Farmers on neighboring properties contacted Johnson County reporting smoldering Granulite® piles on the Grandview Farm.

April 2023 (estimated): Public Employees for Environmental Responsibility (PEER) conducted soil, groundwater, surface water, and animal tissue sampling on neighboring farms in response to complaints tested for per- and polyfluoroalkyl substances (PFAS).

Feb. 2024: PEER reported PFAS test contamination on the neighboring farms.

Feb. 27, 2024: Owners of the neighboring farms filed a lawsuit against Synagro Technologies, Inc. claiming that the biosolids-based Granulite® fertilizer product on the Grandview Farm caused PFAS contamination of their farms.

TIMELINE OF EVENTS



*Estimated timing

SITE INVESTIGATION APPROACH

GRANDVIEW FARM

THE ASSIGNMENT

TEST GRANDVIEW FARM SOILS, GROUNDWATER, SURFACE WATER, AND PLANT AND TISSUE SAMPLES FOR PFAS.

EVALUATE ANALYTICAL TEST RESULTS AND DETERMINE POTENTIAL SOURCE(S) OF PFAS, IF FOUND.

COMPARE GRANDVIEW FARM TEST RESULTS AGAINST PEER DATA TO ASSESS LIKELIHOOD OF PFAS (IF FOUND) TRANSPORTED FROM GRANDVIEW FARM TO ADJACENT FARMS.

Is there PFAS contamination on the Grandview Farm?

- **If so, could it have come from biosolids applied on the farm?**
- **If so, is there a way to differentiate between biosolids land application events and types/levels of PFAS found?**

Is it possible that the PFAS found on neighboring farms is from biosolids that were land applied on the Grandview Farm?

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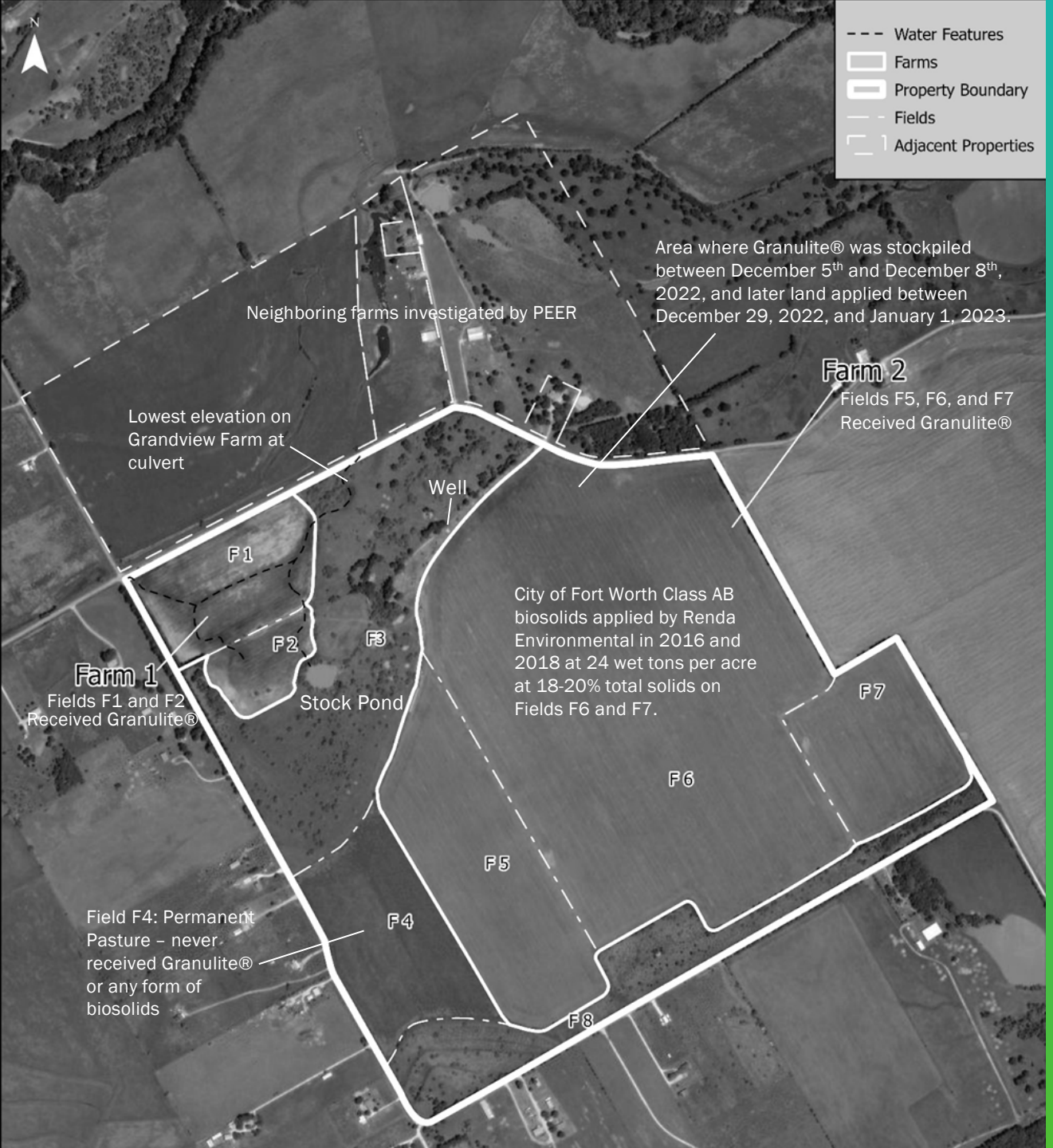


FIRST 48 HOURS

Conduct site walk to assess landscape/site conditions, topography, site access, etc.

Interview Synagro and Grandview Farm farmer.

Develop investigational approach.

Develop Sampling & Analysis Plan and daily workplans.

Begin site sampling.

INVESTIGATIONAL APPROACH

*QA/QC including field blanks, etc.

Farm 1, Granulite® Applied

- Grab samples of topsoil, composite on-site.
- Soil cores, samples at 1-ft increments.
- Plant tissue samples by Field and composite by Field on-site.

Farm 2, Granulite® applied + Field F6 and F7 had prior Class AB application.

- Topsoil samples by Field, composite by Field on-site.
- Soil cores by Field, samples at 1-ft increments.
- Plant tissue samples by Field, composite by Field on-site.

INVESTIGATIONAL APPROACH *(cont')*

Field F3, Never received Granulite® or Class AB biosolids.

- Grabs of surface soils, composite on-site.
- Soil cores, samples at 1-ft increments.
- Plant tissue samples, composite on-site.
- Surface water samples (composite).
- Groundwater samples (composite).

Field F4, Never received Granulite® or Class AB biosolids.

- Surface soil samples, composite on-site.
- Soil cores, samples at 1-ft. increments.
- Plant tissue samples, composite on-site.

Field F8, Never received Granulite® or Class AB biosolids.

- Surface soil samples, composite on-site.
- Plant tissue samples, composite on-site.

GRANDVIEW FARM MAY/JUNE 2024 SAMPLING EVENTS

Analytical suite: EPA 40 PFAS List

27 samples, including duplicates

Well #1 water in duplicate, located in Field F3.

Field F3 stock pond: 2 water samples, 1 sediment grab, and one fish.

2 runoff water samples from an actively flowing agricultural ditch and one corresponding duplicate (Field F3).

3 surface soil composites, including one duplicate, from Fields F1, F2, F3, F4, F5, and F6.

2 soil cores from Fields F1 and F2, up to 4 ft deep.

6 soil cores up to 3.5 ft deep from Fields F5, F6, F7

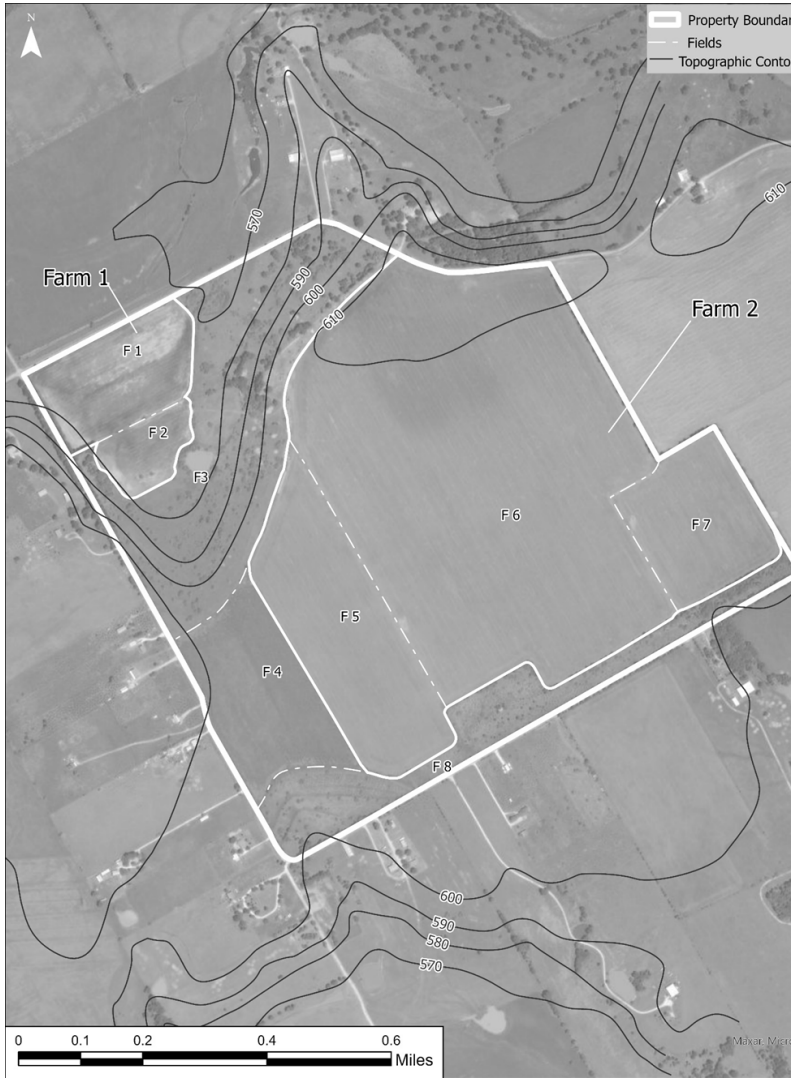
2 soil cores up to 3 ft deep taken from Field F4.

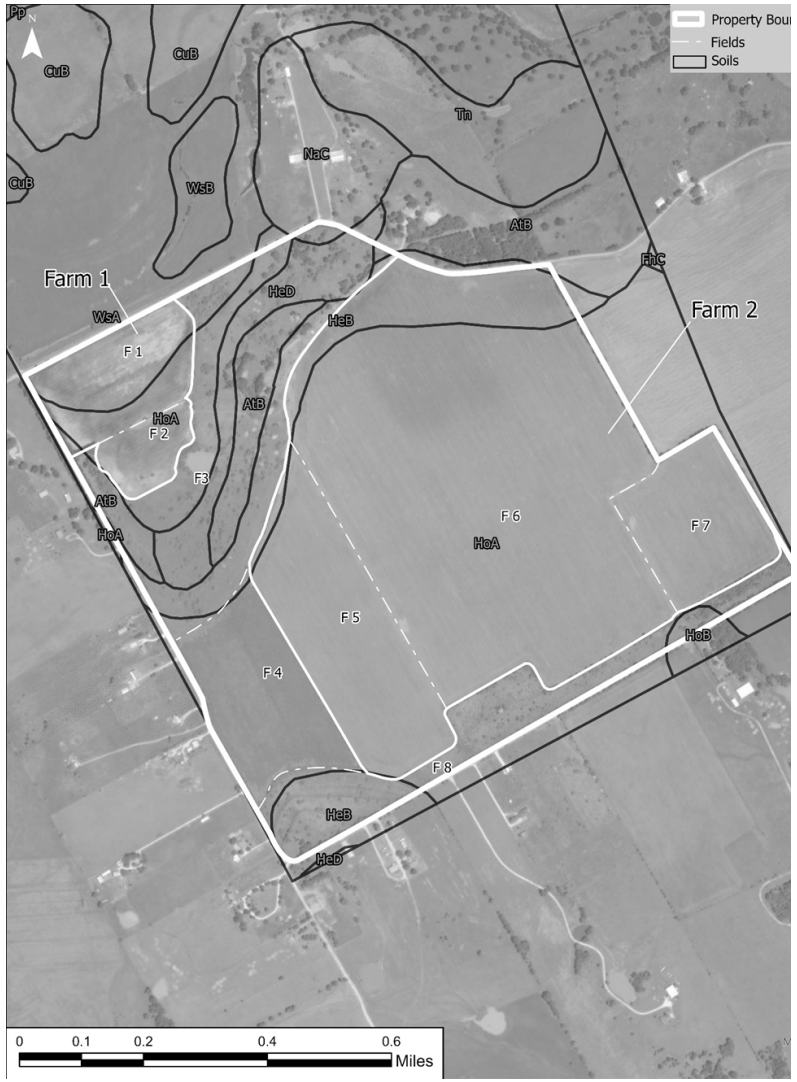
6 feed-grass tissue composites from Fields F3, F4, F8.

DATA EVALUATION FOR GRANDVIEW FARM (MAY/JUNE 2024)

CONSIDER SITE TOPOGRAPHY AND SOIL TYPES

Data Evaluation





AtB: Altoga silty clay (2 - 5% slopes)

CuB: Culleoka channery silt loam (15 - 25% slopes)

HeB: Heiden clay (1 - 3% slopes)

HeD: Heiden clay (3 - 8% slopes)

HoA: Houston Black clay (3 - 8% slopes)

NaC: Nantucket sandy loam (8 - 15% slopes)

Pp: Pulexas fine sandy loam (frequently flooded)

Tn: Tinn clay (0 - 1% slopes; frequently flooded)

WsA: Wilson silty clay (0 - 1% slopes)

WsB: Woodbridge fine sandy loam (3 - 8% slopes)

FIELD F3, NO BIOSOLIDS APPLICATION HISTORY; UNDER INFLUENCE OF RUNOFF

Groundwater Sample (composite)

Well #1: PFBA, PFBS, PFxHS, detected. All detected values <LOD.

Surface Water Composites

Stock Pond: 11 PFAS detected. All detected values were <RLs.

Stock Pond Sediment Composites

Three PFAS detected (PFBA; PFOS; PFNA). All PFAS detected were <RLs.

Agricultural Ditch Composite Samples (2)

11-12 PFAS detected, but only 6-8 >RLs (C4-C8 PFCAs – PFBA, PFPeA, PFHxA, PFHpA, and PFOA) .

For the corresponding sediment sample taken from the flowing agricultural ditch, only two PFAS (PFOS and PFNA) were detected, but these values were <RLs.

FIELD F3, NO BIOSOLIDS APPLICATION HISTORY; UNDER INFLUENCE OF RUNOFF *(continued)*

Surface Soil Samples (composite)

Two PFAS identified (PFBA; PFOA), both <LOD and both were <RLs.

Plant Tissue Samples (2 composites)

One PFAS detected in one composite (PFPeA) that was <RLs.

Fish Sample

All PFAS tested were <LOD except PFOS (0.56 ppb).

FIELD F4, PERMANENT PASTURE - CONSIDERED BACKGROUND

Surface Soil Composite Sample

All but 3 PFAS were <LOD. For the three PFAS detections (PFBA; PFOA; PFOS), estimated concentrations were all <RLs.

Soil Cores – 1-ft. increments

All PFAS <LOD with exception of estimated PFOS for 2 cores (2' to 3' depth, and 0'-1' depth) of Soil Core #1). Both detects in the soil cores were <RLs.

Plant Tissue Composite Samples (two)

All reported PFAS were <LOD except for PFPeA, which was reported at 0.72 ppb for one, and 0.35 ppg for the other. Test results for five PFAS were missing from the lab report, but they have low potential uptake into the above ground plant tissues.

FIELD F8, BUFFER ZONE; MAY RECEIVE RUNOFF FROM F4, F5, F6, F7

Plant Tissue Composite Samples (three with n=20 subsamples each)

All 40 PFAS reported <LOD or LOQs (so below reportable limits).

FARM 1, FIELDS F1 AND F2 - RECEIVED ONE-TIME GRANULITE® APPLICATION, NO OTHER BIOSOLIDS APPLICATION HISTORY

Surface Soil Composite

Surface soil composite: 3 PFAS (C4, C7, and C8 perfluoroalkylcarboxylates (PFCAs): PFBA, PFHpA, PFOA) were detected in the 0.033 - 0.11 ppb range, highest was for PFBA

Even so, all three PFAS were ‘J’ flagged in the analytical reports – above detection limits (>LOD) but below reportable quantification limits (< LOQ).

These PFAS were also within values estimated in the equipment blanks.

Soil Cores (3 locations)

PFAS were <LOD at all depths in all cores.

FARM 2, FIELDS F5, F6, AND F7. RECEIVED ONE-TIME GRANULITE® APPLICATION ACROSS FIELDS ALSO, CLASS AB BIOSOLIDS ON FIELDS F5 AND F7 IN 2016 & 2018.

Surface Soil Composites

- Surface soil composite sample: Several PFAS detected at low concentrations – C4, C8, and C8 PFCAs (PFPeA, PFHxA, PFOA); C4 and C8 PFSAs (PFBS, PFOS) with PFPeA highest at 0.57 ppb.
- For the few PFAS detected on Farm 2, PFAS concentrations are within typical background levels (Rankin et al., 2016) where total PFCA and PFSA concentrations ranged from 0.29 – 14.3 ppb and 0.007 – 3.7 ppb, respectively, 62 locations globally over half in the USA. Similar and higher background soil concentrations have been observed in other studies (Zhu, 2022; Brusseau, 2020)..

FARM 2, FIELDS F5, F6, AND F7. RECEIVED ONE-TIME GRANULITE® APPLICATION ACROSS FIELDS ALSO, CLASS AB BIOSOLIDS ON FIELDS F5 AND F7 IN 2016 & 2018 *(CONTINUED)*.

Soil Cores (6 locations)

- Of the 6 cores plus one single-depth-duplicate, only two 1 - 2 ft. depth sections from Fields F5 and F6 had PFAS detections.
  - Field F5: single detection - 0.42 ppb PFPeA (C5 PFCA).
  - Field F6: six PFAS - C5-C8 PFCAs with the highest being PFHxA (0.69 ppb) and two perfluoroalkylsulfonic acids (PFSAs) – 0.31 ppb PFBS (C4) and 0.34 ppb PFOS (C8)
  - All other samples <LOD.

EVALUATION OF GRANDVIEW FARM PFAS TEST RESULTS AND PFAS TEST RESULTS FROM NEIGHBORING FARMS REPORTED BY PEER

A SUMMARY

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PEER REPORT COMPARISON

- **5 pond samples taken on the plaintiff's farms:**
  - Concentrations generally similar to Grandview Farm
  - 5 to 17 PFAS detected compared to no more than 12 detected on Grandview Farm
  - Highest concentrations observed on the plaintiffs' farms was for PFPrA
    - PFPrA is not one of the 40 PFAS listed in EPA Method 1633, thus in the Grandview Farm analytical reports
    - The next highest concentrations from the plaintiff's farms are for PFBA and PEPA (PEPA is also not among the 40 PFAS listed in EPA Method 1633), and PFHxA, followed by PFPeA. PFOA and PFOS.
- **Fish Tissues**
  - No PFAS in Grandview Farm
  - 57 ppb and 74 ppb PFOS in PEER-report analysis *(interference or real?)*
  - PFAS in plaintiff's pond water higher than Grandview Farm
  - Fish were in pond fed by all runoff including road runoff
  - PFAS in plaintiff's pond water higher than Grandview Farm*

SUMMARY OF FINDINGS & CONCLUSION

GRANDVIEW FARM + DATA REPORTED BY PEER + OTHER INFORMATION

SUMMARY OF FINDINGS

- Grandview Farm PFAS test data for soil, water, and plant and fish tissue samples: all data < LODs or < reportable LOQs where Synagro's Granulite® product was land applied in late Dec. 2022/Jan. 2023.
- Grandview Farm data provide no evidence to explain the PFAS types and concentration levels reported by PEER for samples from the neighboring farms.
- Some soils on the Grandview Farm site where multiple biosolids applications had occurred had measurable PFAS concentrations, but all individual PFAS < 0.7 ppb, this well within background soil concentrations observed across the nation.
- Likewise with one exception, all individual PFAS concentrations reported by PEER for the neighboring farms were also within background concentrations (all values < 0.2 ppb, except N-MeFOSE at 3.3 ppb). N=-Me-FOSE is a precursor to PFOS.

SUMMARY OF FINDINGS (CONTINUED)

- **The exception**: PFPrA (C3 PFCA) was in every PEER sample from the neighboring farms (highest conc. 1,300 ppt in a water sample), which was not detected in the PEER-reported data "giveaway" December 2022 Granulite® sample PEER.
  - PFPrA used in xanthene synthesis used in pharmaceuticals, molecular imaging, photo-insecticides
  - Fracking in Johnson County used PFAS-containing fluids
  - UV-degradation product of GenX, GenX not found on any of the farms
  - Possible degradation product from fluorotelomer-based PFAS
    - Timeline does not align with known FT PFAS degradation kinetics
    - PFAS signature does not align with FT PFAS degradation with next highest water sample concentration being PFBA at 9.6 ppt
- Consistent presence of high levels of PFPrA on the neighboring farms points to a different PFAS source than land-application of Synagro's Granulite® fertilizer product.
- Also, N-MeFOSE found in two soils on the neighboring farms was present in one of the two samples at 3x higher concentration than the Dec. 2022 'giveaway' Granulite® sample or in any of the monthly Granulite® samples sent out in 2024 for analysis.
- The level of PFOS reported in the fish as well as in the calf appear inconsistent with the PFOS levels found in water and soil samples based on known bioconcentration factors.

CONCLUSION

Data indicates that the single Dec 2022/Jan 2023 land application with Synagro's Granulite® fertilizer product on the Grandview Farm could not have led to the PFAS levels reported for the calf liver and fish on the two neighboring farms.

Q&A