



Partnering
for a Better
Tomorrow

Provided by Teklab, Inc.

Kelly Klostermann

Account Executive



Water Operators & Scientists

Working together for a cleaner world



Regulations that drive our work

Wastewater

40 CFR 136

Biosolids

40 CFR part 503

Disposal of Biosolids

40 CFR 261

Drinking Water

Standard Methods



Testing Needs -

- Wastewater

- Clean Water Act

- 40 CFR 136

- Drinking Water

- Safe Drinking Water Act

- 40 CFR 141

- Wastes & Waste Disposal

- RCRA

- SW-846

The Teklab Advantage



- Standard turn-around-time - five business days.
- We take pride in our ability to handle large one- and two-day turn-around-time projects.
- Customer advantage – we strive to be faster than our competitors. Wrap up a work site and move on to other projects faster.



Teklab's Mission

Teklab is committed to safely producing high-quality analytical laboratory results as quick as possible.

As a team of well-trained, highly ethical professionals, we continuously look for ways to improve ourselves, our service, and our company.

Data Confidence

■ Legally Defensible

- ☐ Proficiency Testing Studies
- ☐ Management & Technical Requirements
- ☐ Quality Systems
- ☐ Biannual Onsite Audits

■ NELAP Certified Lab



Customer Service



Customer Service





Wastewater Treatment Theory

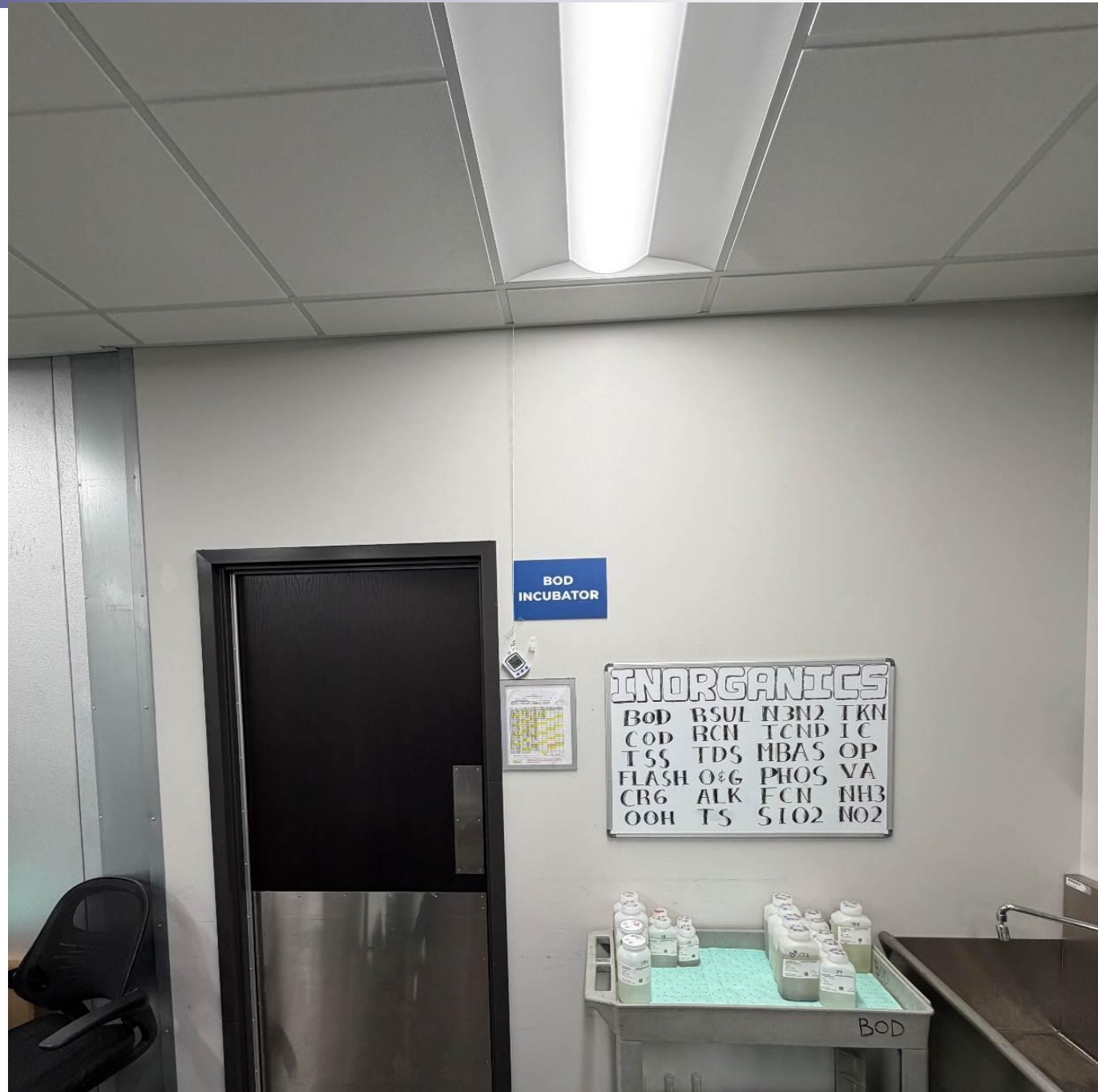
- Biological Organisms used in Treatment
 1. Require Oxygen as they eat and digest the food in the wastewater.
 2. Increase biomass through growth and reproduction.



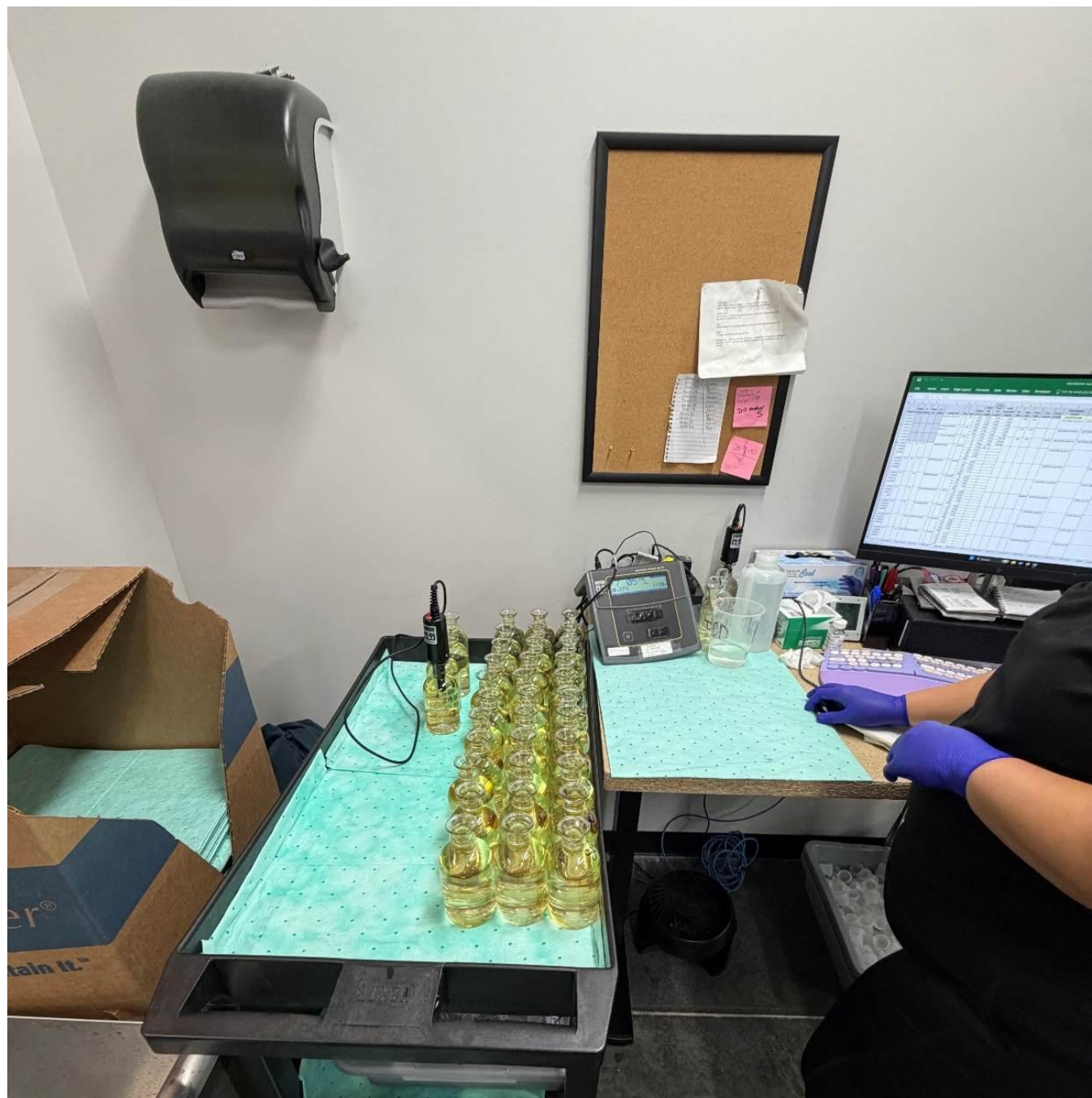
Biochemical Oxygen Demand

- COD – Largest of the three – measures everything in the sample that can be oxidized.
- BOD – usually $\frac{2}{3}$ or less of the COD – measures what microorganisms eat.
- TOC – usually $\frac{1}{2}$ or less of the BOD – measures the organic loading of the waste.

BOD Incubator



BOD Prep





Biochemical Oxygen Demand

- Method assumes waste content is proportional to the oxygen consumed by feeding organisms.
- Lab measures oxygen consumed over 5 days.
- Regulator compares influent and the effluent to give the efficiency or effectiveness of the sewage treatment process.

CBOD₅

- Carbonaceous BOD - BOD from the non-nitrogen containing materials in the wastewater.
- CBOD bottles - nitrogen inhibitor (TCMP) added to poison the organisms' enzymes that normally participate in the degradation of nitrogen-containing organic materials.

Dilution Selection

- Usable sample dilutions

- ☐ must produce a final oxygen reading of at least 1 mg/L

AND

- ☐ must have a consumed oxygen value of at least 1 mg/L (~2 mg/L after subtracting blank)

- Average BOD₅ results from all usable dilutions



Sample Checks

- pH of sample must be between 6.5 and 7.5
- Remove chlorine from sample, if present
- Test sample at room temperature ~ 20°C



Quality Control Indicators

- Dilution water blank – should have an initial DO of 8.5 - 9.1 and a consumed oxygen of no more than 0.2 mg/L.
- Seeded dilution water blank – should be 0.6 – 1.0 mg/L consumed oxygen
- 198 mg/L G/GA lab control sample – should produce a BOD₅ between 167.5 mg/L and 228.5 mg/L. (84.6% - 115% recovery)

Things to Remember

- BOD results are based on living organisms
- Poisoned seed will produce low results – indicated by increasing BOD with decreasing sample size
- Excess chlorine removal will produce excess BOD
- Avoid air bubbles a 1mL air bubble can throw off reading by up to 15% of the calculated BOD_5



Chemical Oxygen Demand

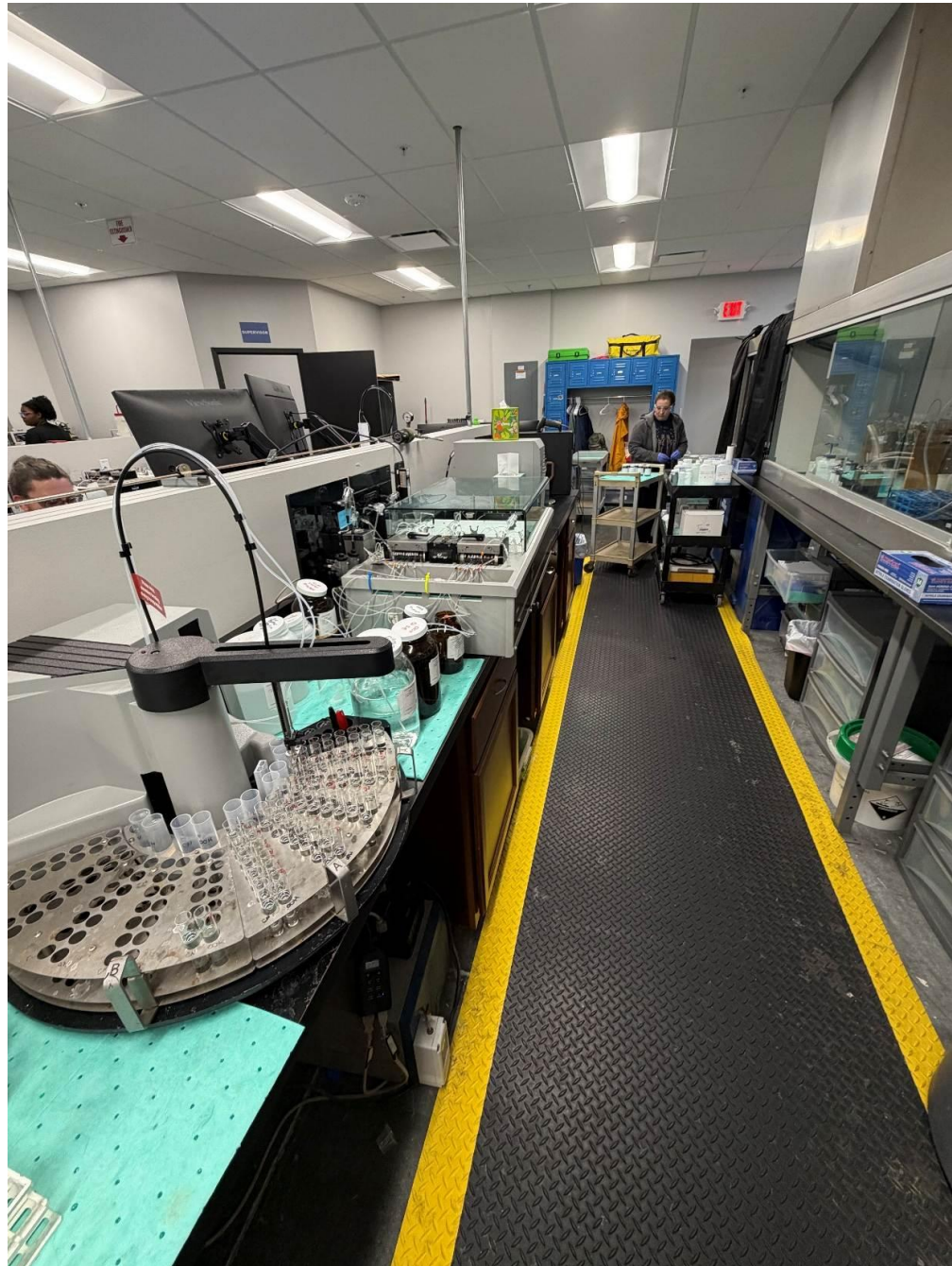
- Shorter analysis time ~ 3 hours.
- Toxic materials do not affect test.
- Measures everything in the sample that can be oxidized, both organic and inorganic.



Chemical Oxygen Demand

- COD like BOD measures the oxygen equivalent of the organic matter content.
- COD of the sample is determined by measuring the intensity of the green color of the reduced dichromate solution.

Total Organic Carbon





Total Organic Carbon

- Measures the organic loading of the wastewater.
- Ultra-violet light and a strong chemical oxidant oxidize organics to CO_2 and H_2O . The CO_2 is measured directly by an Infrared Analyzer.



Things to remember

- Short analysis time however, it requires expensive equipment.
- Samples must be acidic ($\text{pH} < 2$).
- Measures Total Organic Carbon content of the sample – not the Oxygen Demand.

TSS – Total Suspended Solids

- Dry, Cool & Weigh filter pad
- Mix sample
- Measure (quickly)
- Pour thru filter
- Dry, Cool & Weigh filter pad
- Calculate



TS & TVS – Total Solids



Oil & Grease or HEM (Hexane Extractable Materials)



Microbiology Lab – Fecal Coliform



Metals Lab



Metals Lab



Metals Lab



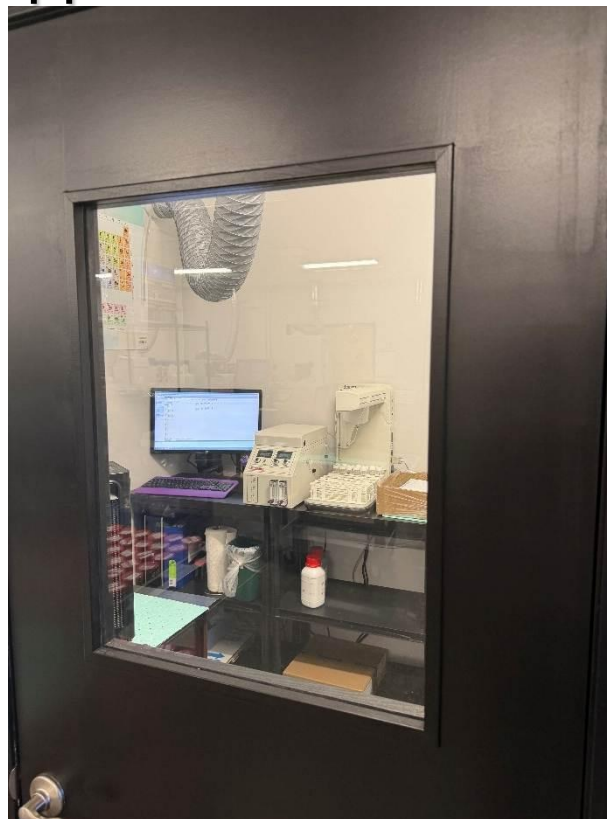
Low Level Mercury

CVAA

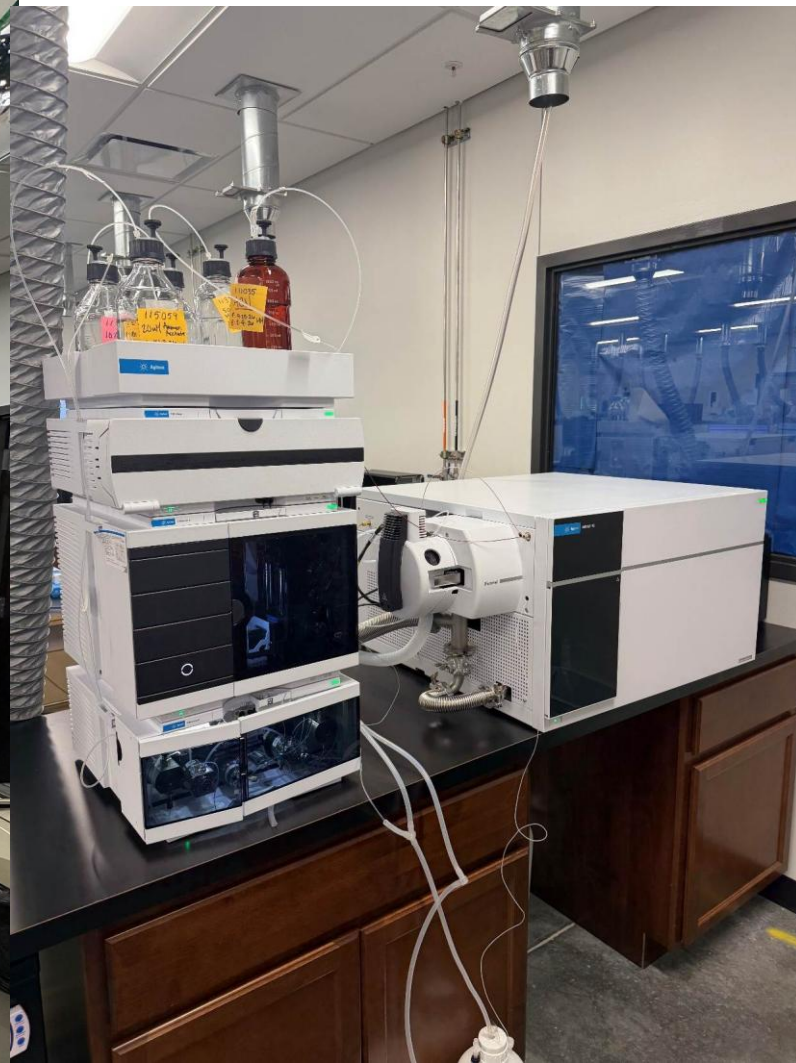
$0.0002 \text{ mg/L or ppm} = 0.2 \text{ ppb}$

CVAFS

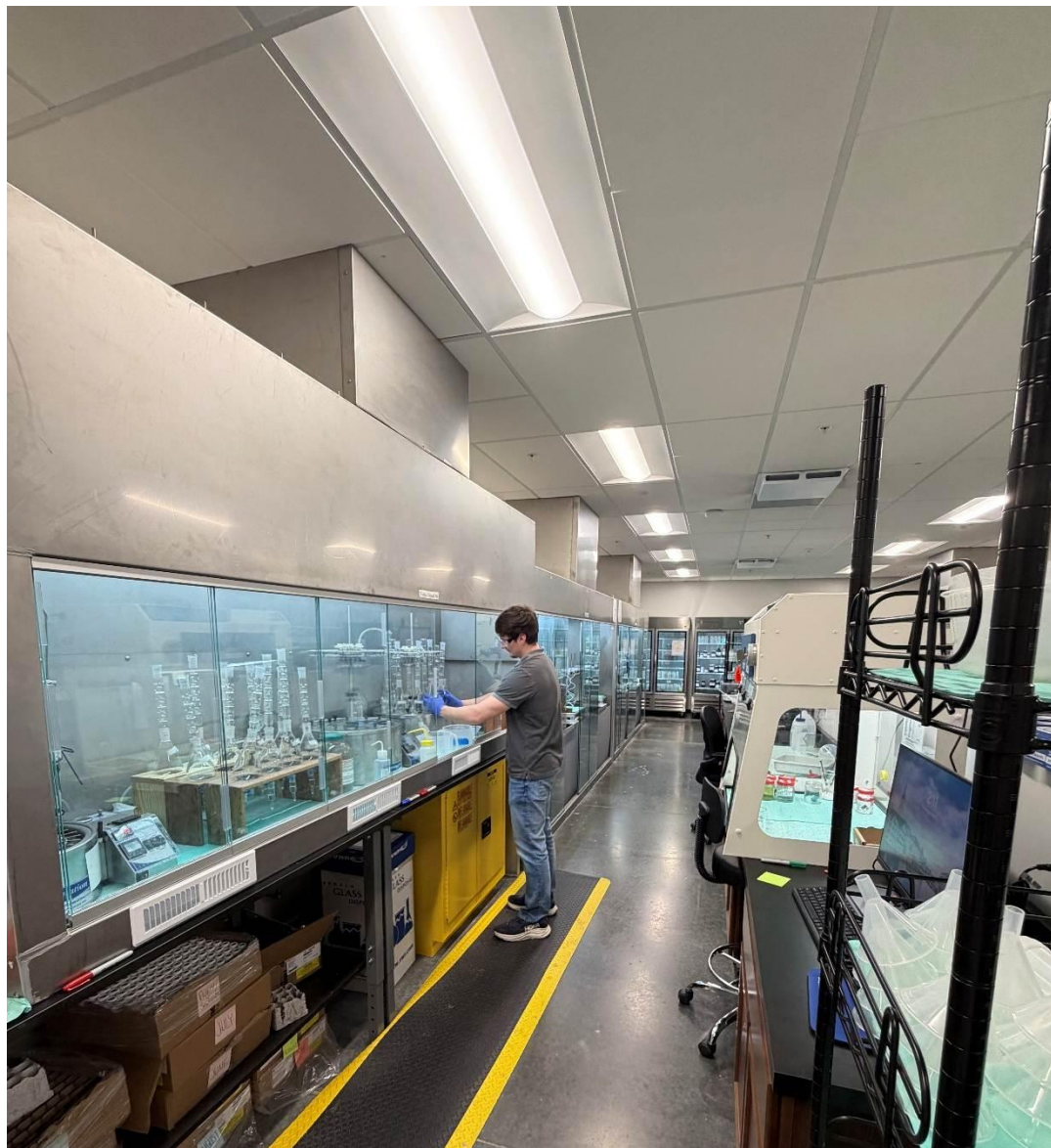
$0.5 \text{ ng/L or ppt} = 0.0005 \text{ ppb} = 0.0000005 \text{ ppm}$



Semi-Volatile Organics Lab



Semi-Volatile Organics Prep Lab



Volatile Organics Lab



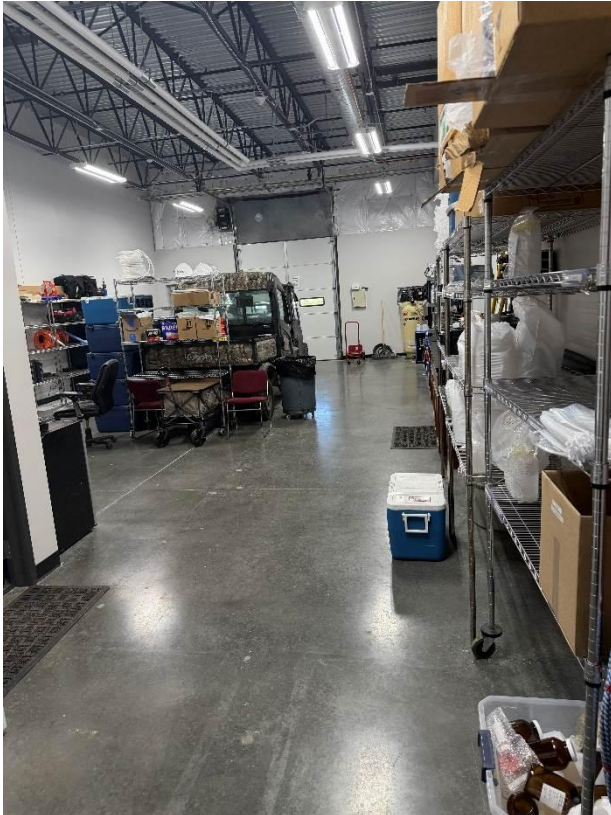
Since 1982



Teklab, Inc.
Environmental Laboratory

- 
- NELAC Accreditation Standards
 - Rapid Turn-Around-Time on Results
 - Electronic Deliverables in Client Specified Format
 - Personal Customer Service
 - Experienced and Well-Trained Analysts
 - A State of the art LIMS

Field Services



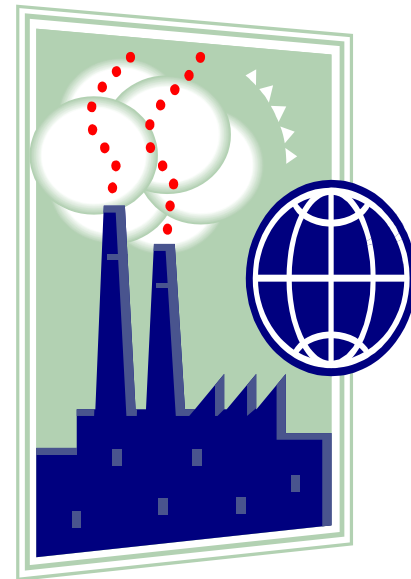
Over 40 Years Experience in the Industry



Teklab's Scope of Operation

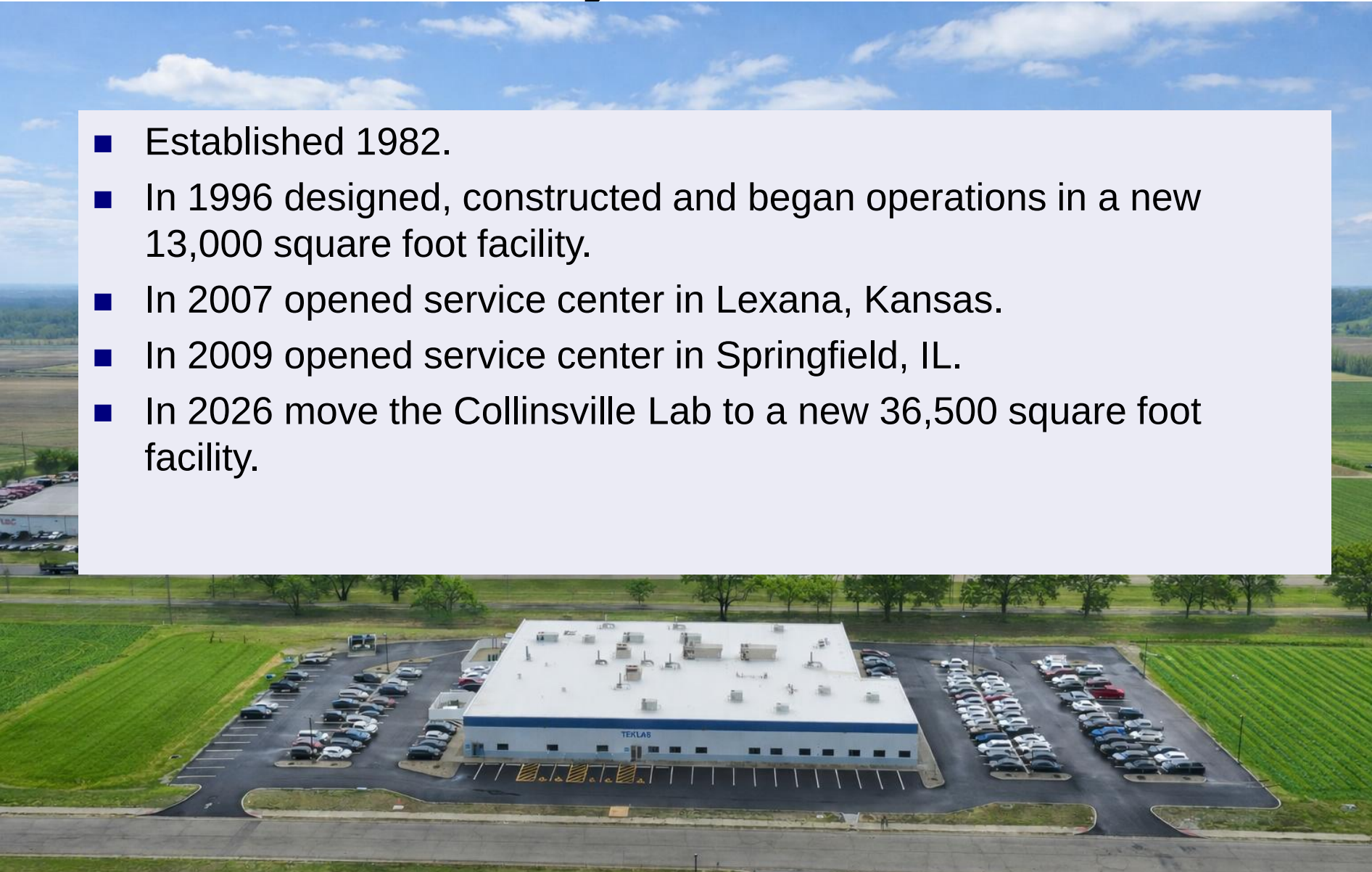
- Environmental/Chemical Testing - manufacturing, engineering, and municipal.

- ☐ Drinking water
- ☐ Groundwater
- ☐ Wastewater
- ☐ Sludge (BioSolids)
- ☐ Soil
- ☐ Oil
- ☐ Special waste testing
- ☐ Air Testing



Teklab History

- Established 1982.
- In 1996 designed, constructed and began operations in a new 13,000 square foot facility.
- In 2007 opened service center in Lexana, Kansas.
- In 2009 opened service center in Springfield, IL.
- In 2026 move the Collinsville Lab to a new 36,500 square foot facility.





Contact Information

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