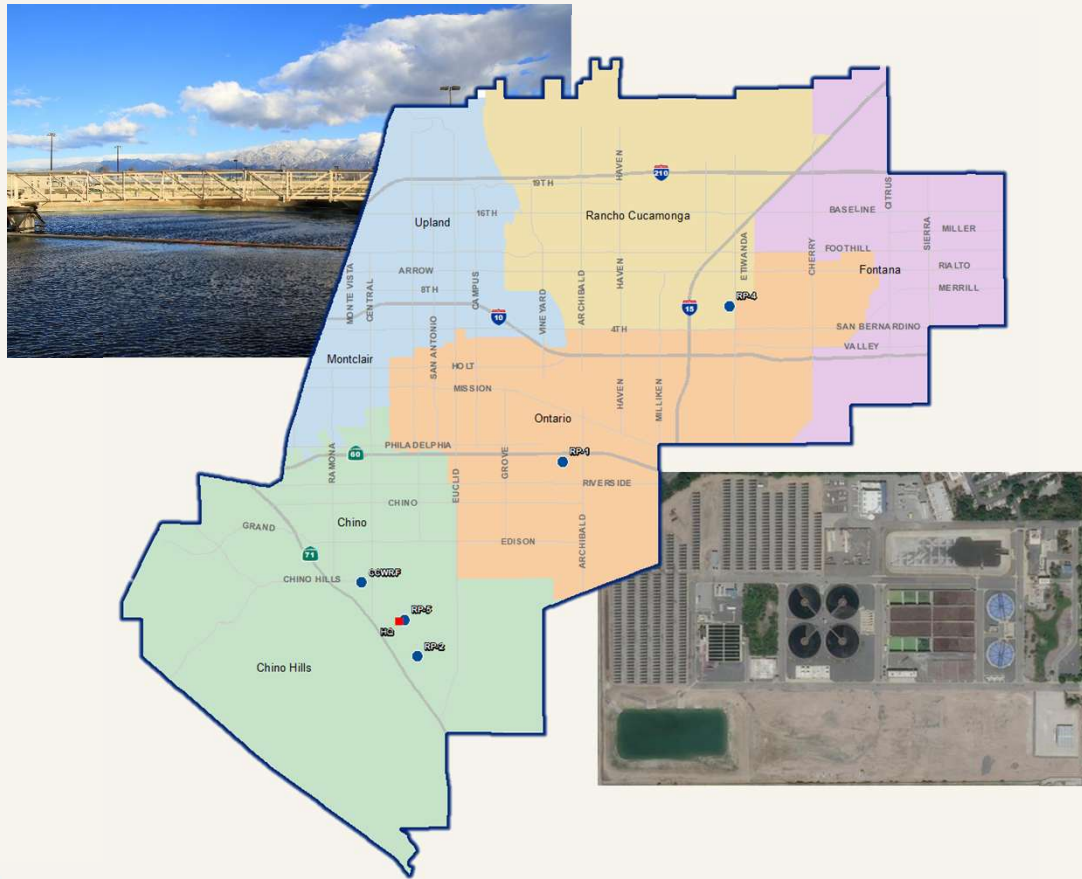


BEYOND COMPLIANCE: Using Laboratory Data to Solve Real-World Water Quality Challenges

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Inland Empire Utilities Agency



- Serving approximately 950,000 residents within 242 square miles in the southwestern portion of San Bernardino County
- Owns and operates four water recycling plants, a solids handling facility and composting facility.

Major Programs

- Water Supply
- Wastewater Treatment
- Recycled Water Supply and Distribution
- Groundwater Recharge
- Composting
- Renewable and On-Site Energy Generation
- Education Outreach and Water-Use Efficiency

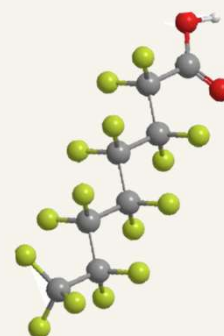
IEUA – Water Quality Laboratory

Mission: Provide high quality, reliable, analytical support to the Agency in its efforts to protect public health and environment



Provide analytical support for process control and regulatory programs

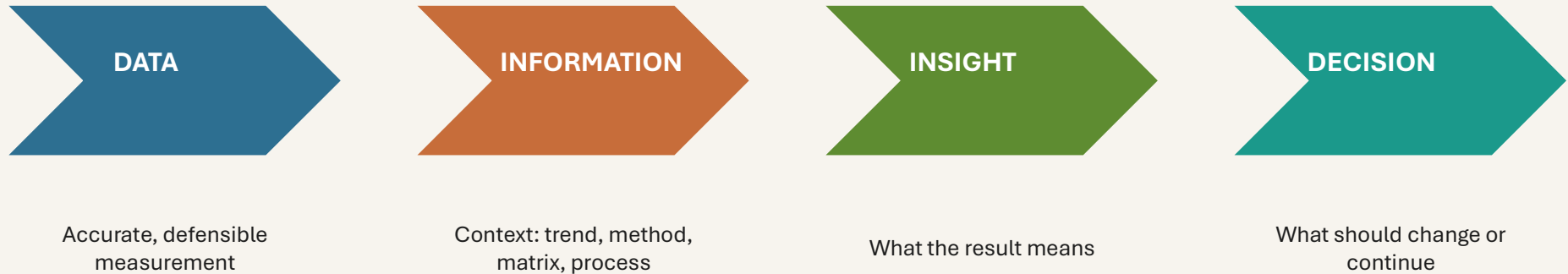
- ~ 500 FOAs in Biology and Chemistry
 - 20000 samples and 64000 Tests
- 21 staff
- Specialized testing
 - Toxicity
 - 1,4 Dioxane
 - CEC
 - PFAS



First and only public lab accredited to perform all CA approved PFAS testing methods

- EPA 533, EPA 537.1 , DoD QSM, EPA 1633

Compliance is the foundation. Decision support is the opportunity.



Ask the better question:

“What decision are we trying to support?”

Four ways laboratory science supports utility decisions

Roadmap

DETECT

1,2,3-TCP

Recognize when an apparent compliance trigger may actually be analytical interference.

EVALUATE

Free Cyanide

Make the method both accurate and usable: representative results with a practical holding time.

OPTIMIZE

TOC vs. BOD

Use a higher-throughput surrogate when BOD capacity and turnaround cannot meet operational demand.

ADVISE

Perchlorate in Bleach

Investigate treatment inputs and translate analytical findings into operational action.

Different projects. One common thread: the laboratory was helping answer a decision question.

Case Study 1: Intermittent detections with no clear pattern

THE QUESTION

Why were 1,2,3-TCP detections appearing intermittently above the 5-ppt MCL with no clear seasonal or operational pattern?

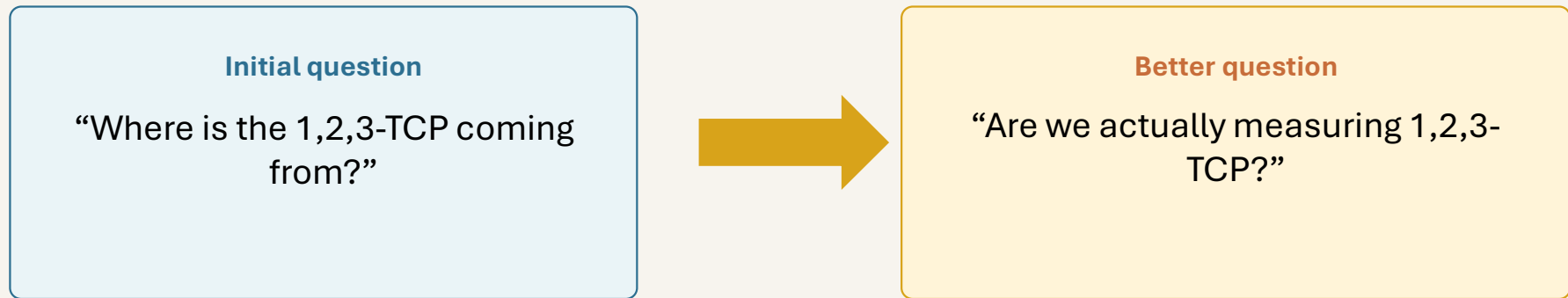
LABORATORY CONTRIBUTION

Process sampling showed apparent detections only after disinfection. The laboratory then evaluated method conditions, preservation effects, chromatographic separation, and the recycled-water matrix.

DECISION / VALUE

Before changing treatment operations, IEUA investigated whether the signal truly represented 1,2,3-TCP.

DETECT means recognizing when a result does not fit the process — and asking why.



Alternate GC column + slower temperature ramp separated the apparent response into 1,2,3-TCP and an unknown coeluting compound.

Lesson: when the data do not fit the process, investigate the measurement before changing the process.

Case study 2 : 2 linked objectives: representative free-cyanide results & a practical analytical window.

THE CHALLENGE

Cyanide was detected in chlorinated effluent, but the results did not fit the process picture. The laboratory needed to determine whether the signal represented actual free cyanide or an artifact of the analytical approach.

LABORATORY FINDING

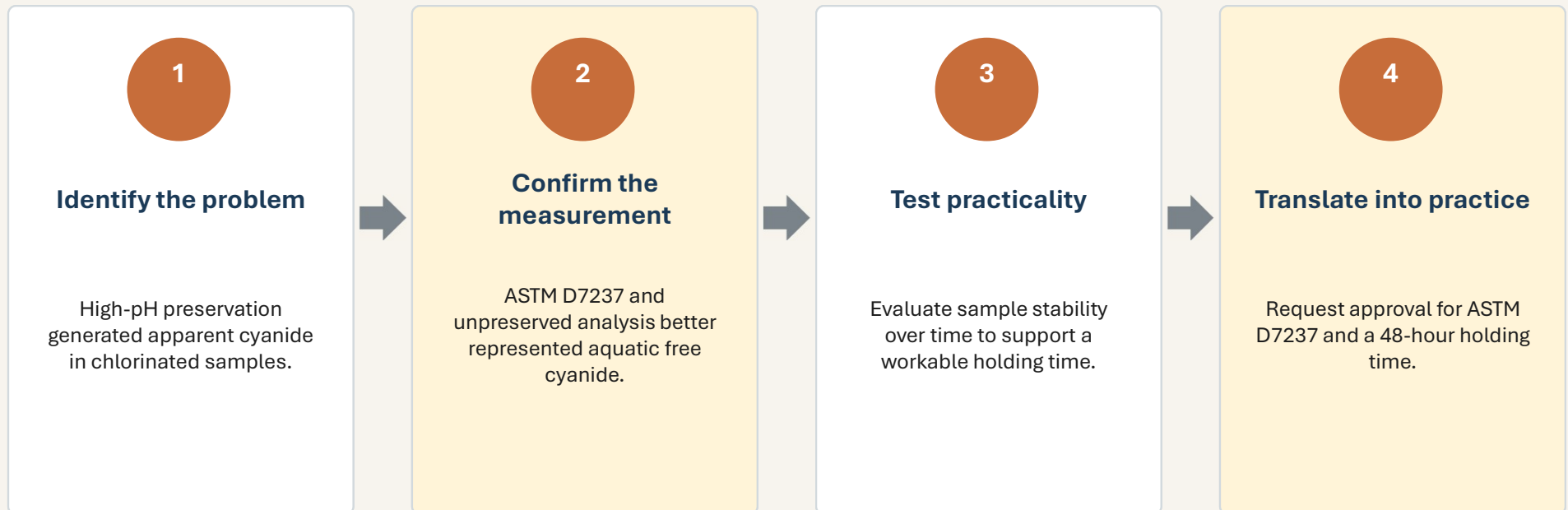
High-pH preservation created positive bias in chlorinated samples. Immediate, unpreserved analysis better represented actual free cyanide conditions.

BIGGER QUESTION

How can we preserve analytical integrity and still give laboratories enough time to analyze samples for routine monitoring and operational support?

EVALUATE means asking whether the method is producing the right answer — and whether it can work in routine practice.

Good laboratory science must produce the right answer — and deliver it in the real world.



Outcome: a method approach that was scientifically defensible, operationally workable, and meaningful for decision-making.

Case study 3: The operational need was bigger than what routine BOD capacity could sustain.

OPERATIONAL NEED

IEUA would need to support approximately 94 BOD samples each week across plant process/compliance samples and pretreatment/source control.

CAPACITY LIMIT

BOD is manual, requires multiple bottles and a 5-day incubation, and cannot be reanalyzed. Sustaining this sample load would require additional incubator capacity and staff.

LABORATORY SOLUTION

Evaluate TOC as a faster, higher-throughput surrogate so Operations could get meaningful information without overwhelming laboratory capacity.

OPTIMIZE means designing a monitoring approach that answers the operational question at a scale the laboratory can sustain.

From high-volume BOD demand to a defensible, higher-throughput TOC approach.

1

Regulatory pathway

Clean Water Act regulations allow COD or TOC substitution when a long-term correlation is demonstrated and accepted.

2

Correlation study

IEUA evaluated influent and effluent samples for BOD and TOC to establish/use appropriate correlations and justifications.

3

Operational benefit

TOC is automated, uses a single aliquot, allows reanalysis, and provides same-day information for Operations.

4

Sustained control

Ongoing verification compares BOD and TOC monthly, evaluates data every 5 years, and adjusts factors if needed.

Key lesson: the best analytical solution is the one that is scientifically justified, timely, and sustainable.

Using laboratory data to manage chemical aging, water-quality risk, and disposal costs.

THE QUESTION

Could sodium hypochlorite be a source of perchlorate?
Could storage practices increase perchlorate formation risk?

WHAT THE LAB EVALUATED

- Potential perchlorate sources
- Perchlorate in sodium hypochlorite
- Storage conditions and product age
- Perchlorate formation over time

WHAT WE LEARNED

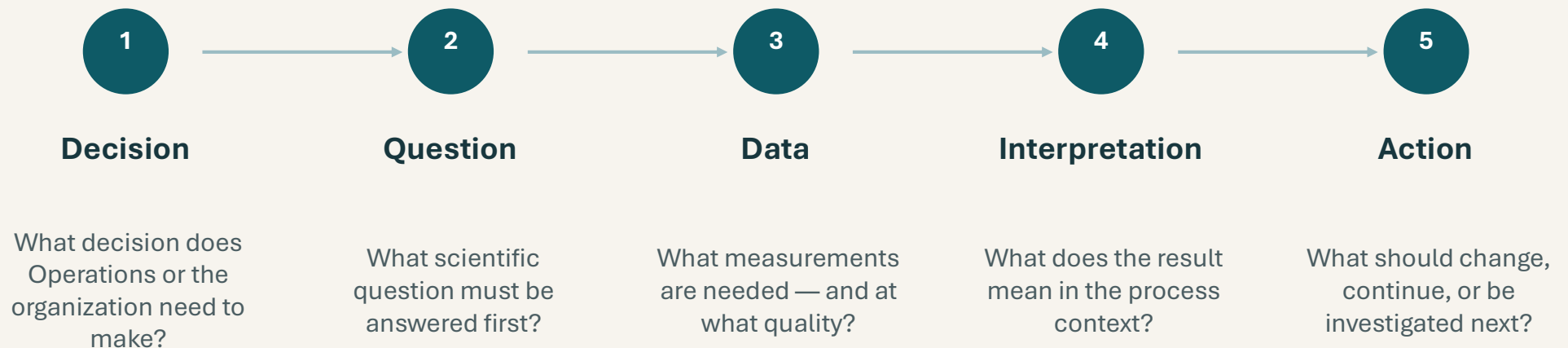
- Perchlorate can form in stored sodium hypochlorite
- Storage conditions and shelf life are critical
- Older inventory can increase water-quality risk

OPERATIONAL DECISION

- Reduce sodium hypochlorite shelf life
- Improve inventory turnover and storage practices
- Use chemical before aging becomes a concern
- Reduce costly disposal of aged product

Laboratory data turned a water-quality investigation into a practical chemical-management decision.

The common thread: start with the decision, not the test



This reframes the laboratory from a testing service to a scientific partner.

BEYOND COMPLIANCE

**The laboratory's greatest product
isn't data.**

It is confidence in the decisions that data supports.

Detect • Evaluate • Optimize • Advise

Questions?



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