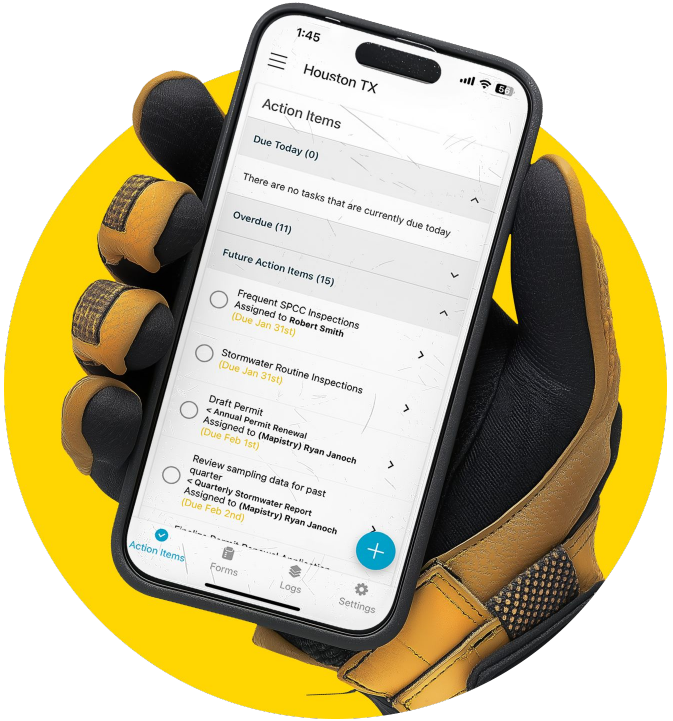
Innovation in Environmental Compliance for Data Centers

AI and Automation for Environmental Reporting



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Speakers

Ino Tsichrintzi

AI Application Lead / Solutions Engineer

Ryan Janoch

Cofounder

Ops

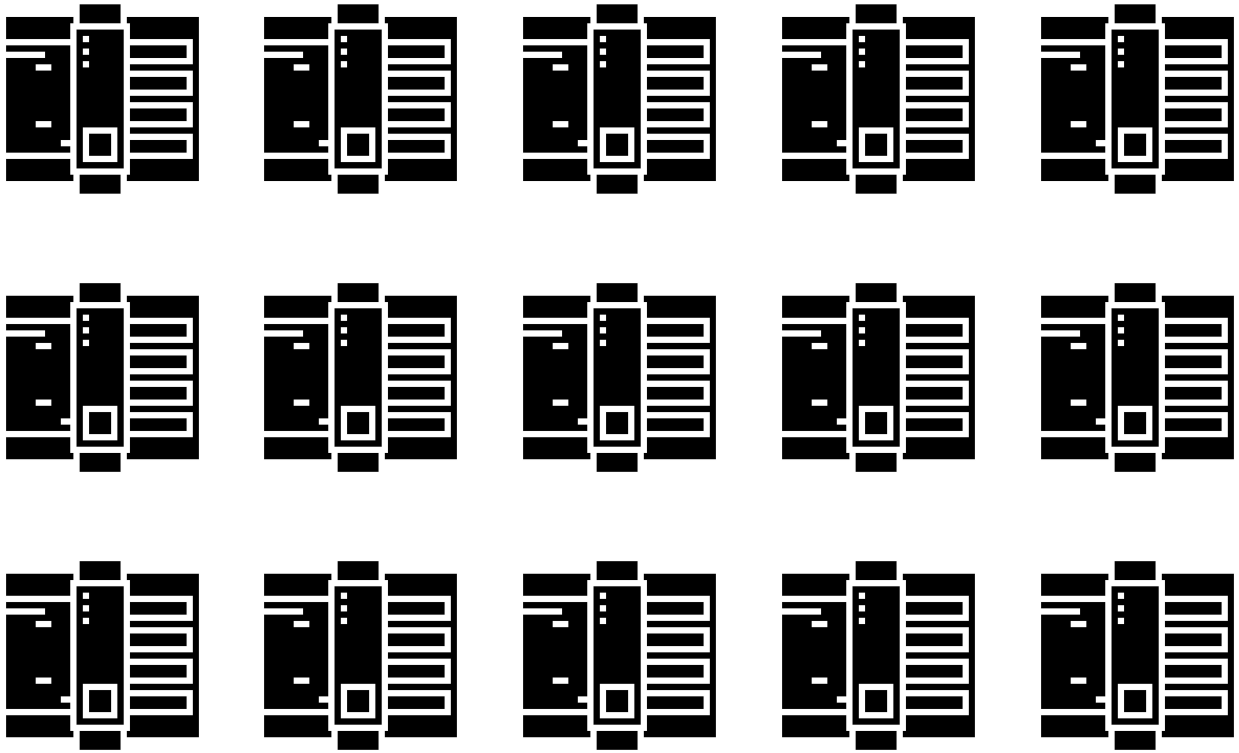
99.99%

Uptime

Env

100%

Manual



Manual compliance is an operational cost & business risk

Use Case #1: Air Permits

automated data collection

Use Case #1: Air Permits

Permit Requirements

Logs

20. **On Site Records –** The permittee shall maintain records of emission data and operating parameters as necessary to demonstrate compliance with this permit. The content and format of such records shall be arranged with the Air Compliance Manager of the Virginia DEQ Northern Regional Office. These records shall include, but are not limited to:

    a. Monthly log of the hours of operation, date, and reason operated (as defined in Condition 4) for each engine-generator set (Ref. Nos. DCA-A through DCA-E, DCA-Swing, DCB-A through DCB-H, DCC-A through DCC-F, DCD-A through DCD-E, and DCD-R), in accordance with Condition 2. In addition the log shall contain:

        i. Generator load with and without SCR (if applicable)

        ii. Hours of operation with and without SCR (for units equipped with SCR)

Calculations & Aggregations

12. **Annual Emissions Calculations –** The annual emissions of NOx (as NO_2), CO, PM10 and VOC from the diesel engine-generator sets (Ref. Nos. DCA-A through DCA-E, DCA-Swing, DCB-A through DCB-F, DCB-G, DCB-H, DCC-A through DCC-F, DCD-A through DCD-E, and DCD-R) shall be calculated monthly as the sum of each consecutive twelve-month period.

    a. Monthly emissions from diesel engine-generator sets (Ref. Nos. DCA-A through DCA-E and DCA-Swing) shall be calculated as follows:

    NOx = (Total monthly hours of operation of the engine-generator sets x 46.36 lb/hr) ÷ 2000 lb/ton

    CO = (Total monthly hours of operation of the engine-generator sets x 5.18 lb/hr) ÷ 2000

    PM_{10} = (Total monthly hours of operation of the engine-generator sets x 0.39 lb/hr) ÷ 2000 lb/ton

    VOC = (Total monthly hours of operation of the engine-generator sets x 0.74 lb/hr) ÷ 2000 lb/ton

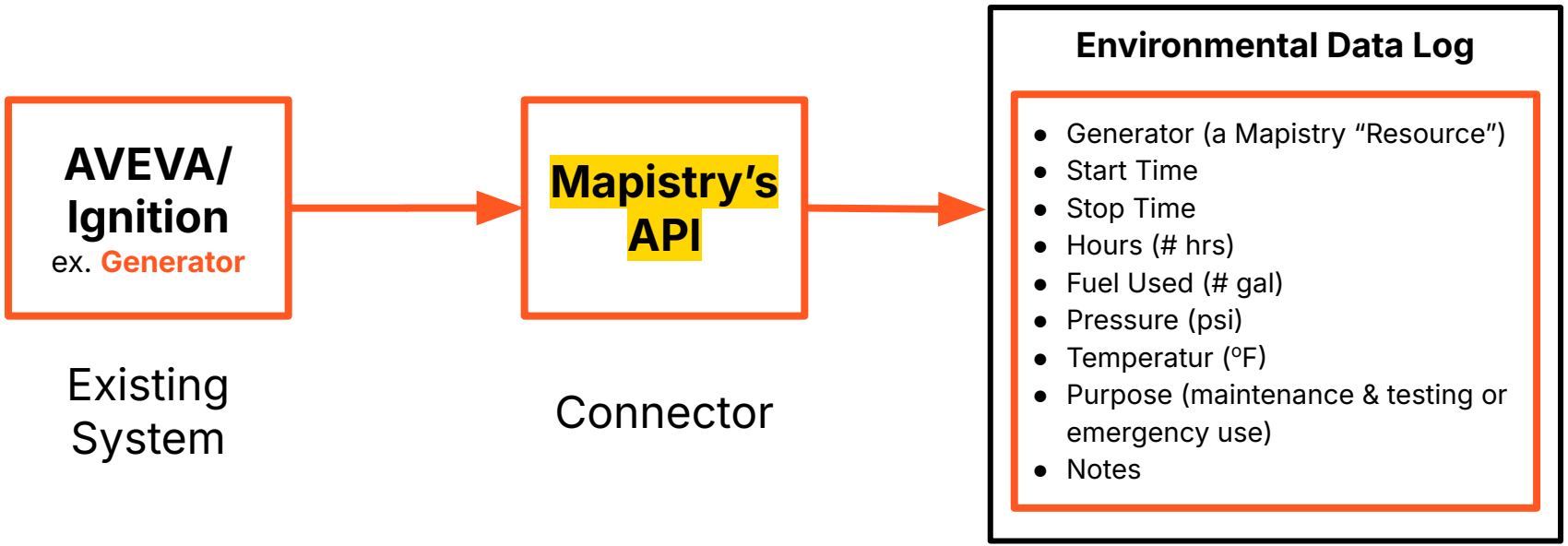
Reports & Limits

11. **Facility Wide Limits** – Combined annual emissions from the engine-generator sets (DCA-A through DCA-E, DCA-Swing, DCB-A through DCB-H, DCC-A through DCC-F, DCD-A through DCD-E, and DCD-R) shall not exceed the limits specified below:

Nitrogen Oxides (as NO_2)	53.7 tons per year
Carbon Monoxide (CO)	22.0 tons per year
Particulate Matter (PM_{10})	1.6 tons per year
Volatile Organic Compounds (VOC)	4.2 tons per year

Use Case #1: Air Permits

Automated Data Collection



Use Case #1: Air Permits

Data Flow

This can all be automated!

Data Logs

Start Time

Stop Time

Hours

Fuel Used (gal)

Pressure (psi)

Temperature (oF)

Use (maintenance / emergency)

Notes

Calculations & Aggregations

Monthly Hours

Monthly Fuel

NOx (lbs)

SOx (lbs)

$PM_{2.5}$ (lbs)

Reports

Monthly Hours by Engine

Monthly Hours by Use

Annual Emissions (NOx, SOx, $PM_{2.5}$)

Rolling 12-Month Emissions by Engine

Limits

Per Engine Limit

Annual NOx Limit

Resources

Engine, Emission Factors, Load, etc

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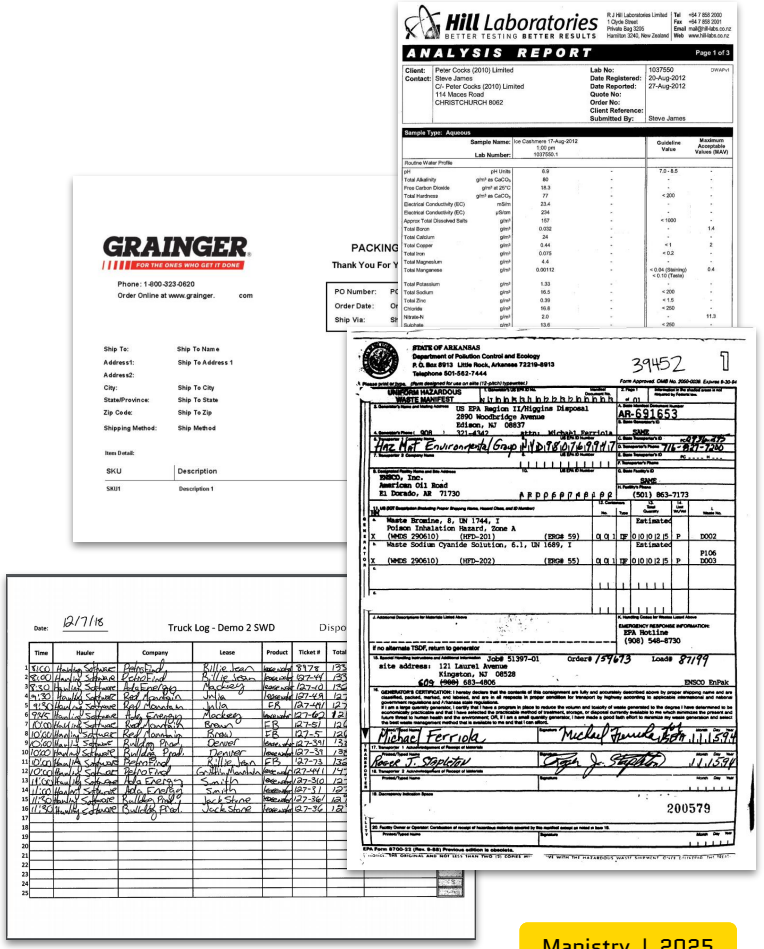
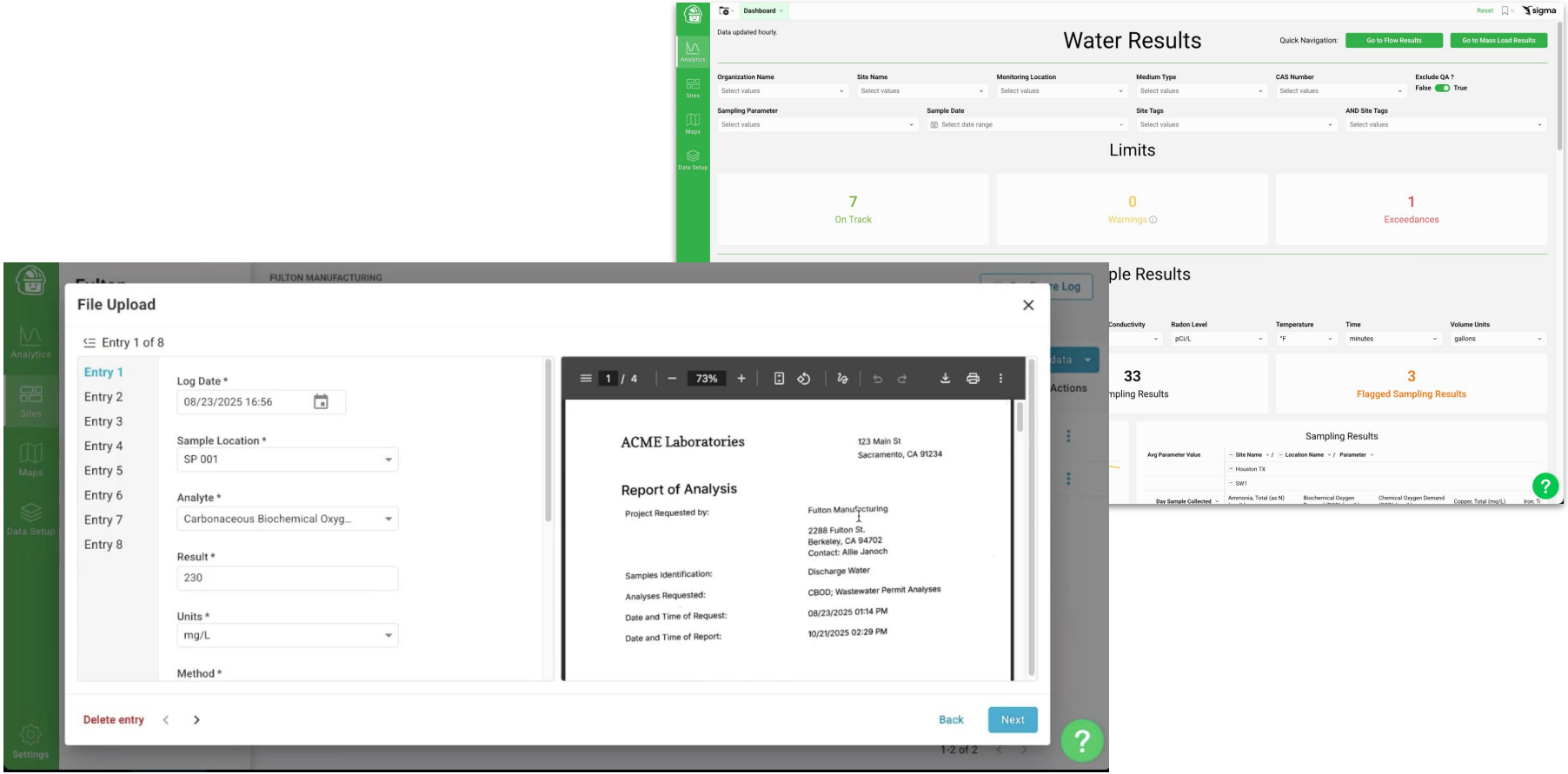
Use Case #2: Lab Report Data

AI data extraction

AI When Paper Persists

- Data **only exists in a PDF** (e.g. receipts or lab reports)
- Operators **don't want to go digital** or do not have a company phone (e.g. truck log)
- The industry **norm is still paper** (e.g. waste manifest)




Water Results
Quick Navigation:
Go to Flow Results
Go to Mass Load Results
Limits
7
On Track
0
Warnings
1
Exceedances
33
Flagged Sampling Results
Sampling Results
File Upload
Entry 1 of 8
Entry 1
Entry 2
Entry 3
Entry 4
Entry 5
Entry 6
Entry 7
Entry 8
Log Date *
08/23/2025 16:56
Sample Location *
SP 001
Analyte *
Carbonaceous Biochemical Oxyg...
Result *
230
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mg/L
Method *
ACME Laboratories
123 Main St
Sacramento, CA 91234
Report of Analysis
Project Requested by:
Fulton Manufacturing
2288 Fulton St.
Berkeley, CA 94702
Contact: Allie Janoch
Samples Identification:
Discharge Water
Analyses Requested:
CBOD; Wastewater Permit Analyses
Date and Time of Request:
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Date and Time of Report:
10/21/2025 02:29 PM
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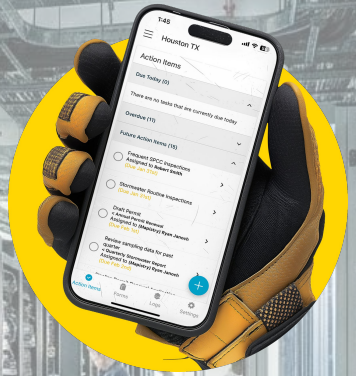
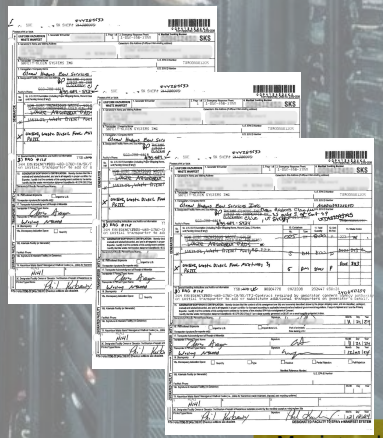
Scalable

Or Bottleneck?





Questions?

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