Novolyze

Digitalization of Sanitation in Food and Beverage Manufacturing

CONFIDENTIAL – NOVOLYZE ©2024 – ALL RIGHTS RESERVED

Smart Food Safety & Quality

12 years delivering FSQ Solutions to the F&B Industry

Global Headquarters: Bethesda, MD

EMEA Headquarters: Dijon, France

Solutions deployed in 42 countries

Integrations to most ERP's, MES, LIM's, Labs & PLC's

Solution built upon the Microsoft Azure Stack

Certified B Corporation

Information Security Management ISO 27001 Certified

ISO 9001:2015

cybervadis

ANAXAGO eit Food European Innovation Council FoodBytes! by Rabobank PLUGANDPLAY LE GRAND PLAN D'INVESTISSEMENT VITAGORA WAVE Responsible Investing for a Clean Future FranceAgriMer hello tomorrow SIGMA GESTION Microsoft for Startups International Association for Food Protection asta INC International Nutshell Fruit IFTPS

Meet Your Presenters

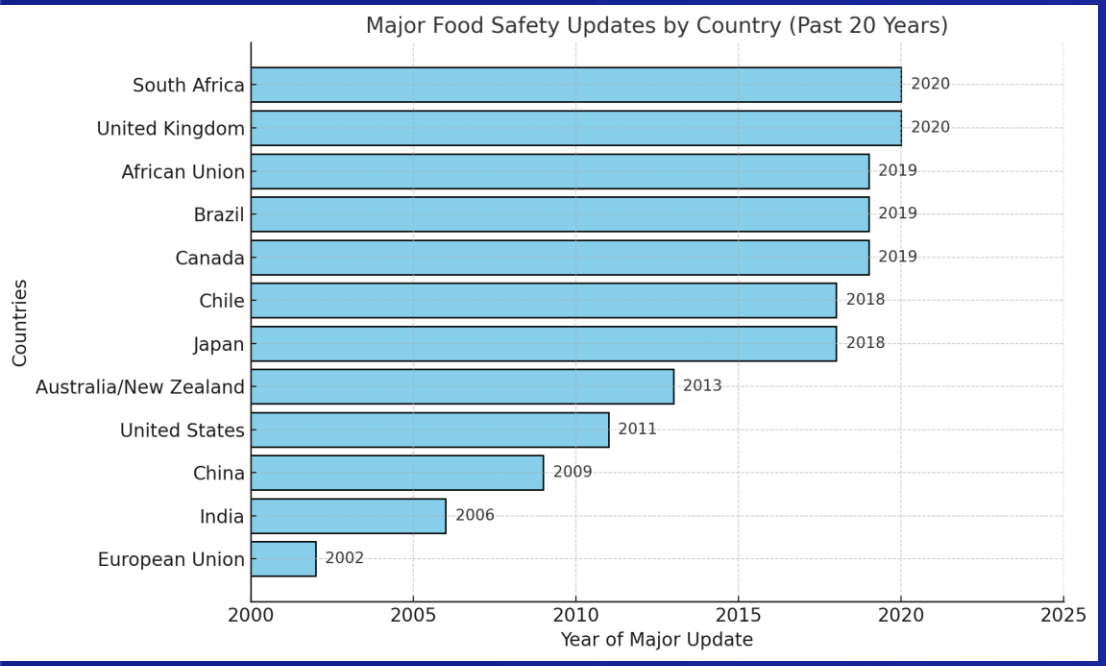
Emma Pruitt

Customer Success Manager
Novolyze

Neil Bogart

Principal Scientist
Post Consumer Brands

Introduction



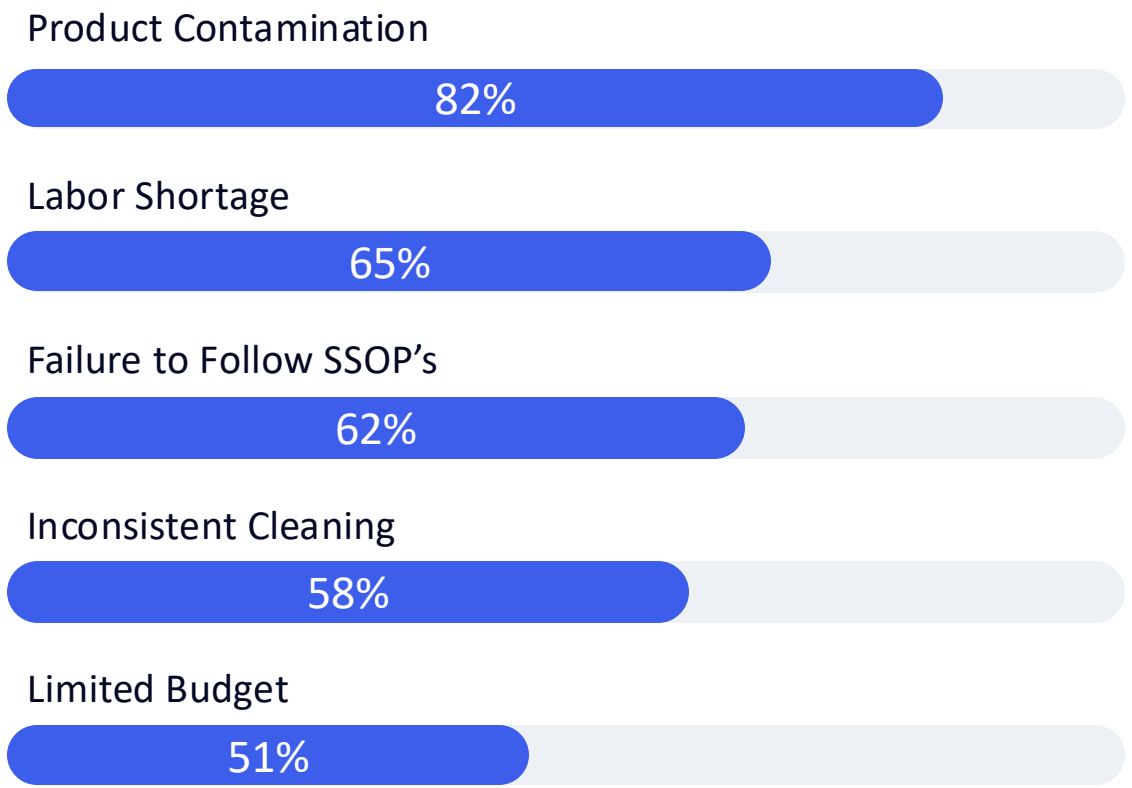
- **Purpose:** Explain why digitalization is transformative in sanitation processes.
- **Key Points:**
  - The food and beverage industry faces increasing pressures: regulatory demands, consumer safety concerns, and operational efficiencies.
  - Digital tools (IoT, AI, cloud systems) enable precise monitoring, real-time adjustments, and cost-saving strategies.

Novolyze

2022 Survey from *Manufacturing Tomorrow*

Question:

Top 5 Challenges you face with your Sanitation Program



The Need for Digitalization

- **Core Drivers:**
  - **Regulatory Demands:** Tightened food safety requirements (e.g., FSMA in the U.S., globally, Codex Alimentarius, ISO 22000, and GMPs).
  - **Consumer Expectations:** Transparency, traceability, and confidence in hygiene practices.
  - **Operational Efficiency:** Pressure to reduce downtime, waste, and costs.

What is Digitalization of Sanitation?

Definition:

- Integration of digital tools into sanitation processes for better tracking, control, and predictive capabilities.

Components:

- **Automated Cleaning Systems:** Tools for consistent cleaning (e.g., CIP systems).
- **Digital Documentation:** Cloud-based logs, automated compliance records.
- **Predictive Maintenance:** AI-based models forecasting when equipment needs cleaning or servicing.

Key Technologies in Sanitation Digitalization

IoT and Sensors:	• Sensors for real-time data on water flow, chemical use, and equipment conditions.
AI and Machine Learning:	• Applications for pattern detection, optimizing sanitation schedules, and identifying contamination risks.
Cloud Systems:	• Centralized, accessible sanitation records enabling remote oversight.

Benefits of Digitalization in Sanitation

Efficiency Gains:	Traceability:	Cost Savings:	Improved Safety:
• Faster cleaning times, and reduced chemical and water usage.	• Digital logs for audits and compliance checks.	• Lowered labor costs, reduced risks of recalls, and fewer production interruptions.	• Immediate alerts during sanitation failures or contamination events.

Challenges in Implementing Digitalization

- **High Initial Costs:** Equipment and system upgrades.
- **Integration Issues:** Compatibility with legacy systems.
- **Data Security:** Protecting sensitive operational data.
- **Resistance to Change:** Managing workforce concerns about automation.
- **Recommendation:** Pilot programs to test ROI before full-scale deployment.

Best Practices for Digitalization

Phased Approach: Begin with smaller, controlled projects and scale gradually.

Training: Invest in upskilling staff to operate and maintain new systems.

Continuous Improvement: Update processes based on data insights and emerging technologies.

Partnerships: Collaborate with tech providers for tailored solutions.

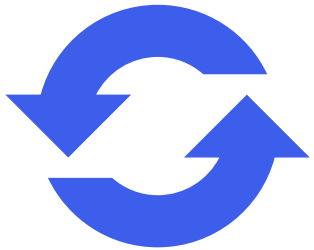
Future Trends

Advanced AI: Enhanced predictive models for sanitation cycles.

Blockchain: Transparency and accountability in hygiene practices.

Sustainability Integration: Aligning digital tools with green initiatives to reduce resource consumption.

Conclusion



Summary:

Digitalization transforms sanitation by enhancing efficiency, compliance, and safety.

Challenges exist but can be mitigated with strategic planning.

Closing Thought:

The future of sanitation is data-driven, efficient, and sustainable.

Sanitation Complete

Digitization is a Journey

Don’t

Boil the Ocean

Novolyze

A Holistic Approach

RISK MITIGATION

Eliminate gaps, real time program compliance monitoring, workflows eliminate manual communications

- BRAND PROTECTION
- QUANTIFIED RISK EXPOSURE
- RISK-AWARE DECISIONS

COMPLIANCE

Stricter regulations, higher customer expectations, New Era for Smarter Food Safety

- ENHANCED TRACEABILITY
- AUDIT-READINESS
- READINESS FOR CHANGE

PROFITABILITY

Chemical and labor cost remain at all time highs, reducing by 10% is the goal

- CHEMICAL COST
- UPTIME
- ONTIME STARTUPS
- STAFFING

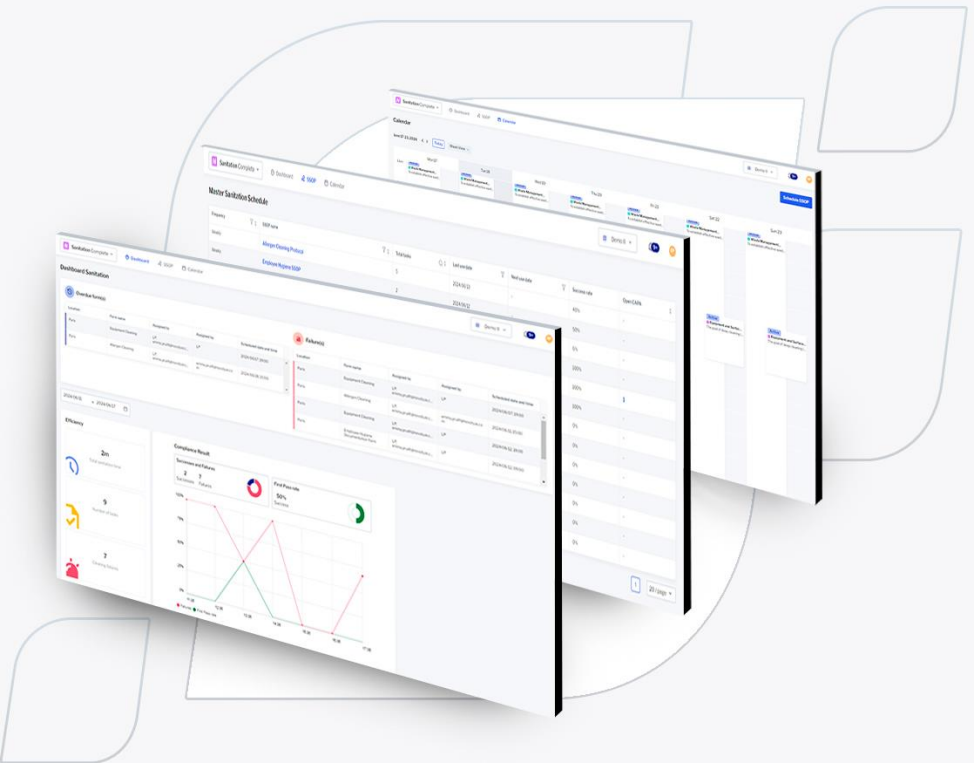
SUSTAINABILITY

Food production = Largest contributor of Greenhouse Gas (WHO, 2021)

- ENERGY
- WATER
- SANITIZERS
- WASTE & REWORK

Sanitation Complete

A single cohesive solution to systematically automate and monitor your entire Sanitation Program

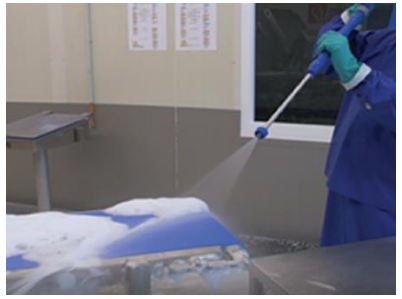


- Sanitation Program Compliance Monitoring
- Data Visualization, Reporting & Trending
- Transition from Paper to Digital Forms
- Closed Loop CAPA Management
- Master Sanitation Schedule & Associated Tasks

Novolyze

Standard Sanitation Operating Procedures

- Step by step view of each SSOP
- A place for operators to reference what is involved in each task
- Job aids such as pictures can be added



Allergen Cleaning Protocol Active

Created at **2024/05/30**

SSOP details

Person to notify

-

Risks

Crustaceans, Eggs, Peanuts, Soy, Milk, Tree nuts, Celery, Mustard, Sesame seeds, Wheat (gluten), Milk, casein

Protocol review frequency

None

Total time

01:00

-

Attachments

- **Foam.png** emma.pruitt@novolyze.com • 2024/05/30
- **Job Aid Swabbing (1).jpg** emma.pruitt@novolyze.com • 2024/05/30
- **Pre Rinse.png** emma.pruitt@novolyze.com • 2024/05/30
- **Rinse.png** emma.pruitt@novolyze.com • 2024/05/30

Step 1

• Time (in minutes) 10 • Action Pre-Rinse • Associated material Warm Water • Concentration - • Temperature 120°F

Step 2

• Time (in minutes) 15 • Action Scrubbing • Associated material Detergent, Applicator, Scrubbing Brush • Concentration 200ppm • Temperature -

Step 3

• Time (in minutes) 10 • Action Rinse • Associated material Warm Water • Concentration - • Temperature 120°F

Step 4

• Time (in minutes) 10 • Action Sanitizing • Associated material Quaternary Sanitizer • Concentration 400ppm • Temperature -

Step 5

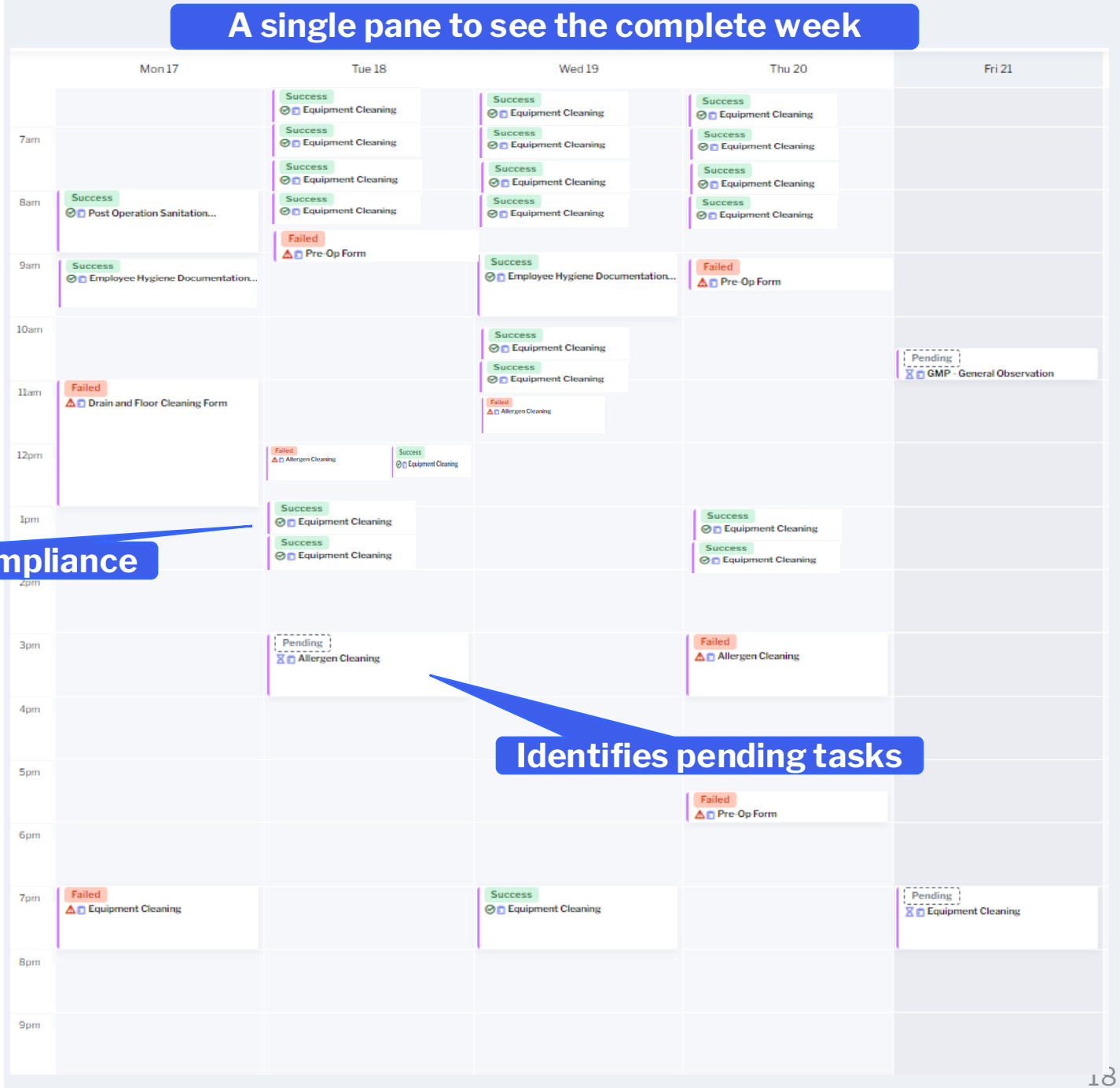
• Time (in minutes) 10 • Action Post- Cleaning Inspection • Associated material Flashlight • Concentration - • Temperature -

Step 6

• Time (in minutes) 5 • Action Allergen Swab Verification • Associated material Allergen Swab kit, gloves, swab template • Concentration - • Temperature -

Master Sanitation
Task & Event Schedule

- Schedule and assign all tasks & events
  - Sanitation of lines
  - Pre-op Inspection
  - HACCP Checks
  - Housekeeping
- Notifications when a task is incomplete
- Monitor line sanitation activity & non-compliance

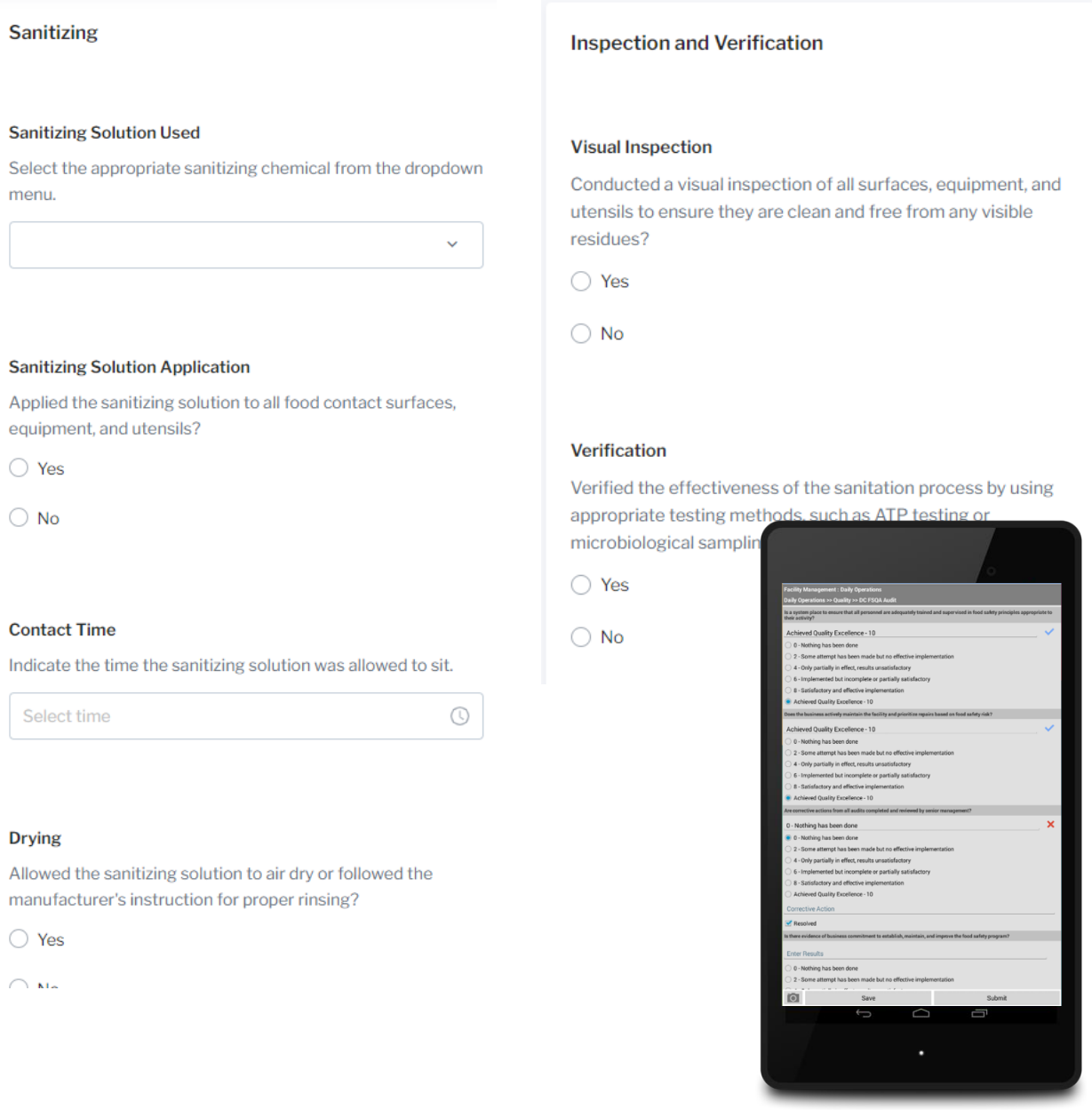


Novolyze

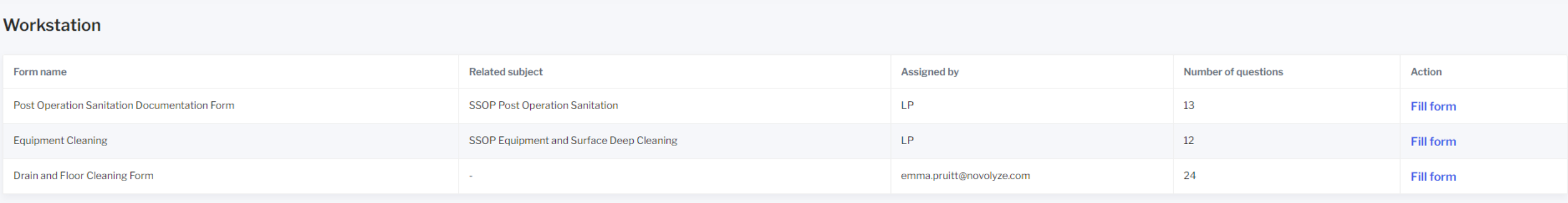
Digital Forms

Transition all FSQ forms to digital format:

- Collect real time data
  - Line checks
  - Inspections
- Alerts for non-compliant events
- Eliminate missed data
- Reduce labor
  - Digital signatures - 21 CFR Part 11 compliant
- Track & Trend data
- Improves audit readiness



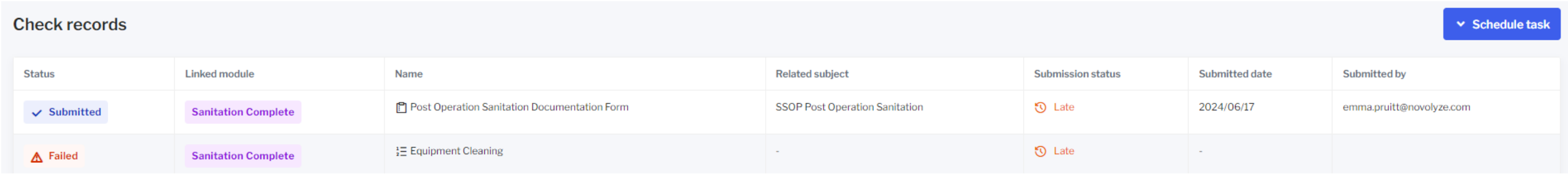
Workstation and Record Check



Workstation

Form name	Related subject	Assigned by	Number of questions	Action
Post Operation Sanitation Documentation Form	SSOP Post Operation Sanitation	LP	13	Fill form
Equipment Cleaning	SSOP Equipment and Surface Deep Cleaning	LP	12	Fill form
Drain and Floor Cleaning Form	-	emma.pruitt@novolyze.com	24	Fill form

Workstation where team members go to see tasks assigned to them



Check records

Schedule task

Status	Linked module	Name	Related subject	Submission status	Submitted date	Submitted by
Submitted	Sanitation Complete	Post Operation Sanitation Documentation Form	SSOP Post Operation Sanitation	Late	2024/06/17	emma.pruitt@novolyze.com
Failed	Sanitation Complete	Equipment Cleaning	-	Late	-	

View records & Signoff – CFR21 part 11 compliant

Dashboard

Daily control tower

Dashboard Sanitation

Overdue form(s)

Location	Form name	Assigned to	Assigned by	Scheduled date and time
Atlanta	Drain and Floor Cleaning Form	LP, emma.pruitt@novolyze.c...	emma.pruitt@novolyze.com	2024/06/17, 11:00
Paris	Equipment Cleaning	LP, emma.pruitt@novolyze.c...	LP	2024/06/17, 19:00

Failure(s)

Location	Form name	Assigned to	Assigned by	Scheduled date and time
Paris	Equipment Cleaning	LP, emma.pruitt@novolyze.c...	LP	2024/06/07, 19:00
Paris	Allergen Cleaning	LP, emma.pruitt@novolyze.c...	emma.pruitt@novolyze.com	2024/06/11, 15:00
Paris	Equipment Cleaning	LP, emma.pruitt@novolyze.c...	LP	2024/06/12, 19:00
Paris	Employee Hygiene Documentation Form	LP, emma.pruitt@novolyze.c...	LP	2024/06/12, 09:00

Compliance Result

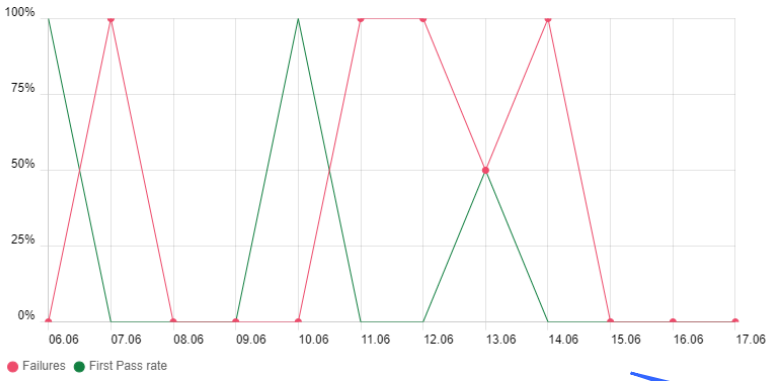
Successes and Failures

7 Successes

6 Failures

First Pass rate

85% Success



SSOP Ranking

Ranking	SSOP name	Success rate	Frequency	Open CAPA
5	Employee Hygiene...	↓ 0%	Weekly	-
4	Equipment and Surfac...	↓ 25%	Weekly	-
3	Allergen Cleaning...	↓ 33%	Weekly	-
2	Post Operation...	→ 100%	Weekly	-
1	Pre-Operationa...	→ 100%	Weekly	-

Compliance Schedule

15 Total

5 On time | 5 Late | 5 Expired

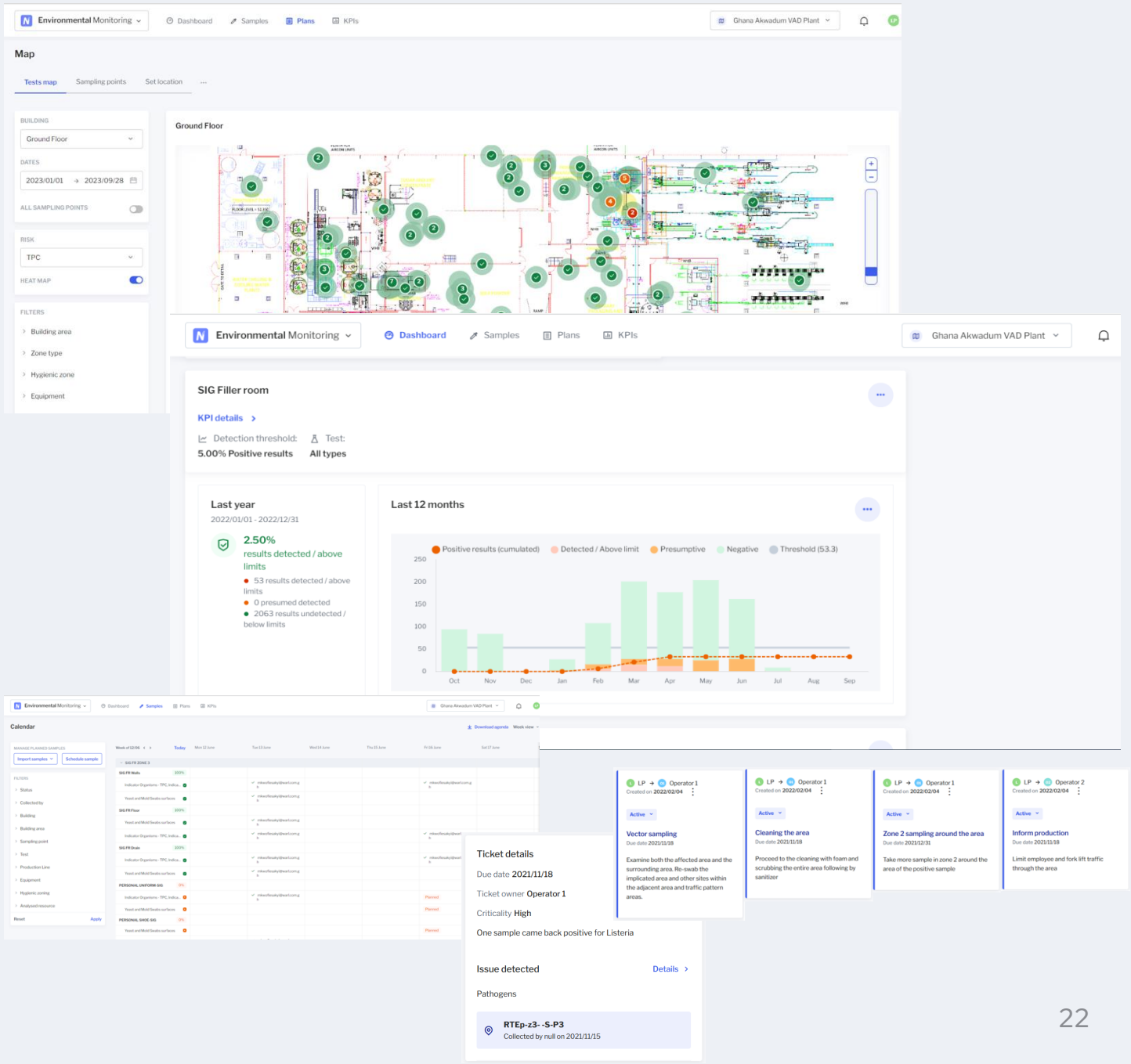
Efficacy of my SSOP

Novolyze

Environmental Monitoring

Increases efficiency and decreases expense of traditional sampling processes

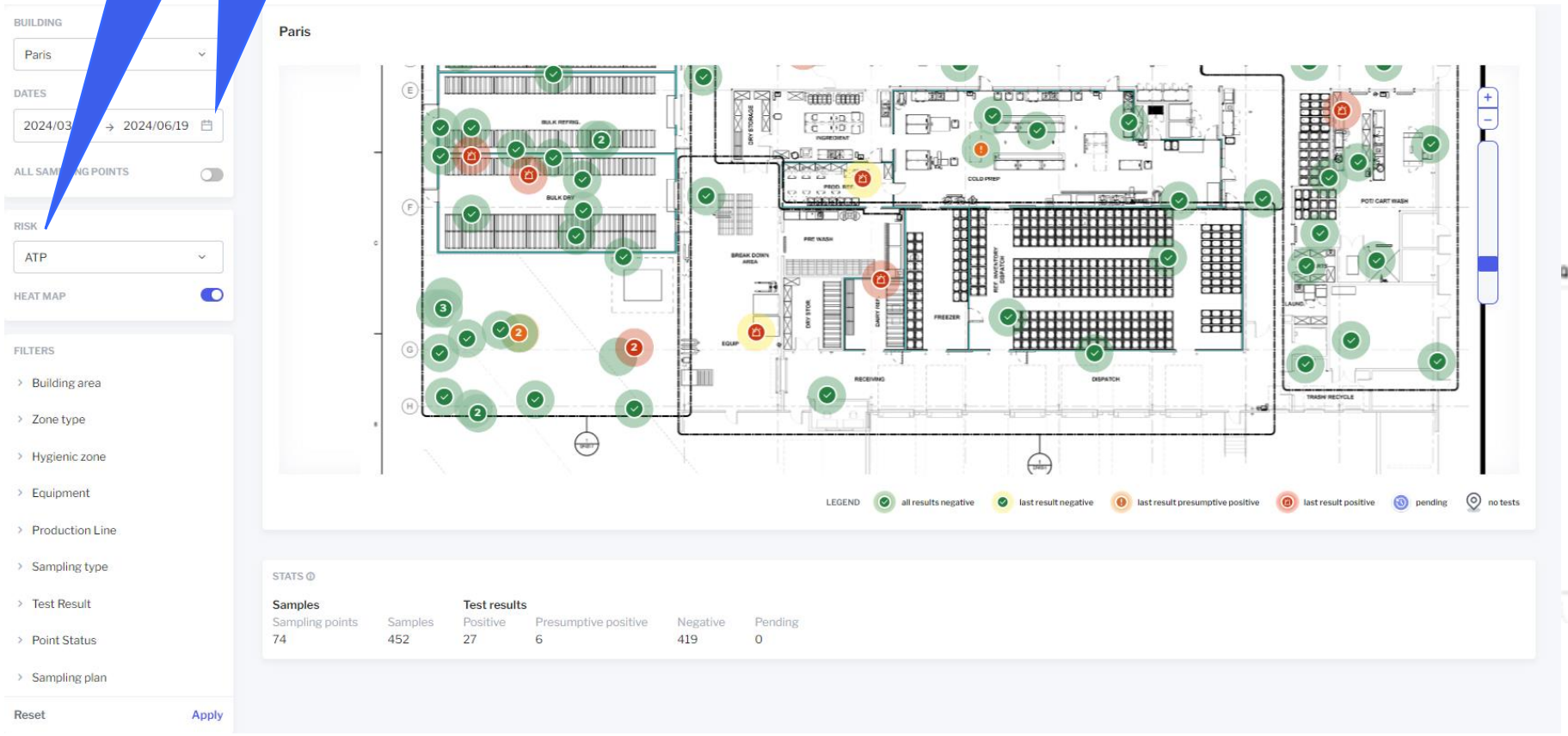
- Dynamic Heat Map
- Dynamic Sampling to ID risk areas
- Historical data analysis by each zone and by each area showing results KPIs
- Calendarization of Sampling Plan
- Automatic and Real-Time notifications of nonconformity
- Sample Randomization Tool
- Mobile–based program on phones and tablets



Novolyze

Factory Map – Risk Areas

Date range and risk



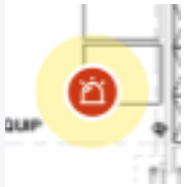
For the defined range date

At least one sample is positive

+

The latest is positive

→ **Still a risk in this area**



At least one sample is positive

+

The latest is negative

→ **Risk controlled**

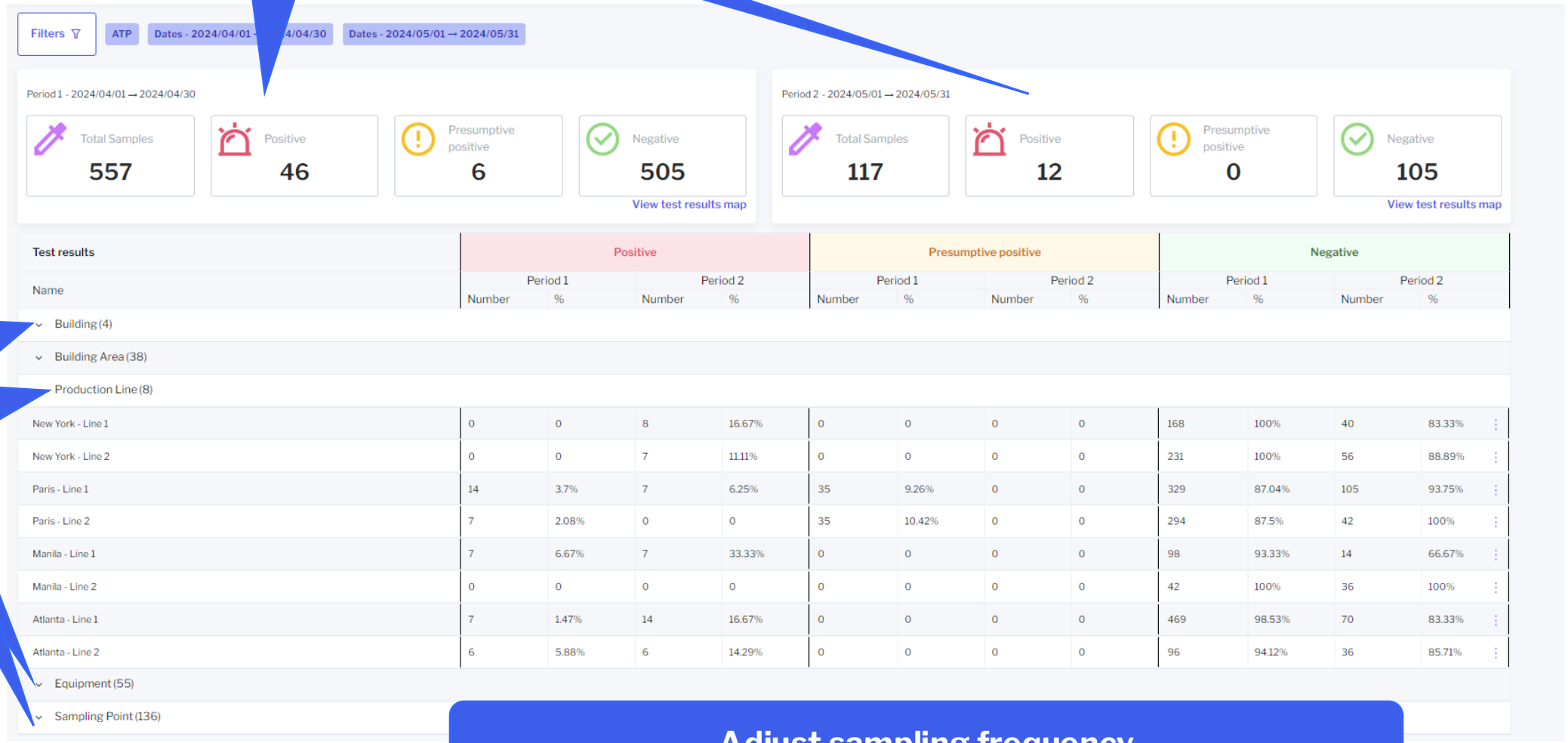
All Samples Negative

→ **Low risk**

Novolyze

Analytics

Comparison of 2 periods



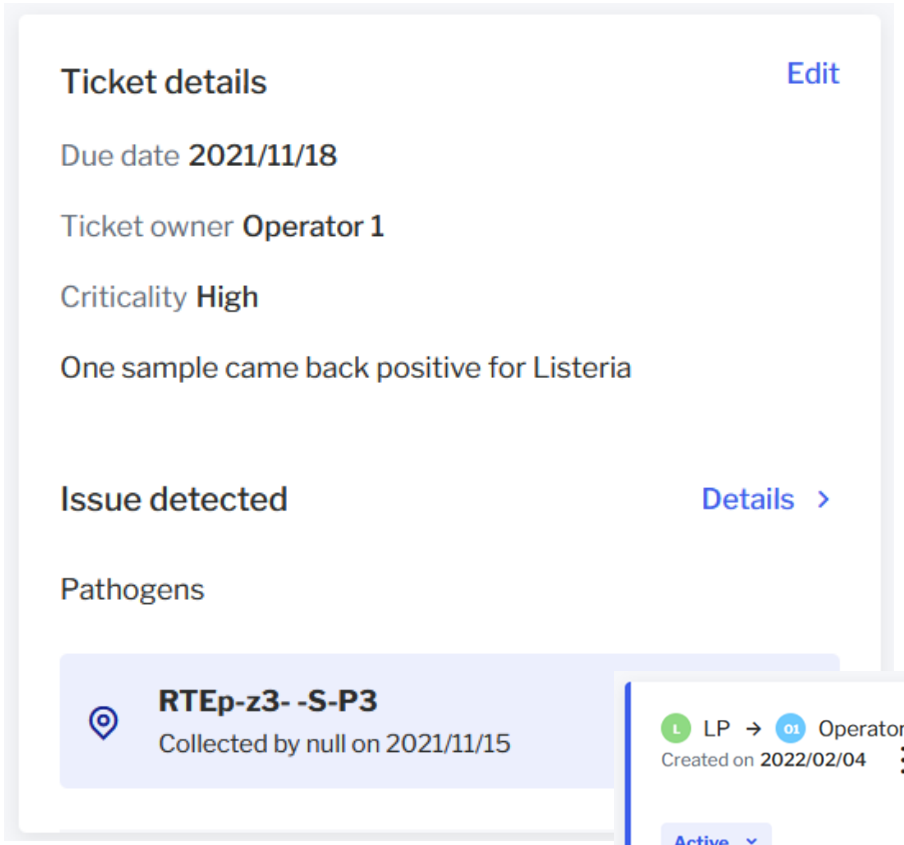
Test results	Positive				Presumptive positive				Negative			
Name	Period 1		Period 2		Period 1		Period 2		Period 1		Period 2	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Building (4)												
Building Area (38)												
Production Line (8)												
New York - Line 1	0	0	8	16.67%	0	0	0	0	168	100%	40	83.33%
New York - Line 2	0	0	7	11.11%	0	0	0	0	231	100%	56	88.89%
Paris - Line 1	14	3.7%	7	6.25%	35	9.26%	0	0	329	87.04%	105	93.75%
Paris - Line 2	7	2.08%	0	0	35	10.42%	0	0	294	87.5%	42	100%
Manila - Line 1	7	6.67%	7	33.33%	0	0	0	0	98	93.33%	14	66.67%
Manila - Line 2	0	0	0	0	0	0	0	0	42	100%	36	100%
Atlanta - Line 1	7	1.47%	14	16.67%	0	0	0	0	469	98.53%	70	83.33%
Atlanta - Line 2	6	5.88%	6	14.29%	0	0	0	0	96	94.12%	36	85.71%
Equipment (55)												
Sampling Point (136)												

Efficacy evaluation at different level

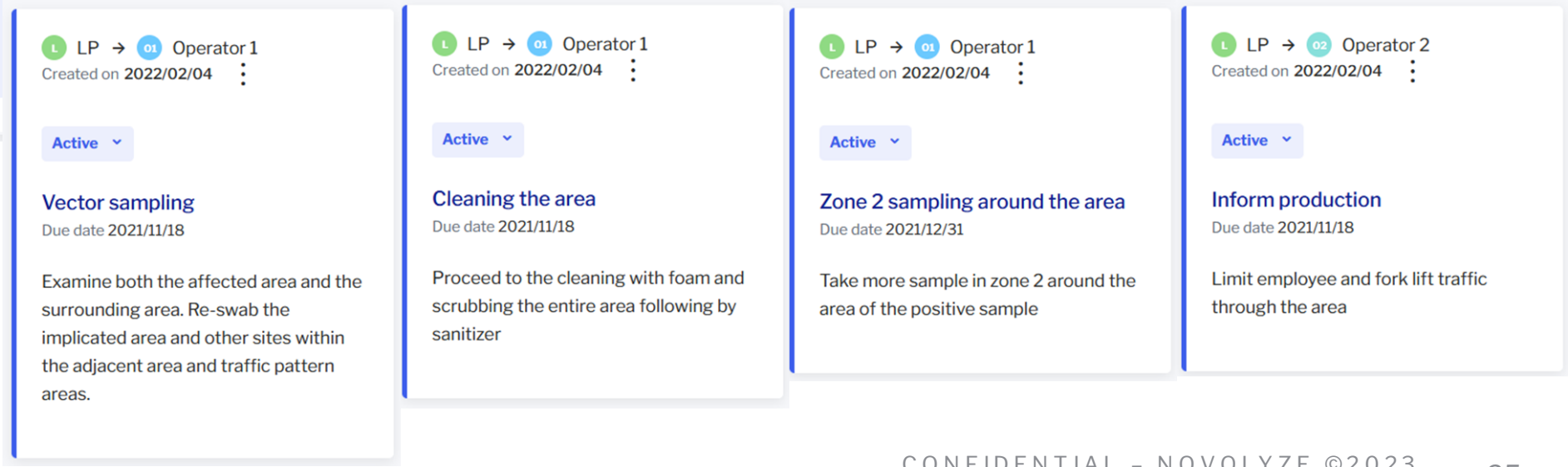
Adjust sampling frequency

Novolyze

CAPA Management



- Integrated solution
- Ticketing system with multiple actions associated with a ticket
- Configurable workflows based on events
- Triggered alerts



CONFIDENTIAL – NOVOLYZE ©2023

Predictive Modeling

Novolyze

Platform-wide data analytics

Predictive Modeling | Dashboard | Samples | Plans | Analysis | KPI's | Novolyze Daix

Predictive Analytics

Filter | Main Building | Listeria

February 20 - February 27, 2024

Pest Control
Swabbing
Sanitation

Building area

Building area	Value
Storage	2%

Production line

Production Line	Value
Production line 1	2%
Production line 2	2%
Production line 3	2%
Production line 4	2%
Production line 5	2%

Equipment

Equipment	Value
Filler	2%
Mixer	2%
Oven	2%
Fridge	2%
Packaging	2%

Analytics > Analytics details

Next week risk 20%

Predictive Analytics details

Main Building | Listeria | Production Line 1

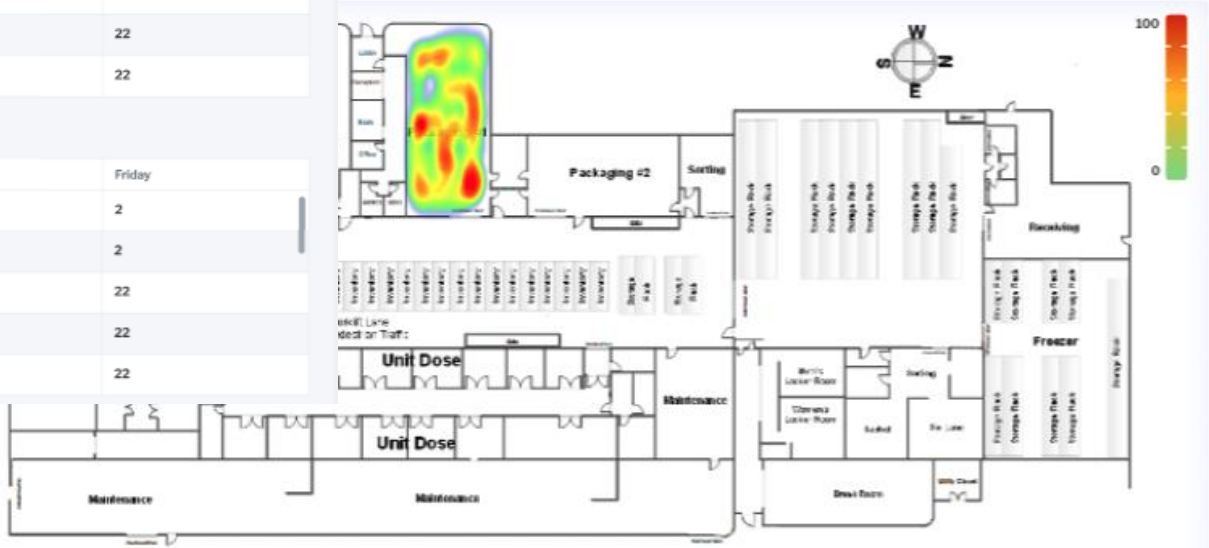
Sampling

February 20 - February 25, 2024

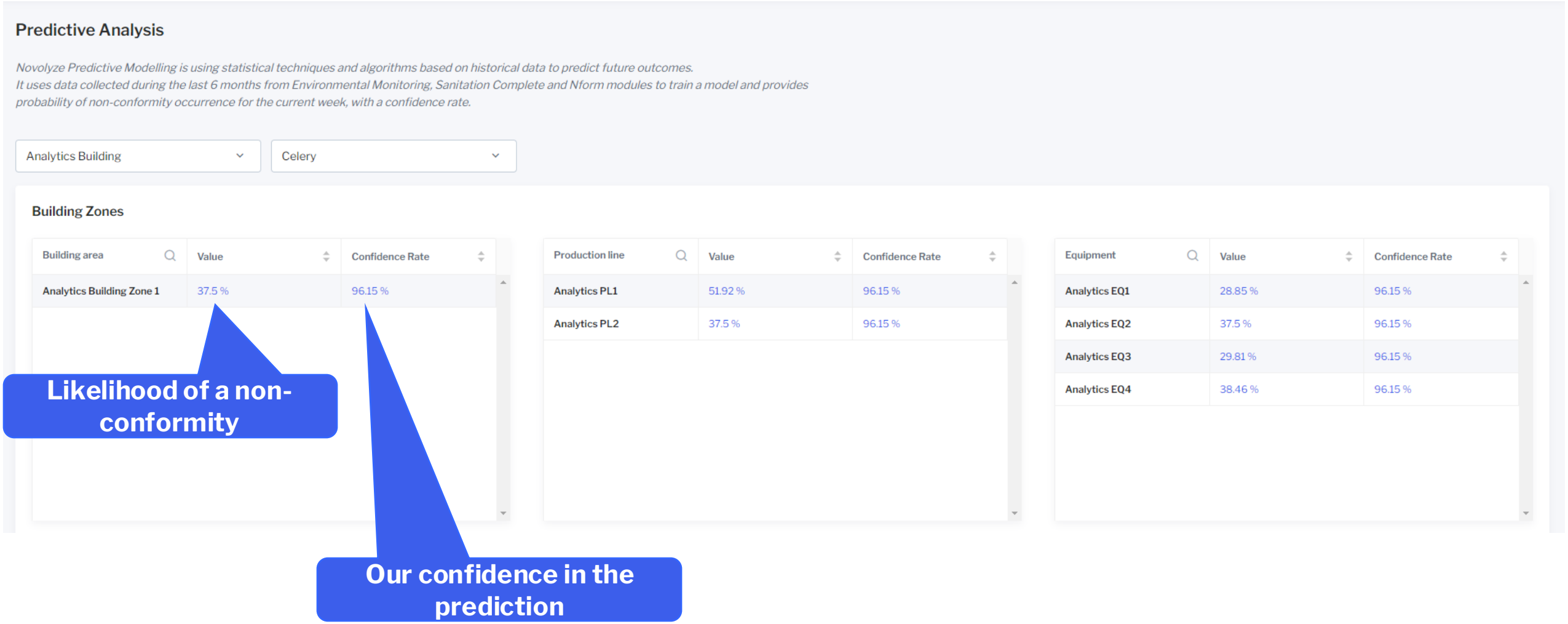
Sample points	Total	Monday	Tuesday	Wednesday	Thursday	Friday
Sample point 1	25		22	2	2	2
Sample point 46	25	2	2	22	2	2
Sample point 73	25	2	22	2	2	22
Sample point 237	25	2	22	2	2	22
Sample point 391	25	2	2	2	2	22

Cleaning

SSOP	Total	Monday	Tuesday	Wednesday	Thursday	Friday
Production Line 1 Cleaning	25	2	2	2	2	2
Floor PL1 cleaning	25	2	2	2	2	2
Packaging equipment	25	2	2	2	2	22
SSOP	25	2	2	2	2	22
SSOP	25	2	2	2	2	22



Likelihood of a Positive Sample



Novolyze

Predictive Analytics for a Line

Risk and Confidence level

Predictive Analytics details

Samples already scheduled

Building	Production Line	Risk
Analytics Building	Analytics PL1	Celery

Sampling

July 1 - July 7, 2024

Sample points	Total	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Point_A001	1	0	0	0	1	0	0	0
Point_B003	1	0	1	0	0	0	0	0
Point_B004	1	0	0	0	1	0	0	0

Cleaning

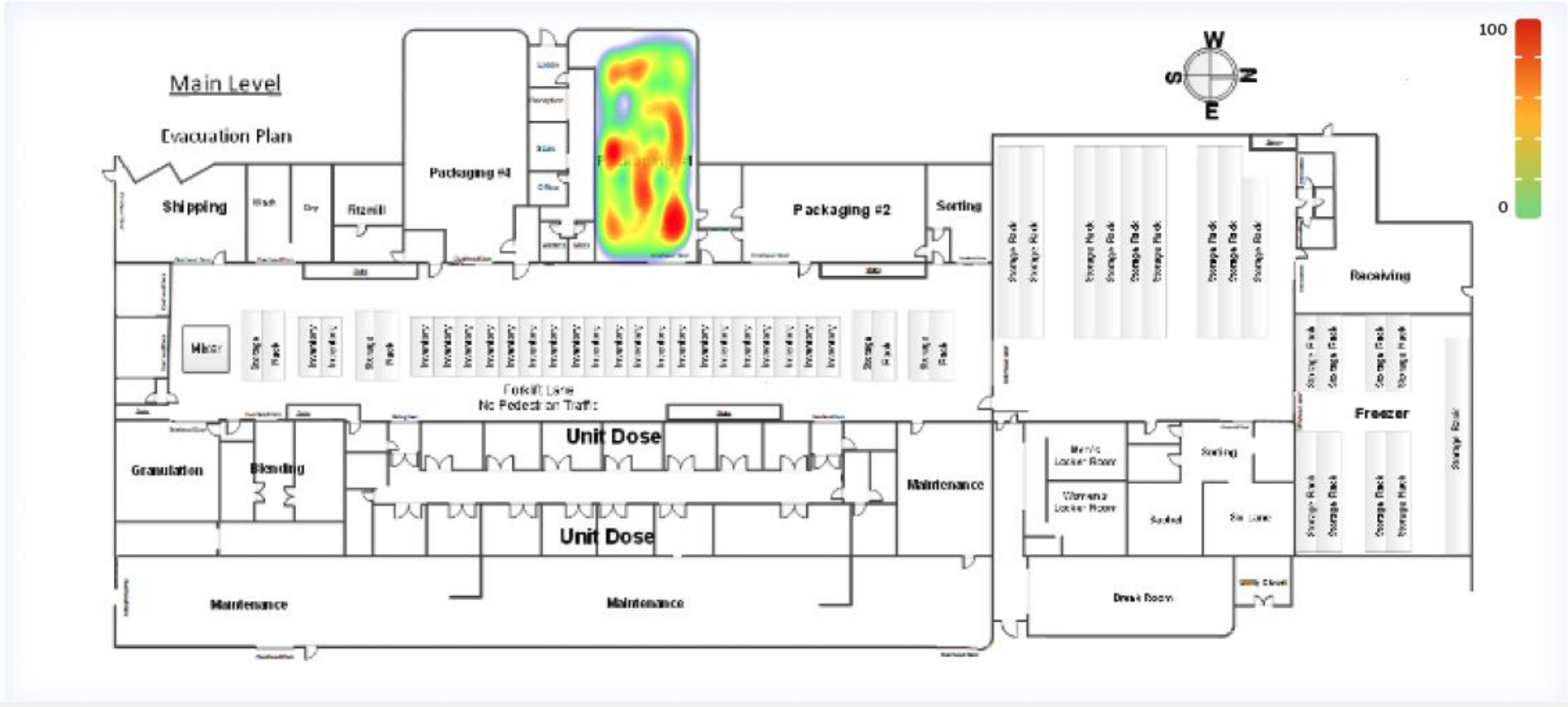
SSOP	Total	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
SSSOP Celery_001	4	0	1	0	1	0	1	1

Cleaning activities scheduled

Novolyze

Heat Map

Map


Main Level
Evacuation Plan
Shipping
Packaging #4
Packaging #2
Sorting
Receiving
Freezer
Mixer
Granulation
Blending
Unit Dose
Unit Dose
Maintenance
Maintenance
Maintenance
Drum Room
W
S
N
E
100
0

Thank you

WWW.NOVOLYZE.COM