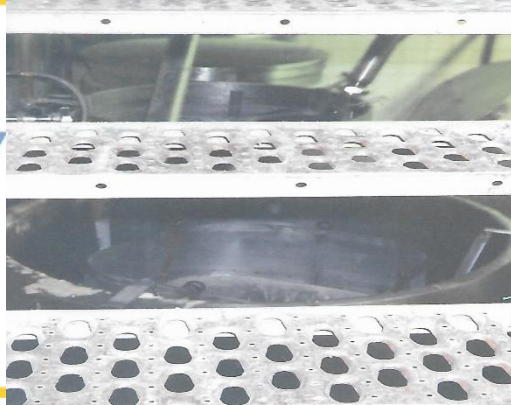


# Legacy Facilities & Legacy Equipment: *Impact on Achieving Food Safety*



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**FoodSafety**  
magazine

**Sara Mortimore**  
Panelist

**Nick Rowley**  
Panelist

**Liz Presnell, Esq.**  
Panelist

**Larry Keener**  
Moderator

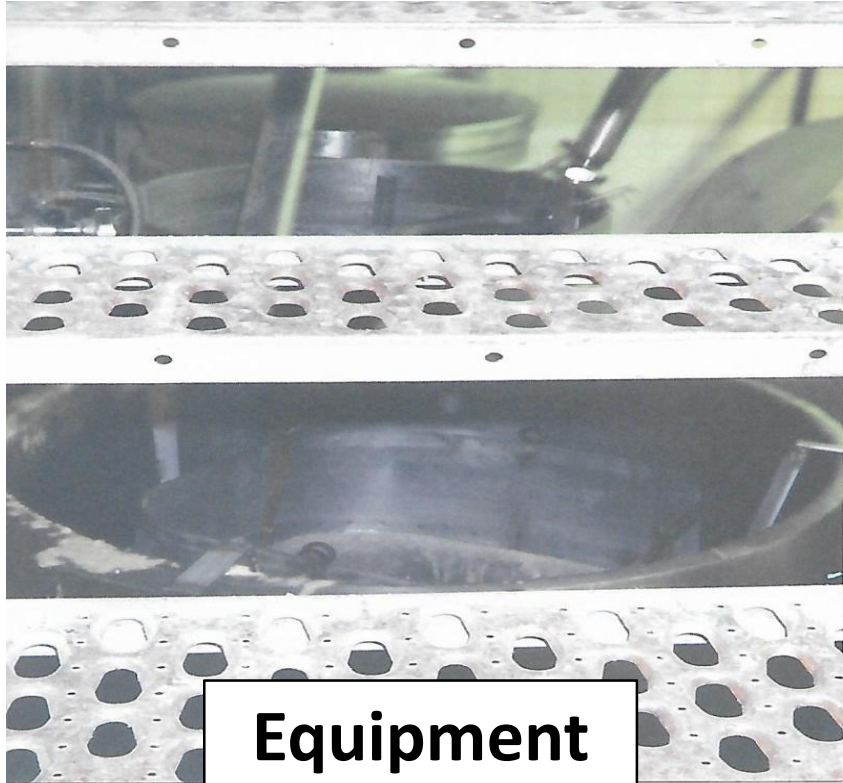
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# The Challenge: “Sweating the Assets”



**“Legacy facilities and the legacy food processing equipment operating in those facilities represent the industry’s greatest threat to food safety”**

(L. Keener – Houston Chronicle and Austin American Statesman 2016)



**Equipment**



**Floors & Drains**

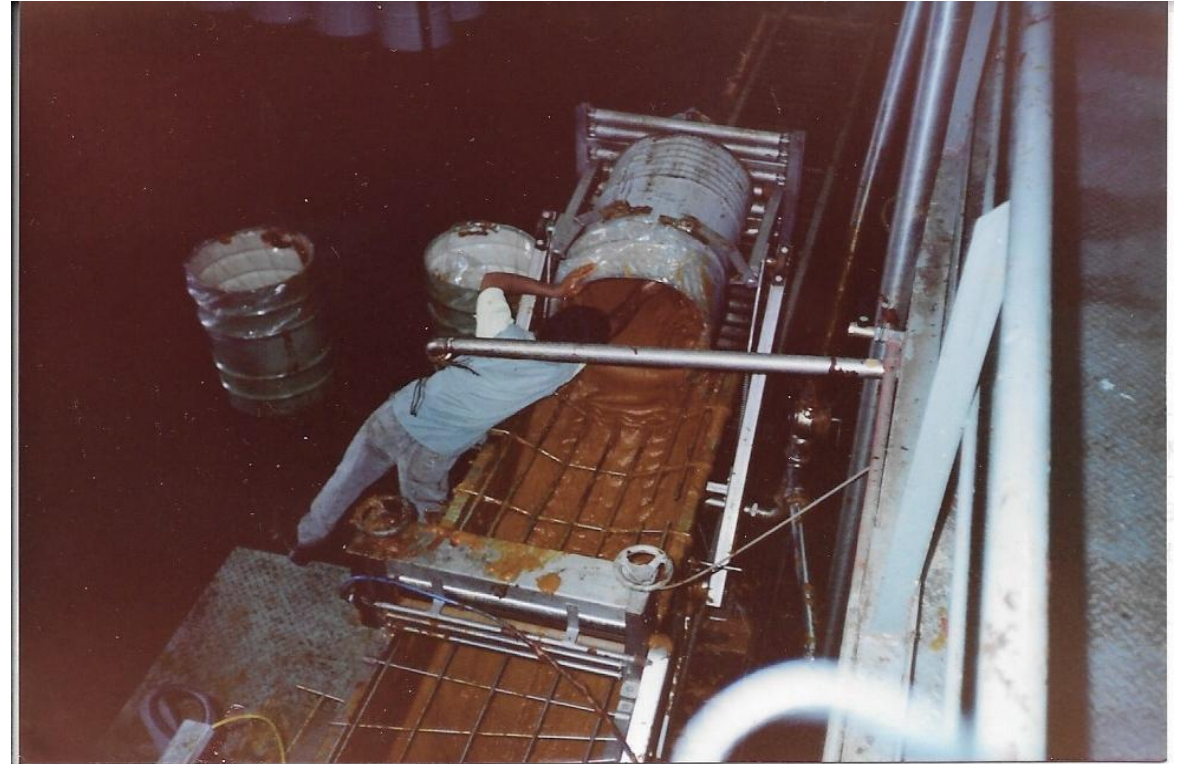


**Buildings & Structures**

**Sweating the Assets and Accepting the increased Risk of Food Safety Failures**



The challenge of Legacy Equipment and Facilities is far greater than the ability of the “willing worker” to overcome and the outcomes for Food Safety are predictable



Hygienic Design Principles for Equipment and Facilities to prevent product adulteration and promote Food Safety Assurance is comparatively new to the industry



# What is Hygienic Design?



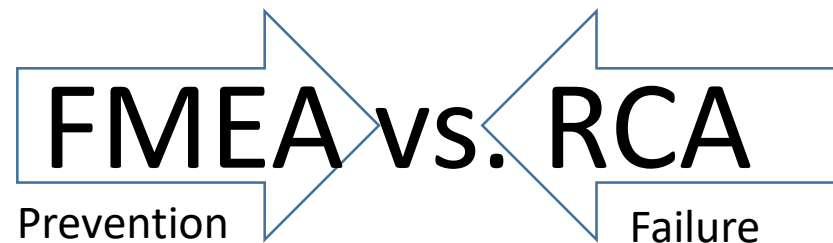
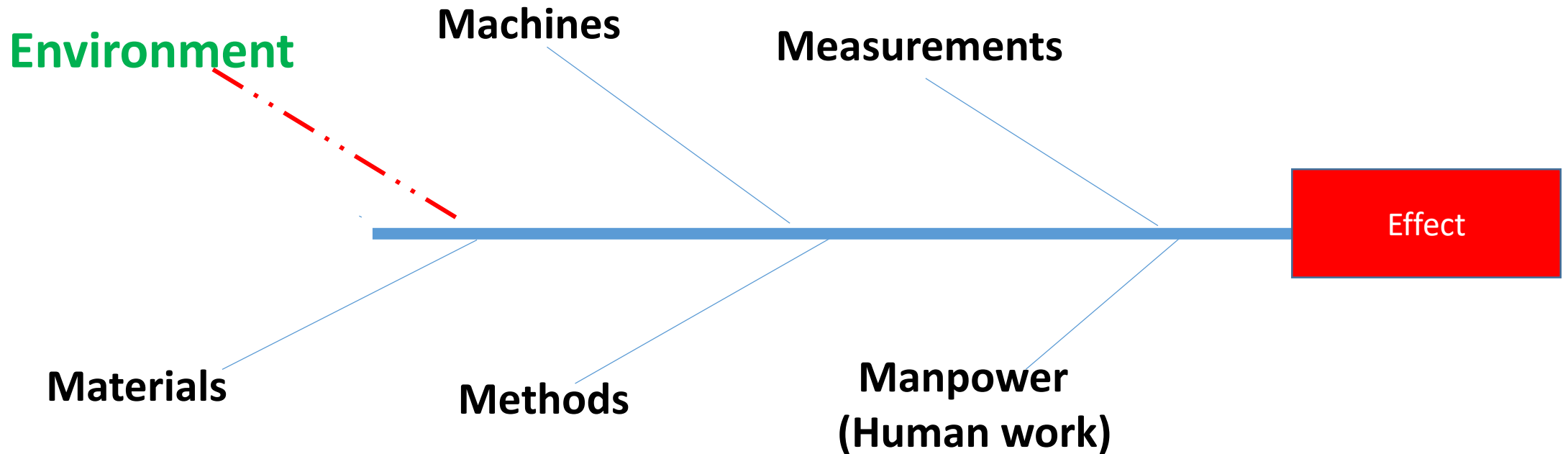
**Hygienic Design** refers to the **design, materials of construction and the installation** of all components and appurtenances of food processing machinery, as well as the architectural design and construction of the food processing facility, in order to **promote cleaning** and to **reduce the risk of contaminating food products** with hazardous substances that would cause the food to become injurious to the public health (food safety).

European Hygienic Engineering and Design Group (1989)

3A Sanitary Standards (1920 US Dairy Industry)



# Hygienic Design impacts every aspect of facility and production operations



# “The State of Food Manufacturing”

Food Engineering Magazine Survey Aug. 2023

## Survey Question - Requirements for Productivity Improvements?

- Equipment upgrades 80% - ranked **1/20**
- **Improve maintenance systems** 67% - ranked **4/20**
- Increase *flexibility* on existing lines 56% - ranked 9/20
- Retrofit and upgrade facilities 56% - ranked 10/20
- Improve overall equipment effectiveness reporting 54% - ranked 12/20

Nearly 50% of survey respondents expected increased budgets for production and processing equipment in the range of about 23%

**Sweating the Assets = Accepting the increased Risk of Food Safety Failures**

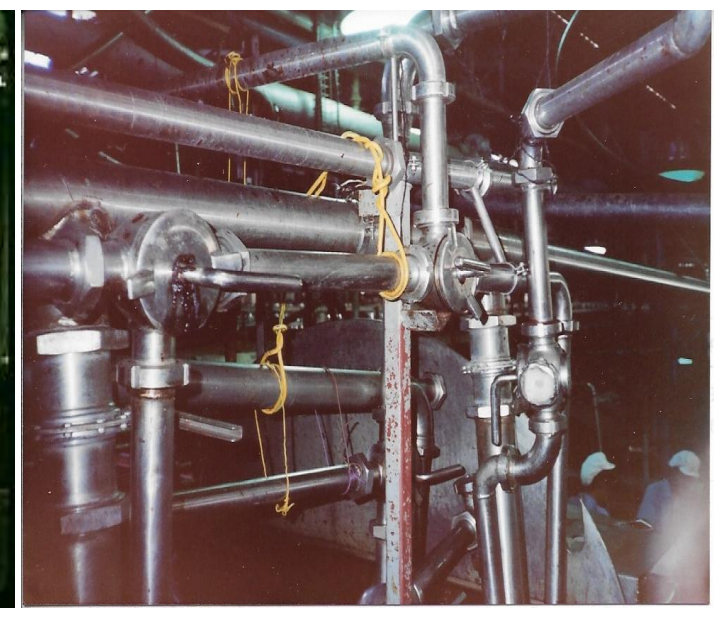
# Legacy Facilities & Legacy Equipment: Impact on Food Safety

*Our Expert Panel:*

*Sara Mortimore - Industry Consultant*

*Nick Rowley - Global Director Sanitation – Kellanova Corp.*

*Liz Presnell, Esq. – Food Industry Counsel LLC*



All Photos are the property of International Product Safety Consultants LLC

*“Sweating the Assets, accepting the Risk”*





# Food Safety Summit

## Legacy Facilities and Equipment:

### “Sweating the Assets, accepting the Risk”

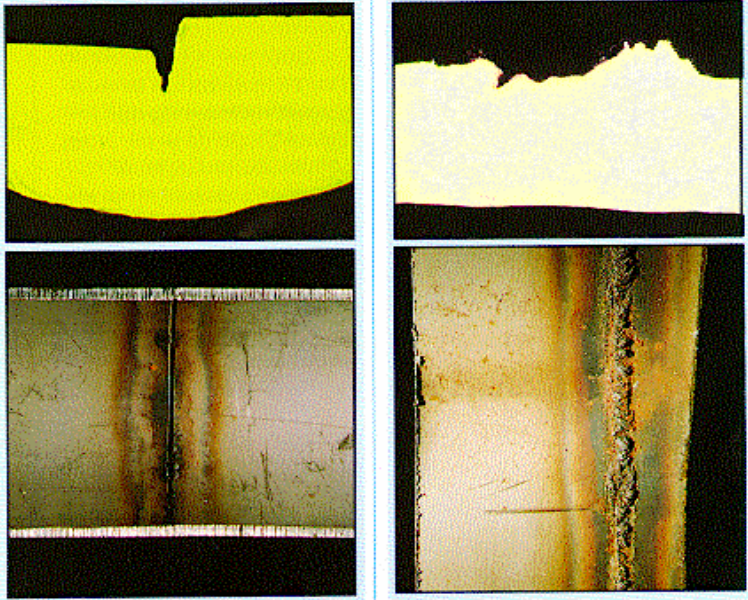
#### Order of Discussion

Sara Mortimore

Nick Rowley

Liz Presnell

Q&A







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# *Legacy Facilities and Legacy Equipment and their impact on Food Safety Assurance*

*Sara Mortimore  
May 2024*



Inadequate infrastructure, inappropriate equipment and sanitation program is a common barrier to having an effective program

- Buildings Design
  - Hygienic Fabric
  - Hygienic zoning/work-flow
  - Utilities
  - Employee facilities
- Equipment
  - Appropriate for the task
  - Hygienic design
  - Process capability

## Key messages

- Majority of process facilities have opportunities for improvement
  - Manufacturing, foodservice and retail
  - Legacy or new construction
- Knowledge is key to managing what you have and reducing risk



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# Strengthening the risk-based preventive control program

A practical hazard analysis and risk assessment process can be applied to hygienic design continuous improvement and prioritized capital planning

## Understand:

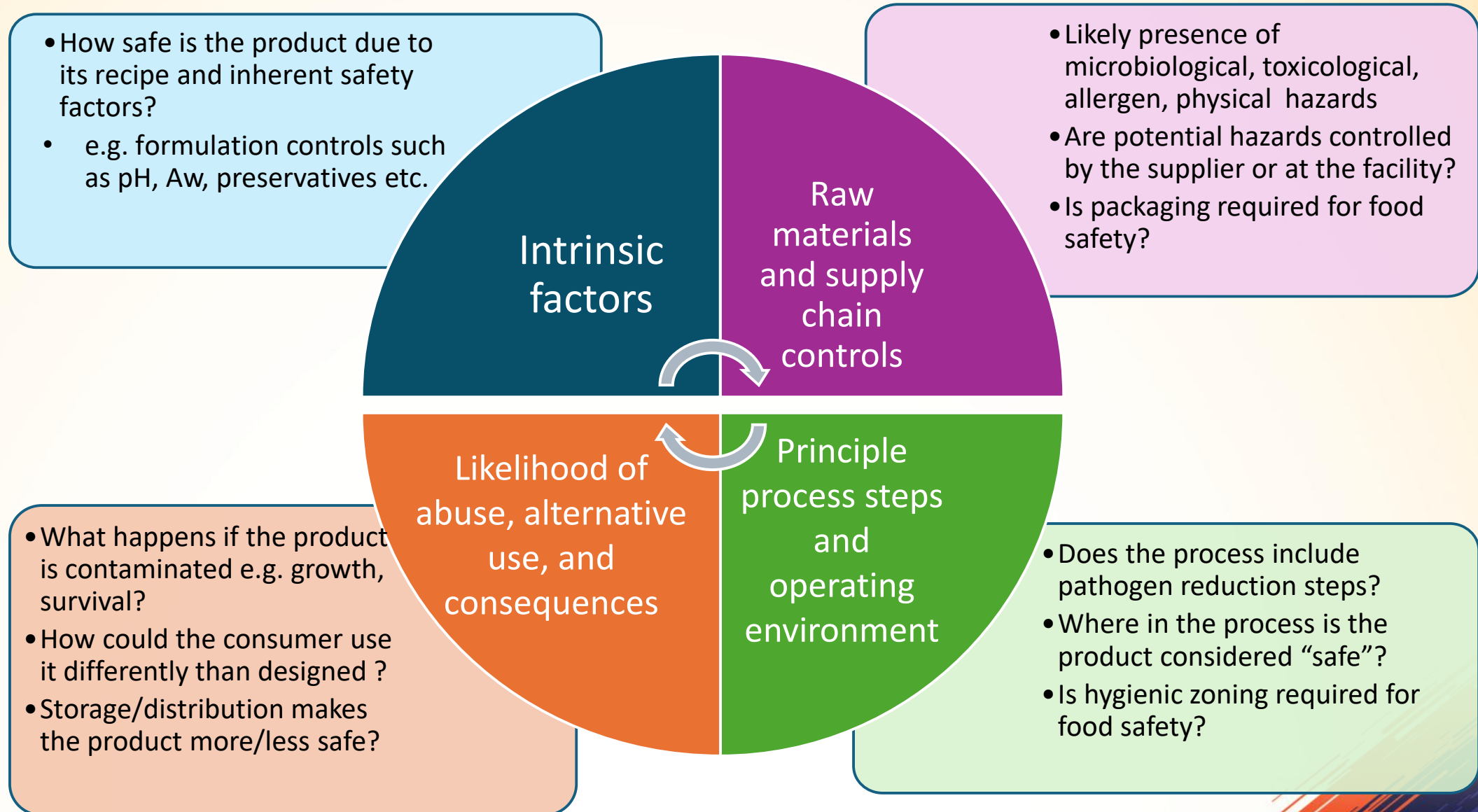
- The product and its intended use
- The plant layout, the HACCP Process Flow Diagrams, and relook at the hazard analysis
- The ongoing plant hygiene profile, verified through inspection, EMP, and audit.

## Evaluate:

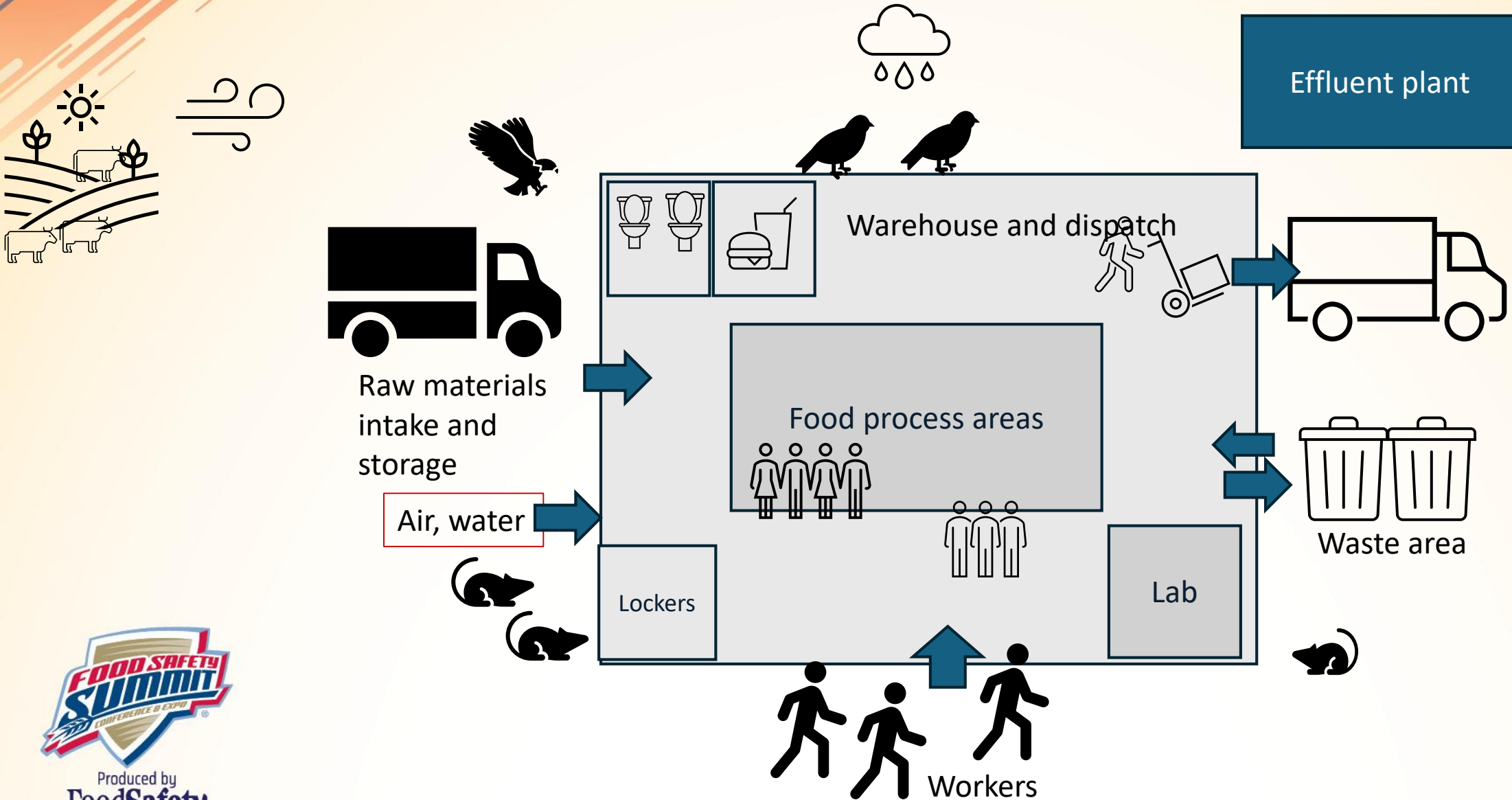
- Sources and vectors of hazards
- *Best practice* preventive control measures – short term and longer term
- What the data is telling you



# Understanding what makes the product safe is important in determining a risk management strategy



# Main routes of contamination into a food plant



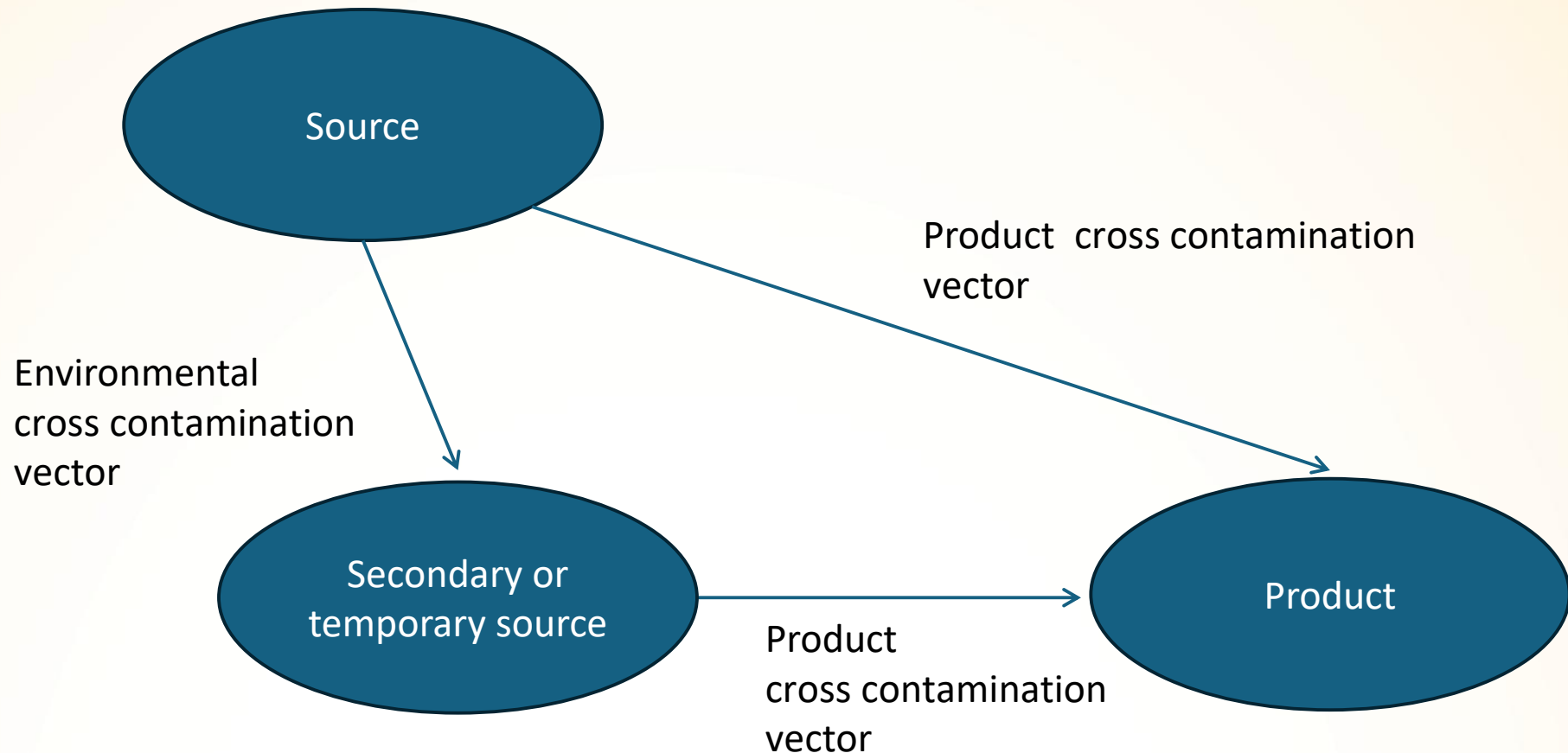
# Identifying and controlling sources and vectors of contamination

**Sources** of product contamination include:

- **Harborage sites** - physical areas in which pathogens can lodge (survive) and be protected from cleaning and disinfection actions
- **Growth niche** - a harborage site that provides an environment suitable for growth, i.e. food, water, temperature, oxygen and lack of competition from other microbial flora

# Contamination: understanding sources and vectors

**Vectors** of contamination are anything (air, water and other liquids, physical objects, pests or people) that carries or transfers a pathogen from one place to another





# Control of microorganisms in the processing environment: plant and equipment

Control **SOURCES** of  
contamination

Control  
entry

Kill or  
remove

Control **VECTORS** of  
contamination

Control  
transfer

Control  
growth

# Control of microorganisms in the processing environment: plant and equipment

## Control **SOURCES** of contamination

- Raw material control (supply chain preventive controls)
- Utilities (air, water)
- Pest control
- People:
  - Hygienic work wear and entry procedures,
  - Contractor, construction and visitor procedures

Prevent entry

Kill or remove

- Hazard reduction step e.g. heat kill
- Cleaning and sanitation procedures
- Sanitary design of equipment and facility for cleanability

- Control of water
- Sanitary design of equipment and facilities (harborage and niche areas)
- Frequency of cleaning and sanitation
- Time/temp control

Control growth

## Control **VECTORS** of contamination

Control  
transfer

- Raw material and personnel traffic patterns and hygiene junctures
- Separation of pre- and post-lethality areas
- Control of product and environmental vectors





## Manufacturing plants:

- Most facilities and equipment have challenges – legacy or new build
- Understanding the plant and the risks through critical inspection, EMP, and 3<sup>rd</sup> party expert input can be helpful

## Retail:

- Facilities/equipment capability and improvement needs must be evaluated to be understood
- Legacy and new facilities may have challenges – the implications will be related to what they are processing and selling



# A practical hazard analysis can be used to prioritize the improvement needs and manage CAPEX based on risk

Process step or area of plant	Issue identified	Likely hazard associated with issue?	Vector identified?	Likelihood of occurrence H/M/L	Severity if present H/M/L	Sort term risk mitigation plan	CAPA and Verified as completed and effective Yes/No?  Date:	If no then when?  Date:	Longer term mitigation plan	Cost estimate	Approval	Timing: Year 1/2/3	CAPA verified as complete and effective?  Date:



This will include short and longer terms improvements and may span multiple years.

**Poor hygienic design alone does not always lead to unsafe food.**

**Rigorously applied food safety knowledge and can make the  
difference between**

**having a well managed facility with inadequate infrastructure and  
one that is taking unnecessary risk**



# Management Responsibility



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# Thank you

Sara Mortimore

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## References:

C.A. Wallace, W.H. Sperber and S.E.Mortimore. *Food Safety for the 21<sup>st</sup> century*, 2<sup>nd</sup> Ed. Wiley, 2018

H. L. M. Lelieveld and J. T. Holah, *Hazards, sources and vectors of contamination* in Hygiene in food processing: Principles and Practice (Second edition). Eds. H.L.M. Lelieveld, J. Holah and D. Napper, Woodhead Publishing. 2013

J.T. Holah et al. *Identifying and Controlling Microbiological Cross-Contamination*, Food Safety magazine, 2012





# HYGIENIC DESIGN IN PRACTICE

May 2024

- Nick Rowley
- Kellanova
- Director, Global Sanitation

# WHY - HYGIENIC DESIGN

- Upfront costs are miniscule compared to long-term losses / remediation
  - Ongoing Sanitation Labor, chemicals (Time & Effort)
  - Remediation from events (Pests, Pathogens)



# SANITARY DESIGN



# BUILD HD CAPABILITY

1. Organize a HD Community / Committee
  - Cross-Functional Team
2. Develop Standards & Assessment Strategy
  - Personal Safety vs. Food Safety
3. Communicate Standards, Develop Training
4. Deliver Training / Capability to perform Assessments
5. Execute Plan to Assess & Address defects

# HD CHECKLIST STRATEGY

Old Equipment, Tools, Bins, Containers, Infrastructure, Utilities

New Equipment

- Factory Acceptance Testing
- Build into Engineering System



5



# HOW DO WE ASSESS LEGACY

EQUIPMENT?

Strategies:

1. Systematic, Line by Line, Area by Area
2. For Cause – ATP, EMP trend
3. Target Legacy Technologies (close or beyond amortized value)



# WET VS. DRY CLEAN

- Key differences in Design Standard
- BOTH need to meet standards of cleaning
  - Allergen Free, Gluten Free
  - Pathogen Free

EASILY CLEANABLE!

READILY ACCESSIBLE!

- Effectiveness always first
- Efficiency is key business enabler
- MORE Difficult to Dry Clean  
poor HD equipment/facility



# Legacy Facilities and Equipment: Diligence Required



**FoodIndustry**  
COUNSEL LLC

**“GOING ALL-IN FOR FOOD AND ALL-OUT FOR  
THOSE WHO PRODUCE IT”**

Liz Presnell

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# What Risks Exist

- Historical Uses of the Equipment/Facility
- Resident Organisms – Environmental Monitoring
- Historical Regulatory Interactions
- Design
- Suitability for Intended Use

# Investigate Thoroughly

- Independent Research
  - [FDA Records](#) and State/Local Regulatory Inspection Records
  - Investigational Environmental Monitoring
- Ask Questions
- Conduct a Hazard Analysis to Evaluate Risks –  
Take Action as Appropriate

# Potential Risks

- Regulatory Action
- Foodborne Illness or Outbreak
- Brand Reputational Harm
- Civil Damages
- Criminal Charges – Individual and Company



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