

Systems and technologies for effective Quality Management

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Driscoll's of the Americas**

INOFOOD
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Casa Piedra, Santiago de Chile

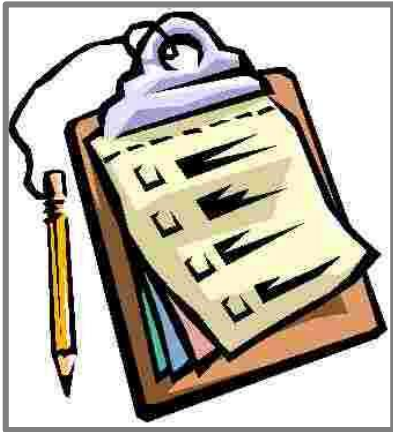
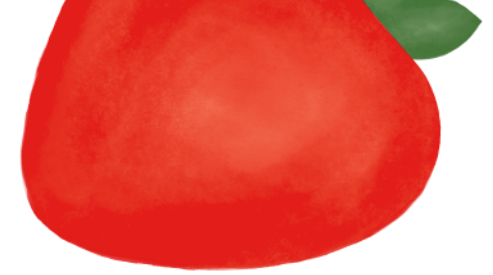
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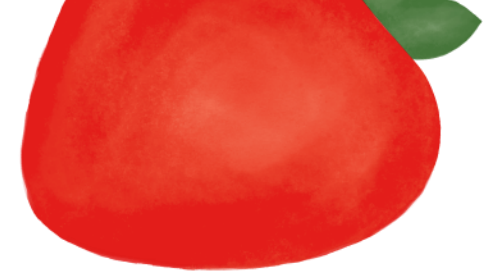
Our mission is to provide food safety professionals worldwide with a forum to exchange information on protecting the food supply

Elements of effective product quality systems



- Quality management system and related processes
- Management commitment and quality culture
- Transparency and communication
- Validation and verification
- Technological solutions

Quality management system and related processes

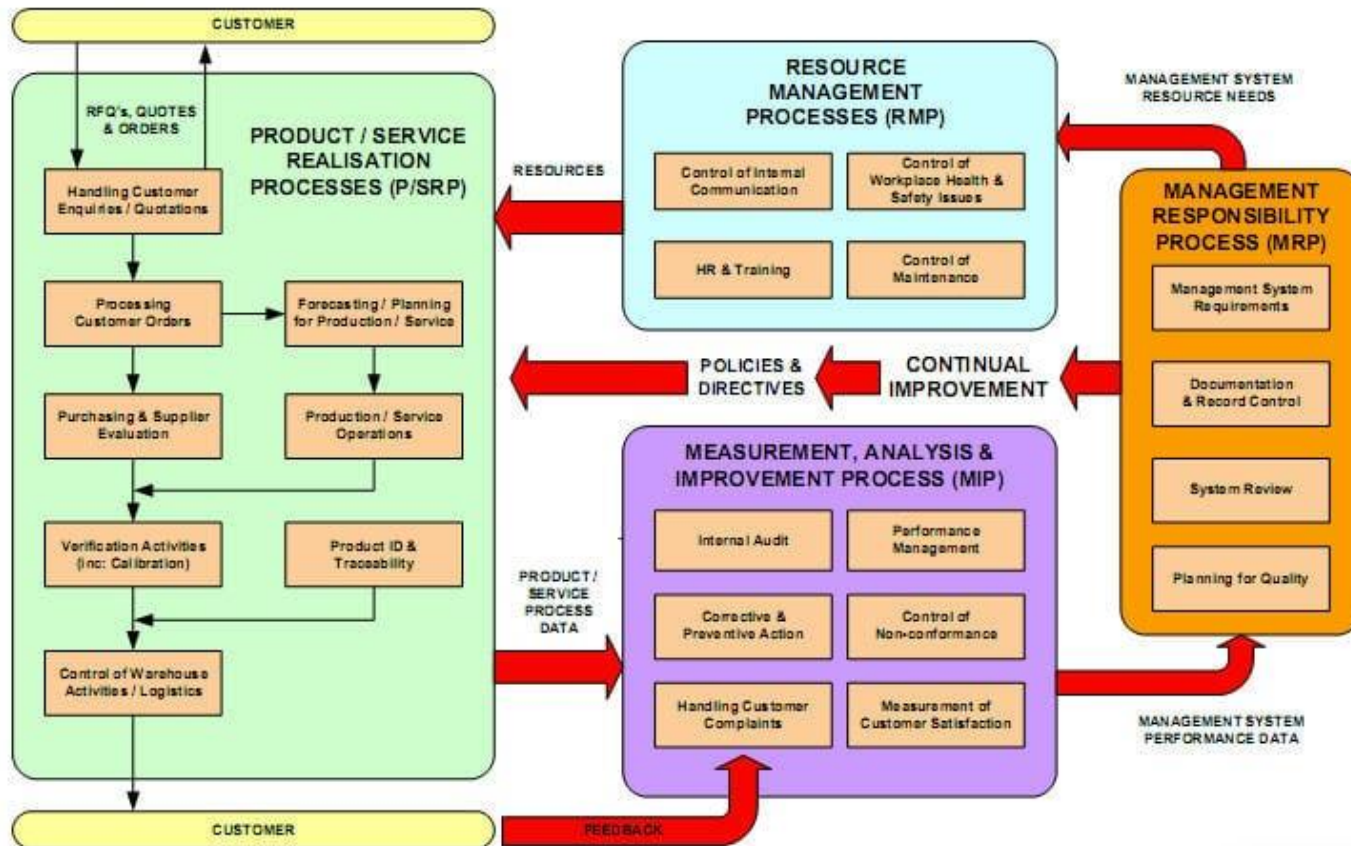


- Leadership
 - Commitment and responsibilities
- Planning
 - Objectives, actions to address risks
- Support
 - Resources, competence, communication
- Operations
 - Planning and control, definition of requirements, control of non-conformances
- Performance evaluation
 - Verification, management review
- Improvement
 - Non-conformance, corrective actions

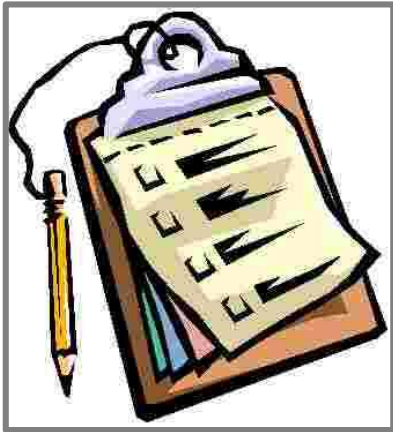
Process mapping

WI-0103
Rev: 0
Date: 16.09.09

SYSTEM MANAGEMENT - PROCESS MODEL



Management system and quality culture



- Management commitment
- Quality policy
- Food Safety and quality culture
- Behavior-based quality

Management commitment



“Quality is about trust. Each and every one of us has the power to influence this trust through our dedication to the quality of our products and through our passion and leadership.”

Paul Bulcke
Chief Executive Officer

Quality culture

- Reflected in behaviors employees routinely practice and demonstrate
 - Employees constructively learn from peers the critical food safety assumptions and behaviors that then cascade throughout the organization to influence all
- Businesses reflect food safety culture through a variety of factors:
 - Priorities and attitudes;
 - Perceptions and knowledge of food hazards;
 - Confidence in food safety requirements;
 - ‘Ownership’ of their food safety responsibilities;
 - Competence;
 - Internal leadership;
 - Employee involvement;
 - Communications within the business.



GMA Science and Education Foundation 2015

Behavior-based quality



ASQ Ottawa Valley Section

Are you ready to BBQ

Behaviour-Based Quality and how to get there?



Transparency and communication




- Clear definition of requirements, relevant parameters and parameter limits
- Specifications and contracts
- Quality monitoring scheme and Standard Operating Procedures
- Defined monitoring and verification activities

Specifications

PRODUCT BULLETIN

PB.561
VERSION 09.0316
UNRESTRICTED

WHOLEMILK POWDER
Regular



Regular Wholemilk Powder is a soluble powder made by spray drying fresh pasteurised wholemilk

Product Characteristics

- > Good solubility
- > Full fat content
- > Rich creamy flavour

Suggested Uses

- > Wide range of applications including reconstituted milk, fermented milk foods, yoghurt, ice cream mixes and confectionary products.
- > Is extensively used as an ingredient in bakery products and snack foods.
- > Has consistent and uniform composition, which is imperative in formulated products.
- > Is an ideal milk source for any situation where regular liquid milk supply or refrigeration is not available.
- > Not for use in infant formula for infants less than 12 months

Packaging

Multi-wall bag with a paper outer and an inner plastic liner
No staples or metal fasteners are used

Net weight	25.0kg
Gross weight	25.4kg

Storage and Handling

Wholemilk Powder is hygroscopic and can absorb odours. Therefore adequate protection is essential. It is recommended that product is stored at below 25°C, relative humidity below 65% and in an odour free environment. Stocks should be used in rotation preferably within 24 months of manufacture

Typical Compositional Analysis

The analysis results listed in this product bulletin are typical as measured on an "as is" basis. Refer to the selling specification for minimum and maximum limits by parameter.

Protein (N x 6.38) (g/100g)	24.5
Moisture (g/100g)	3.1
Fat (g/100g)	26.3
Total Carbohydrates (g/100g)	40.3
Minerals (g/100g)	5.8

Typical Chemical Analysis

Titrateable Acidity (%m/v)	<0.15
Inhibitory substances (IU/ml)	Not Detected


Ingredients by Fonterra Dairy for life

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WHOLEMILK POWDER
Regular



Typical Nutritional Analysis

Energy (kJ/100g)	2075
Calories (kcal/100g)	500
Energy from fat (kJ/100g)	970
Calories from fat (kcal/100g)	233
Total Sugars (lactose) (g/100g)	40.3
Fibre (g/100g)	<1
Cholesterol (mg/100g)	63
Saturated fat (g/100g)	17.4
Trans fat (g/100g)	1.2
Vitamin A (µg/100g)	200
Vitamin A (IU/100g)	670
Vitamin C (mg/100g)	8.0
Iron (mg/100g)	0.2
Sodium (mg/100g)	290
Calcium (mg/100g)	980

Typical Physical Properties

Bulk Density (g/ml)	0.59
Insolubility Index (ml)	<1.0
Colour	Pale cream
Flavour	Creamy
Odour	Clean
Scorched particles	Max B
Foreign matter	Not Detected

Typical Microbiological Analysis

Aerobic Plate Count (cfu/g)	<10,000
Coliforms (g)	Not Detected
Escherichia coli (g)	Not Detected
Yeasts and Moulds (cfu/g)	<50
Coagulase Positive Staphylococci (g)	Not Detected
Salmonella (/750g)	Absent

Quality Assurance

Strict quality control procedures are enforced during manufacture. The manufacturing environment is also subject to regular monitoring and control.

Final product is sampled and tested for chemical, sensory and microbial parameters using internationally recognised procedures.

During storage and shipment, precautions are taken to ensure that the product quality is maintained. Each package is identified, enabling trace back.

Compliance

- > Halal
- > CODEX STAN 207

Suggested Labelling

Wholemilk Powder
Allergens: Contains Milk and Dairy products. For additional information refer to the allergen statement

Country regulations for product labelling vary. Fonterra advises customers that they need to check local regulations to determine the correct labelling of this ingredient

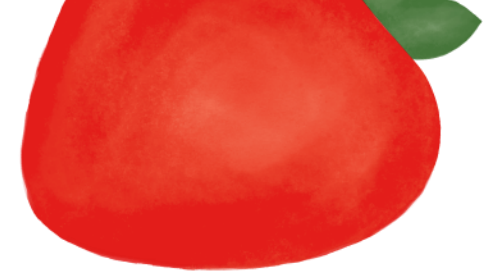
Additional Information

Fonterra will only ship this product to countries listed on the Import Eligibility Statement and bidders Contracting Information File.

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Quality monitoring scheme



Product Category:		Confectionery	Product Group:	Chocolate	Model QMS:	Chocolate Manufacture		Date:	Sep-14			
Inspection Stage	Inspection Point	Inspected By	Char. Classification	Inspection Characteristic	Inspection characteristic QCAMM	CCP /CP / Monit.	Req / Opt	Sampling	Inspection Method	Inspection method QCAMM	Specification / Evaluation	Corrective Actions
Refining (5 roller)												
03	Chocolate mass refining	Operator	Particle & Droplet Size Dist.	Particle size	10161	CP	R	Every 2 hrs or every recipe for each refiner	Malvern - Laser Diffraction (LI 33.122) Micrometer (LI-33.121)	33030 10657	Target specification particle size.	Adjust refiner settings. If particle size cannot be achieved stop refiner and report to Shift Manager and Engineering
03	Chocolate mass refining	Operator	Particle & Droplet Size Dist.	Particle size	10161	M	R	Once a week per refiner - 3 point particle size check across the 5th roller (motor, centre, water).	Malvern - Laser Diffraction (LI 33.122) Micrometer (LI-33.121)	33030 10657	Particle size range between 3 point across the roll vary no more than 3 μ difference	Contact Engineering.
03	Chocolate mass refining	Operator	Line Fit	Dry running	35043	M	R	Every recipe change or once per shift per refiner	Visual Inspection	98999	Clean and check operation of	Dry clean sensor with brush or cloth
03	Chocolate mass refining	Operator	Line Fit	Knife integrity	12176	M	R	Determine frequency based on no more than 3mm	Visual	98999	Knife change frequency within limit of	Replace Knife

Validation and verification



- Validation of control measures, methods and equipment
- Verification procedures and frequencies defined
- Audits and certification
- Tracking and trending of data
- Corrective and preventive actions

Definitions (Codex CAC/RCP-1 (1969), Rev.3 (1997))

- **Validation**

- Obtaining evidence that a control measure or combination of control measures, if properly implemented, **is capable of controlling the hazard** to a specified outcome. (TDT, fluid flow, heat penetration, Temperature distribution)

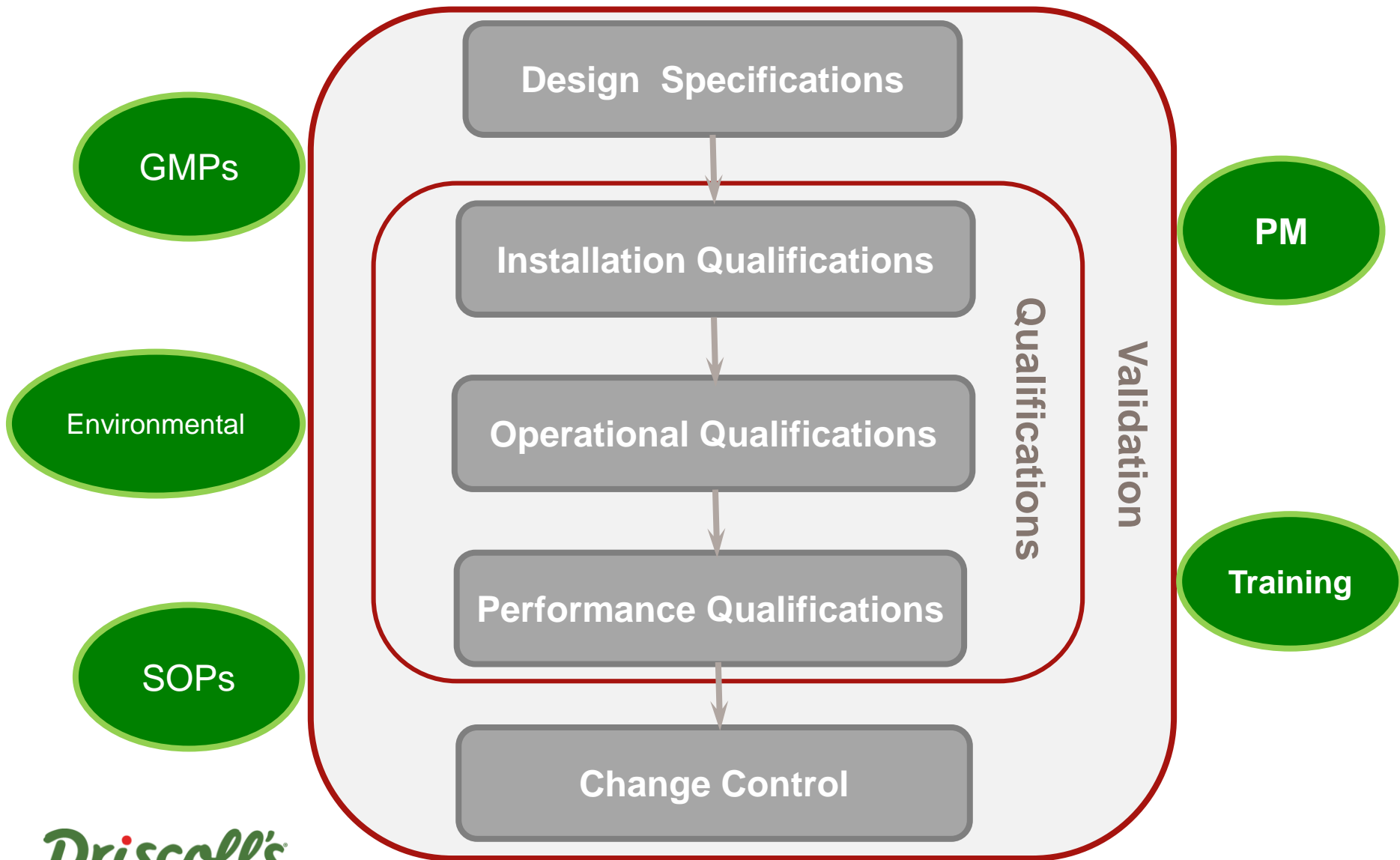
- **Verification**

- The application of methods, procedures, tests and other evaluations, in addition to monitoring, to determine whether a control measure **is or has been operating as intended**

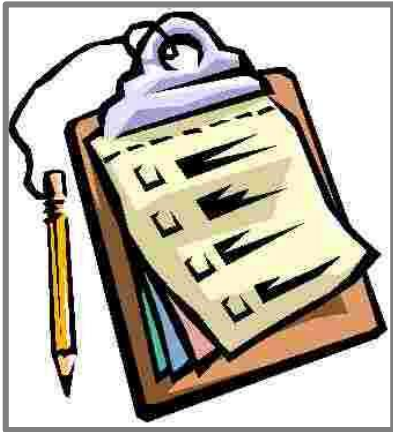
- **Monitoring**

- The act of conducting a planned sequence of observations or measurements of control parameters to assess whether a CCP is under control

Equipment and system validation

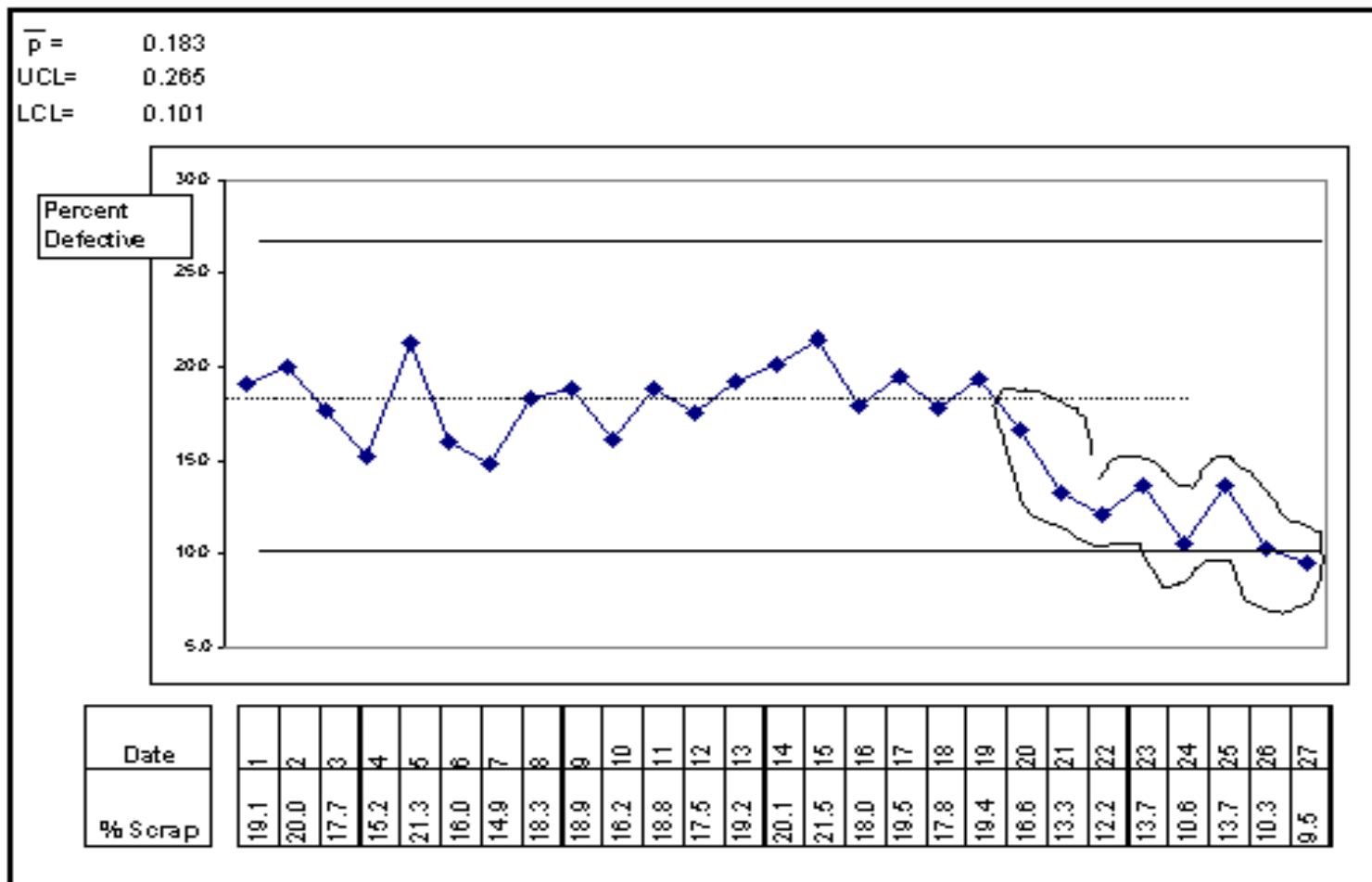


Verification activities



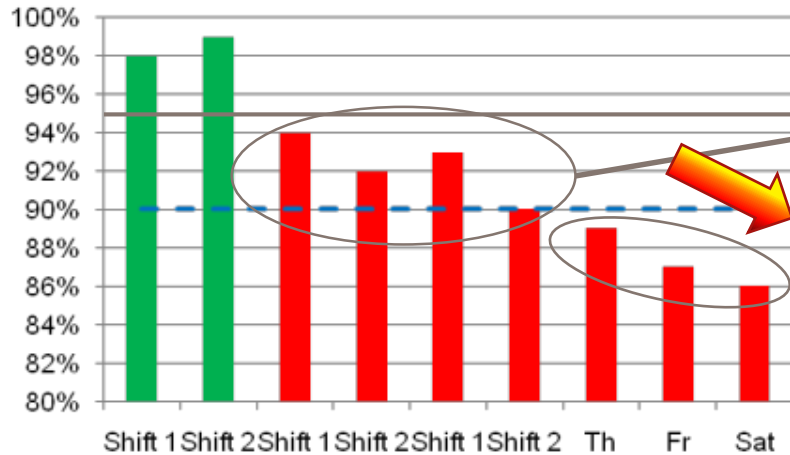
- Supplier audits
- Internal audits and certification
- Equipment calibration and performance checks
- Observation of functioning of control measures
- Evaluation of parameters during process
- Testing of raw materials or finished products

Trending monitoring and verification data

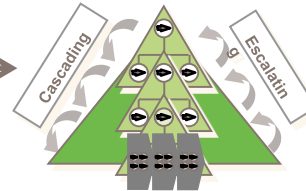


Problem-solving approaches

Shift/Daily Measure

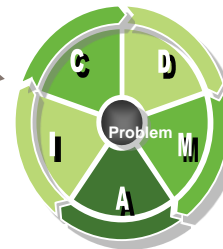
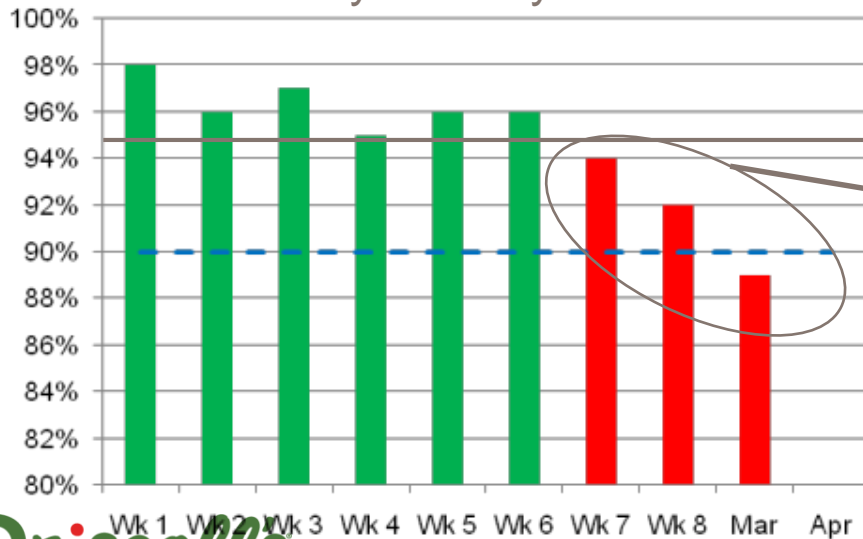


- ✓ Go See Think Do
- ✓ 5 Whys



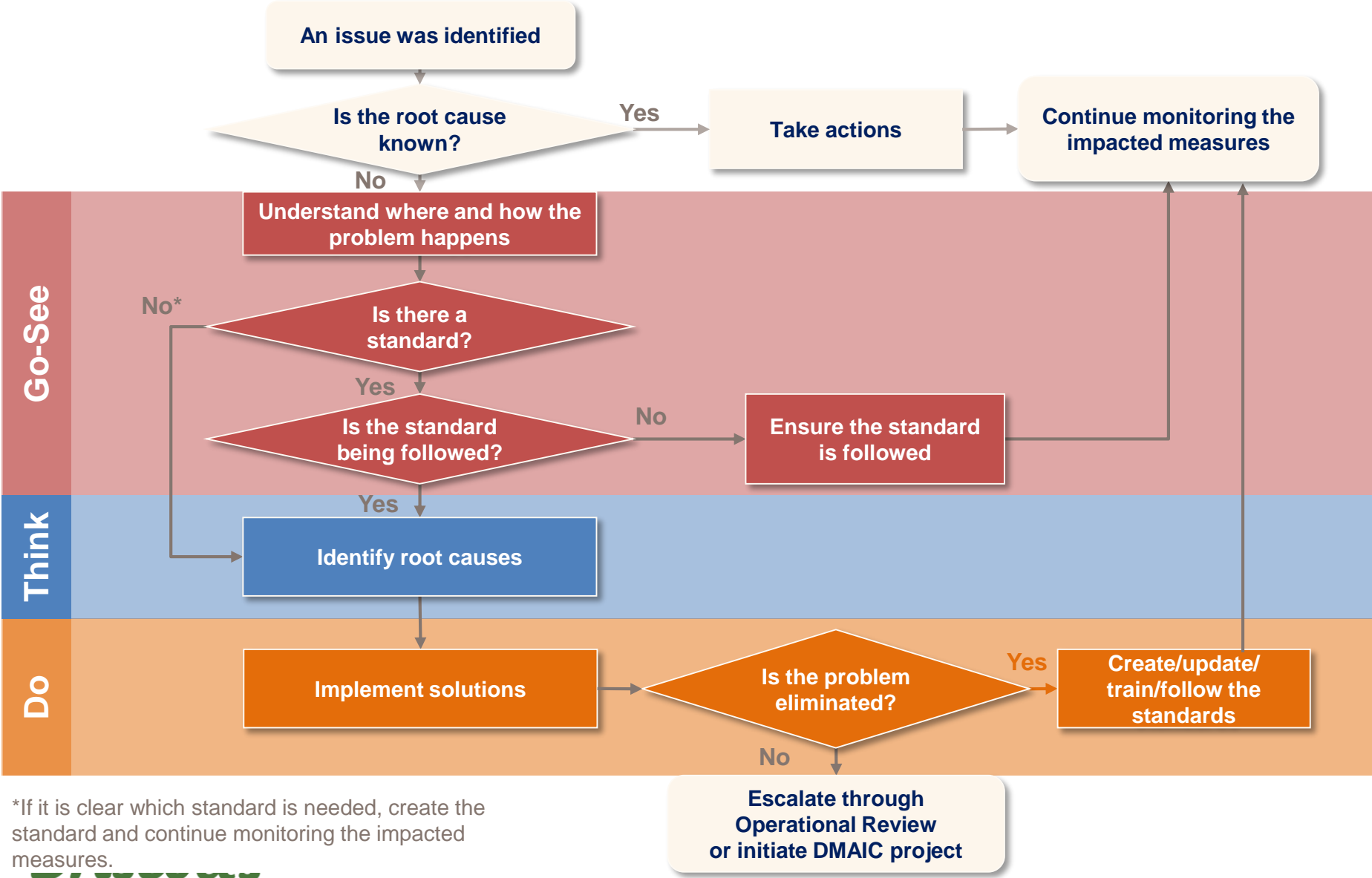
- ✓ Escalation or Help Chain

Weekly/Monthly Measure



- ✓ Basic DMAIC Problem Solving

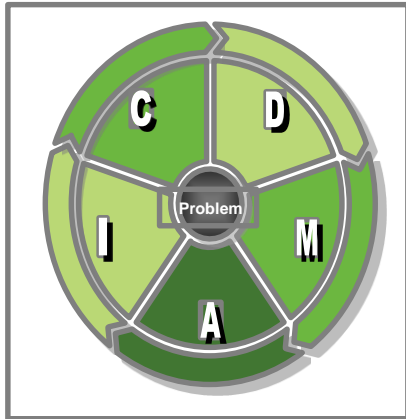
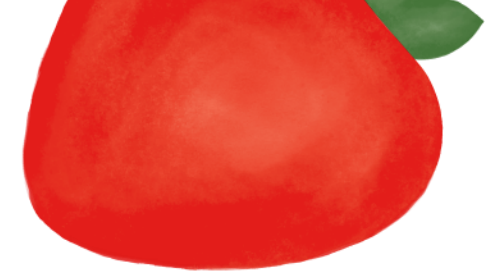
Go-See Think Do process



*If it is clear which standard is needed, create the standard and continue monitoring the impacted measures.



DMAIC approach to solving problems

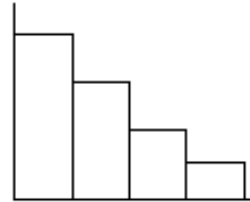


- **Define phase**
 - Define the process to be improved and establish goals
- **Measure phase**
 - Measure the current state
- **Analyze phase**
 - Develop cause and effect theories
 - Scientifically evaluate cause and effect linkage
- **Improve phase**
 - Take action to address identified cause
- **Control phase**
 - Measure to verify improvement has taken place
 - Take actions to sustain the improvement

Tools used in root cause analysis



BRAINSTORMING



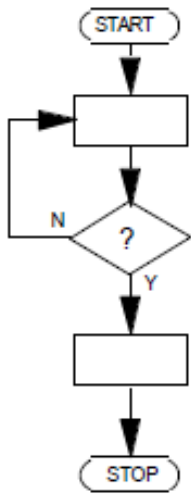
PARETO CHART



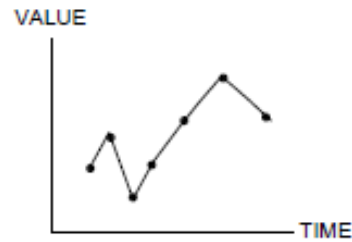
FISHBONE DIAGRAM



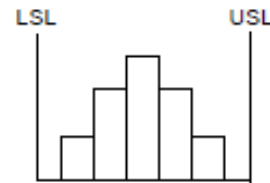
SCATTER DIAGRAM



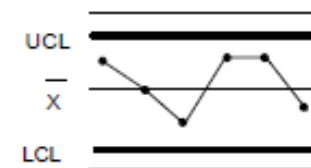
FLOWCHART



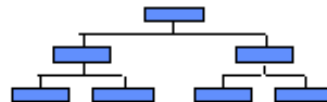
RUN CHART



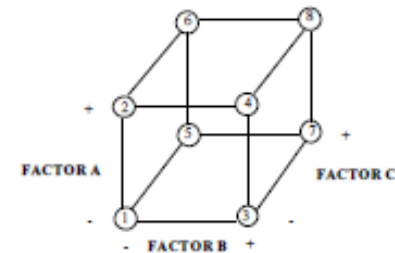
HISTOGRAM



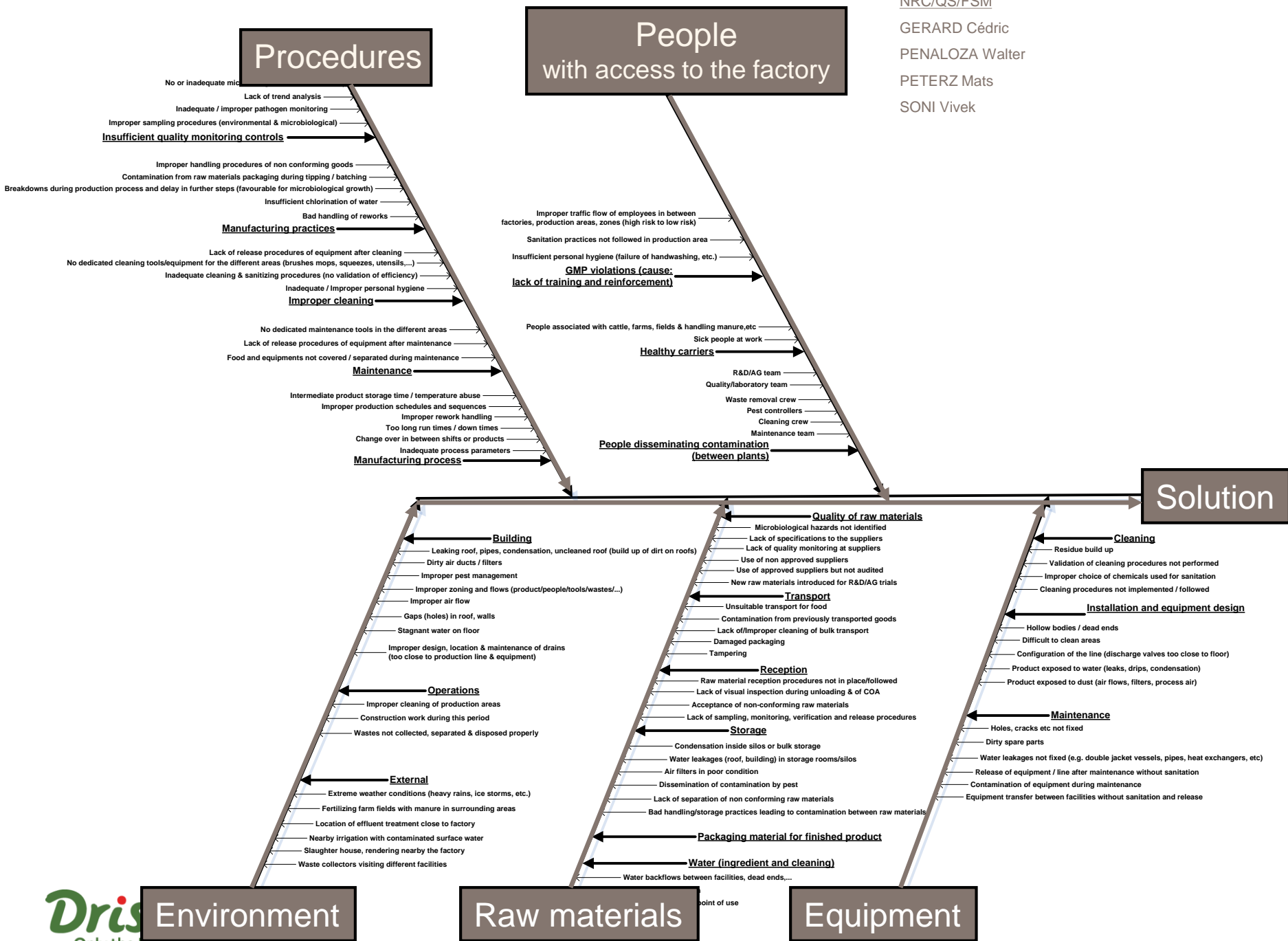
CONTROL CHARTS



TREE DIAGRAM



DESIGN OF EXPERIMENTS



* Nestlé people, contractors, temporary people, visitors

5-why in root cause analysis

Problem: Plastic glove material found in finished product.

Gloves worn by line worker in contact with product

Line worker pushes down on the top each product package prior to addition of lid film to ensure effective lidding

There is variation in the fill level of the product

The filler does not dispense the frozen vegetables evenly

The dispenser is out of calibration

Why?

Why?

Why?

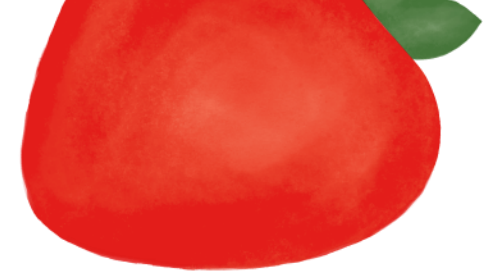
Why?

Why?

Corrective actions:

- Maintenance repair of the dispenser

Technological solutions



- Databases
- In-line monitoring solutions
- Center lining of equipment
- Solutions to design out problems
- Improvements to streamline processes

Concepts from Total Productive Maintenance (TPM)



Jidoka (Automation)

- Design equipment to partially automate the manufacturing process (partial automation is typically much less expensive than full automation) and to automatically stop when defects are detected.

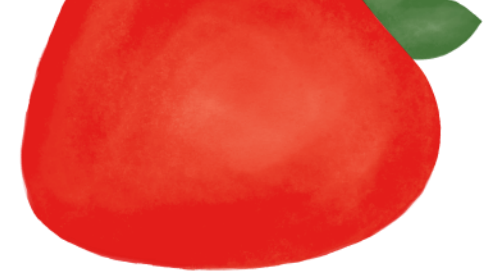
Poka-Yoke (Error Proofing)

- Design error detection and prevention into production processes with the goal of achieving zero defects.

In-line monitoring systems



Center-lining a process



Four steps to “centerline” a process:

- Identify the important process factors or “variables”
- Determine the best settings and ranges for all of the important variables – by grade or product if multiple products are being produced
- Determine how these variables affect the process and the product
- Ensure that the center-lined settings are always used during production (visual or software tools)



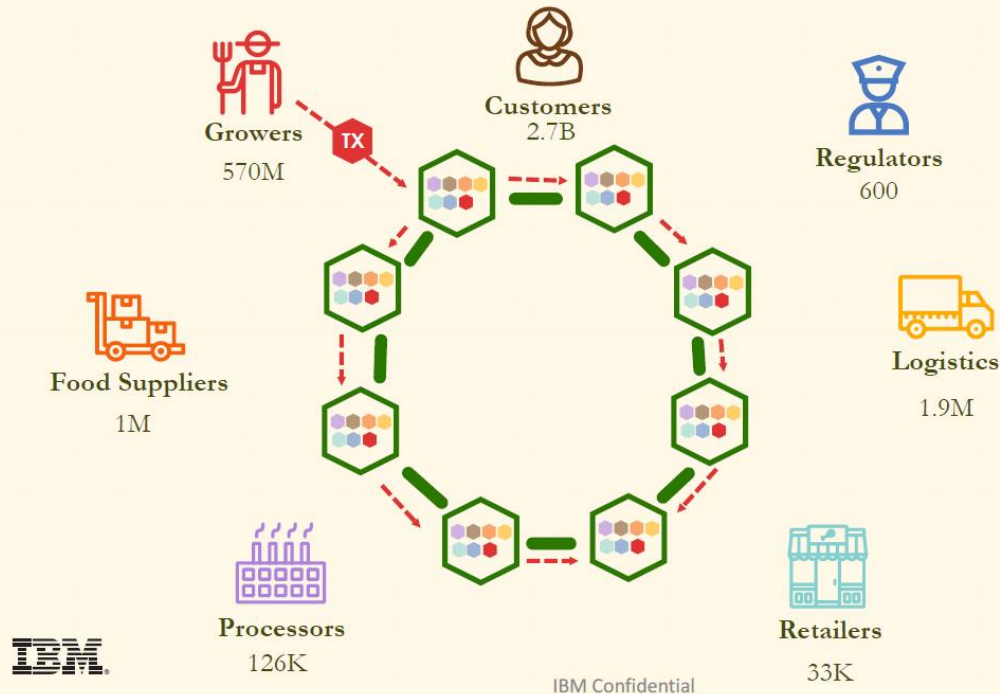
Defect elimination by design



Improvements to streamline processes

How Blockchain Helps

The entire ecosystem shares a single trusted source of information on the food system



Blockchain

- A continually growing list of records (blocks) which are linked and secured using cryptography
- Each block contains transaction data, a timestamp and a link to a previous block
- Can record transactions between two parties in a verifiable and permanent way





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