DEVELOPMENT OF U.S. FOOD LAWS

• **1906** A novel, *The Jungle* by Upton Sinclair about the meat packing industry in Chicago outraged the public and lead to the **Pure Food Act.**
• **1938 Food, Drug, and Cosmetic Act.** This act is still the basis for food laws today.
• 1958 Delaney Clause on additives and cancer
• 1966 Fair Packaging and Labeling Act
• 1973 Low Acid Food Processing Act – Botulism
• 1980 Infant Formula Act
• 1982 Tamper Resistant Packaging Act
• 1990 Nutritional Labeling Enforcement Act
• 1996 Food Protection Act – Pesticides
• 1996-Pathogen Reduction- HACCP final rule
• 2002 Bioterrorism Act
• 2004 Food Allergy Labeling Act

WHAT’S NEXT?
FORCES ACTING ON FOOD SAFETY - PERFECT STORM MODEL

**INFORMATIONAL**
- CDC FOODNET SURVEILLANCE REPORTING TECHNIQUES FROM PUBLIC HEALTH DEPARTMENTS
- IMPROVED CDC COMPUTER DATABASE AND STATISTICS ON FBI AND CAUSE ANALYSIS
- STATE, FDA AND CDC COOPERATION

**ECONOMIC**
- INVESTOR - WALL STREET INFLUENCE AND LACK OF COMMITMENT
- LACK OF TRAINED FOOD SAFETY PROFESSIONALS
- LEAN MANUFACTURING STAFFS - USA
- MANUFACTURING HAMMERED BY RISING COSTS
- FOREIGN COMPETITION

**ETIOLOGICAL**
- LARGER LOTS AND INTERMINGLING OF AGRICULTURAL PRODUCTS
- POTENTIAL BIOTERRORISM
- NEW PATHOGENIC STRAINS FOUND
- OVER SANITARY FOOD SUPPLY
- AGING POPULATION
- MORE WORKERS FROM 3RD WORLD COUNTRIES WITH NATURAL IMMUNITY
- DEFINITION OF HAZARDOUS FOOD

**MORE FREQUENT AND SERIOUS FOOD SAFETY RECALLS**

**SOCIOLOGICAL**
- WIDESPREAD MEDIA COVERAGE
- MEDIA SENSATIONALISM
- POLITICAL POSTURING
- MASS HYSTERIA
- NEED FOR INCREASED LEGAL PROTECTION

**ANALYTICAL**
- NEW- FASTER- SENSITIVE- ACCURATE TESTING TECNIQUES FOR PATHOGENS BY FOOD LABS AND REG AGENCIES
- CDC PULSENET FOR PGEP SEROTYPING OF PATHOGENS

**DEFINITION OF HAZARDOUS FOOD**
GLOBAL MANUFACTURING COMPETITORS

ULTRA MODERN ISO 9000 GUMMY PLANT IN CHINA
RECENT EMPHASIS ON FOOD SECURITY AND BIOTERRORISM

CAREFUL BACKGROUND CHECKS ON NEW HIREs?
DEFINITION OF A HAZARDOUS FOOD

The following is the definition used in the FDA Food Code (FDA 1999, pt 1-201.10[B][61]):

(a) "Potentially hazardous food" means a food that is natural or synthetic and that requires temperature control because it is in a form capable of supporting:

(i) The rapid and progressive growth of infectious or toxigenic microorganisms;

(ii) The growth and toxin production of Clostridium botulinum; or

(iii) In raw shell eggs, the growth of Salmonella Enteritidis
### HAZARDOUS FOODS - A SEA CHANGE

<table>
<thead>
<tr>
<th>TRADITIONAL HAZARDOUS FOODS - EXAMPLES</th>
<th>NOW NEED TO BE TREATED AS HAZARDOUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUPPORTS PATHOGEN GROWTH</td>
<td>DOES NOT SUPPORT PATHOGENS</td>
</tr>
<tr>
<td>EGG PRODUCTS</td>
<td>CHOCOLATE</td>
</tr>
<tr>
<td>GROUND BEEF, POULTRY</td>
<td>SPICES</td>
</tr>
<tr>
<td>DELI MEATS</td>
<td>TREE NUTS, ALL TYPES</td>
</tr>
<tr>
<td>RAW CHICKEN</td>
<td>CEREALS</td>
</tr>
<tr>
<td>DELI SALADS</td>
<td>PEANUTS AND PEANUT BUTTER</td>
</tr>
<tr>
<td>MILK PRODUCTS - SOFT CHEESE</td>
<td>PRODUCE, SPINACH, LETTUCE</td>
</tr>
<tr>
<td>DRY CURED MEATS</td>
<td>PEPPERS - TOMATOS</td>
</tr>
<tr>
<td>LOW ACID CANNED PRODUCTS</td>
<td>APPLE JUICE</td>
</tr>
</tbody>
</table>

SIDE NOTE: USDA SALMONELLA POS STANDARD FOR RAW CHICKEN = 20%  9.3% IN 2002
# The Food Defect Action Levels

Levels of natural or unavoidable defects in foods that present **no health hazards** for humans

## PEANUT BUTTER

<table>
<thead>
<tr>
<th>DEFECT</th>
<th>LEVELS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insect filth</td>
<td>(AOAC 968.35) Average of 30 or more insect fragments per 100 grams</td>
</tr>
<tr>
<td>Rodent filth</td>
<td>(AOAC 968.35) Average of 1 or more rodent hairs per 100 grams</td>
</tr>
</tbody>
</table>

**DEFECT SOURCE:** *Insect fragments* - preharvest and/or post harvest and/or processing insect infestation, *Rodent hair* - post harvest and/or processing contamination with animal hair or *excreta*, *Grit* - harvest contamination

**SIGNIFICANCE:** Aesthetic

## Levels of natural or unavoidable? defects that **present a health hazard:**

<table>
<thead>
<tr>
<th>DEFECT</th>
<th>SIGNIFICANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salmonella</td>
<td>Zero Allowed!</td>
</tr>
</tbody>
</table>
ZERO TOLERANCE = ZERO RISK STATUTE

• NEW PATHOGENS WITH UNCERTAINTY OF INFECTIOUS MECHANISM

• LEADS TO **ZERO TOLERANCE** FOR PATHOGENS

• LEADS TO **ZERO RISK** POLICIES BY REGULATORY AND CUSTOMERS

• LEADS TO POTENTIAL LOSSES FOR MANUFACTURERS

• LEADS TO .......... THE PLANT IS **Closed**
USDA Recalls 1999-2009

Pathogen Reduction - HACCP Rule

SIDE NOTE: USDA LISTERIA TESTING WAS 4.6% POSITIVE IN 1999 AND 0.6% POSITIVE IN 2006
<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>NUMBER</th>
<th>PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALLERGEN</td>
<td>253</td>
<td>13.6</td>
</tr>
<tr>
<td>E. COLI</td>
<td>165</td>
<td>8.5</td>
</tr>
<tr>
<td>LISTERIA</td>
<td>371</td>
<td>20.7</td>
</tr>
<tr>
<td>SALMONELLA</td>
<td>152</td>
<td>11.5</td>
</tr>
<tr>
<td>FOREIGN OBJECTS</td>
<td>66</td>
<td>3.6</td>
</tr>
<tr>
<td>MISLABEL</td>
<td>105</td>
<td>5.6</td>
</tr>
<tr>
<td>OTHERS</td>
<td>232</td>
<td>12.5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1185</td>
<td>100</td>
</tr>
</tbody>
</table>

SIDE NOTE: USDA INCREASED SALMONELLA SAMPLING FROM 46,000 TO 58,000 IN 2003
## TEN MOST COSTLY RECALLS

<table>
<thead>
<tr>
<th>YEAR</th>
<th>PROBLEM</th>
<th>COMPANY/INDUSTRY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>E.Coli</td>
<td>Jack in the Box Hamburgers</td>
</tr>
<tr>
<td>1996</td>
<td>E.Coli</td>
<td>Odwalla Apple Juice</td>
</tr>
<tr>
<td>1997</td>
<td>E.Coli</td>
<td>Hudson Ground Beef</td>
</tr>
<tr>
<td>1998</td>
<td>Listeria</td>
<td>Sara Lee - Bil Mar Deli Meat</td>
</tr>
<tr>
<td>2006</td>
<td>E. Coli</td>
<td>Natural Selection - Spinach</td>
</tr>
<tr>
<td>2007</td>
<td>Salmonella</td>
<td>Con Agra - Peanut Butter</td>
</tr>
<tr>
<td>2007</td>
<td>Melamine</td>
<td>Menu Foods - Pet Food</td>
</tr>
<tr>
<td>2008</td>
<td>Improper Insp</td>
<td>Westland Hallmark - Beef</td>
</tr>
<tr>
<td>2008</td>
<td>Salmonella</td>
<td>Tomato Industry</td>
</tr>
<tr>
<td>2009</td>
<td>Salmonella</td>
<td>PCA - Peanut Butter</td>
</tr>
</tbody>
</table>
FOOD SAFETY RISKS - Cause and Effect

**MATERIALS**
- Contaminated raw materials
  - Undeclared ingredients and allergens
  - Poor supplier quality & food safety
  - Contaminated trailers

**PRACTICES**
- Poor GMPS
  - Lack of enforcement
  - No or poor HACCP program
- No supplier approval program
  - Inadequate pest program
  - Inadequate sanitation
  - No pre-op & op inspection
  - Allergens run on same line

**PLANT AND MACHINES**
- Poor plant design
  - No zones of defense
  - Uneven cracked floors
  - Roof leaks
  - Environmental contamination
- Old & antiquated equipment
  - Equipment not designed for cleaning
  - Chipped paint and rust

**PERSONNEL**
- Poorly trained workers
  - Unrealistic goals
  - High turnover
- Poor hygiene
  - Lack of discipline - motivation
- Disgruntled employees
  - Infected workers - pathogen carriers
  - Sick workers - direct contact

**Food Safety Deficiency - Consumer Illness or Recall**
PLANT ENVIRONMENTAL SALMONELLA
PLANT ENVIRONMENTAL LISTERIA
THE CHALLENGE

FOOD SAFETY AND QUALITY ASSURANCE

= NON VALUE-ADDED ACTIVITIES!
# Estimation of Plant Food Safety Expenses

<table>
<thead>
<tr>
<th>Food Safety Discipline</th>
<th>Estimate % of Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical QA Staff and Expenses</td>
<td>0.75-1.5%</td>
</tr>
<tr>
<td>Sanitation Staff and Expenses</td>
<td>0.5 – 2.5%</td>
</tr>
<tr>
<td>Production FS Activities (Based on 15% Direct Labor Costs)</td>
<td>0.75-1.0%</td>
</tr>
<tr>
<td>Maintenance FS Related Activities</td>
<td>0.3-0.5%</td>
</tr>
<tr>
<td>Total Food Safety Cost</td>
<td>2.3 – 5.5%</td>
</tr>
</tbody>
</table>
TARGET RISK

• NEED A RISK REDUCTION PROGRAM FOR EACH THREAT

• DEVELOP A FOOD SAFETY MGT SYSTEM (FSMS)
  – PERFORM GAP ANALYSIS WITH ISO 22000, AIB, SQF 2000

• IMPLEMENT FSMS AND RISK REDUCTION WITHIN MEANS

• CONTINUALLY STRENGTHEN THE FSMS LOWER RISK
### CONSCIOUS COMPETENCE LEARNING MODEL APPLIED TO FOOD SAFETY RISK

<table>
<thead>
<tr>
<th>Conscious</th>
<th>Incompetence</th>
<th>Competence</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEVEL 2</td>
<td>PLANT IS AWARE OF FOOD SAFETY RISKS AND KNOWS IT NEEDS TO DEVELOP OR IMPROVE THE PLAN TO ADDRESS.</td>
<td>PLANT KNOWS FOOD SAFETY RISKS AND HAS PLANS IN PLACE TO ADDRESS. CONTINUALLY REASSESS RISK LEVELS.</td>
</tr>
<tr>
<td>LEVEL 3</td>
<td>PLANT HAS PROGRAMS IN PLACE, BUT DOES NOT CONTINUALLY REASSESS THE RISKS LEVELS AND IS OVERCONFIDENT.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unconscious</th>
<th>LEVEL 1</th>
<th>LEVEL 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLANT IS NOT AWARE OF FOOD SAFETY DANGERS AND HAS NO PLAN TO ADDRESS.</td>
<td>PLANT HAS PROGRAMS IN PLACE, BUT DOES NOT CONTINUALLY REASSESS THE RISKS LEVELS AND IS OVERCONFIDENT.</td>
<td></td>
</tr>
</tbody>
</table>
CONSCIOUS COMPETENCE LEARNING MODEL AND RISK REDUCTION
HACCP IS AN ECONOMIC RESPONSE TO FOOD SAFETY!
FSMS GUIDES AND GLOBAL CERTIFICATION AGENCIES

SQF 2000 Code

A HACCP-Based Supplier Assurance Code for the Food Manufacturing and Distributing Industries

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ISO 22000
Policies, Procedures & Forms

How to Quickly Create an ISO 22000 Food Safety Management System
with Easily Editable Food Safety, Quality, and HACCP Policies and Procedures
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MAINTAINING A FOODSAFE, 100% MOTOR AND THE WORLD'S BEST PRACTICE. IF YOU'RE INTERESTED, ANY QUESTIONS ABOUT FOOD SAFETY WILL BE ANSWERED WITH
NON-PRODUCTIVE FOOD SAFETY STRATEGIES

• WEAK EFFORT TO BUILD-IN FOOD SAFETY
• FOOD SAFETY IS QA ACTIVITY ONLY
• LACK OF PARTICIPATION BY TOP MGT
• DEPENDANCE ON INCOMING INSPECTION
• DEPENDENCE ON FINISHED PRODUCT TESTING
• LETTERS OF GUARANTEE
• NO USE OF MEASUREMENT FOR IMPROVEMENT
• NO INDEPENDENT OVERSIGHT WITH AUTHORITY
• OVERCONFIDENCE IN SYSTEMS
FINISHED PRODUCT TESTING

• STILL TAKES TOO MUCH TIME
  – PLATING OR AND ENRICHMENT = 24 PLUS HRS MIN

• COST SENSITIVE SAMPLING IS UNRELIABLE

• TYPICALLY, NOT STATISTICALLY VALID

• TOO LATE TO REPAIR PRODUCT

• NO DIAGNOSTIC VALUE

• DELAY IN SHIPMENTS
OVER 50% CHANCE OF ACCEPTING LOT WITH 15% CONTAMINATED

ABOUT 25% CONTAMINATED BEFORE 95% PROBABILITY OF REJECTION

ABOUT 43% CONTAMINATED BEFORE 95% PROBABILITY OF REJECTION

Figure 2 **OC-curves for two-class sampling plans in relation to proportion defective with varying number of sample units**
BUILT-IN FOOD SAFETY

SAFE PLANT DESIGN → MAINTENANCE FOOD SAFETY

R&D FOOD SAFETY

VENDOR FOOD SAFETY

RELIEVES DEPENDENCE ON THE FOOD SAFETY MANAGEMENT SYSTEM

COST OPTIMIZATION

PROCESS FOOD SAFETY

PACKAGING FOOD SAFETY

LEAN MANUFACTURING
FOOD SAFETY BALANCE OF COST

Operating costs to manage food safety risk

Weak built-in food safety system

Higher $

Food safety management program
FOOD SAFETY BALANCE OF COST

FOOD SAFETY MANAGEMENT PROGRAM

OPERATING COSTS TO MANAGE FOOD SAFETY RISK

STRONG BUILT-IN FOOD SAFETY SYSTEM

LOWER $
PLANT DESIGN FOR FOOD SAFETY

- LIMITED ACCESS FOR PEOPLE, RODENTS, INSECTS
- MADE WITH CLEANABLE MATERIALS
- GOOD LIGHT ALL AROUND
- RECEIVING ON ONE END – SHIPPING THE OTHER
- GOOD DRAINAGE ALL OVER FACILITY
- EASILY MAINTAINABLE ROOF
- ADEQUATE SPACE – WELL UTILIZED SPACE
VENDOR FOOD SAFETY

• VENDOR APPROVAL PROGRAM A MUST

• TOTAL FS COST OF VENDOR’S PRODUCT:
  - NEEDED TESTING TO ENSURE FOOD SAFETY
  - FOOD SAFETY RISKS AND POTENTIAL RECALLS
  - COST OF RETURNS FOR NON CONFORMANCE

• DON’T DEPEND ON 3RD PARTY AUDITS

• ISO 9000- 22000, SQF 2000, ETC NOT COMPLETE ASSURANCE

• FREQUENTLY VISIT STRATEGIC SUPPLIERS

• CONVERSELY, INVITE VENDORS TO YOUR PLANT
MAINTENANCE FOOD SAFETY

• MUST HAVE A FOCUSED PM PROGRAM

• CONSIDER HACCP FOR MAINTENANCE
  – ID THE PM’S THAT MUST BE PERFORMED
  – DOCUMENT & VERIFY THOSE TASKS
  – CRITICAL PARTS IDENTIFIED - STOCKED

• USE SCADA/MES SYSTEMS WHERE POSSIBLE
  – COLD ROOM TEMPERATURE MONITORING
  – METAL DETECTOR EVENTS RECORDED
  – OVEN TEMPERATURE MONITORING
SCADA EXAMPLE
Track Food Safety Data in Real Time
R&D FOR FOOD SAFETY

- SELECT INGREDIENTS FOR FOOD SAFETY
  - IRRADIATED SPICES
  - PASTUERIZED EGGS AND DAIRY PRODUCTS
  - PRE-COOKED MEATS
  - PRE-ROASTED OR PASTUERIZED NUT PRODUCTS
  - NO UNDECLARED ALLERGENS
  - LOW AW AND LOW PH WHERE POSSIBLE

- USE EXISTING INGREDIENTS WHERE POSSIBLE:
  - REDUCES NUMBER OF SUPPLIERS
  - REDUCES CHANCE FOR FORMULA MIX-UPS
  - KEEPS LABEL NEAT AND REDUCES NEED FOR LABEL CHANGES

- KEEP FORMULATIONS SIMPLE
  - WATCH FOR PROCESSING AIDS THAT ARE ALLERGEN BASED
  - ID CRITICAL COMPONENTS FOR AW, pH, ANTIMICROBIOLS
PROCESS FOR FOOD SAFETY

- Use fail-safe systems to divert under processed – non conforming items
- Reduce handling steps when possible
- Design lines with adequate accumulation
- Keep levels of WIP to a minimum
- Eliminate capacity constraints
- Run lines at optimum rate – not maximum
- Develop process level maps for all products – include food safety items in L3
PROCESS MAPPING FOR FOOD SAFETY

IDENTIFY FOOD SAFETY ACTIONS AT EACH POINT IN THE PROCESS

RAW MATERIALS APPROVAL PROCESS

1.0 INGREDIENT MATERIAL NEEDS DETERMINATION
2.0 VENDOR SELECTION & CONTACT
3.0 APPROVAL PROCESS
4.0 PHASE WI QUALIFICATION PROCESS
5.0 COMMERCIALIZATION PROCESS
6.0 PERFORMANCE ASSESSMENT
7.0 VENDOR FOLLOW-UP AND NSB OPPORTUNITY

3.0 VENDOR APPROVAL LEVEL 2 MAP

BASIS SCREEN FOR INITIAL ACCEPTABILITY

ANALYTICAL VALIDATION, IF NECESSARY

COLLECTION OF CRITICAL INFORMATION AND FOOD SAFETY ASSESSMENT

3.5 VISIT SENSITIVE INGREDIENT AND HIGH VOLUME SUPPLIERS - FOOD SAFETY

3.6 INPUT - Profiles of the selected vendors

MECHANISM - The product takes and submitted sample, analysis

LEVEL 1 MAP

LEVEL 2 MAP

LEVEL 3 MAP

A023 - VENDOR (APPROVAL) LEVEL 3 MAP - CONTROL POINTS

CP 3.3.10

- Policy, procedure
- The minimum DC. All food and material needs to be consistent with the expectations for ISO and customer groups. The expected regulatory activities that maintain test objectives in the final production of the product for the customer.

CP 3.3.2.10

- Analytical requirements
- The minimum DC. All food and material needs to be consistent with the expectations for ISO and customer groups. The expected regulatory activities that maintain test objectives in the final production of the product for the customer.

CP 3.3.3.10

- Product and product
- The appropriate person must ensure that the information provided by the supplier is consistent with all of the product descriptions, processes, and information that is applicable to the production process.

CP 3.3.4.10

- Vendor and suppliers
- The appropriate person must ensure that the information provided by the supplier is consistent with all of the product descriptions, processes, and information that is applicable to the production process.

CP 3.3.5.10

- Material acceptance
- For the appropriate person must ensure that the information provided by the supplier is consistent with all of the product descriptions, processes, and information that is applicable to the production process.
PACKAGING DESIGNED FOR FOOD SAFETY

• SYSTEM TO IDENTIFY PROPER PACKAGES
  – IN LINE BAR CODE SCANNERS FOR CORRECT PACKAGE
  – COLOR DIFFERENTIATION

• LOW METAL CONTAINER FOR GOOD METAL DETECTION

• EFFECTIVE TAMPER RESISTANCE

• USE FILMS WITH GOOD SEALABILITY

• GRAPHICS HAS AREA FOR EXPIRATION DATES
PACKAGING DESIGN FOR FOOD SAFETY

DIET FOR DIABETICS ≠ REGULAR SUGAR PRODUCT

MEAT – NON ALLERGEN ≈ SEAFOOD – SERIOUS ALLERGEN
COST OPTIMIZATION & LEAN MANUFACTURING FOR FOOD SAFETY

• WHY? - COMPANIES CAN RARELY justifying CAPITAL PROJECTS ON FOOD SAFETY.

• ELIMINATES NON-VALUE ADDED ACTIVITIES

• IMPROVEMENTS FOR EFFICIENCY, LABOR, CAPACITY

• FREQUENTLY IMPROVES FOOD SAFETY

• EXAMPLES:
  - AUTOMATION WITH LESS HUMAN HANDLING - ELIMINATE WASTE
  - CONTINUOUS RUNS WITH LESS NEED TO CLEAN - ELIMINATE WASTE
  - IMPROVED MATERIAL CONTAINERS WITH MORE CAPACITY
  - LESS WIP GENERATED, SMALLER LOTS AND REDUCED EXPOSURE
  - JIT PROGRAM WITH BETTER QUALITY SUPPLIER
COST – FOOD SAFETY IMPROVEMENT

PLASTIC TOTES FOR USED FOR INGREDIENTS:
1. DIFFICULT TO CLEAN
2. CANNOT PASS ATP BIOLUMINESCENCE TEST
3. CAUSE OF HARD PLASTIC CONTAMINATION
4. LABOR INTENSIVE
5. CAPACITY BOTTLENECK

REPLACED WITH SS DUMP BUGGIES AND LIFT:
1. EASY TO CLEAN
2. EASILY PASSES ATP SWAB
3. NO PLASTIC CONTAMINATION
4. REDUCED LABOR NEEDED
5. INCREASED CAPACITY BY > 70%
6. MORE COMPACT STORAGE

IRR > 55% PLUS!
Packaging Process 4.0 Level 3 Map

Estimated shift stack-off volume = 4684 units

SIX OZ ARRIVAL RATE = 118 / minute - 36 +10
128/ min MAXIMUM

FROM FREEZER
4.1-

TOWER LINE
DIVERTER
SINGLE FILER
5.1.1

FMC FILM CHANGE = 3-5 min X 6 = 24 min

CCR2
95% CU

FMC DOWNTIME = 15.7 min/day +/- 34 min

5.2 - CONVEYOR ACCUMULATOR LOOP
( 5” GAP = 103 ft/min)

5.2.1 OFF-STACK UNWRAPPED WIP

5.2.2 RE-SUPPLY FMC FEED WITH UNWRAPPED WIP.

5.2.3 LINE-UP FEED TO FMC - MUST BE FULL

5.3.1 FMC WRAPPER
APPLY POLYPROPYLENE OVERWRAP FILM
LIMIT 130/MIN

5.3.2 FILM CHANGE OVER ON FMC = 3-4 MINUTES 480 UNITS COLLECTED

5.4.1 CHECK-WEIGHER

5.4.2 METAL DETECTOR

5.4.3 DIVERT PRODUCT HERE WHEN CARTONER DOWN

CCR3
94% CU

5.4.3 - INFEED STAR AND SLOTTED BELT LIMIT 135/ MINUTE

5.5.1 MAKE UP RATE FROM DIVERT LINE = 40/ MIN

5.5.2 THIELE CARTONER
PLACE WRAPPED TRAY IN CARTON

RE-SUPPLY FMC FEED WITH UNWRAPPED WIP. MAKE-UP RATE = 50/ MIN

5.5.3 THIELE DOWNTIME = 49.2 min/day +/- 63 min

Bottleneck 2 115% CU

5.6.1 HAND CASE STATION LIMIT 110/ MINUTE

5.6.2 TAPE CASE

5.7 HAND PALLETIZE

5.6.3 HAND CASE STATION

5.7.1 FINISHED GOODS

Estimated shift stack-off volume = 5805 units

5.2.1 PULL PRODUCT AND WIP WHEN FMC DOWN OR FILM CHANGE

5.2.2 RE-SUPPLY FMC FEED WITH UNWRAPPED WIP. MAKE-UP RATE = 50/ MIN

5.3.2 FILM CHANGE OVER ON FMC = 3-4 MINUTES 480 UNITS COLLECTED

5.5.1 MAKE UP RATE FROM DIVERT LINE = 40/ MIN

Estimated shift stack-off volume = 5805 units
FOOD SAFETY TRENDS AND STRATEGIES

• FOOD SAFETY RISK AND COST IS INCREASING

• A COMPREHENSIVE FSMS TO REDUCE RISK, BUT IT CAN BECOME A REVENUE EATING MONSTER

• FINISHED PRODUCT TESTING LEAST EFFECTIVE AND MOST COSTLY STRATEGY

• STRIVE TO BUILD-IN FOOD SAFETY TO REDUCE COSTS

• COST AND LEAN MFG CAN RESULT IN FOOD SAFETY IMPROVEMENTS
QUESTIONS?