

MONITORING PROCEDURES

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**PRINCIPLE 4: ESTABLISH
PROCEDURES TO MONITOR
CRITICAL LIMITS**

DEFINITIONS

***INTERNATIONAL COMM. ON
MICROBIOLOGICAL STANDARDS FOR FOOD
(ICMSF)***

- ***CHECKING THAT THE PROCESSING OR
HANDLING PROCEDURE AT A CCP IS
UNDER CONTROL.***

***NATIONAL ADVISORY COMM. FOR
MICROBIOLOGICAL CRITERIA FOR
FOODS (NACMCF)***

- ***A PLANNED SEQUENCE OF OBSERVATIONS OF CRITICAL LIMITS DESIGNED TO PRODUCE AN ACCURATE RECORD AND INTENDED TO INSURE THAT THE CRITICAL LIMIT MAINTAINS PRODUCT SAFETY.***

FOOD & DRUG ADMINISTRATION (FDA)

- ***THE SCHEDULED TESTING OR OBSERVATION OF THE EFFECTIVENESS OF A PROCESS TO CONTROL CCPs AND THEIR LIMITS.***

USDA/FOOD SAFETY & INSPECTION SERVICE (FSIS)

- ***PROCEDURES , AND THE FREQUENCY WITH WHICH THESE WILL BE PERFORMED, THAT WILL BE USED TO MONITOR EACH OF THE CCPs TO ENSURE COMPLIANCE WITH THE CLs***

CODEX ALIMENTARIUS

- ***THE ACT OF CONDUCTING A PLANNED SEQUENCE OF OBSERVATIONS OR MEASUREMENTS OF CONTROL PARAMETERS TO ASSESS WHETHER A CCP IS UNDER CONTROL***

NATIONAL CONFERENCE ON INTERSTATE MILK SHIPMENTS (NCIMS)

- ***LIST THE PROCEDURES, AND THE FREQUENCY WITH WHICH THEY ARE TO BE PERFORMED, THAT WILL BE USED TO MONITOR EACH CCP TO INSURE COMPLIANCE WITH CLs.***

MONITORING PURPOSES

- **TO TRACK THE HACCP SYSTEM'S OPERATION**
 - **OBSERVE TRENDS**
- **TO IDENTIFY AND DETERMINE LOSS OF CONTROL AND DEVIATION AT A CCP (EXCEEDING THE CL)**
 - **REQUIRES CORRECTIVE ACTION**
- **TO PROVIDE WRITTEN DOCUMENTATION OF THE PROCESS**

CONSIDERATIONS FOR HACCP TEAM

- **WHAT IS SPECIFIC INFORMATION NEEDED?**
 - RIGHT VS. WRONG QUESTIONS
 - RIGHT VS. WRONG DATA
- **DATA ANALYSES?**
 - APPROPRIATE TO CONTROL HAZARDS
- **COLLECTION POINTS?**
 - APPROPRIATE?
 - ON-LINE/REAL TIME?
- **MONITORING METHODS?**
 - ACCURACY/PRECISION?
 - NON BIASED?

CONSIDERATIONS FOR HACCP TEAM

- **TRAINING NEEDS?**
- **DATA COLLECTION FORMS?**
 - **APPROPRIATELY DESIGNED**
 - **EASY TO USE**
 - **TESTED AND REVISED AS NEEDED**
- **APPROPRIATELY AUDITED, VERIFIED?**
 - **IS IT AUDITABLE? VERIFIABLE?**

INDIVIDUALS DOING MONITORING SHALL BE TRAINED IN--

- **HACCP**
- **MONITORING PROCEDURES**
 - **VERIFY COMPETENCY**
- **FREQUENCY OF MONITORING**
- **APPLICATION OF CRITICAL LIMITS**
- **PROCESS CONTROL**
 - **DEVIATIONS AND CORRECTIVE ACTIONS**
 - **ADJUSTMENTS**
- **DATA ENTRY & RECORD KEEPING**
- **UNDERSTANDING RESPONSIBILITY**

MONITORING

- **WHAT?**
 - **WHAT TO MONITOR**
- **HOW?**
- **WHEN OR HOW OFTEN?**
- **WHO?**

HACCP PLAN FORM-- MONITORING

1. CCP	2. Hazards	3. Critical limits	Monitoring				8. Corrective actions	9. Verification
			4. What	5. How	6. Frequency	7. Who		

***WHAT IS “MEASURABLE
PARAMETER” FOR MONITORING
CLs?***

MEASURABLE PARAMETER OR CRITERIA

- **SPECIFIED ACCEPTABLE PRACTICES**
- **DETERMINING SAFE LIMITS OR TOLERANCES AT EACH CCP**
- **MUST BE REAL TIME OR ON-LINE**
- **GOVERNMENT REGULATIONS VS. CORPORATE POLICIES**

TEMPERATURE

- **MEASURABLE?**
- **REAL-TIME?**
- **PROCESSING**
 - **PASTEURIZATION**
 - **STERILIZATION**
- **STORAGE/HOLDING**
 - **COLD STORAGE**
 - **HOT HOLDING**
 - **41 – 140 F DANGER ZONE**

TIME

- MEASURABLE?
- REAL-TIME?
- PROCESS TIMES
- CONTACT TIMES

VISUAL OBSERVATION

- **MEASURABLE?**
- **REAL TIME?**
- **EXAMPLES**

PRODUCT COMPOSITIONAL FACTORS

- **pH & ACIDITY**
 - MEASURABLE?
 - REAL-TIME?
- **SALT CONCENTRATION**
 - MEASURABLE?
 - REAL-TIME?

PRODUCT PHYSICOCHEMICAL FACTORS

- *A_w*
 - MEASUREABLE?
 - REAL-TIME?
- VISCOSITY
 - MEASURABLE?
 - REAL-TIME?

PROCESSING/HANDLING AID MEASUREMENT

- SANITIZER OR DETERGENT STRENGTH
 - MEASURABLE?
 - REAL TIME?
- EXAMPLES
 - CLEANING STEP
 - SANITIZING PRODUCE

***HAZARD DETERMINATION &
DETECTION***

CHEMICAL HAZARDS

- **RAW PRODUCT/INGREDIENT TESTING**
 - MEASURABLE?
 - REAL-TIME?
 - SPECIFICATIONS
 - FDA/EPA TOLERANCES
 - OTHERS
- **END-PRODUCT TESTING**
 - MEASURABLE?
 - REAL-TIME?

PHYSICAL HAZARDS

- METAL
 - IN-LINE DETECTORS
 - MEASURABLE?
 - REAL-TIME?
 - CRITICAL LIMIT?
 - MAGNETS
 - MEASURABLE?
 - REAL-TIME?
 - CRITICAL LIMIT?
- GLASS/OTHER?

BIOLOGICAL HAZARD

- **RAW PRODUCT/INGREDIENT**
 - MEASURABLE?
 - REAL-TIME?
 - SPECIFICATIONS
- **END-PRODUCT TESTING**
 - MEASURABLE?
 - REAL-TIME

SUPPLIER REQUIREMENTS & AGREEMENTS

- CERTIFICATES OF ACCEPTANCE
& LETTERS OF GUARANTEE
 - MEASURABLE?
 - REAL TIME?

MONITORING PROCEDURES

- **CONTINUOUS VS. INTERMITTENT OR NON-CONTINUOUS MONITORING**
- **SUBJECTIVE VS. OBJECTIVE MEASUREMENTS**
- **PHYSICAL VS. CHEMICAL**
- **MEASUREMENT VS. OBSERVATIONAL**

MONITORING PROCEDURES – PREFER :

- **OBJECTIVE OVER SUBJECTIVE**
- **MEASUREMENT OVER OBSERVATION MONITORING**
- **“REAL-TIME” OVER LAB ANALYSIS**
 - **PROVIDE IMMEDIATE RESULTS**
 - **PREVENT POTENTIALLY UNSAFE PRODUCT FROM GOING FURTHER**
- **CONTINUOUS OVER INTERMITTENT MONITORING**
- **“OFFICIAL” QUANTITATIVE MEASUREMENTS (AOAC, ETC.) IF AVAILABLE**

OBSERVATION MONITORING

- **DISADVANTAGES**
 - BIAS
 - SUBJECTIVE
 - STANDARDIZATION ISSUES?
- **REQUIREMENTS**
 - UNBIASED, TRAINED OBSERVER
 - SUPERVISORY CHECKS AND BALANCES

OBSERVATION MONITORING EXAMPLES

- **SUPPLIER REQUIREMENTS/AUDITS**
- **RAW MATERIAL INSPECTION**
- **CHECKING APPROVED SUPPLIER LISTS**
- **OBSERVING EMPLOYEE PRACTICES**
- **OBSERVING ON-LINE OPERATIONS**
- **REVIEWING THERMAL-PROCESS CHARTS**
- **OBSERVING TIME/TEMPERATURE RECORDERS**
- **CHECKING DOUBLE SEAMS ON CANS**
- **INSPECTING EQUIPMENT SANITATION**
- **INSPECTING TRANSPORTATION VEHICLES**
- **SENSORY EVALUATION**

MEASUREMENT MONITORING

- **OBJECTIVE**
 - LESS POTENTIAL FOR BIAS
- **SENSITIVITY/ACCURACY/PRECISION**
 - CALIBRATION FREQUENCY
 - TYPE OF EQUIPMENT AND INSTRUMENTS
- **DATA ANALYSIS**

EXAMPLES OF PARAMETERS TO BE MONITORED

- **TIME**
- **TEMPERATURE**
- **VISUAL OBSERVATIONS**
- **PRODUCT CHARACTERISTICS**
 - **COMPOSITIONAL FACTORS**
 - **pH AND TITRATABLE ACIDITY**
 - **SALT CONCENTRATION**
 - **PHYSICOCHEMICAL FACTORS**
 - **VISCOSITY**
 - **WATER ACTIVITY (A_w)**

EXAMPLES OF PARAMETERS TO BE MONITORED

- **PROCESSING/HANDLING AID MEASUREMENT**
 - SANITIZER STRENGTH
 - DETERGENT STRENGTH
- **HAZARD DETERMINATION**
 - CHEMICAL ANALYSES
 - PHYSICAL ANALYSES
 - MICROBIOLOGICAL ANALYSES
- **SUPPLIER REQUIREMENTS**
 - CERTIFICATE OF ANALYSIS (COA)
 - LETTER OF GUARANTEE (LOG)

CHEMICAL MEASUREMENTS

ON-LINE MEASUREMENTS

- **pH, TITRATABLE ACIDITY**
- **SANITIZER STRENGTH**
- **SALT**
- **SUGAR**
- **VISCOSITY**

LABORATORY ANALYSES

- **NOT REAL TIME**
- **TOXINS**
- **ADDITIVES & CHEMICAL RESIDUES**

ALTERNATIVES TO DIRECT MEASUREMENTS

- **MONITOR THE PROCESS**
 - **ADDITION RATE FOR SANITIZER**
 - **ADDING CHEMICALS**
 - **MEASURE RATE OF ADDITION**
 - **VITAMIN ADDITION TO MILK**
 - **MONITOR FEEDING SYSTEM**
 - **REAL-TIME**

PHYSICAL MEASUREMENTS

- **OFTEN CONTINUOUS**
 - ON-LINE INSTRUMENTATION
- **OFTEN 100% TESTING**
- **CALIBRATION NEEDS OF EQUIPMENT**
- **EXAMPLES**
 - TEMPERATURE/TIME
 - WATER ACTIVITY
 - HEAD-SPACE OF CANS
 - METAL DETECTION
 - GLASS DETECTION
 - BONE DETECTION

MICROBIOLOGICAL MEASUREMENTS

- **RAW MATERIAL MONITORING AND SPECIFICATIONS**
- **EXAMPLES**
 - **TOTAL PLATE COUNT**
 - **COLIFORM COUNT**
 - **SPECIFIC PATHOGEN TESTS**
- **NOT REAL TIME**

DATA RECORDING

- **“HEART” OF HACCP**
- **RELIABILITY AND CLARITY**
- **PREVENT “LINE INITIALLING”**
 - **AKA PENCIL WHIPPING**
 - **AKA DRY LABBING**
- **TYPES**
 - **INSPECTION REPORTS**
 - **CHECKLISTS**
 - **DATA SHEETS**
 - **CHECK SHEETS**
 - **PROCESS CONTROL CHARTS**

CALIBRATION OF MONITORING INSTRUMENTS AND PROCEDURES

- **PART OF HACCP VERIFICATION**