

HACCP Principle 3 – Establish Critical Limits

FSKN I 15D

Chennai, India

February 2-4, 2011

HACCP Principles

- Principle 3.
 - Establish **critical limits** for each preventative measure associated with each identified CCP.

Critical Limit – Codex Definition

“ A criterion which separates acceptability from unacceptability”



Basis for Critical Limits

- Biological hazards
 - Inactivation of microbes, toxins prevention/destruction, growth prevention
- Chemical hazards
 - Toxicity, allergen, safety limits
- Physical hazards
 - Criteria related to potential for injury (e.g. object size, hardness, sharpness)

Examples of Parameters that May Be Critical Limits

- Temperature
- pH
- Moisture level
- Line Speed
- Time
- Flow rate
- Water activity
- Salt concentration
- Physical dimensions
- Weight
- Viscosity

These parameters are:

- ❖ in place and operational
- ❖ measurable
- ❖ observable

Deviation

- Failure to meet a critical limit.
- Also referred to as a **nonconformity**



Not Meeting a Critical Limit

- Indicates:
 - Evidence that a direct health hazard **already exists** (e.g. bacterial contamination of a ready-to-eat food), or
 - Evidence that a direct health hazard **could develop** (e.g. under-processing of a low-acid food), or
 - Indicates that a product was not produced under conditions **assuring safety** (e.g. metal detector calibrated incorrectly)

Setting Critical Limits

- Factors to consider:
 - Current research
 - Variations during operation of processing equipment
 - Critical Limits are set at CCPs

Regulatory Standards

- Food safety criteria established by the regulatory agency

For example (requirements in the US):

- Mandatory time and temperature for milk pasteurization (161°F [72°C] for 15 seconds)
- 7-log reduction in Salmonella in fully cooked poultry products
- Zero tolerance for fecal contamination during meat animal or poultry slaughter
- 5-log reduction in the pathogen of concern for juices

Operating Limit

- Definition
 - A criterion that is more stringent than a critical limit and that is used by an operator to reduce the risk of deviation

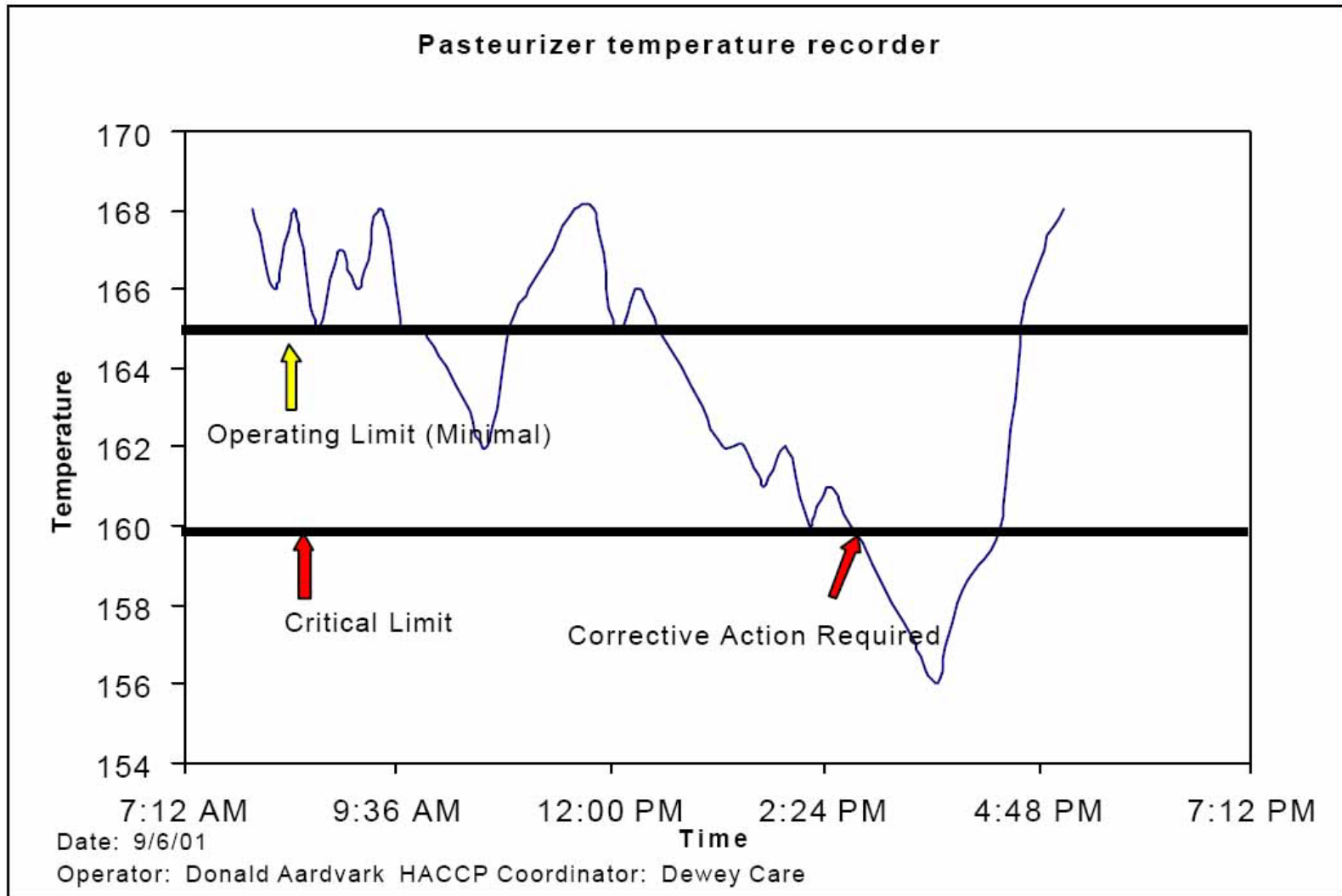
Operating Limits

- Parameters that **exceed** those necessary for safety and are established for reasons other than food safety.
- Operating limits may be used to compensate for expected variation in operation of processing and monitoring equipment so that critical limits are not violated.

Critical Limit

Critical limit is a
maximum and/or minimum value,
not an average value

Example of Critical and Operating Limits



Suboptimal Choice of Critical Limit

- Monitoring for presence of pathogens in finished product:
 - Hazard - presence of pathogens (biological)
 - CCP - pasteurization
 - Critical limit - no pathogens detected
- If pathogen testing is used as a critical limit, appropriate testing procedures and sampling plans must be used

Better Choice of Critical Limit

- Processing at a certain temperature for a specific time:
 - Hazard - presence of pathogens (biological)
 - CCP - pasteurization
 - **Critical limit - minimum process temperature of 160°F for at least six seconds**
 - Controlling hazards by process control is usually preferable to end-product testing

Critical Limits

- Rationale for the chosen critical limits must be **documented**.
- Critical limits based on subjective data (e.g. visual inspection) must be supported by instructions or specifications and/or education and training.



Acknowledgements

This material was developed with financial support from the:

- United States Agency for International Development – Michigan State University – Indian Horticulture Development Alliance (IHDA) project, and
- Italian Development Cooperation under the project UE/GLO/09/017 Establishment of an Agribusiness Solutions, Traceability and Upgrading Excellence Centre in Egypt.



License to Reuse



- © 2011 Michigan State University and United Nations Industrial Development Organization, original at <http://www.fskntraining.org>, licensed using Creative Commons Attribution-Share Alike 3.0 Unported (CC-BY-SA).
- To view a copy of this license, visit <http://creativecommons.org/licenses/by-sa/3.0/> or send a letter to Creative Commons, 559 Nathan Abbott Way, Stanford, California 94305, USA.