PORTABLE INSTRUMENTATION - TOOLS AND TECHNIQUES FOR THE COMPREHENSIVE FOOD SAFETY INSPECTION

MASSACHUSETTS ENVIRONMENTAL HEALTH ASSOCIATION

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Sanitarian

Introduction

- Estimating environmental conditions for proper application of portable instruments.
- Objectives of inspection and a brief review sampling strategies.
- Monitoring basics and data analysis.
- The scope, use and limitations of portable field instruments.
- A typical and atypical tool box.

Inspections

Inspections

- Definition

  n. a checking or testing against established standards

- Criteria

  Develop a predictive model;

  Gather empirical evidence;

  Weigh and verifying findings;

  Analyze results and drawing conclusions.

Inspections

- Inspections are Objective
- Purpose
  - Identify the change in circumstances or arrangements whereby microorganisms or misplaced energy breach defenses and cause illness and injury.
  - Identify failures in equipment and procedures; policy and practice, or human error.

Monitoring

Reasons for Monitoring

- Verify the existence and magnitude of an environmental health and safety condition;
- Document level of adherence to codes and standards;
- Determine effectiveness of control and corrective measures.

Reasons for Monitoring

- Planning logistics;
- Refute or substantiate claims and complaints;
- Document “Action Levels”;
- Validate processes;
- Quality control, quality assurance and quality improvement.

Estimate - definition

1: to judge tentatively or approximate the value, worth or significance of …

2: to determine roughly the size, extent, or nature of …

Estimate -

- syn ESTIMATE implies a judgment, considered or casual, that precedes or takes the place of actually measuring or counting or testing out.

- syn ASSESS implies a critical appraisal for the purpose of understanding or interpreting, or as a guide in taking action.

- BEST GUESS (estimate and assessment) is usually correct.

Estimating Environmental Conditions

- There is no environmental uniformity …

  all environments differ; even within themselves.

- Differences in both environmental quality and quantity are measurable.

- THERE IS NO TYPICAL ENVIRONMENT

Sampling

Rules of Sampling

To produce a sample or set of samples representative of the source under investigation.

Garbage In = Garbage Out

- Samples that are not representative of the source are of little use.
- Poor collection or detection procedures yield unrepresentative samples and contribute to the uncertainty of the analytical results.

Sampling Strategies

Probability

- Errors can be calculated
- Easy to interpret

Non-probability

- Non random – biased?
- Difficult to interpret
- Errors cannot be calculated

Sampling Classifications

Probability

- Systematic
- Random

Non-probability

- Convenience
- Judgmental
- “Snowball”

Control and Site Selection

Controls: 1-3 per sample

- Use one control where condition is obvious
- Use three controls were condition is unknown

Site Selection: Would the act of sampling or testing at a given site disturb the immediate environment sufficiently to cause erroneous data to be collected, or, contaminate the product or process?

Data Analysis

Data Analysis and Classification of Observations

- Draw a central theme from the data;
- Answer questions that were posed before any samples were taken;
- Sort data and findings based on importance (significance) and relevance;
- Results must be traceable to requirements.

Sampling description

- Introduction - statement of purpose
- Sampling data
- Ambient conditions and description of activities, etc.
- Date and time
- Person(s) on site
- Comments

Instrumentation Basics

Definition

Instrument- n.

A measuring device for determining the present value of a quantity under observation.

What are Field Instruments?

A portable extension of the senses

Qualify: yes or no

Quantify: anything that is measurable. e.g. relative concentration, amplitude, energy, etc..

Instrument Selection

- Portable, small, light weight, safe and rugged.
- Inexpensive and simple to operate.
- Easily decontaminated or easily protected from contamination (non-reactive).
- Easy to calibrate or validate.
- If powered, the unit should run on readily available batteries.
- Easy to read and interpret.
- Adherence to standards protocol.

Pre-purchase Planning

- History of product, vendor or supplier.
- Storage and travel conditions.
  - temperature extremes and vibration
- Service Plan - factory service and calibration.
  - loaner equipment availability
- Availability of product and parts.
- Warranty, guarantee, discount and trade-in.
- Staff training and user manual.

Calibration / Validation Schedule

Before each use - all equipment used routinely and repeatedly.

Thermometers

Electronic measuring devices

Any equipment that is easy to calibrate or validate

Preventive Maintenance

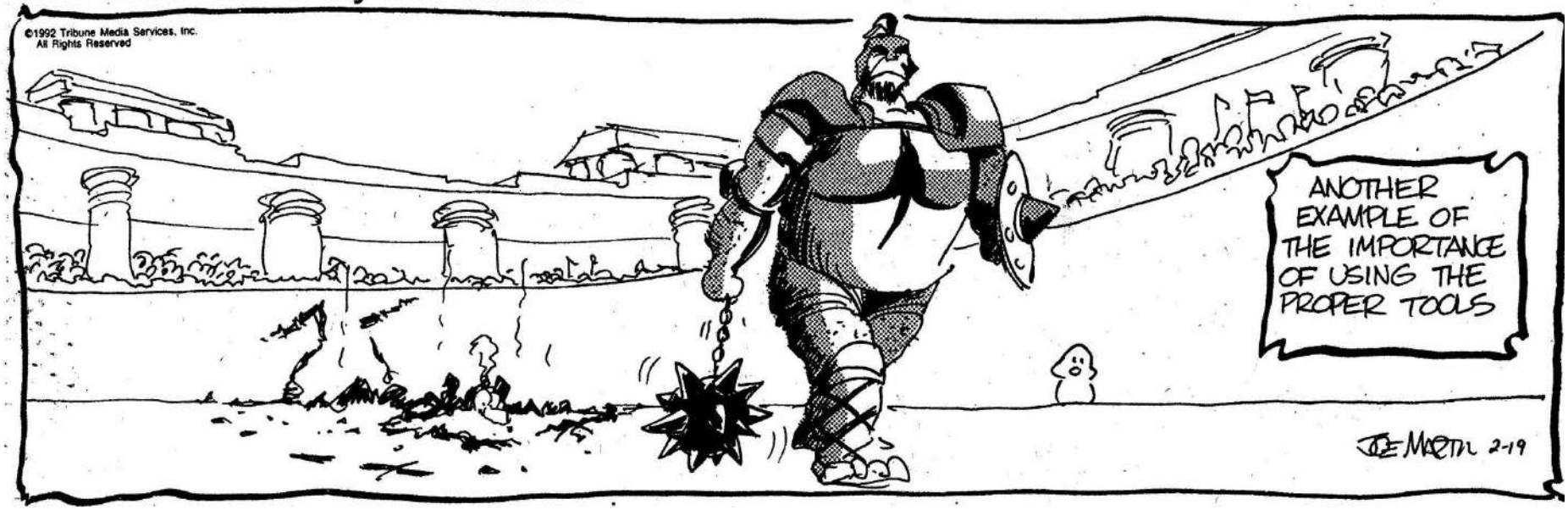
- Policy and procedures for use, transport and storage of all field instruments.
- Specification log

  include vendor, date of purchase, warranty information, maintenance, repair and service
- Document staff training.

  particularly if used for making legal measurements
- Document storage conditions.

TOOL BOX

MISTER BOFFO By Joe Martin



Thermometry

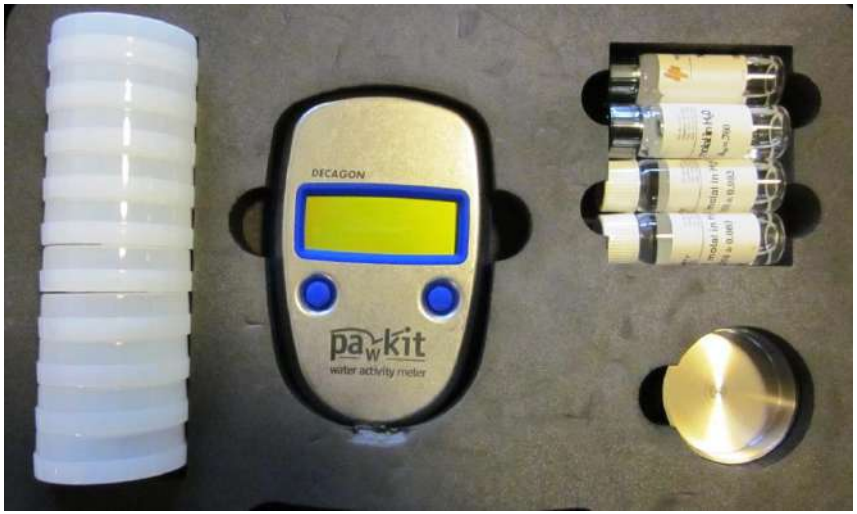
Basic essential thermometers

HACCP kit K-probes

Thermometer calibration and validation

Defining Potentially Hazardous Foods - Time/Temperature Control for Safety (PHF/TCS)

pa_Wkit for measuring water activity (a_w)



Color-change pH indicators

Sper pH meter kit with flat probe

Brix/Salinity and UV lamps

Salinity and Brix Refractometers

Portable Battery and High Intensity UV lamps

Measuring Environmental conditions

Mini Environmental Quality Meter
Air velocity, temperature, RH and light

Electrical Safety

Assessing Cleanliness

ATP monitoring system
“Dirt test”

Luminometer

ATP swabs

Practical Water Quality

Odds and Ends

Thermometry and Air Flow

Lollypop Thermister

Borozin Gun

Tricks of the trade

Things I've leaned … the hard way

- Always operate equipment before use.
- Change alkaline batteries monthly on all electronic thermometers; remove all batteries when not in use.
- Maintain calibration/validation and service records in a hardbound notebook.
- Keep a ring binder with copies of equipment instructions.

More things I've leaned … the hard way

- Store electronic equipment in a protective case.
- Always use a portable cooler, thermal tote or chest cooler when traveling. Maintain equipment at room temperature.
- Clean (and sanitize) exterior of equipment after use.
- Never loan out equipment.

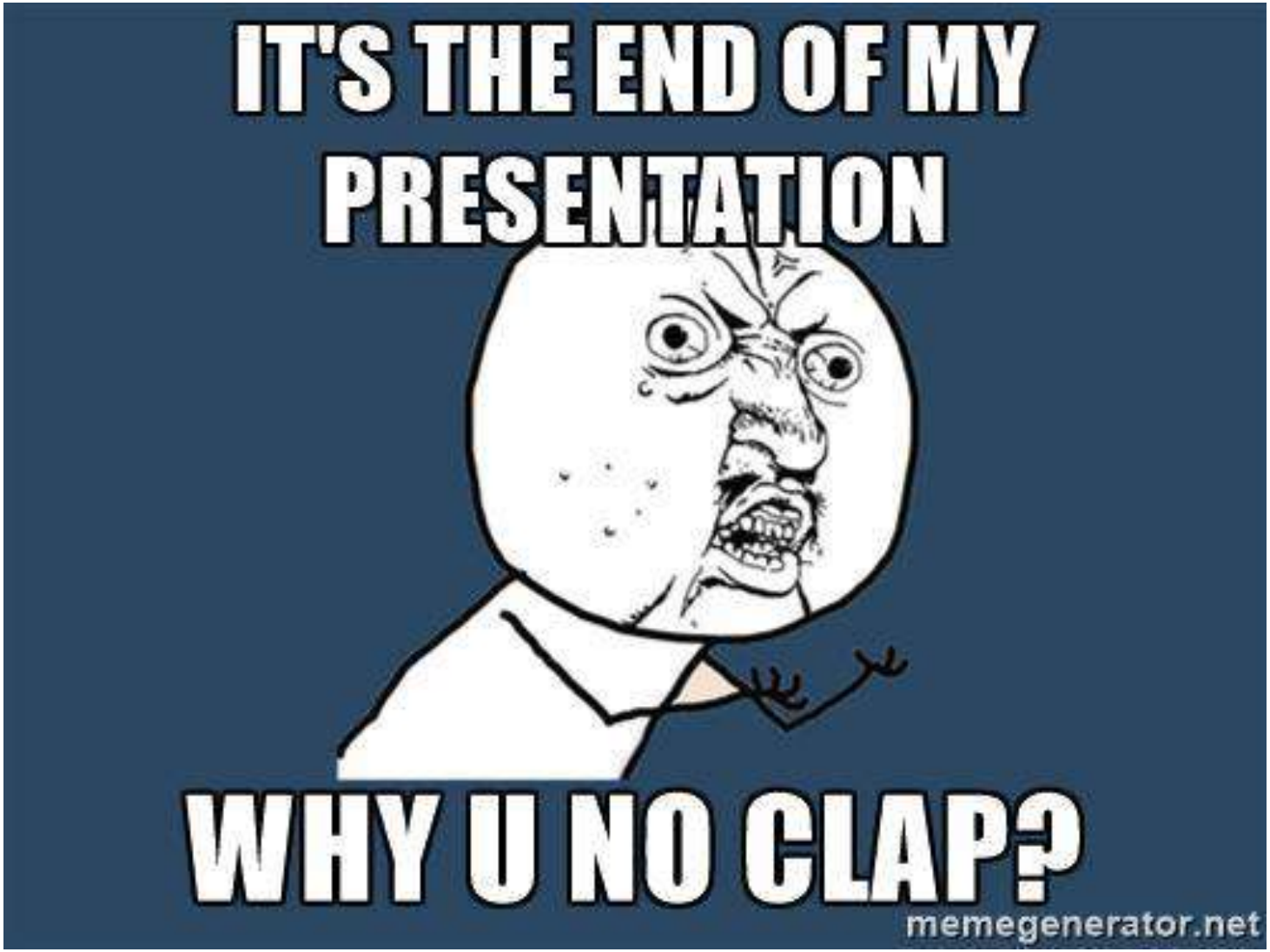
Even more things I've leaned … the hard way

- Plan all inspections and sampling operations moving from "clean" to "soiled".
- Carry several bi-metal dial thermometers to all inspections (consider equilibration times).
- Carry at least two IR thermometers; condition one in refrigerator.
- Whenever possible, double check critical readings with another instrument. (IR → thermocouple)
- Record all readings to include margin of instrument error, e.g. 41°± 2°F.

… and one last field instrument

Epilog ...

- While we have not succeeded in answering all your problems.
- The answers we have found only serve to raise a whole set of new questions.
- In some ways we feel we are as confused as ever, but we sincerely believe we are confused on a higher level and about more important things.


IT'S THE END OF MY PRESENTATION
WHY U NO CLAP?
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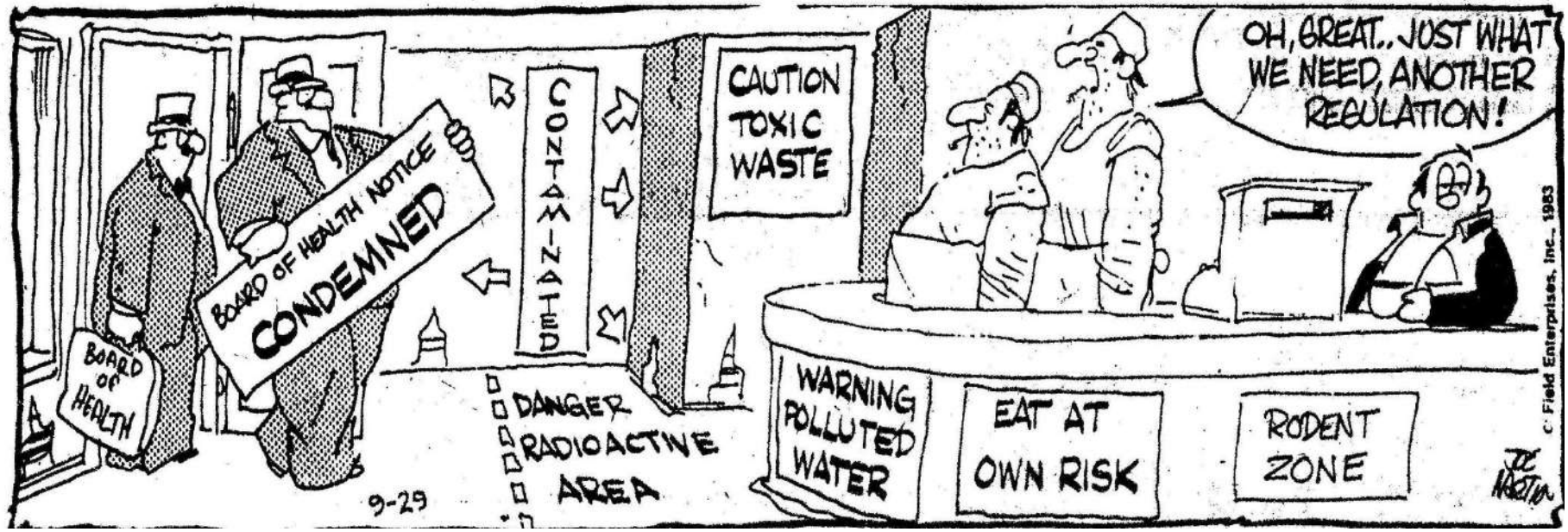
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RADIOACTIVE
AREA
CAUTION
TOXIC
WASTE
WARNING
POLLUTED
WATER
EAT AT
OWN RISK
RODENT
ZONE
OH, GREAT.. JUST WHAT WE NEED, ANOTHER REGULATION!
JIM MARTIN
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