QUALITY THROUGHOUT THE PRODUCT LIFECYCLE

2013 ISPE ANNUAL MEETING

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ISPE

Extending the Life Cycle of GMP Validated Equipment

Introduction

- John Fisher, President of Unidec
- 30 years experience in Industrial Manufacturing Equipment Support
- Unidec electronics support lab
- Unidec field service operation serving the pharmaceutical industry
- Specialize in extending the end-of-life of validated equipment.

Unidec®
Pharmaceutical Manufacturing Support

This Session

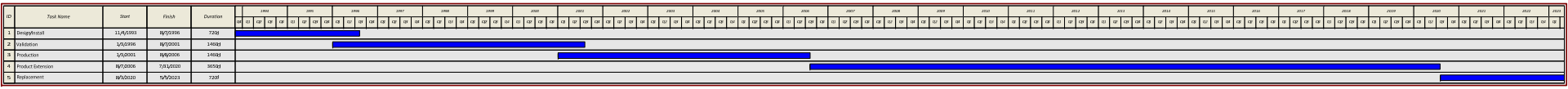
- Will explore the technological challenges and regulatory compliance issues that you must consider when extending the end-of-life support of electronic control and process monitoring equipment through third party vendors.
  - Does your support vendor do full functional testing?
  - Is the vendor backing up, verifying and validating that the firmware and other software has not changed?
  - Is your vendor meeting the regulatory compliance requirements under GMP such as documenting as-found and as-left conditions of the equipment?
  - Do you have assurance that the repaired equipment is meeting the original IQ, OQ and PQ test requirements?

This Session

- Will address the confluence of technical issues and compliance requirements under GMP, 21 CFR Part 11 and other standards (GAMP).
- In this session we will also identify several technical aspects of legacy systems support as it relates to service level agreements, backup and recovery processes, configuration management and system requirements that are potential critical success factors to end of life extension.

Equipment Life Cycle

Equipment URS began in November 1993

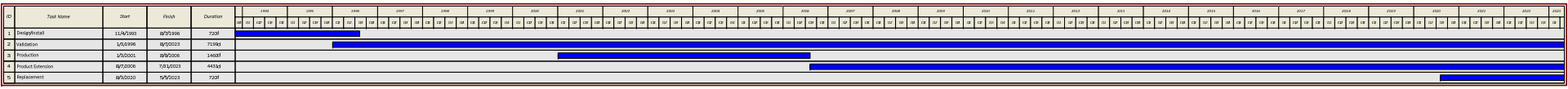


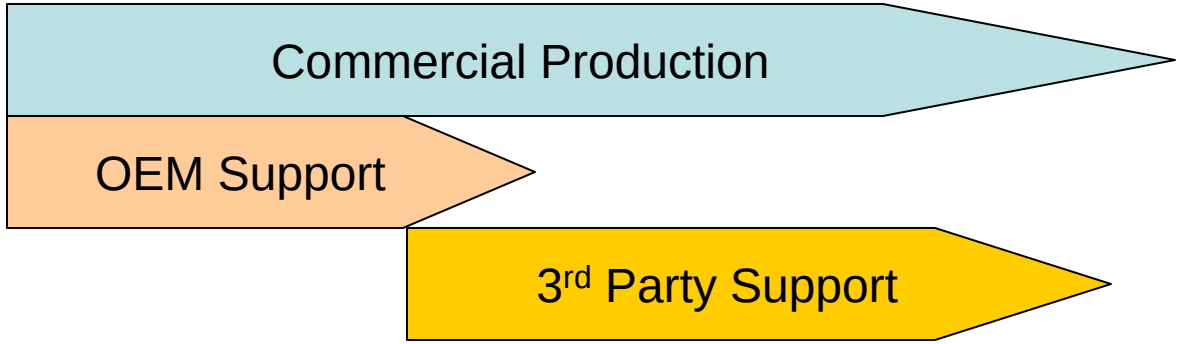
Equipment Decommission scheduled for 2023

ID	Task Name	Start	Finish	Duration
1	Design/Install	11/4/1993	8/7/1996	720d
2	Validation	1/3/1996	8/7/2023	7199d
3	Production	1/3/2001	8/8/2006	1460d
4	Product Extension	8/7/2006	7/31/2023	4431d
5	Replacement	8/3/2020	5/5/2023	720d

30 year equipment life cycle demand

Life Cycle Reality





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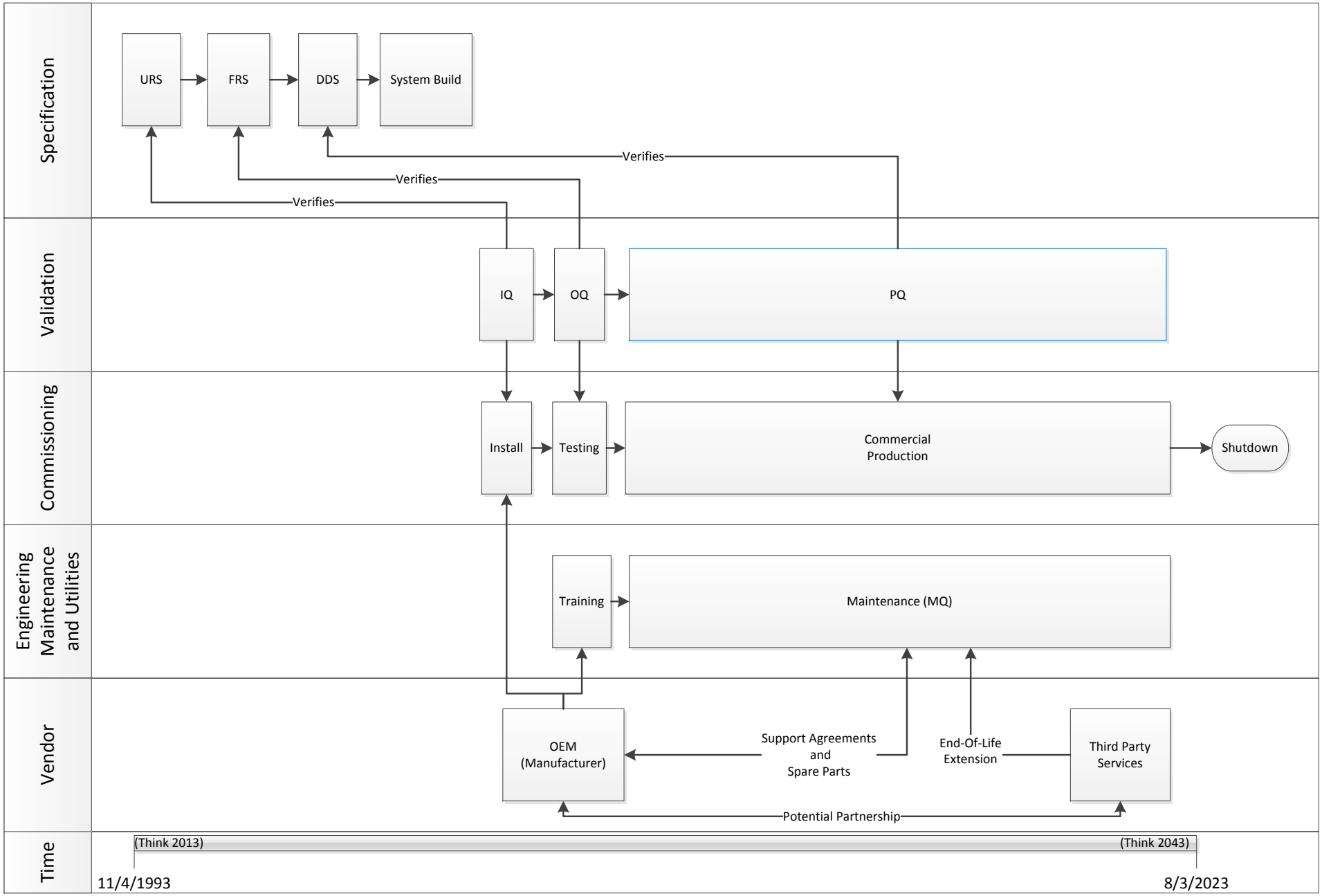
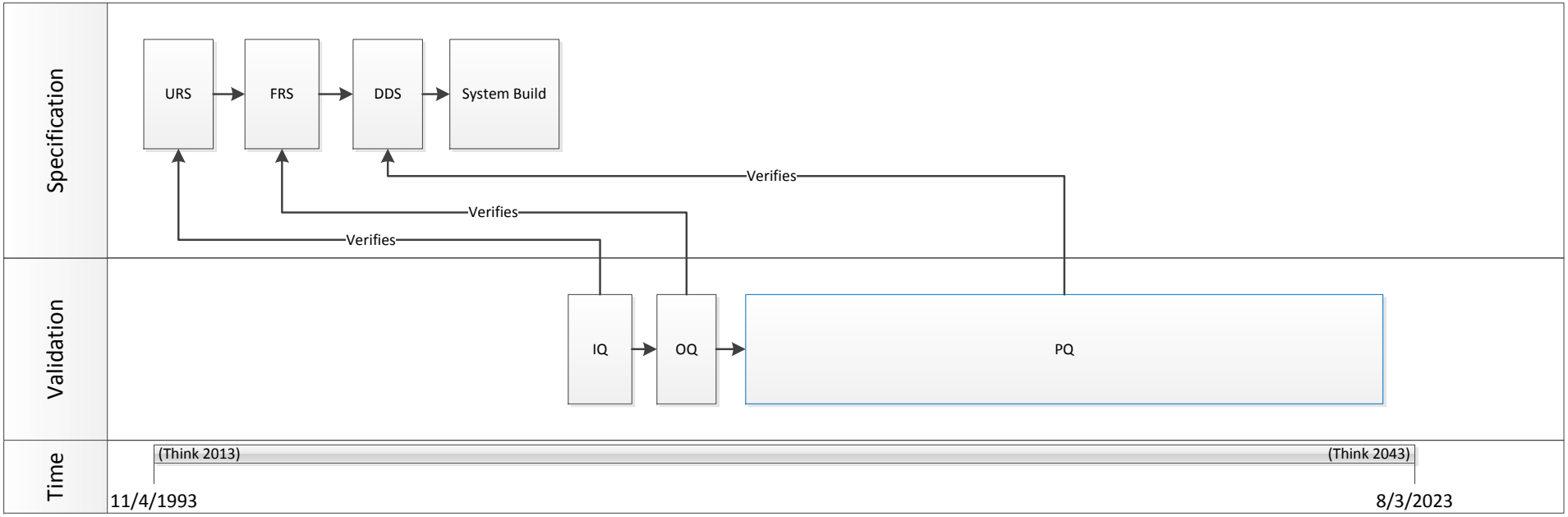
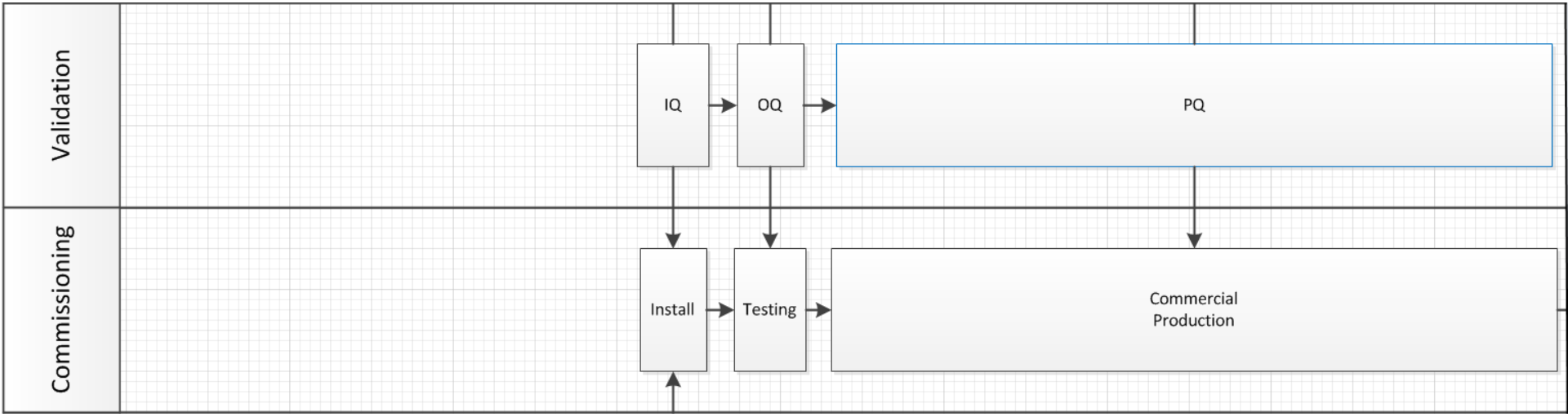
Equipment Life-Cycle



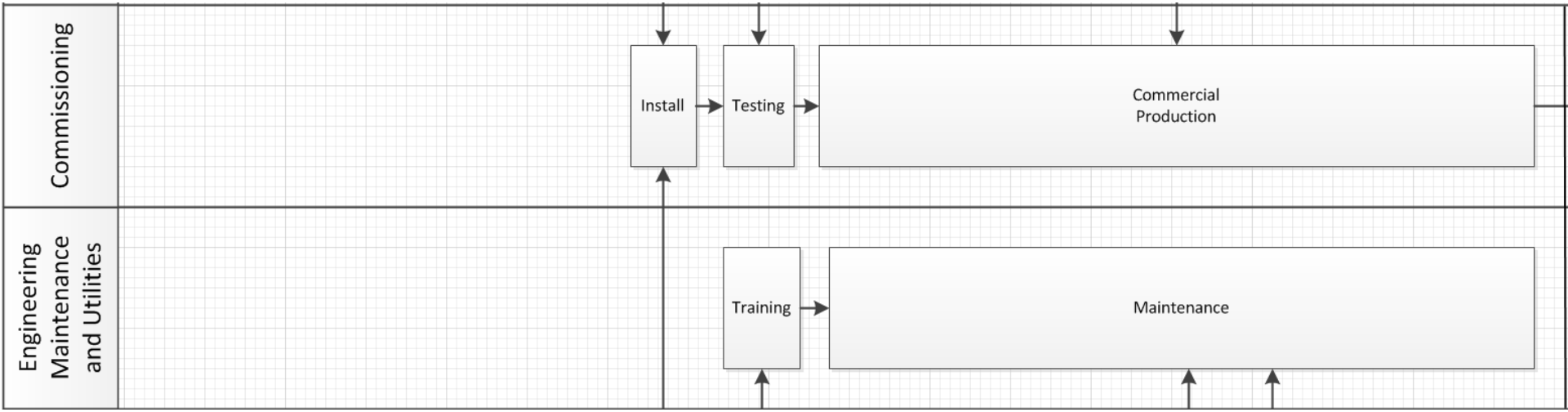
Specification and Validation Processes



Commissioning and Use



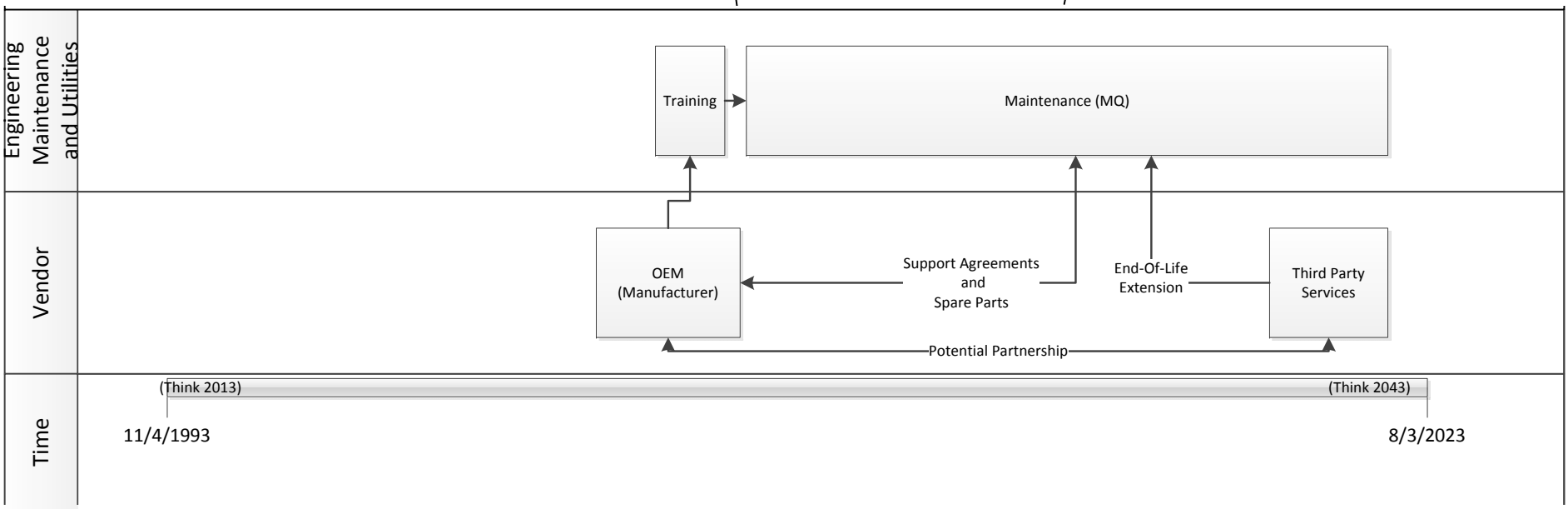
EMU Support


Commissioning
Engineering Maintenance and Utilities
Install
Testing
Commercial Production
Training
Maintenance

Maintenance and Vendor Support

"Maintenance Qualification MQ"

Predictive Vs. Preventative Maintenance



Regulations and Standards

- FDA Code of Federal Regulations (CFR)
- European Standards (EMA)
- GAMP Standards
- Compliance and Policy Guidelines
- International Standard Organization (ISO)
- Occupational Safety & Health Administration (OSHA)

FDA Code of Federal Regulations (CFR)

- **21 CFR Part 11** Computer Validation
- **21 CFR 58.61** Equipment Design
- **21 CFR 58.63** Maintenance and Calibration of Equipment
- **21 CFR Part 210** Good Manufacturing
- **21 CFR Part 211.68** Automatic, Mechanical and Electronic Equipment
- **21 CFR Part 820.70** Automated Processes

European Standards

- European Medicines Agency (EMA)
- Volume 4 Chapter 3 Equipment
  - 3.34 Manufacturing equipment should be designed, located and maintained to suit its intended purpose.
  - 3.35 Repair and maintenance operations should not present any hazard to the quality of the products.
- **EU GMP Annex 11** Computerized Systems

GAMP 5

- Good Practice Guides
  - Process controls
  - Calibration management
  - Testing
  - Electronic data archiving
- Appendix (Management and Operations)
  - M2 Supplier Assessment
  - M4 Categories of software and hardware
  - M8 Project change and configuration management
  - **M10 System retirement (new in GAMP 5)**
  - O3 Performance monitoring
  - **O5 Corrective and preventative action**
  - O6 Operational change and configuration management
  - **O7 Repair activity (new in GAMP 5)**

Compliance Policy Guidelines

- **CPG 7132a.07** I/O Checking
- **CPG 7132a.11** CGMP Applicability to Hardware and Software
- **CPG 7132a.15** Source Code for Process Control Application Programs

ISO Standards

- **ISO 13849-1** 2006 Safety of Machinery
- **ISO 13849-2** 2012 Safety of Machinery Validation

OSHA

- **29 CFR 1910.147** Lockout-tagout (LOTO)
- **29 CFR 1910.146** Confined Space
- **29 CFR 1910.1450** Chemicals in labs
- **29 CFR 1910.134** Respiratory protection
- **29 CFR 1910.332** Electrical safety training
- **29 CFR 1910.303..8** Electrical installation

Critical Success Factors for MQ

- Regulatory compliance (processes/docs)
- Predictive Vs preventative maintenance
- Service level agreements
- Backup and recovery processes
- Configuration management
- System requirements
- Spare parts
- Documentation
- Training

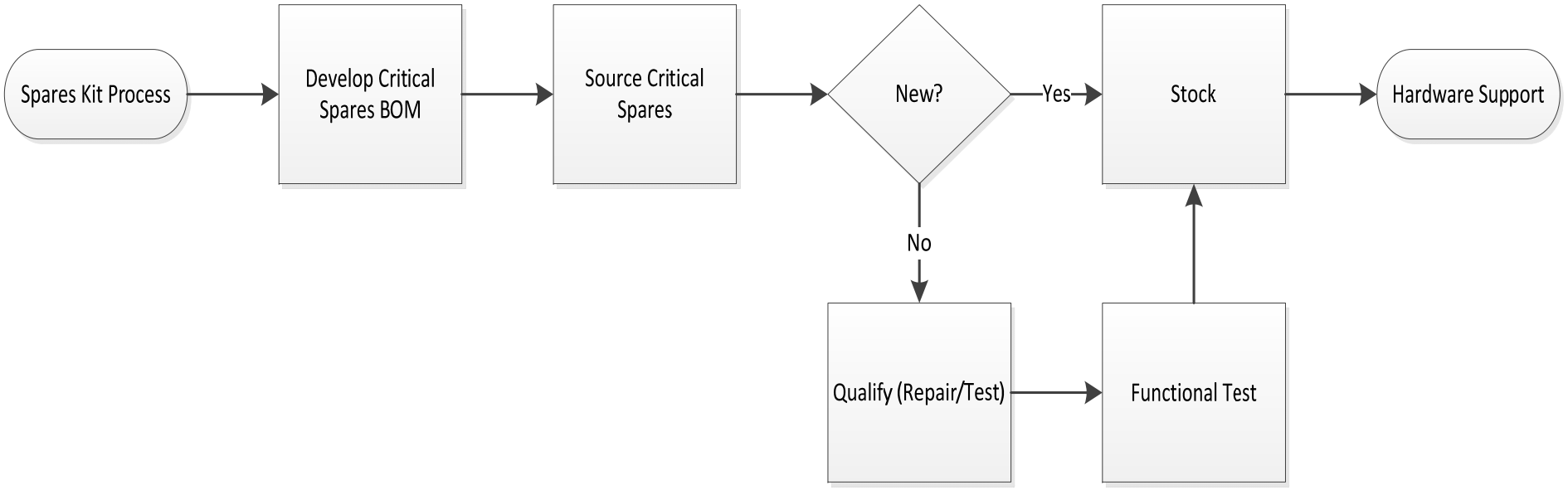
Critical Vendor “MQ” Functions

- Holistic viewpoint
- Multidisciplinary knowledge
- Knowledge of equipment failure modes
- Document As-Found and As-Left conditions
- Document software settings and parameters
- Software backups
- Firmware backups
- Automatically offload and store software settings and parameters
- Reverse engineer electrical systems
- Reverse engineer electronic circuits and controls.
- Source critical spare parts
- Service electronics
- Documentation creation
- Training

Spare Parts

- Identify and source at-risk spare parts to continue support on your legacy equipment.
- Process should include:
  - Creation of a detailed BOM
  - Risk based assessment
  - Locate sources for critical spare parts
  - RFQ
  - Receive quotations for spares kit parts
  - Source upon approval
  - Inventory

Spares Kit Support Processes



If new components are not available, used parts need to be acquired, refurbished, repaired and tested under strict quality standards.

Ongoing Maintenance Issues

- Loss of OEM support
  - No Spare parts
  - No training resources
  - Limited documentation
- Loss of Institutional Knowledge
  - Supervisor movement
  - Employee turnover
  - Poor transitioning – succession management
  - Lost manuals

3rd Party Vendors

- Gap analysis
- Engineering support
- Technical support
- Documentation renewal
- Training resources
- Spare parts renewal
- Spare parts sourcing and qualification

Take Away

- Product life cycle may exceed equipment life cycle
- OEMs generally end support in 7-10 years
- 3rd party vendors can help fill the gap, but…
  - Service level agreement (roles/responsibilities)
  - Need to be compliant
  - Need formal QMS, SOPs, etc.
  - Provide qualified spare parts
  - Training and support

Questions?

Thank You

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