# Development Process & Validations- New Pouch Introduction

**Anne Marie Bracken**

Bemis®

# Content

- Overview of Pouching Validation at Bemis
- **Initiation Stage**
- Critical Quality Attributes
- **Development Stage**
- Critical Process Parameter
- **Qualification Stage**
- **Closure/Hand over to Operations**

Bemis®

# Overview

**Validation Planning**

- **Validation Planning Phase**
- Inputs to the planning phase involve identifying business needs, defining project purpose and identifying project team members

**Installation Qualification (IQ)**

- **Validation Testing Phase - IQ**
- General installation checks. Equipment defined.

**Process Development (PD)**

- **Development Phase**
- Identify upper and lower limits for individual critical process parameters via ranging study. Data, where available, may be taken from existing process(es) as a starting point for these studies.

**Operational Qualification (OQ)**

- **Validation Testing Phase - OQ**
- Critical process parameters challenged to ensure sterile barrier systems will meet all defined requirements.
- Limited production runs at the upper and lower limits.

**Performance Qualification (PQ)**

- **Validation Testing Phase - PQ**
- Demonstrate consistency at the nominal set points. incorporate anticipated challenges to the process. At least three production runs of sufficient length to account for process variables. Introduce Shift variation , material variation etc.

**Validation Summary Report(VSR)**

- **Validation Testing Phase – Validation Summary Report**
- This shall consist of a formal review and approval of the IQ, OQ and PQ as appropriate.

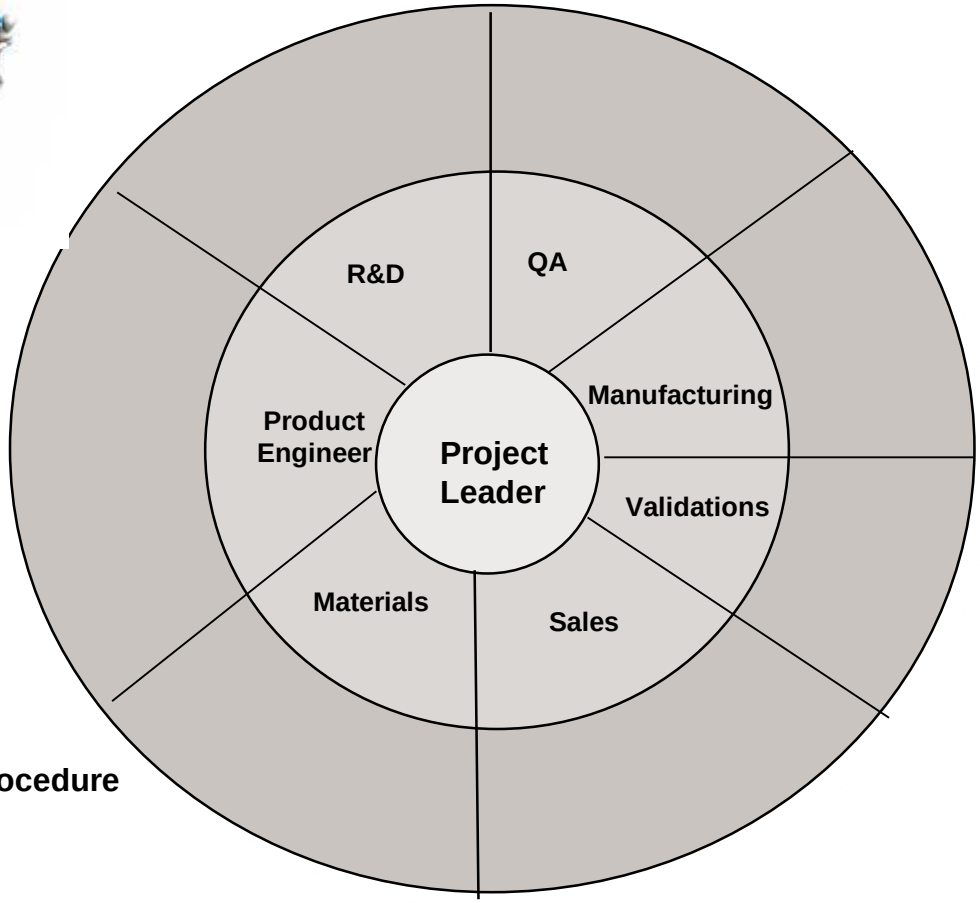
**Operation and Maintenance**

- **Operation and Maintenance Phase – Project Closure & handover to Operations**
- Operation and Maintenance - day to day operations. Ensure adherence to operational SOP's including SOP QA07-17 Documentation Change Notice (change control)



Bemis®

# Core & Extended Team Members


**Four Stages**

**Initiation stage**

**Development**

**Qualification**

**Closure**

- **Internal Development Procedure**
- **Systematic Process**
- **Cross Functional Team**
- **Definitive Milestones**
- **Escalation Process**



Bemis

# Initiation Phase

- Identify customer requirements
  - Customer Specification
  - Critical Quality Attributes
  - Customer Timelines
  - Review customer specific requirements
    - Customer Specific Protocol
- Develop Project Charter – scope, objectives, participants
- Develop product schedule and costings
- Identify equipment and assess equipment capability

Bemis®

# Critical Quality Attributes

- Critical Quality Attributes are defined on a case by case basis for each product, based on
  - review of the customers product specification
  - validation protocol,
  - Bemis standard in process tests.
- Define acceptance criteria
- Define Test Method
- Verify Test Method Validation / MSA

# Critical Quality Attributes

| Typical Tests for Critical to Quality Features | | |
|---|---|---|
| **Test Name** | Purpose | Type of Data |
| **Tensiles** | To test the tensile strength of the seals. | Variable |
| **Teardowns** | The two materials are peeled apart and the seal transfer is visually inspected to ensure a consistent coating transfer. | Attribute |
| **Dye Penetration** | Dye placed in contact with seals to ensure no penetration and thereby verifying the integrity of the seal. | Attribute |
| **Burst** | To test the burst strength of the seals. | Variable |
| **Dimensions** | To ensure bag is dimensionally within specification. | Variable |
| **Visual** | To ensure all visual acceptance criteria are met. | Attribute |

Bemis®

# Development Stage

- Manufacturing process and equipment further defined
  - If required, new equipment, tooling or machine modifications sourced and ordered
- Initiate qualification of materials (if using new materials)
- Review process FMEA and update if required
- Identification and understanding of **Critical Process Parameters**.
- Develop P2 Prototypes
  - Built by R&D/Engineering
  - Parameter development initiated – high level understanding gained
- For standard material/pouch configurations, P2 runs may not be required. In lieu, a review of parameters, test results and capabilities from previous orders may be performed.

Bemis®

# Critical Process Parameters

- Typical Critical Process parameters for Pouch Sealing Process:
    - Temperature
    - Pressure
    - Dwell Time
- Other parameters which may be varied during the P2/P3 stages prior to establishing the process include the following. Once established, these remain fixed during the OQ and PQ:
    - Surface area of die
    - Shore hardness of mat
    - Thickness of Mat
    - Teflon
    - Cooling / Air blast
    - Closing Time


Bemis®

# Qualification Stage

- Develop P3 prototypes
  - Built by R&D/Engineering
  - Parameter ranging study undertaken
- Develop material qualification report (for new materials)
- Customer sample review and obtain feedback if required.
- Assess SOPs and update if required.
- Update specifications if required.
- Review Process FMEA and update if required.

Bemis®

# Qualification Stage

- Develop & Execute IQ/OQ/PQ Validation Protocols.
  - IQ: process of obtaining and documenting evidence that equipment has been provided and installed in accordance with its specification.
  - OQ: process of obtaining and documenting evidence that equipment operates within predetermined limits when used in accordance with its operational procedures.
  - PQ: process of obtaining and documenting evidence that equipment, as installed and operated with operational procedures, consistently performs in accordance with predetermined criteria and thereby yields product meeting its specification.

Bemis®

# Installation Qualification

**IQ ensures**

- that all equipment has been installed correctly,
- all required calibrations have been performed,
- all safety measures have been implemented and
- the equipment has been entered into the Preventative Maintenance and Calibration system.

Bemis®

# Installation Qualification

- In general, standard pouches will be produced on existing equipment. If this is the case, a full IQ is not required.
  - The previous equipment qualification will be referenced in the report.
  - Certain IQ checks such as verification of the documentation and calibration status of all relevant instrumentation will still be performed.
- Verification of the following Associated Documentation:
  - Previous IQ protocols/reports for the equipment
  - P1 Report
  - P2 Report
  - P3 Report
  - MSA for test methods.

Bemis®

# Operational Qualification

- OQ: Process Parameters challenged. Produce samples at both the upper and lower parameter limits.

- The outcome of the OQ section is to verify
  - Lower and Upper process parameter setting limits
  - Nominal process parameter set points to be carried over into PQ.

Bemis®

# Operational Qualification

- The key process parameters, test methods & reference procedures, required for the validation, are identified in the validation protocol.
- The following are reviewed under OQ:
  - Components/Ancillary Equipment required for Qualification
  - Security Verification
  - Loss of Power
  - Alarms / Interlocks / Emergency Stops
  - Function Verification - Operator Interface Testing
  - Critical Requirements Test – Critical Quality Attributes
  - Critical Requirements Test –Critical Process Parameters
- If the validation is being performed on existing equipment, certain OQ checks are not required.

Bemis®

# Performance Qualification

- PQ: demonstrate that the process will consistently produce acceptable product under specified operating conditions.
- Challenges to the process shall include conditions expected to be encountered during manufacture.
- At least 3 production runs with adequate sampling to demonstrate variability within a run and reproducibility between different runs.

Bemis®

# Performance Qualification

- Run size/sampling is specified in the protocol, based on the nature of the process under validation.
- PQ run should account for process variables, including, but not limited to:
  - Machine equilibrium,
  - Breaks
  - Shift changes / Operator variation
  - Normal starts and stops
  - Material lot to lot variation
- Critical Process Parameters are monitored and recorded during the PQ runs

Bemis®

# Acceptance Criteria

- The validation protocol must outline the criteria, by which the validation will be deemed a success. These criteria are reviewed against the outcomes of the IQ, OQ & PQ.
- A deviation is raised if a test fails to meet acceptance criteria and /or departs from the study plan as approved in the protocol. Deviation forms are included in both the IQ/OQ and PQ protocol templates.
- All deviations must be described and resolved prior to the approval of the validation summary report.

Bemis®

# Qualification Stage

- Validation Summary Report (VSR) – Formal Approval of the Validation

  – Prepared on completion of the validation execution.

  – The VSR documents all key steps referenced in the Qualification Protocols (IQ/OQ/PQ)

  – Summary of all protocols and results, and conclusions.

Bemis®

# Closure/ HandOver to Production

- Closure of the project and formal handover to Operations
- Typically 3 to 6 months after first orders are used by the customer.
- Establish, collect, review and manage issues generated from business monitoring points.
- Production performance / Sales performance / Complaint analysis / Cross functional team meeting and document outcome for stage 4.
- A decision may be made by project team to redirect the project back to development stage and not close the project if further work is required.