V Model & Validation Process-in the Pharmaceutical Industry - FDA Perspective

Applies to:

Any standard SAP R/3 System and Software Development Life Cycle (SDLC). For more information, visit the Enterprise Resource Planning homepage.

Summary

The objective of this paper is share Conceptual clarity while working on Life science SAP projects (End to end, Solution Rollout, Development & Support etc) and try to take best practices out of this to other domain projects. To bring the importance of Validation, Compliance from Quality System point of view.

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Author Bio

Girish Deshpande has worked in leading Automobile manufacturing for eight years in area of Quality Assurance and has extensively worked as Senior Consultant in Quality Management, Plant Maintenance, and Document Management System for global clients in Pharmaceuticals giants in Europe, Steel Manufacturing units, Beverage bottler in China from eight years. The aim of this paper is to share V model & validation in Pharma from FDA point of view.

Table of Contents

Introduction

The primary aim of this article is to share key concepts while one work with Life science SAP projects in particular to Pharmaceutical, Beverage, and Health care domain. Under stand and implement universally formed model while executing projects. Following are key theme

- GxP overview
- Know Important Regulatory bodies
- V model
- Importance of Validation
- Document Tractability

As most of you know that entire Pharmaceutical Industry (Finished goods, Intermediate products, Drugs & Substance manufacturing) deals with human & animal life, saving human. The pharmaceutical industry undertakes the development, production and supply of pharmaceutical products needed to save lives, prevent disease and otherwise assist in maintaining quality of life.

This industry is governed by Regulatory authorities and lot of emphasis on documentation. There is huge Research & Development investment with long lead time for product to come into market for commercial purpose once regulatory approvals are in place.

GxP Overview

The term GxP means GMP (Good Manufacturing Practices) 'x' includes

- GCP (Good Clinical Practices)
- GLP (Good Laboratory Practices)
- GDP (Good Distribution Practices)

The pharmaceutical industry is regulated industry means pharmaceutical. Preparations must be safe and effective for patients & the general public. It must protect consumer. Adhere to GxP for compliance & Proof that any systems and activities are "fit for purpose".

In nutshell the GMP covers all business functions which are closely associated with business process in major category People who follow certain Processes to make required Products with the help of administrative, Quality, regulatory Procedures & related paper work.

Key Regulatory Bodies

In major continents across globe, we have International reputed agencies who has worldwide presence who acts as Regulated bodies for Pharmaceuticals industry

- Food & Drug Admirations (FDA) –Relevant for US Market mainly
- European Medicines Evaluation Agency (EMEA) –For European Region
- Drug Controller General of India –For India

Refer website for country specific regulatory bodies mentioned in reference.

What is CSV (Computer System Validation)

- Computerized system validation (CSV) is the documented process of assuring that a computerized system does exactly what it is designed to do in a consistent and reproducible manner.
- The validation process begins with the system proposal / requirements definition and continues until system retirement and retention of the e-records based on regulatory rules.
- System definition artifacts that reflect these requirements can include, but are not limited to, the following:
    - User Requirements Specification: What the system needs to do for its user(s)?
    - Functional Requirements Specification: How each feature of the system functions?
    - Design Requirements Specification: How each feature of the system is built?
    - Hardware Requirements Specification: Minimum hardware required to support the system.

FDA Definition: "Establishing documented evidence which provides a high degree of assurance that a specific process will consistently produce a product meeting its **pre-determined specifications and quality attributes**." (Source: FDA Guidelines on General Principles of Process Validation, 1987)

Significance of CSV

Main business reason behind CSV is to deliver as per requirements and to have minimum maintenance cost for a computer system. Documentation is one of the most important requirements of CSV. It is important for Pharma Systems to be CSV compliant to:

- Minimize regulatory actions.
- Maintain positive relationship with regulatory bodies.
- Expediting submissions to FDA / other regulatory and faster approvals by FDA.
- Avoiding product recalls and negative publicity.

Key FAD Regulations applicable for SAP Projects

Following are key FDA Regulations which are closely related with SAP Software development cycle.

CFR : Code of Federal Regulations ,Title 21 mainly deals with Food & Drugs published by US FDA

- 21 CFR Part 11 (Electronic Records, Electronic Signature)*
- 21 CFR Part 210 (Current GMP in Manufacturing, processing, packaging)
- 21 CFR Part 211(Current GMP for finished pharmaceuticals)

* The 11 th sub part is related with all kinds of electronic records & Signature for software project documentation.

Audit trail of changes

- What type of changes (Creation, Modification, deletion)
- What record was & what it is now
- Who did it (Unique identities)
- When it was done

Electronic Signature

- Irrevocable legal signature
- 2 Elements (User ID and Password)
- Password not viewable (even by system administration)

Access Control

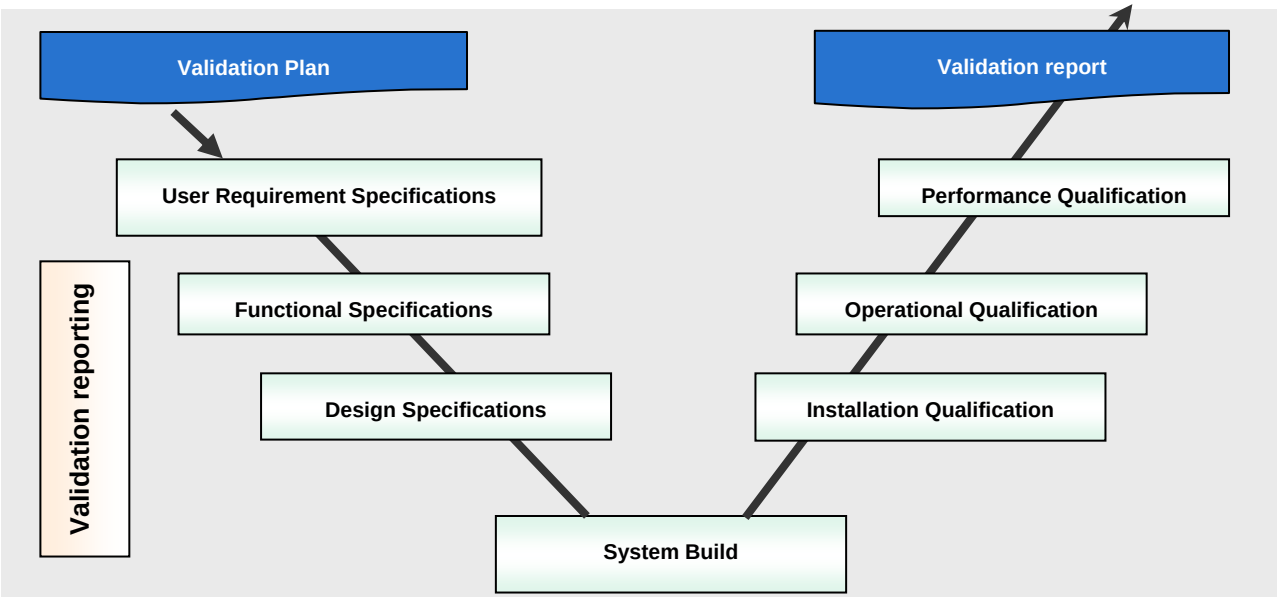
- User Profile
- Password
- Password encryption

Main Benefits of 21 CFR Part 11 are

- Increased speed of information exchange
- Cost savings
- Reduced data entry and errors
- Improved process control
- More efficient data transmission to FDA for review and approvals

V Model Concept

Below is Universally accepted model popularly known as V model The left arm of the V always deals with defining the requirement and detailing the change and the right arm of the V ensure that for each item in the left arm, There is a corresponding activity which verifies that the change done is as per the requirement, design etc. Each Pharma company, IT Department, Implementation partner (System Integrator) makes its tailored made Quality System to adhere to this. (both Verification and Validation process)



Validation Process

Definition: Confirmation by examination and provision of objective evidence that the particular requirements for a specific intended use are fulfilled.

To ensure integrity, the system has to perform in a consistent manner and should give consistent performance as expected. Validation of the system has to be done to ensure the system behaves in the intended way as per the documented requirements.

Which Computer system should be validated

As a general rule computer systems used for or performing regulated operations should be validated. These could include

- System used to control the quality of regulated products during various life cycle stages of the product (development, testing, manufacture etc).
- Systems that create, modify, store, transmit regulated data such as product safety data, clinical trial data, product efficacy data etc.
- Systems that maintain decision making data.
- Systems used to maintain data to be made available for agency inspection.
- Systems used to submit electronic records to the agency.

What is Qualification?

Organized efforts in project quality planning, Data Collection, documenting qualification plan and executing qualification steps as per qualification plan. Finally reporting qualification results.

The major type of Qualification processes are

- Installation Qualification
- Operational Qualification
- Performance Qualification

Document Tractability

Documentation is a very important topic in the Pharma world, "In documentation we trust, everything else is a rumor". This is how the importance of documentation in validation could be stated. Documented evidence of all the qualification activities is a must and these documents should follow documentation life cycle described in the Documentation plan.

Traceability matrix simplifies the process of proving if and where the requirements or specifications are tested, or conversely what each test case challenges. It is thus an aid to efficient test specification design. It is a regulatory expectation that all requirements and specifications are demonstrably and appropriately challenged, and traceability matrix is the best tool for achieving this.

- It is a must to record **what is done** and **when it is done**.
- Documentation should be able to gives complete end to end view of a drug history.
- Documentation helps in root cause analysis.
- Good documentation is a pre-requisite to achieve **GxP**.
- Documentation helps in achieving **CAPA** (Corrective Action – Preventive Action) schedules.
- It acts a Ready – Recokner
- Documentation is a key requirement for any **compliance audits**.

Conclusion

I assume that content of this paper will help most of reader to get more conceptual understanding with SAP Project in Pharma, health care and other verticals to bring best practices from Life sciences. Your suggestion are welcome for future improvement perspective.

Related Content

For more details please refer following reference material

http://www.pharmweb.net/pwmirror/pwk/pharmwebk.html (Country specific regulatory bodies)

http://www.fda.gov/ora/compliance (**21 CFR Part 11**: Electronic Records; Electronic Signatures)

www.fda.gov/ohrms/dockets/dockets/00d1538/00d-1538_c000031_03_vol7.pdf - 08-08-2002
(Guidance for industry **21 CFR Part 11**; Electronic Records)

SAP White Paper "Complying with U.S. FDA Title 21 CFR Part 11 for the Life Sciences Industry"

For more information, visit the Enterprise Resource Planning homepage.

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