Introduction

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Agenda

Part 1: Validation role in GEP

Part 2: GEP and Validation with ASTM E2500

Part 3: GEP During System Lifecycle

Part 4: Benefit of Building Quality into GEP

Part 5: GEP and Regulatory Audit

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Validation Role in GEP

- What is Validation
  - Group?
  - Department?
  - Individuals that test systems?
- Industry changes (ASTM E2500, IQH Q9, and ISPE GEP Guideline) have refocused the definition of Validation to:
  - Documented evidence that verifies critical aspects of systems satisfy process user requirements.
  - It is not one person or a department checking another persons work, but data generated by multiple departments.

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Validation Role in GEP

- Who Performs Validation?
  - Anyone who obtains or generates documented evidence to verify that a system does what it is supposed to do for:
    - Process Validation
    - Equipment Validation
    - Computer Systems Validation
    - Analytical Methods Validation

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Validation Role in GEP

- Why is Validation needed?
  - The documented evidence that critical aspects of systems satisfy user requirements does is needed for a company to have documentation to present during regulatory audits that demonstrate critical quality attributes are consistently achieved.
  - Important to generate documentation that is presentable so it does not need to be repeated. How many binders of engineering documents are generated by engineering and then stored somewhere to collect dust or eventually discarded?
  - If it is not documented, it can not be presented during an audit and is as good as if it never happened.

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Validation Role in GEP

- Building Quality into GEP?
- **ISPE GEP Guideline Page 70 Attachment B3** identifies GEP documents and types of GEP documents that are also quality documents.
- Team effort where anyone from a quality, validation, or engineering department should be comfortable defending a report in a regulatory audit from any quality documented generated as part of GEP.

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GEP & Validation with ASTM E2500

- ASTM E2500 outlines a science and risk based approach based on process understanding.
  - GEP is a building block for qualification of critical aspects verses GEP only for everything else.
  - Companies decide how to most effectively or efficiently implement a compliant way.
  - Should the quality or workmanship of GEP documentation be different if used for qualification of critical aspects or not?
  - Example: water project documentation.

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GEP During System Lifecycle

- Maintain as built documents (URS, FS, Drawings) throughout a system lifecycle.
  - Ordering based on a previous URS or similar system.
  - Last time an engineer evaluated the system.
  - Trust anyone else's work?
  - More information for validated systems?
  - Engineering ordering requirement that will look for the cheapest system that will meet the requested specification?
  - Example: Incubator requested to do X, but really needed X, Y, and Z.

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GEP During System Lifecycle

- Legacy System Projects
  - Excited to work on a legacy system modification or new system.
  - Scope creep? Why?
  - Decommission a system connected to qualified and non qualified utilities. Which utility drawing would you expect to be more accurate? GEP?

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GEP During System Lifecycle

- Historical Data, Monitoring, Trending
  - Audit questions regarding how do you know if a system is operating properly after it was qualified.
  - GEP not just at time of initial install, but throughout system lifecycle.

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GEP During System Lifecycle

- Project Closeout Summaries
- Regulatory auditors want to see:
  - Summary documentation for closeout of large projects.
  - Change descriptions (planned vs. actual).
  - Deviations (how does the company handle unplanned events – company culture).

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Benefit of Building Quality into GEP

- What company has the greatest validation program?
- Does any company brag about its validation program in its annual report?
- How about its engineering or GEP program? Same?
- Does it show up indirectly?

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Benefit of Building Quality into GEP

- Companies maintain a relatively fixed capital expense budget, but is the stewardship of the capital investments at some companies better than others:
  - Providing high ROI.
  - Minimizing manufacturing system's down time.
  - Creating a culture that prevents regulatory audit observations.
- Does building quality into GEP and validation contribute to that?

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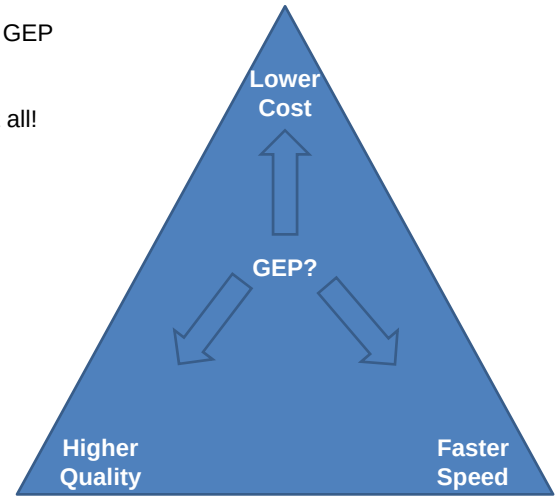
Benefit of Building Quality into GEP

Where does GEP fit on this diagram? Can't have it all!



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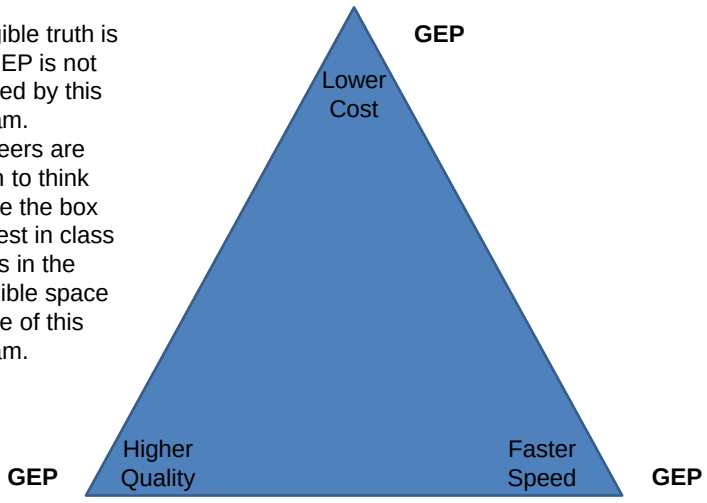
Benefit of Building Quality into GEP

Intangible truth is that GEP is not confined by this diagram. Engineers are known to think outside the box and best in class GEP is in the intangible space outside of this diagram.



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Benefit of Building Quality into GEP

Costs (Lower or Higher)?
What is better than low cost? **High ROI**

Building quality effectively into GEP enables companies to implement effective and efficient projects that improve processes or provide more process understanding rather that creating a risk for future projects to remediate quality issues rather than providing a high ROI.

It is always more expensive to revisit and remediate a project that has had quality issues! (what's the ROI for a project the cuts quality costs when factoring in 483s, warning letters, or a consent decree)

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Benefit of Building Quality into GEP

Speed (Fast of Slow)?
What is better that a fast project? **Minimizing Manufacturing System's Down Time**

Building quality efficiently into GEP enables shakedown and verification of systems earlier such as at FATs, out of place at SATs, or using automated test environments to minimize impact on the valuable manufacturing equipment utilization. Example: freezer testing out of place.

Building quality effectively into GEP results in systems ordered that satisfy both detailed user requirements and engineering specifications.

Building quality efficiently and effectively into GEP enables routine things to be completed routinely rather than requiring heroic efforts to lessen the impact on a manufacturing system's down time.

Focus first on the manufacturing system down time before focusing on the project's critical path.

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Benefit of Building Quality into GEP

Quality (High or Low)?
What is better than high quality? **Culture that prevents regulatory audit observations**

Building quality into GEP sets an ethical tone during audits of qualified systems that the company has a strong quality culture that leads investigators no reason to dig deeper.

Not the same as more documentation, but meaningful documentation such as established policies and procedures, QBD, routine monitoring of systems, maintaining as built engineering documents.

Having the right people in the right positions making the right decisions for both the patient and company.

Example: older SIP qualification

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GEP and Regulatory Audits

Who wants a regulatory audit and who is impacted?

High Impact

Quality Employees

Management

Engineering Employees

Wants to Avoid Audits

Wants Audits

Patients

Friend / Family of a Patient

Shareholders

Engineering Contractors

Low Impact

Government

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GEP and Regulatory Audits

- Change control change descriptions and impact:
  - What was planned.
  - What was implemented.
- Investigation and remediation of unexpected results or unplanned events.
  - Consistently follow procedures.
  - Level of investigation proportional to level of risk for high risk items.

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GEP and Regulatory Audits

- QBD for continuous or routine monitoring of process performance and product quality.
- Companies maintain a relatively fixed capital expense budget, but is the stewardship of the capital investments at some companies better than others at:
  - providing a ROI
  - minimizing manufacturing down time
  - preventing regulatory audit observations.

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Building Quality into GEP Summary

- **G**ood **E**ngineering **P**ractices

  is also

- **G**reat **E**thics and **P**lanning
  - Melting pot of implementing quality into Engineering.
  - Making good long term decisions that do not cut corners and create future remediation projects.
  - Knowing what is required at the planning stages to achieve the end result or future state.

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Questions?

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