

Using Lean Six Sigma to Reduce Annual Surveillance Costs of the Neat CASARM Sales Program

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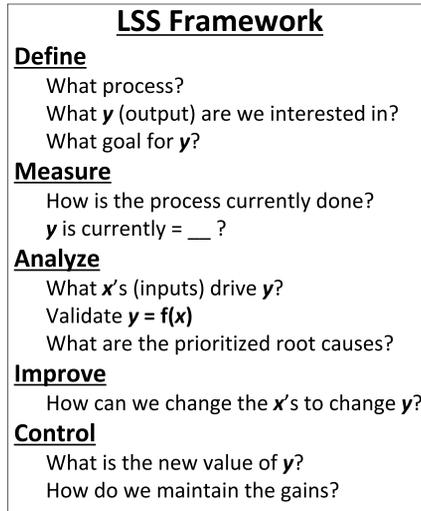
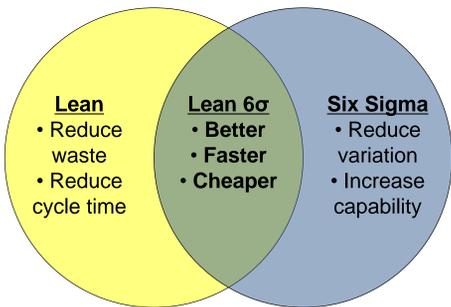
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Introduction

Chemical Agent Standard Analytical Reference Materials (CASARM) are chemical warfare agents that ECBC creates and sells for use by various research and other DoD laboratories. Because they are used for scientific purposes, CASARMS are made with very high purity, stored under tightly controlled conditions, and tested each year ("surveillance") to ensure that each lot's purity has not degraded. These surveillance tests were identified as an area in which cost reductions were possible and desirable, so a Lean Six Sigma (Black Belt level) process improvement project was launched.

Overview of Lean Six Sigma

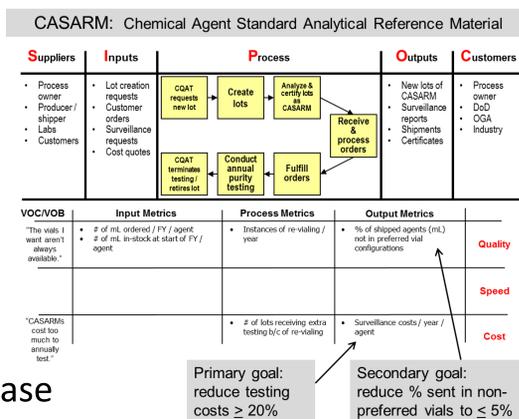
Lean Six Sigma (LSS) is a structured, team-based, data-driven approach to making culturally-accepted, long-term process improvements that improve quality, reduce cost, and reduce cycle time, thereby increasing our ability to meet the needs of the customer and the needs of the business.



Lean Six Sigma uses a five step process (shown to the right) to identify the root causes of inefficiencies and to quantify the effects of changes to the process.

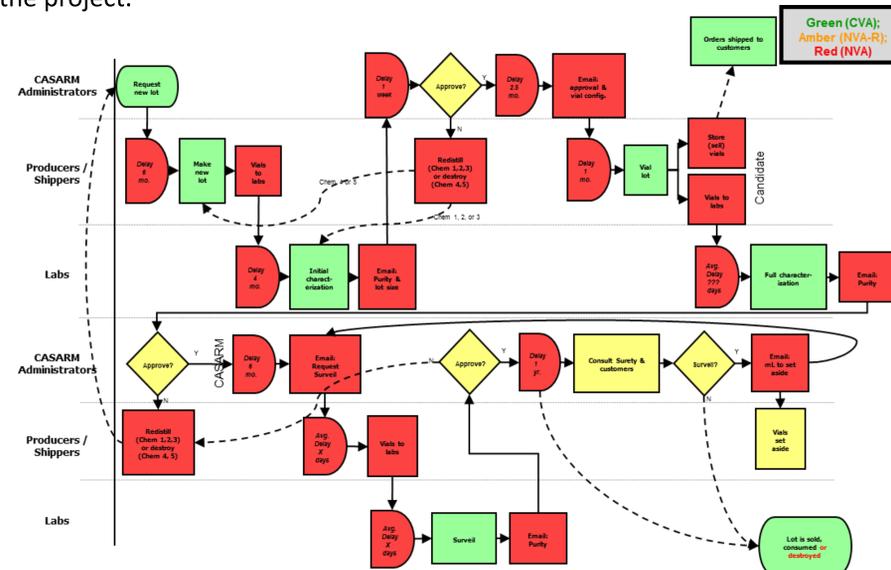
Phase 1: Define

The annual surveillance process was examined at a high level to determine the priorities of the organization and the customer. Specific, measurable outputs were prioritized for improvement, and quantifiable goals were set for the project.



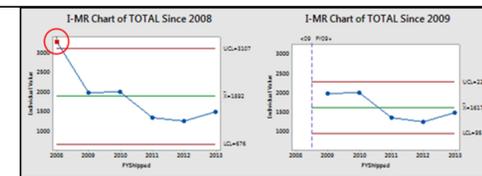
Phase 2: Measure

The annual surveillance process was mapped, and the metrics of interest were measured so that the effects of process changes could be quantified later in the project.



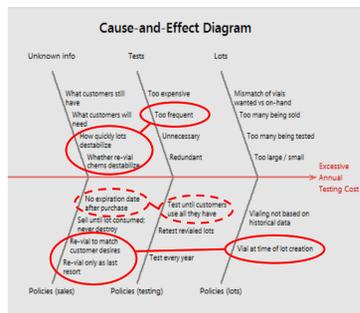
Surveillance costs (FY13):
Total: \$82,028 Goal: \leq \$65,622

% of agents shipped (mL) in non-preferred vials (FY08-13):
Total: 13.5% Goal: \leq 5%



Phase 3: Analyze

The root causes for the high costs of annual surveillance tests were identified and confirmed. Simply put, the total cost was too high because too many lots were being tested each year. The following root causes explain why so many lots were being tested.



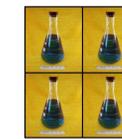
Root Cause 1: Vialing happens prior to order placement. Effect: the last 50-100 mL are hard to sell; many small lots remain in inventory.

Root Cause 2: Lots were being tested more frequently than necessary. Statistical analysis confirmed that agent purity was extremely stable and didn't need to be tested each year.

Root Cause 3: Certificates have no expiration date. Effect: the sales program was obligated to monitor lots that customers had on their shelves for many years.

Phase 4: Improve

Representatives from the affected organizations worked together to create a solution that would address the root causes, thereby reducing annual surveillance costs. A separate approach was developed for the lots already in inventory and for future lots.



Future Lots

- Vialing
Store in large flasks
Vial when ordered
- Testing frequency
Annual until stability is demonstrated
- Certificates
3 years from date of sale



Existing Lots

- Vialing
Sell one lot at a time
Re-vial when necessary
- Testing frequency
No retesting (re-vials)
Every other year
- Certificates
Prior sales: 3 years from now
Future sales: 3 years from date of sale

Phase 5: Control

The final step of the process is to ensure the improvements are maintained: SOPs must be updated; customers must be notified of the changes; etc.

The process revisions given above are expected to produce the following benefits:

- Surveillance costs (by FY19):
 - Reduced >50%
 - 1 lot/agent in-stock
 - ≤ 1 lot/agent tested/yr
- Agents in non-preferred vials
 - Problem eliminated
- Time and space
 - A smaller, simpler inventory

Chem	Lot	Actual (FY14) and Predicted (FY15-20) Testing Costs						
		FY14	FY15	FY16	FY17	FY18	FY19	FY20
Chem1	Lot 1244	\$ 7,166	Skip test	\$ 7,166	\$ 7,166	\$ 7,166	Hold	Hold
	Lot 5045	\$ 7,166	Skip test	\$ 7,166	Hold	\$ 7,166	Hold	Eliminate
	Lot 5340	\$ 7,166	\$ 7,166	Hold	\$ 7,166	Hold	1st Year	\$ 7,166
Chem2	Lot 2323	\$ 7,166	Hold	Hold	Eliminate			
	Lot 8141	\$ 7,166	Hold	\$ 7,166	Hold	Eliminate		
	Lot 2277	\$ 7,166	\$ 7,166	\$ 7,166	\$ 7,166	\$ 7,166	\$ 7,166	\$ 7,166
Chem3	Lot 1079	Skip test	Hold	\$ 6,315	Hold	Eliminate		
	Lot 1228	Hold	Hold	Eliminate				
	Lot 2086	\$ 6,315	\$ 6,315	Hold	\$ 6,315	Hold	Eliminate	
Chem4	Lot 4356	\$ 6,755	\$ 6,755	\$ 6,755	\$ 6,755	\$ 6,755	\$ 6,755	\$ 6,755
	Lot 1244	\$ 7,166	\$ 7,166	Hold	\$ 7,166	Hold	Eliminate	
	Lot 2128	\$ 7,166	\$ 7,166	Hold	\$ 7,166	Hold	Eliminate	
Chem5	Lot 7350	Skip test	Hold	\$ 7,166	Hold	Eliminate		
	Lot 9348	Hold	Eliminate					
	NEW LOT	1st Year	\$ 7,166	\$ 7,166	\$ 7,166	\$ 7,166	\$ 7,166	\$ 7,166
Total Cost of Tests		\$ 74,892	\$ 47,049	\$ 61,381	\$ 67,699	\$ 40,724	\$ 33,568	\$ 29,883

Baseline (FY13) costs were \$82,028. FY18-20 are representative of the expected long-term behavior of the process. > 50% savings

Benefits

- A Lean Six Sigma study could benefit your organization if:
- A process produces inconsistent/unacceptable outputs (time, cost, quality).
 - There is no obvious solution, and data-driven decision-making is needed.

This project demonstrates the value of LSS's structured, team-based, data-driven approach to process improvement. Because of this project, ECBC will save time and money, and customer expectations will be better met.

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