



# Lean 6-Sigma Program



## ***CALIFORNIA AIR RESOURCES BOARD***

*Bruce Oulrey*

(Project Green Belt)

*Todd Sax*

(Executive Sponsor)

*Leisa Bush*

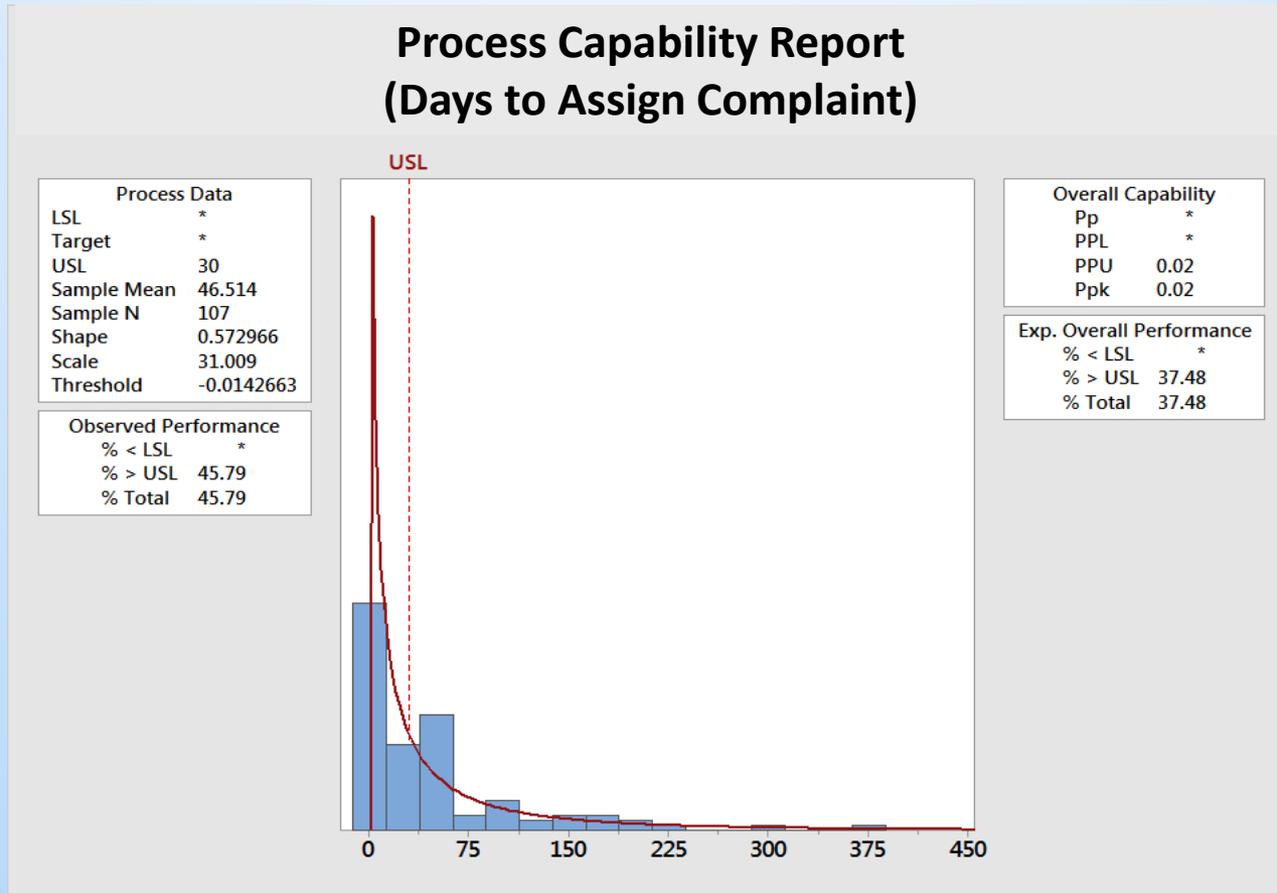
(Project Champion)

# ***Diesel Complaint Management System***

- ❖ **Problem Statement:** There is no systematic approach for processing, assigning, and initiating investigation of diesel-related complaints. Complaints may go unprocessed for extended periods of time resulting in potential excess emissions and public health impacts.
- ❖ **Objective:** Assign 95 percent of complaints in less than 30 days without mischaracterizing complaints.
- ❖ **Project Team:**
  - ❖ *Todd Sax – Executive Sponsor*
  - ❖ *Leisa Bush – Project Champion*
  - ❖ *Bruce Oulrey – Green Belt*
  - ❖ *Ann Stacy – Team Member*
  - ❖ *Kristen McKinley – Team Member*
  - ❖ *Ed Virgin – Team Member*
  - ❖ *Heather Brown – Team Member*
  - ❖ *Warren Hawkins – Team Member*



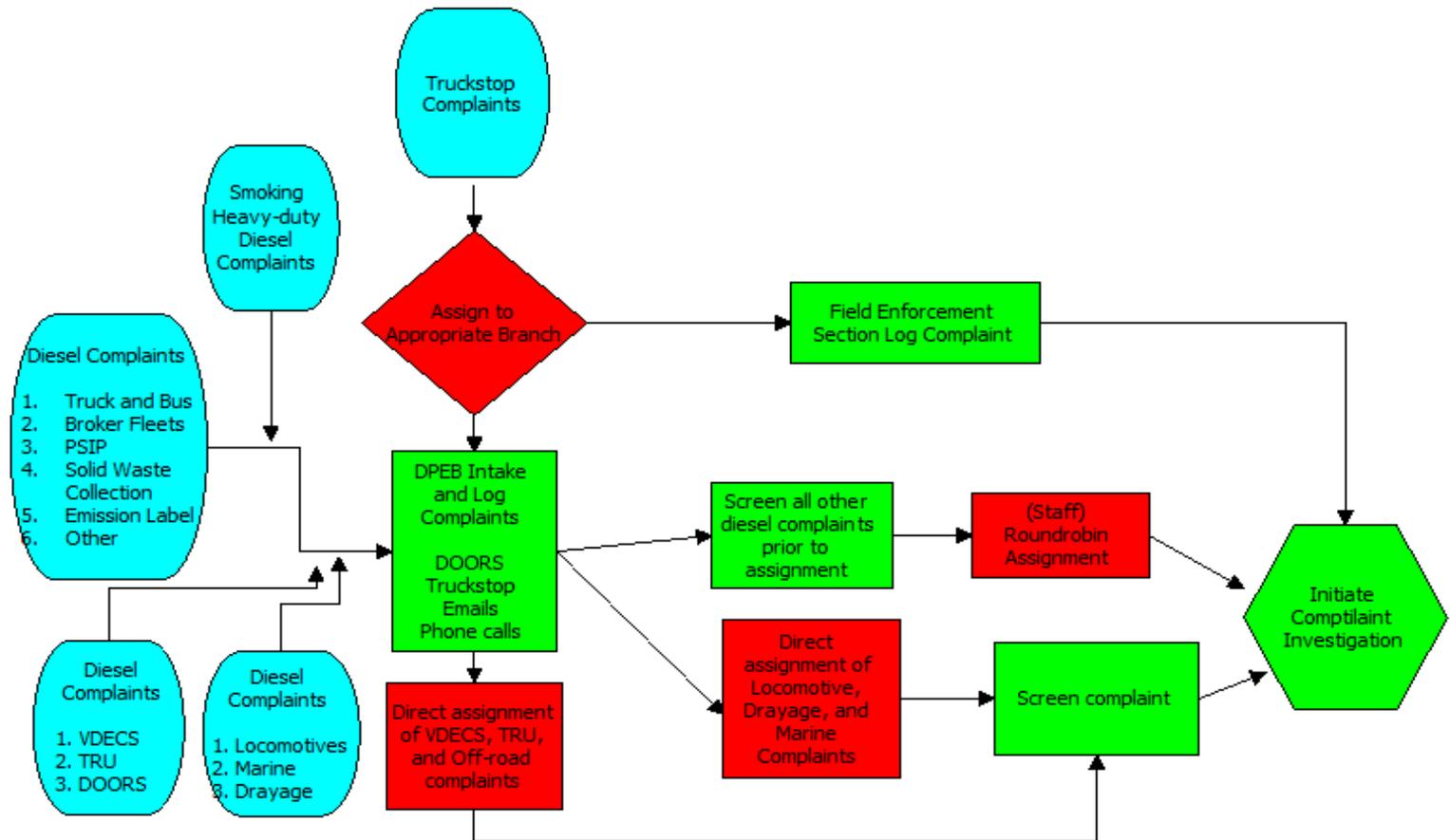
# Baseline Capability



- ❖ Average before project – 46 days; Maximum before project – 375 days
- ❖ Percent within 30 days – 55 percent



# Initial Process Map



- ❖ Data inputs highlighted in aqua; value added steps highlighted in green; non-valued added steps highlighted in red

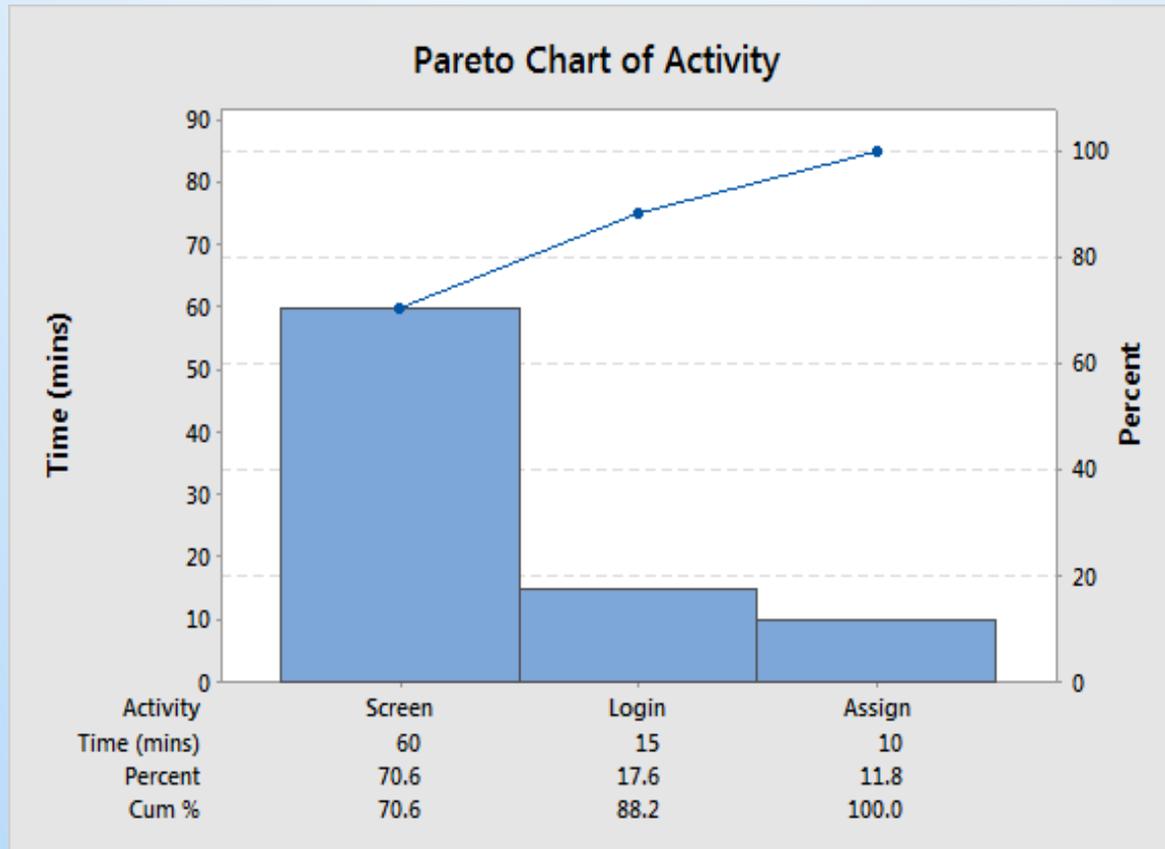
# *Analysis Tools*

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- ❖ Process Map
- ❖ Fishbone Diagram
- ❖ Process Critical Xs
- ❖ Failure Modes and Effects Analysis
- ❖ Moods Median Tests
- ❖ Pareto Charts
- ❖ Staff Activity Chart
- ❖ Takt-time Analysis
- ❖ Cycle-time Analysis
- ❖ Labor-cost Analysis



# Key Analytical Finding 1



- ❖ Complaint processing time consists of data input, screening/scoring, and assigning
- ❖ Complaint cycle-time = 1.35 hrs/complaint

## *Key Analytical Finding 2*

# Receipt of Complaints (Takt-time)

- 10 complaints/week are received
  - 1 complaint/4 hr
- ❖ Knowing how long it takes to process a complaint and the number of complaints received per hour, we can determine labor costs and staffing needed to assign 95 percent of complaints within 30 days.



# Key Analytical Finding 3

## Labor Costs

$$\underline{(10 \text{ complaints/week}) \times (1.35 \text{ hrs/complaint}) = 13.5 \text{ hrs/week}}$$

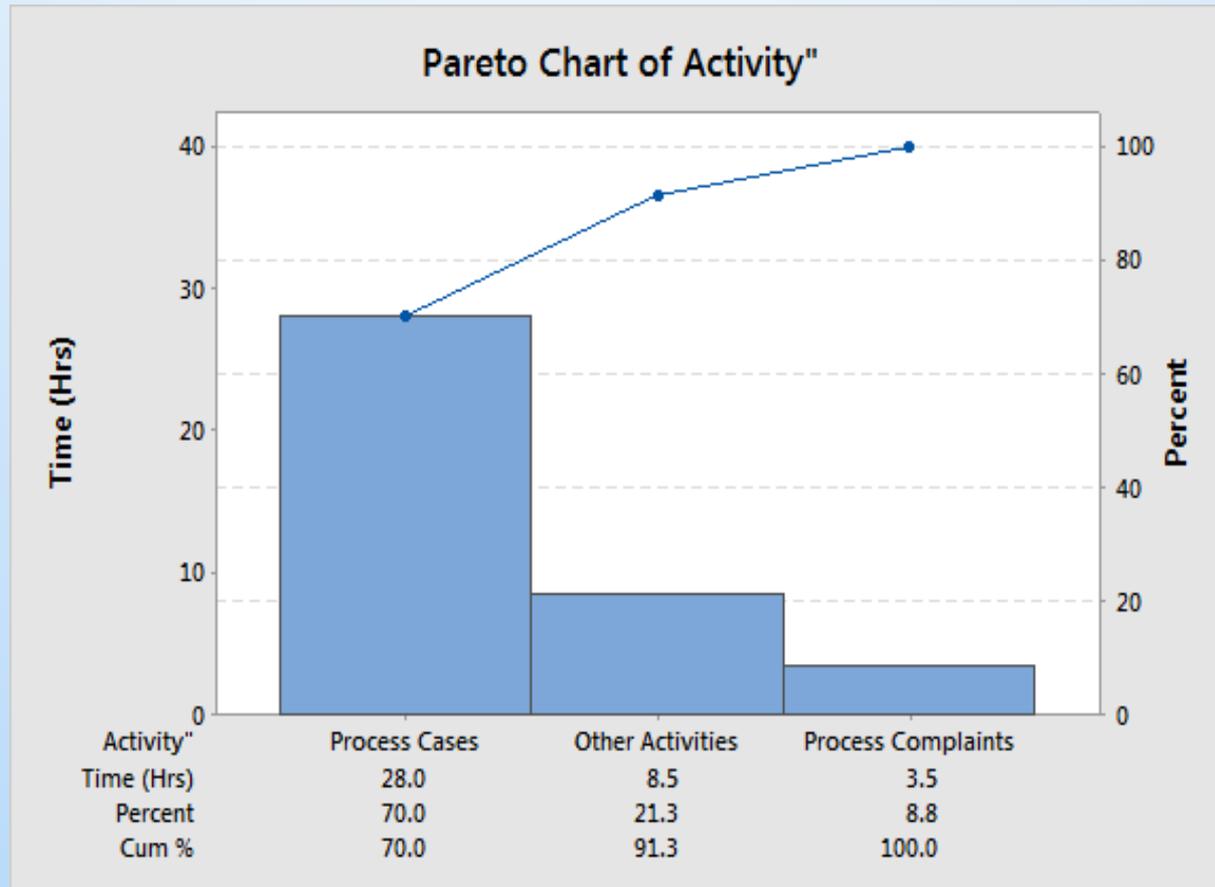
$$\underline{\text{Needed Staff Time}} = \text{Cycle time/Takt time} = 1.35 \text{ hrs}/4\text{hrs}$$

$$= \underline{0.34 \text{ PYs}}$$

- ❖ About 1/3 of a PY should be sufficient to keep up with incoming complaints and process them within 30 days at 10 complaints/week.



# Key Analytical Finding 4



- ❖ Staff currently allocates about 3.5 hours per week to process complaints, short of the 13.5 hours needed to keep up.

# *Critical X's (root causes of problems)*

- ❖ Insufficient staffing resources
- ❖ Insufficient processing procedures
- ❖ Lack of first in/first out processing
- ❖ Lack of processing targets
- ❖ Limited-function database tracking system
- ❖ Faulty web-based complaint form
- ❖ Insufficient control system

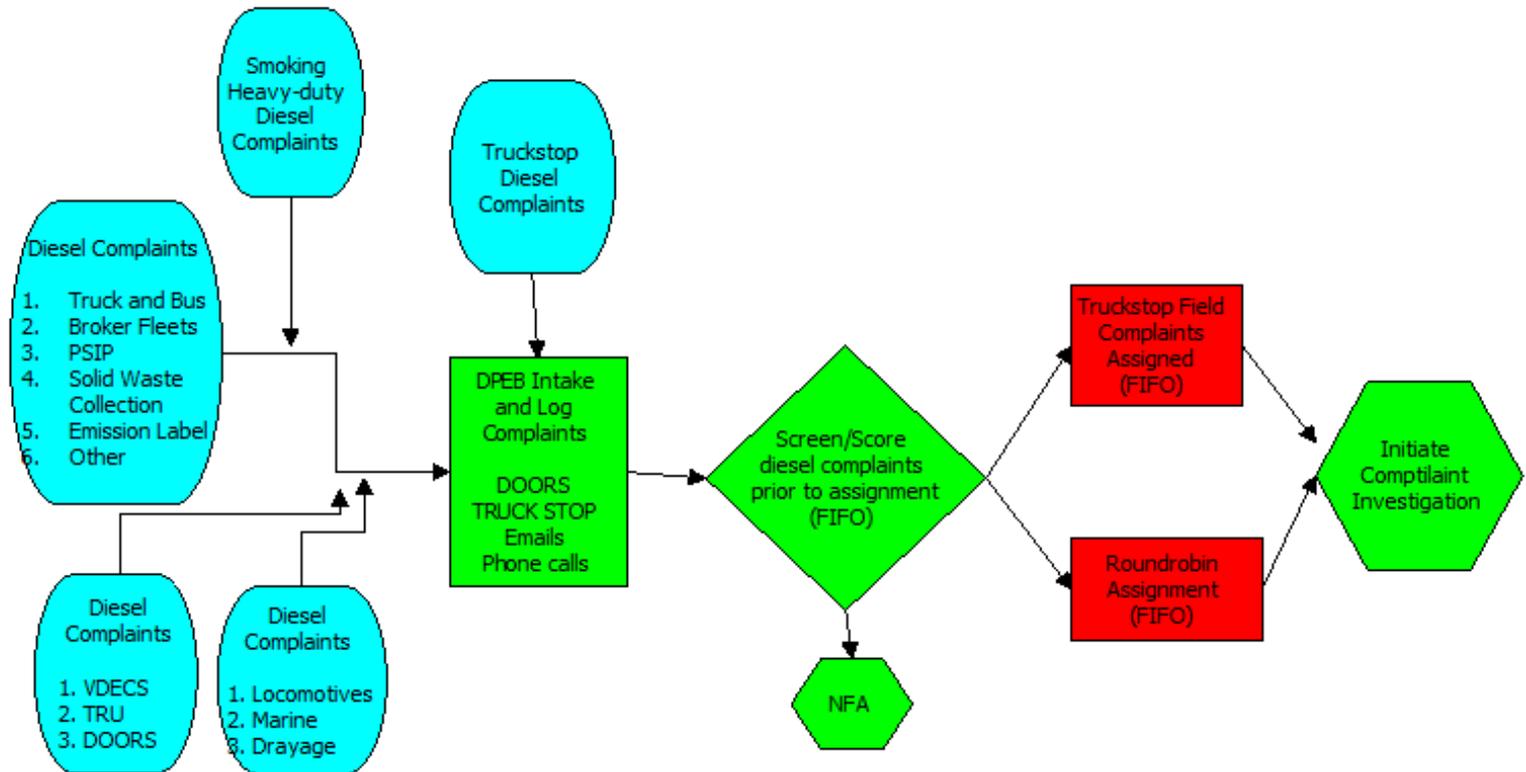


# *Improvement Techniques*

- ❖ Three additional staff were assigned to process complaints
- ❖ Processing procedures were developed for:
  - ❖ Screening and inputting complaints into database
  - ❖ Scoring complaints
  - ❖ Processing complaints
    - ❖ Eliminating non-actionable complaints
    - ❖ Assigning complaints for follow up with potential violator and /or investigation
- ❖ Development of training materials and training of staff on:
  - ❖ Processing targets (assign in less than 30 days)
  - ❖ Processing procedures
- ❖ Database improvements were made, housing system on new Headquarters server
- ❖ Improvements to web-based complaint forms implemented



# New Process Map



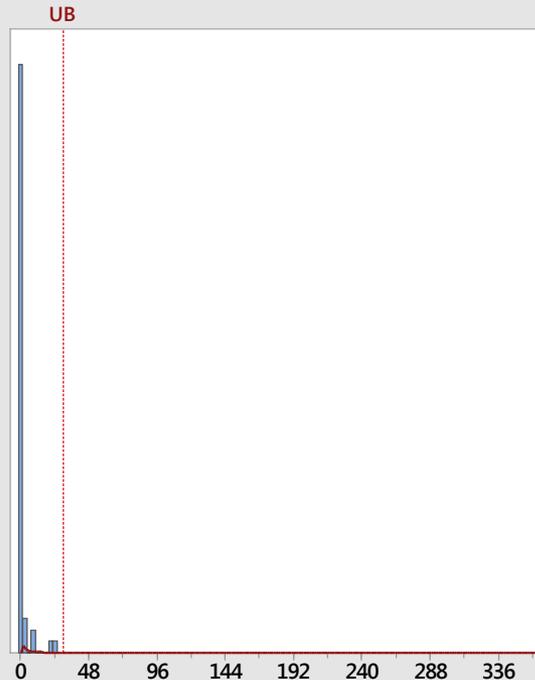
- ❖ Data inputs highlighted in aqua; value added steps highlighted in green; non-valued added steps highlighted in red

# New Capability Analysis

## Process Capability Report (Days to Process Complaint)

Process Data	
LSL	*
Target	*
UB	30
Sample Mean	1.31018
Sample N	59
Shape	0.0569729
Scale	8.34179e-010
Threshold	-2.22045e-016

Observed Performance	
% < LSL	*
% > UB	0.00
% Total	0.00



### Overall Capability

Pp	*
PPL	*
PPU	*
Ppk	*

### Exp. Overall Performance

% < LSL	*
% > UB	*
% Total	*

- ❖ New average days to process complaint – 1.3 days
- ❖ Current Maximum – 25 days
- ❖ Percent within 30 days – 100%

# Control Plan

- ❖ Ongoing Staff Training
- ❖ Statistical Process Controls
  - ❖ I-Charts
    - ❖ Total complaints per week/month/quarter/year
    - ❖ Time to assign
  - ❖ P-Charts
    - ❖ Actionable complaints
    - ❖ Complaints recommended for audit
    - ❖ Complaints that become cases
- ❖ Quarterly Audits
  - ❖ Screening of complaints
  - ❖ Scoring of complaints
- ❖ Monthly reports
  - ❖ Complaint processing status



# *Additional Benefits*

- ❖ Elevated staff recognition of importance of complaints
- ❖ Management understanding of resource needs
- ❖ Improved staff understanding of production targets and processing expectations
- ❖ Equitable distribution of workload
- ❖ Elimination of complaint backlog
- ❖ Improved communication among complaint processing staff
- ❖ Improved staff understanding of the value of L6S techniques for improving other ARB-related programs and processes



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