TOP Investigation

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Agenda

- Triangle of Prevention (TOP) methodology
- Description of event
- Systems of Safety
- Lessons Learned

TOP Methodology

- Root cause analysis based on Systems of Safety (SOS)

- Employee participation
  - One represented, one non-represented team members

Description of Event / Initial Findings

- Location: FCC

- Event
  - During routine test of backup air motor for spent catalyst slide valve, valve output moved from 61% open to 12% open
    - High level in reactor triggered FCC feed trip

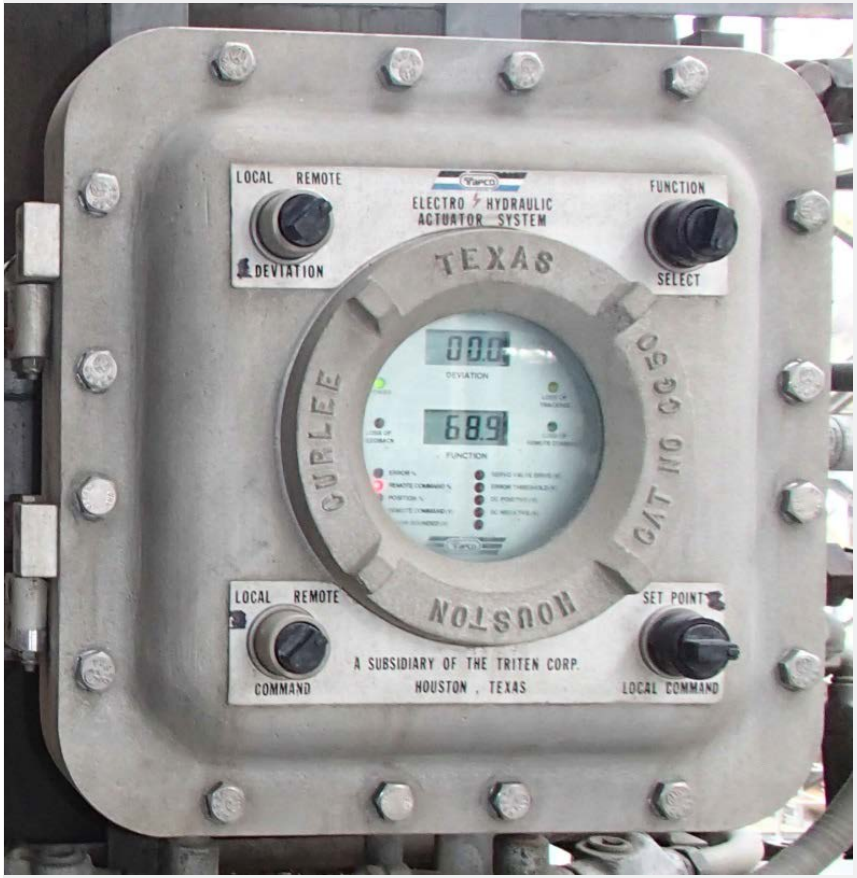
- Investigation findings
  - At some point during the switch to local control a step was missed or the deviation was not set to zero.
  - This caused the valve to move closed once the final knob was turned to local control.

System of Safety: Training and Procedures

- Operator was new to that job and inexperienced with task performed
  - Performing a critical task for the first time

- Job Aid was confusing and unclear
  - Job aid for initial task lacked warning for potential for the consequence
  - No reference to second job aid that was needed to operate local valve control panel
  - Steps poorly worded

System of Safety: Design and Engineering



- Human Machine Interface (HMI) panel buttons similar, poorly labeled, and confusing
- All four control knobs look the same
- Same words LOCAL, REMOTE and COMMAND appear on multiple knobs

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Lessons Learned

- Job Aids need to be written so operator can easily understand them and include warnings of consequences if steps not performed correctly

- Outside equipment should have easy to read labels
  - Knobs on the local control unit panel are easily misunderstood

- People new to a task would benefit from supervision while executing tasks for the first time