

Exercise 8

Trickle Diversion Exercise with Process Control

Session Objectives:

After the session the participants will be able to do the following:

1. Prepare Shewart, CUSUM, and EWMA charts for sample ID data.
2. Estimate the Pd point in time for various inside trickle diversion rates.

Estimated Time:

1.5 hours in subgroup
+1.0 hour in large group discussion
2.0 hours total

Large Group Exercises:

Materials need: Computer with Bulk Exercise Spreadsheet, Excel, and QI Macros for Excel

- 1) Using the sample data introduce a 0.3 kg insider trickle diversion per month from months 25 – 29. Prepare a Shewart, CUSUM, and EWMA chart for the data.
 - a. Do any of the 3 analysis methods indicate an out of control situation? Under WECO rules?
 - b. Do any of the 3 analysis methods indicate a process shift?
- 2) Using the sample data introduce a 2.0 kg insider trickle diversion per month from months 25 – 34. Prepare a Shewart, CUSUM, and EWMA chart for the data.
 - a. Do any of the 3 analysis methods indicate an out of control situation? Under WECO rules?
 - b. Do any of the 3 analysis methods indicate a process shift?
- 3) Using the sample data introduce a 1.75 kg insider trickle diversion every other month from months 25 – 34. Prepare a Shewart, CUSUM, and EWMA chart for the data.
 - a. Do any of the 3 analysis methods indicate an out of control situation? Under WECO rules?
 - b. Do any of the 3 analysis methods indicate a process shift?

- 4) Using the sample data introduce a 10 gram insider trickle diversion per month from months 25 – 34. Prepare a Shewart, CUSUM, and EWMA chart for the data.
 - a. Do any of the 3 analysis methods indicate an out of control situation? Under WECO rules?
 - b. Do any of the 3 analysis methods indicate a process shift?
- 5) Review control charts for each of the 4 possible scenarios
- 6) Discuss possible insider strategies with respect to rates
- 7) Discuss the following questions?
 - a. You were given the statistical limits that apply to this process based on its current design. How does that relate to specification or safeguards limits?
 - b. What are the next steps to consider with respect to improving the process?