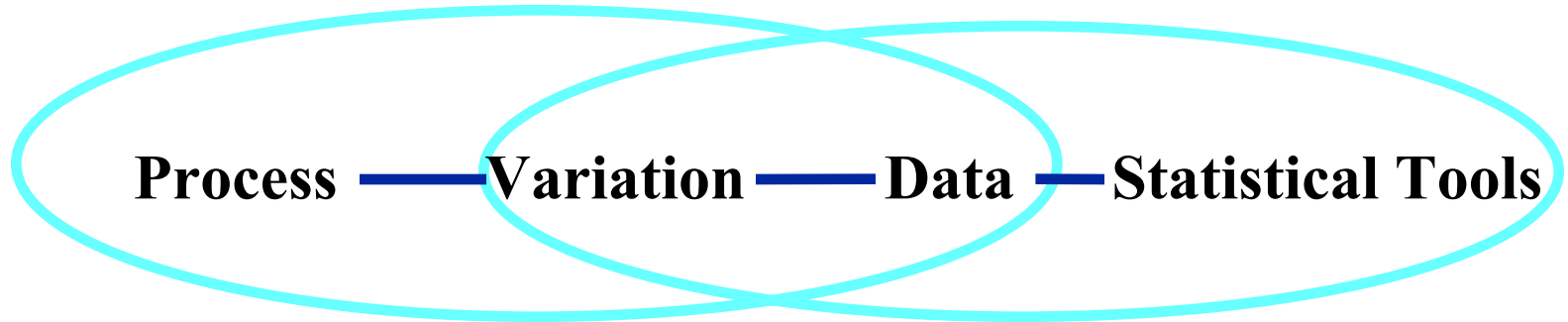


STATISTICAL THINKING

USING STATISTICAL THINKING IN A PLANT

Galen Britz, Statistics Division

Statistical Thinking and Methods



Statistical Thinking

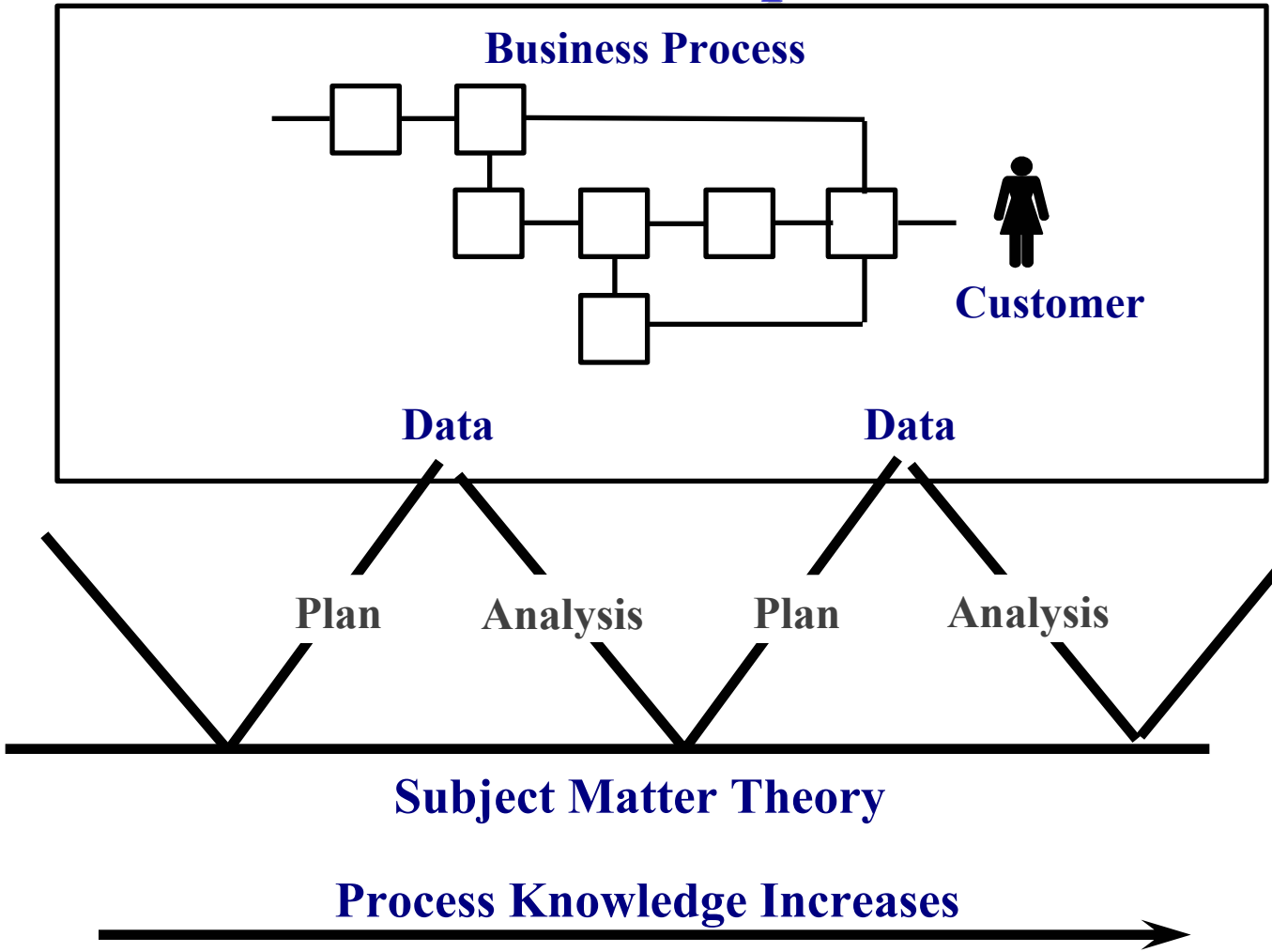
Statistical Methods

DEFINITION

Statistical Thinking is a philosophy of learning and action based on the following fundamental principles:

- All work occurs in a system of interconnected processes,
- Variation exists in all processes, and
- Understanding and reducing variation are keys to success.

Statistical Thinking for Business Improvement



Use of Statistical Thinking

Depends on levels of activity and job responsibility.

Where we're headed

Strategic

Executives

**Managerial processes
to guide us**

Managerial

Managers

**Where the work gets
done**

Operational

Workers



Examples of Statistical Thinking at the Operational Level

Work processes are flowcharted and documented.

Key measurements are identified.

- Time plots displayed

Process management and improvement utilize:

- Knowledge of variation, and
- Data.

Improvement activities focus on the process, not blaming employees.

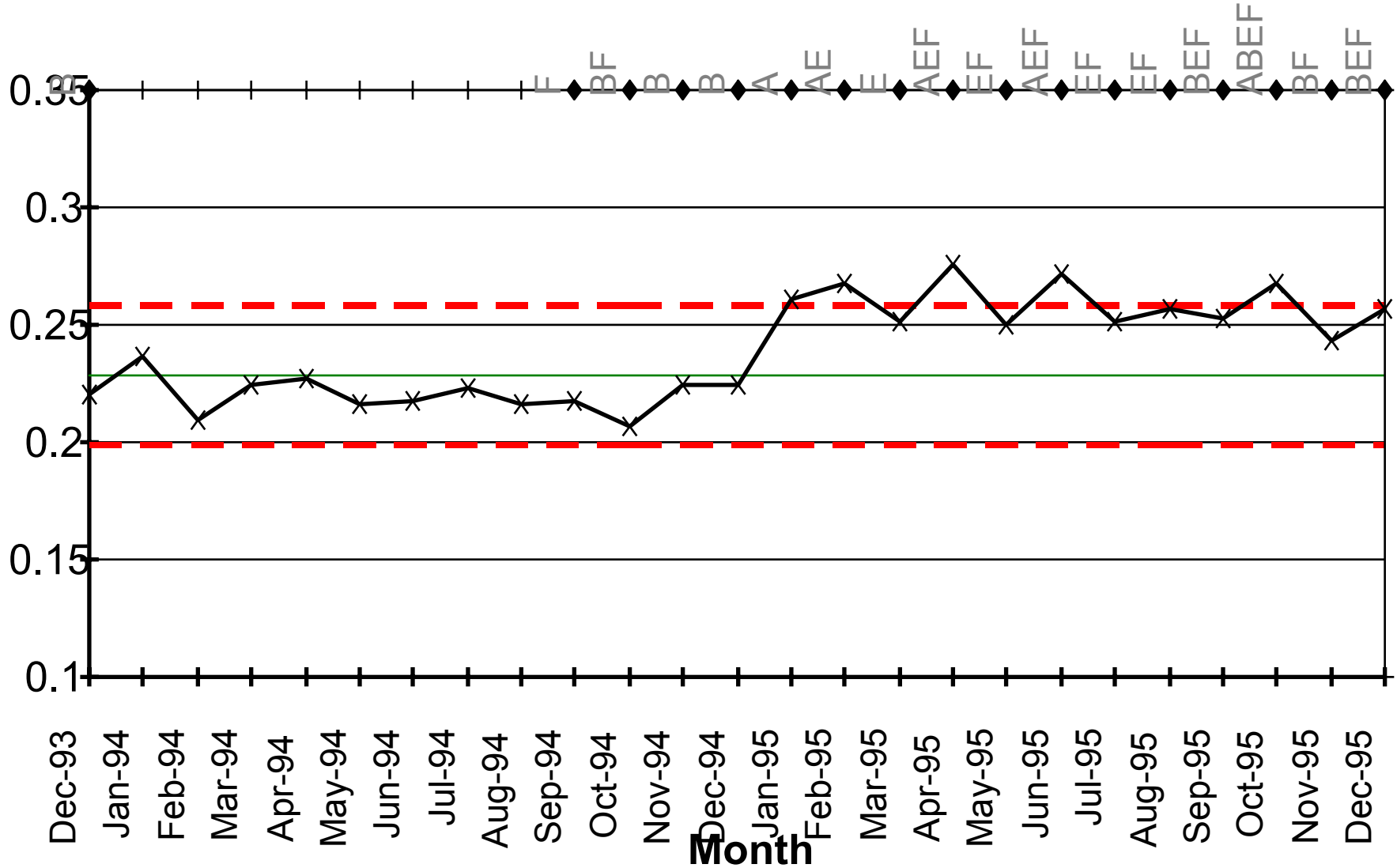
PLANT DATA

IN

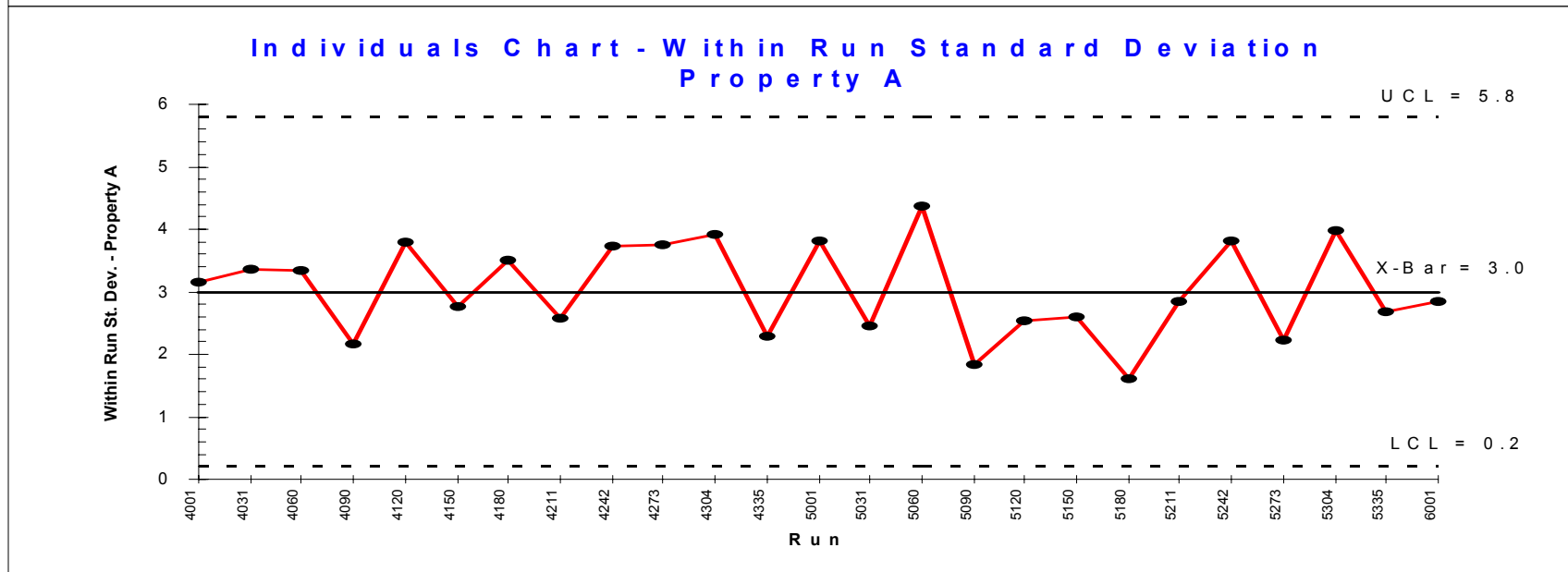
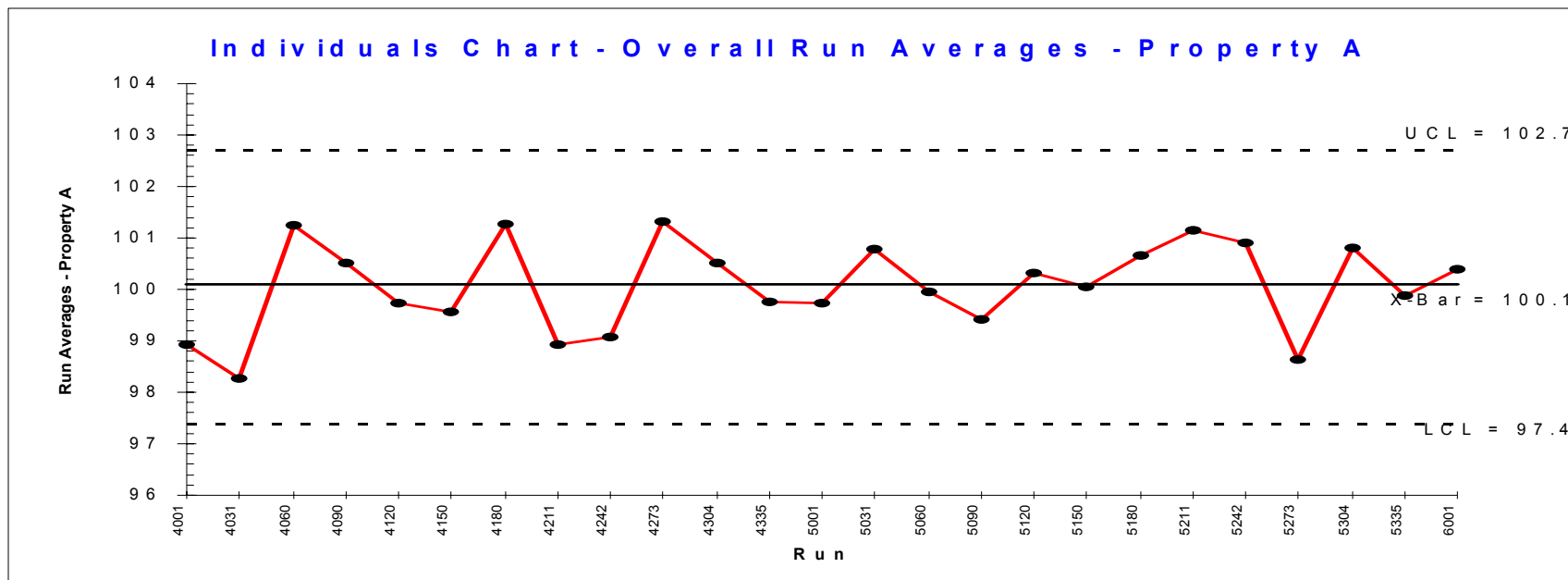
CHART FORM

Unit Cost (C\$/SqM)

Special Cause Flag



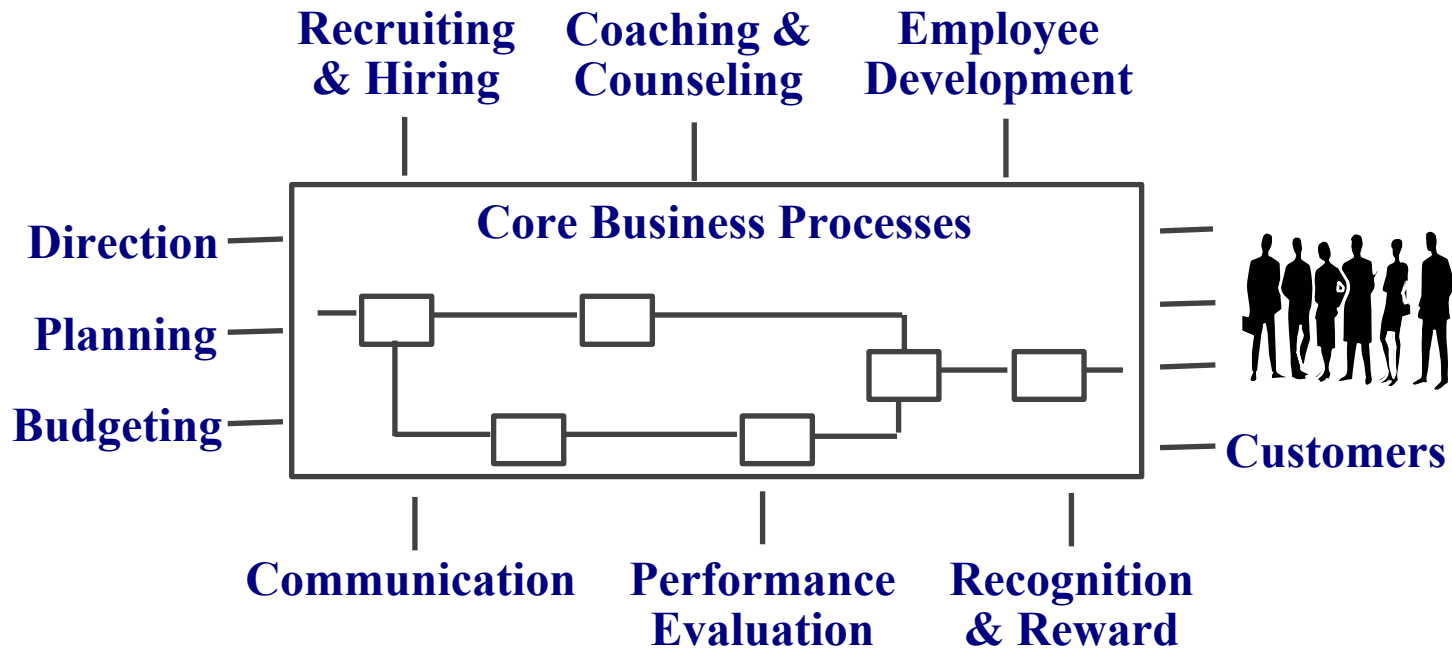
2 CHART: OVERALL RUN AVERAGES AND WITHIN RUN STANDARD DEVIATIONS



When reporting on the charts, you should:

- **Special causes** - Explain the root causes and action plan to eliminate or make permanent (depending if the special cause is good or bad.)
- **Common causes** - Comment if the average and variability are satisfactory or if improvement is needed. If needed, what are the improvement plans?

Examples of Managerial Processes



Examples of Statistical Thinking at the Managerial Level

Managers use meeting management techniques.

Standardized project management systems are in place.

Both project process and results are reviewed.

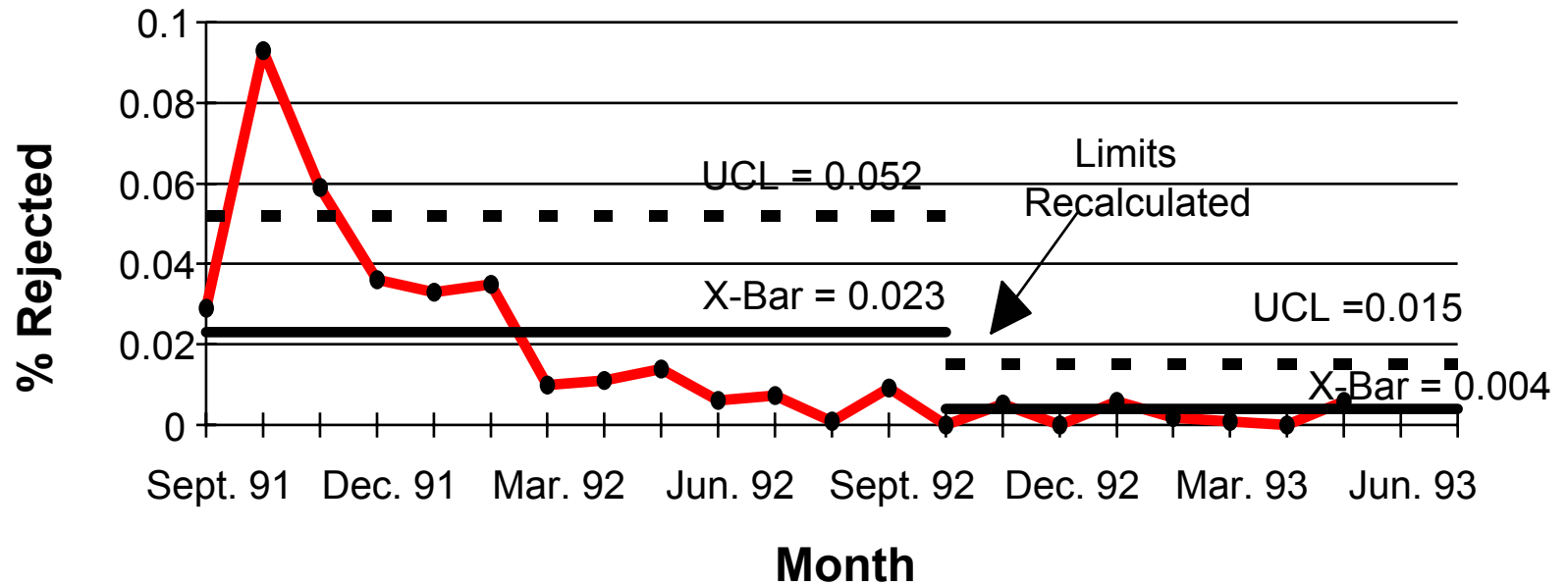
Process variation is considered when setting goals.

Measurement is viewed as a process.

The number of suppliers is reduced.

A variety of communication media are used.

CUSTOMER COMPLAINTS



Examples of Statistical Thinking at the Strategic Level

Executives use systems approach.

Core processes have been flow charted.

Strategic direction defined and deployed.

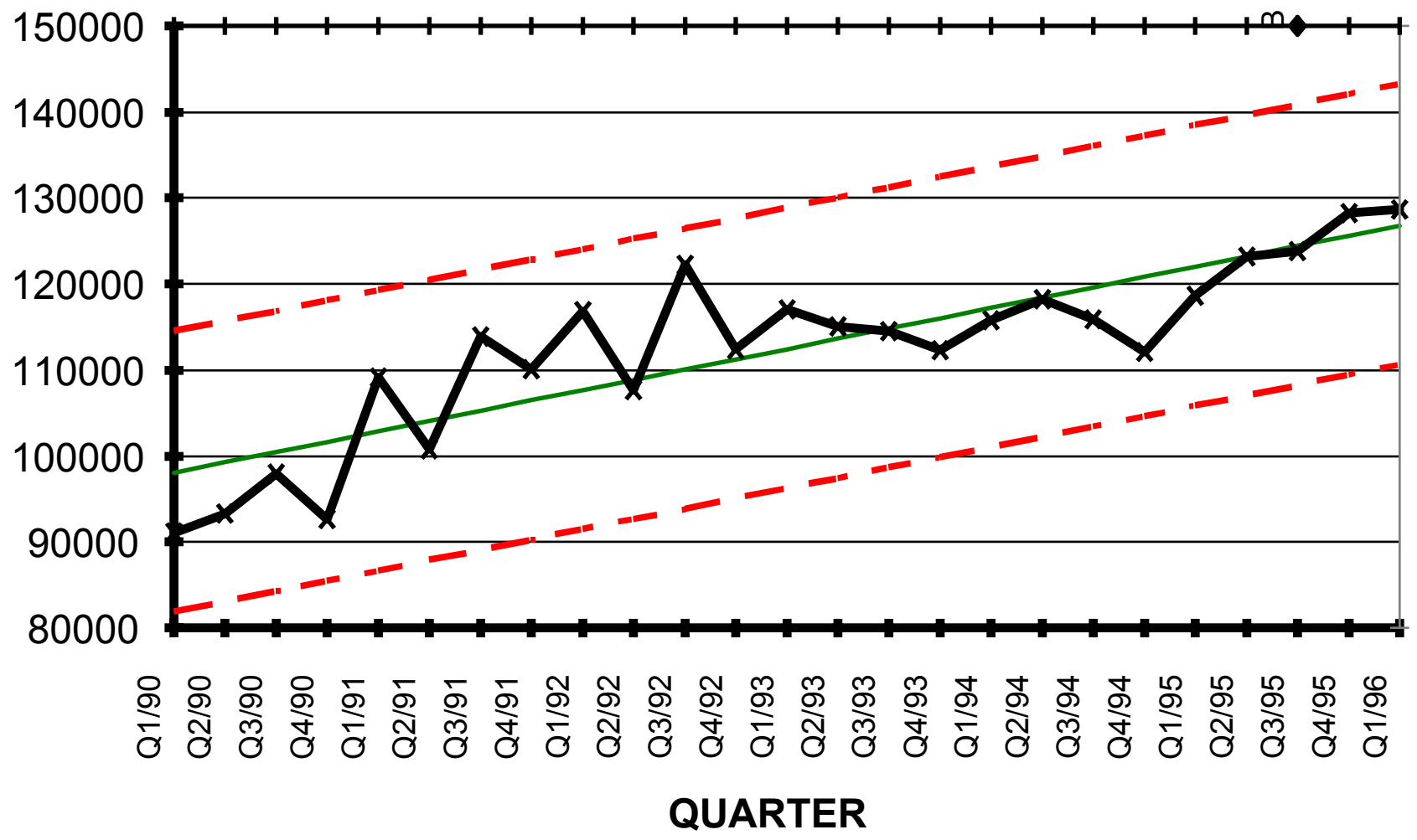
Measurement systems in place.

Employee, customer, and benchmarking studies are used to drive improvement.

Experimentation is encouraged.

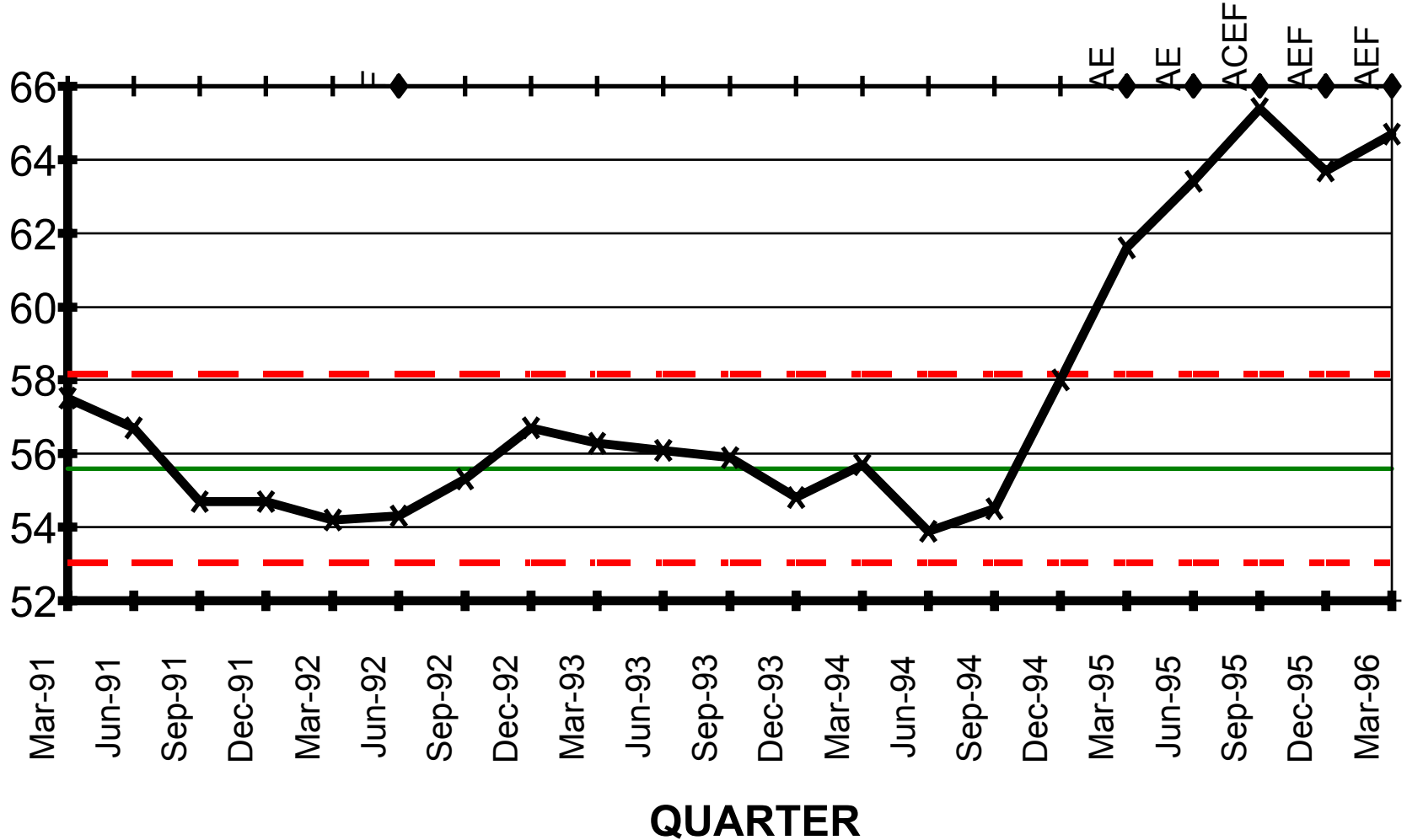
SALES

Special Cause Flag



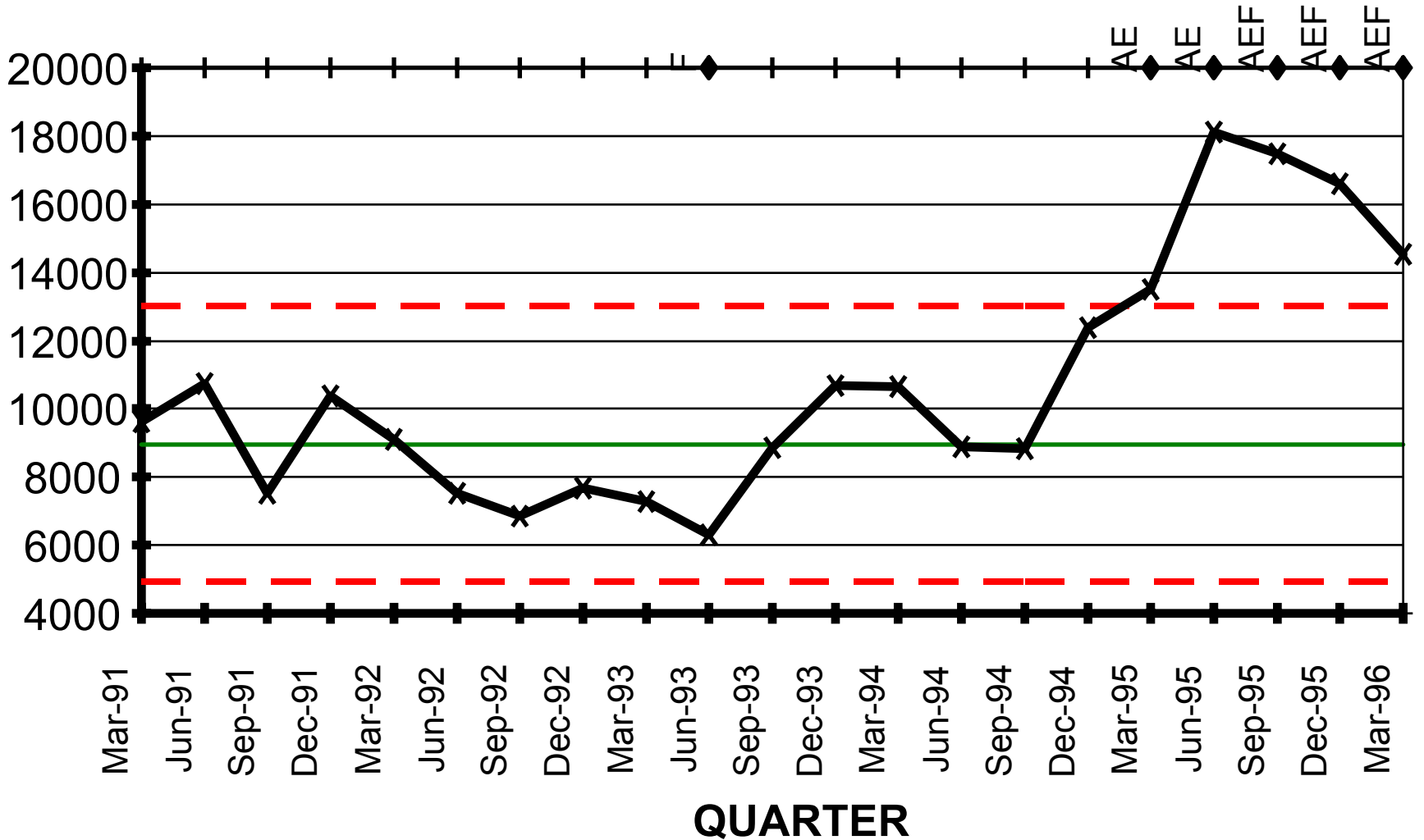
FACTORY COST %

Special Cause Flag



INVENTORY

Special Cause Flag



STATISTICAL THINKING

**OPERATORS WORK ON
SPECIAL CAUSES**

**ENGINEERS AND MANAGERS
WORK ON COMMON CAUSES**

**AN IN-CONTROL PROCESS DOES NOT NECESSARILY
MEAN GOOD PRODUCT PERFORMANCE.**

STATISTICAL THINKING

“... no matter how much a company might want to transform itself to some new order, it must continue doing business and, for the time being, do so in the way it knows best.

Transformation, therefore, involves a sort of adolescence -- a period of inelegance when we shift from one way of being to a new way of being.”

Peter R. Scholtes

Heero Hacquebord

1988

STATISTICAL THINKING

CONCLUSIONS

Statistical Thinking

- **Plays a Role In All Aspects Of Total Quality**
- **Involves Concepts And Systems As Well As Statistical Tools**
- **Is Useful In Improving Management Processes As Well As Other Types of Processes**
- **Demands A Culture Change In Everyone**