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## Abstract

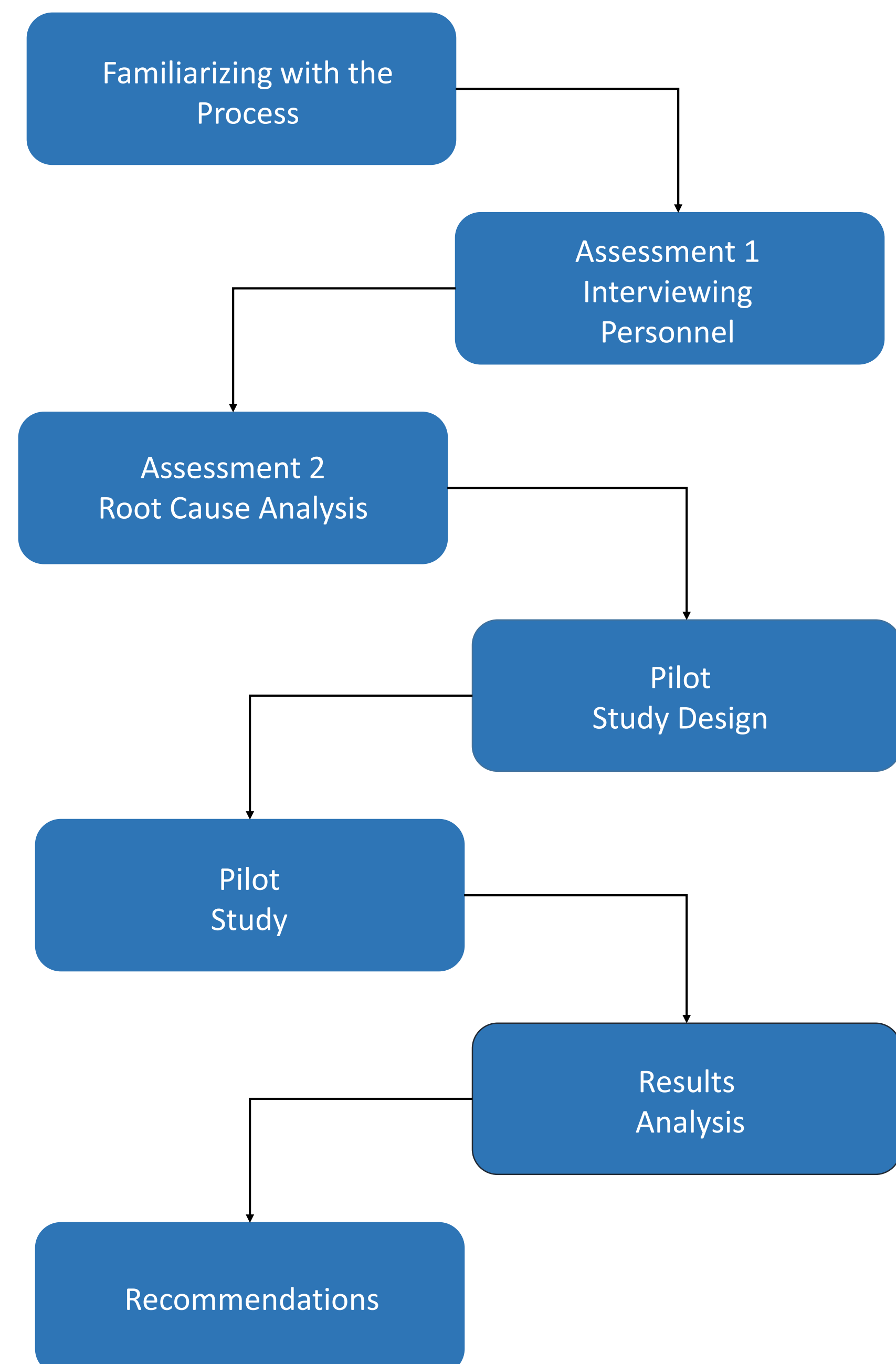
A manufacturing facility is taking back control of their circuit assembly line by studying the behavior of their raw components. The production line was carefully studied and some problems in the circuit assembly area were detected. Then a Fishbone analysis was carried to find the root cause of this problems. The inspection of incoming raw material didn't test the critical parameters, the sampling size was not representative of the received lots and there were no records found of any measurements. After identifying the problem, a pilot study was made on six usual components. A sample of 30 of each component was studied and tested on their critical parameters: resistance, capacitance, voltage and contamination on printed circuit boards (PCB). The resistors, capacitors and batteries do not demonstrate an adverse trend based on the Control Charts. However, the Ionic contamination test results suggested the process is not in control. Some recommendations were made on the steps to take before starting to gather data and get the process in control

## Introduction

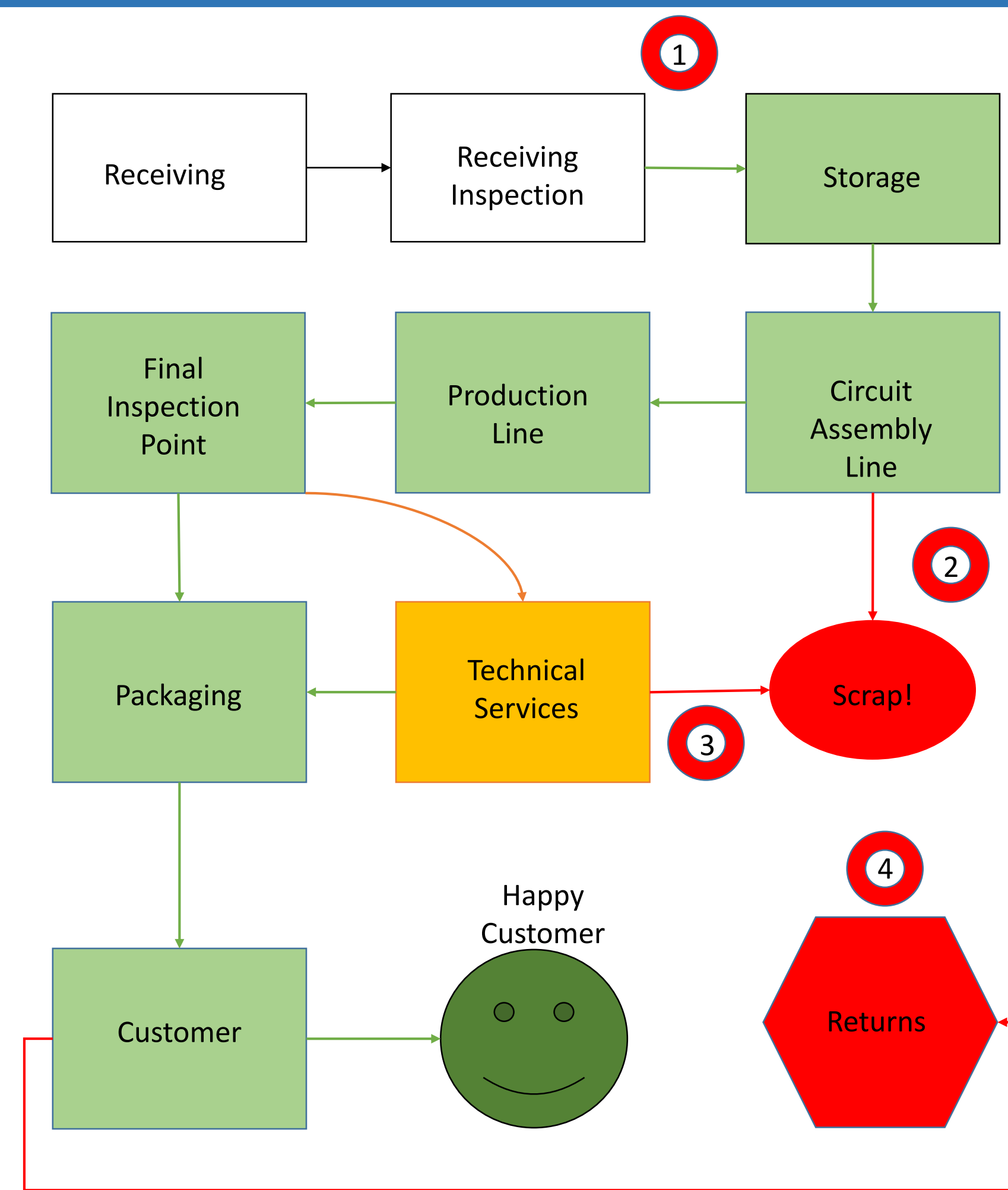
What is the cost of giving the customer a defective product?

- Open investigations
- Recalls
- Lawsuits
- FDA interventions
- Loss of reputation

The goal of this project is to improve the quality of products, of the electronic raw material on the circuit assembly line.

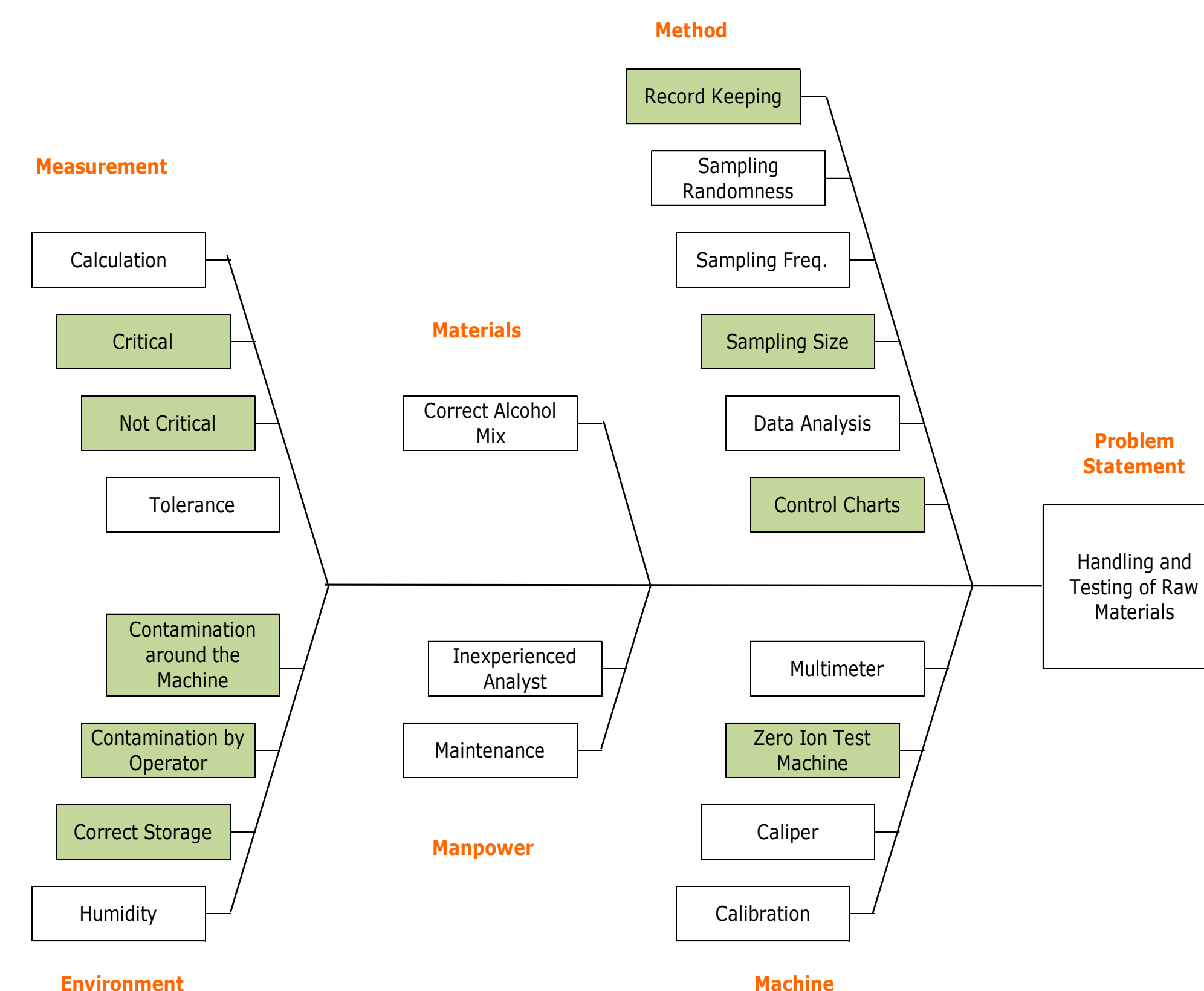


## Problem



## Observations

- |  |   |
|--|---|
| <p>1 Receiving inspection:</p> <ul style="list-style-type: none"> <li>• Non-representative samples</li> <li>• Not critical Measurements</li> <li>• No historic data</li> </ul> | <p>3 Technical Services:</p> <ul style="list-style-type: none"> <li>• Debug</li> <li>• Re-test</li> <li>• Open investigations</li> </ul>                  |
| <p>2 Circuit Assembly Line:</p> <ul style="list-style-type: none"> <li>• Compromised line efficiency</li> <li>• Scrap</li> <li>• Rework</li> </ul>                             | <p>4 Returns:</p> <ul style="list-style-type: none"> <li>• Return Logistics</li> <li>• Open investigations</li> <li>• Customer Dissatisfaction</li> </ul> |



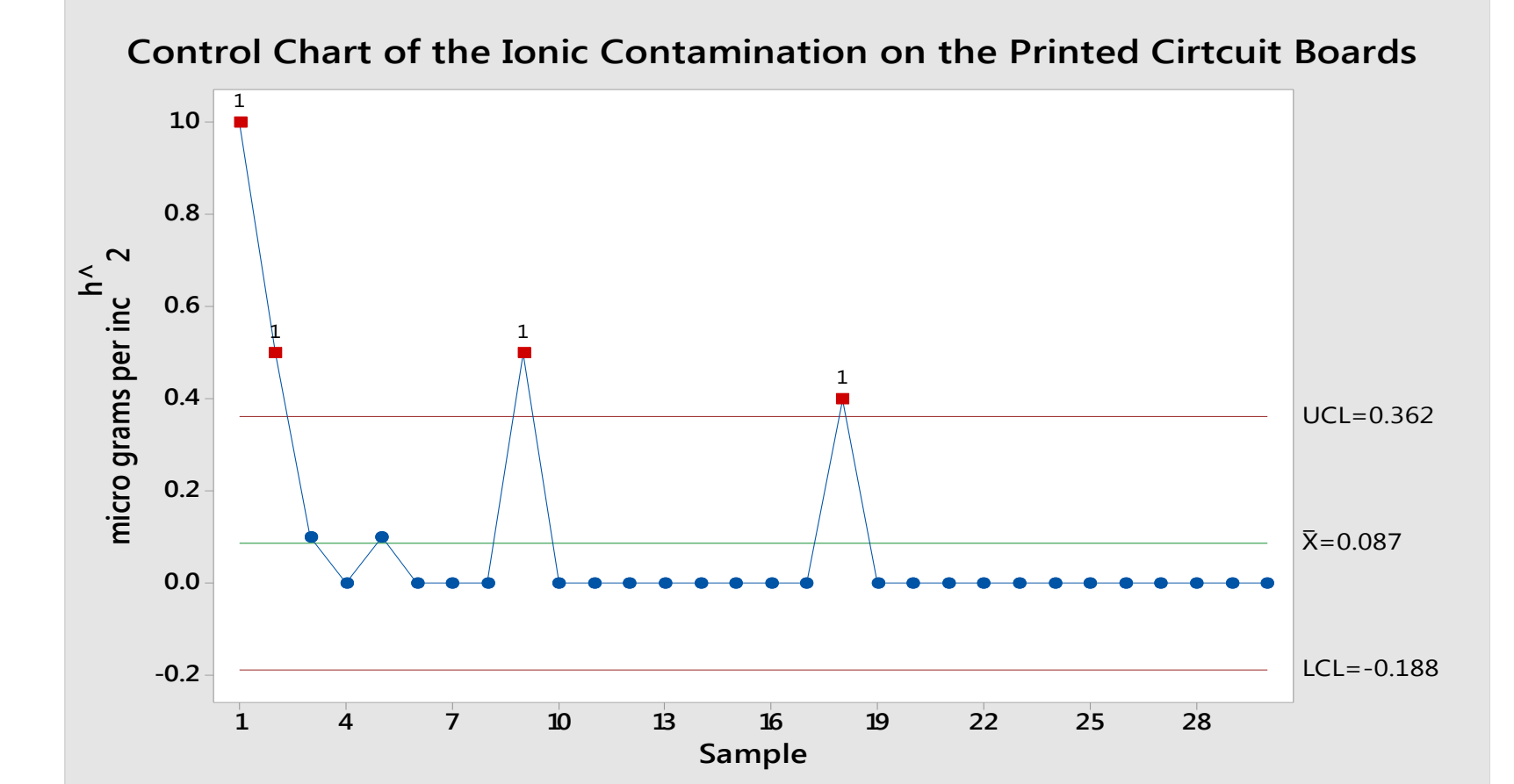
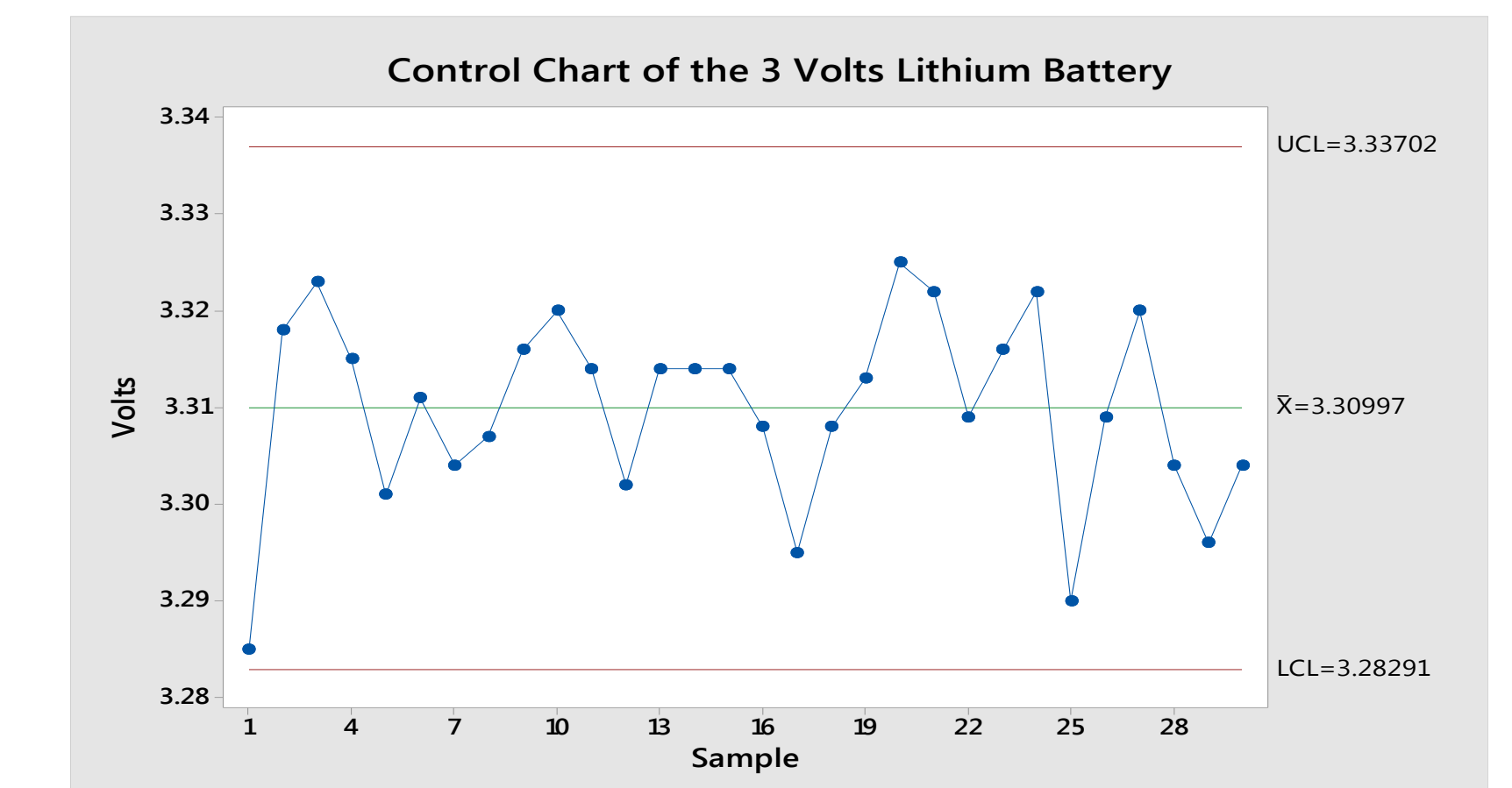
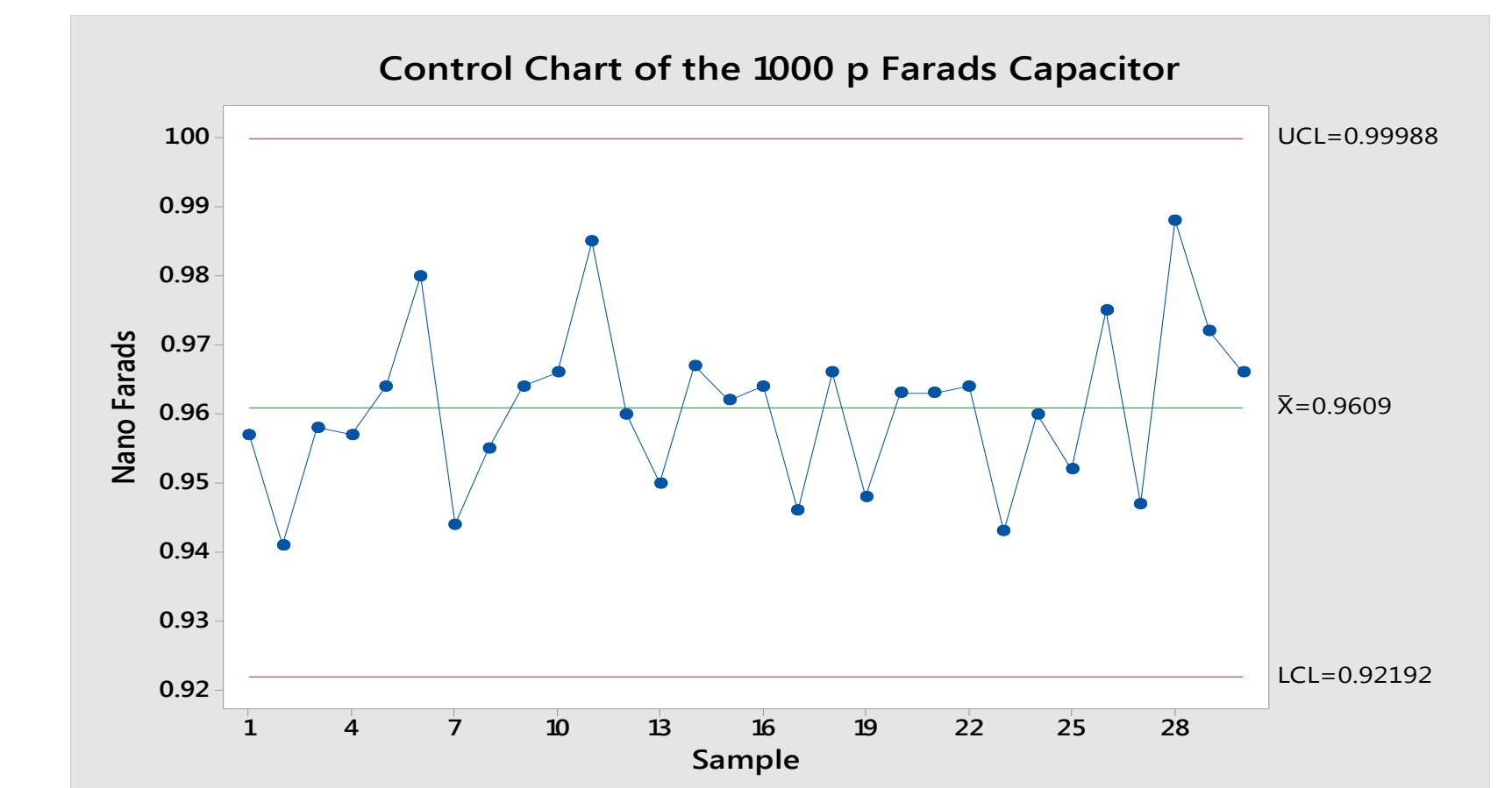
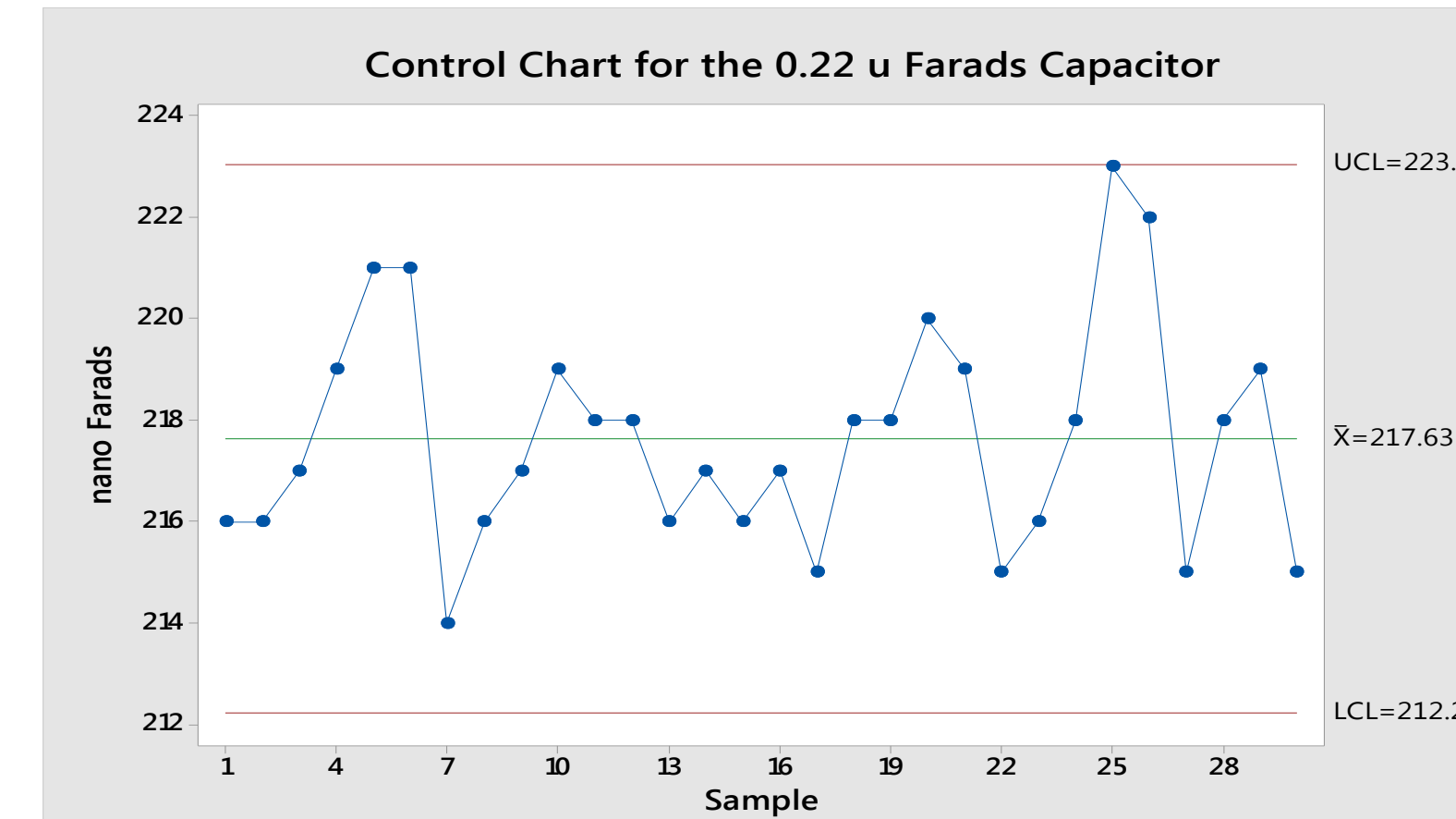
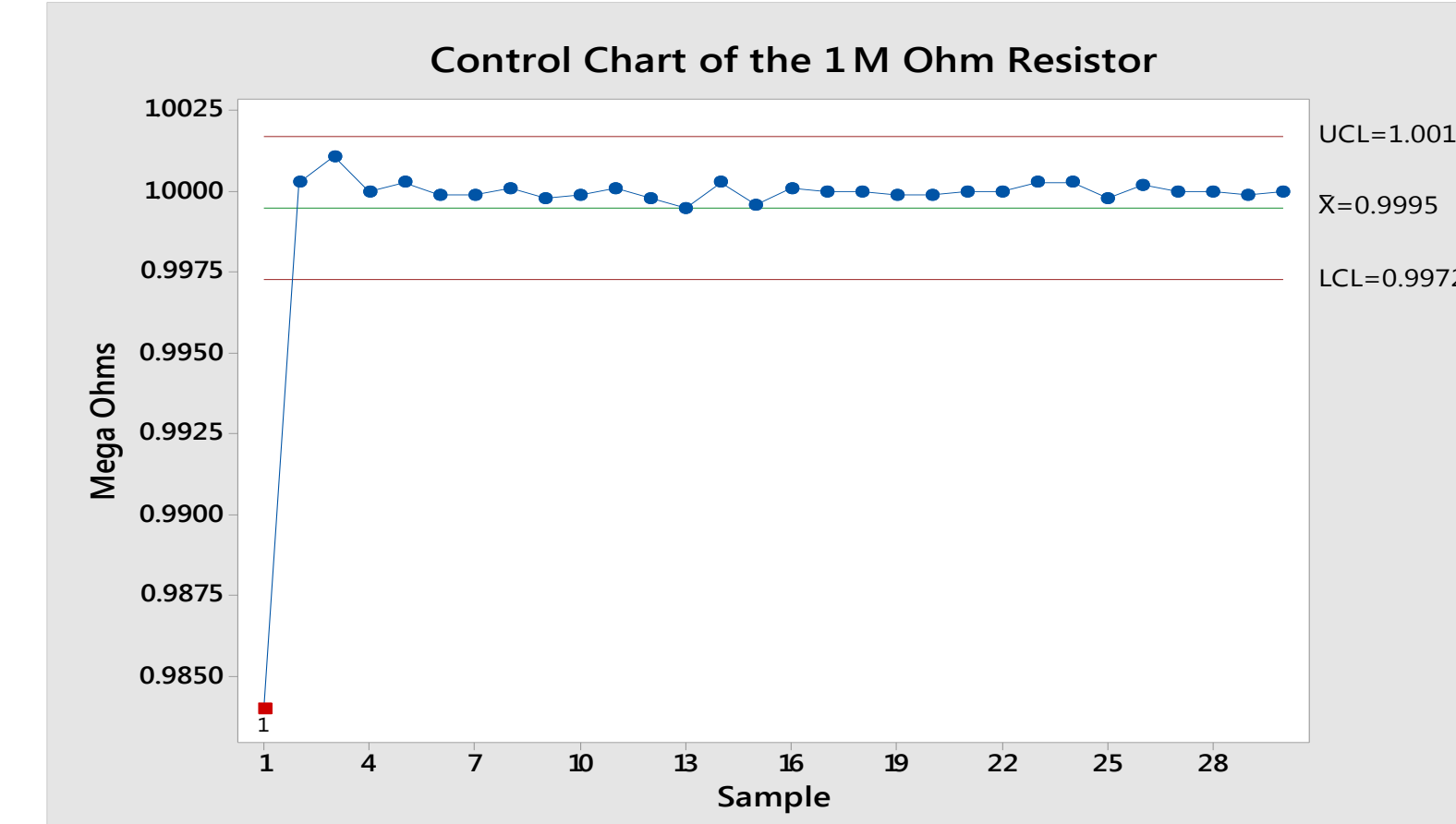
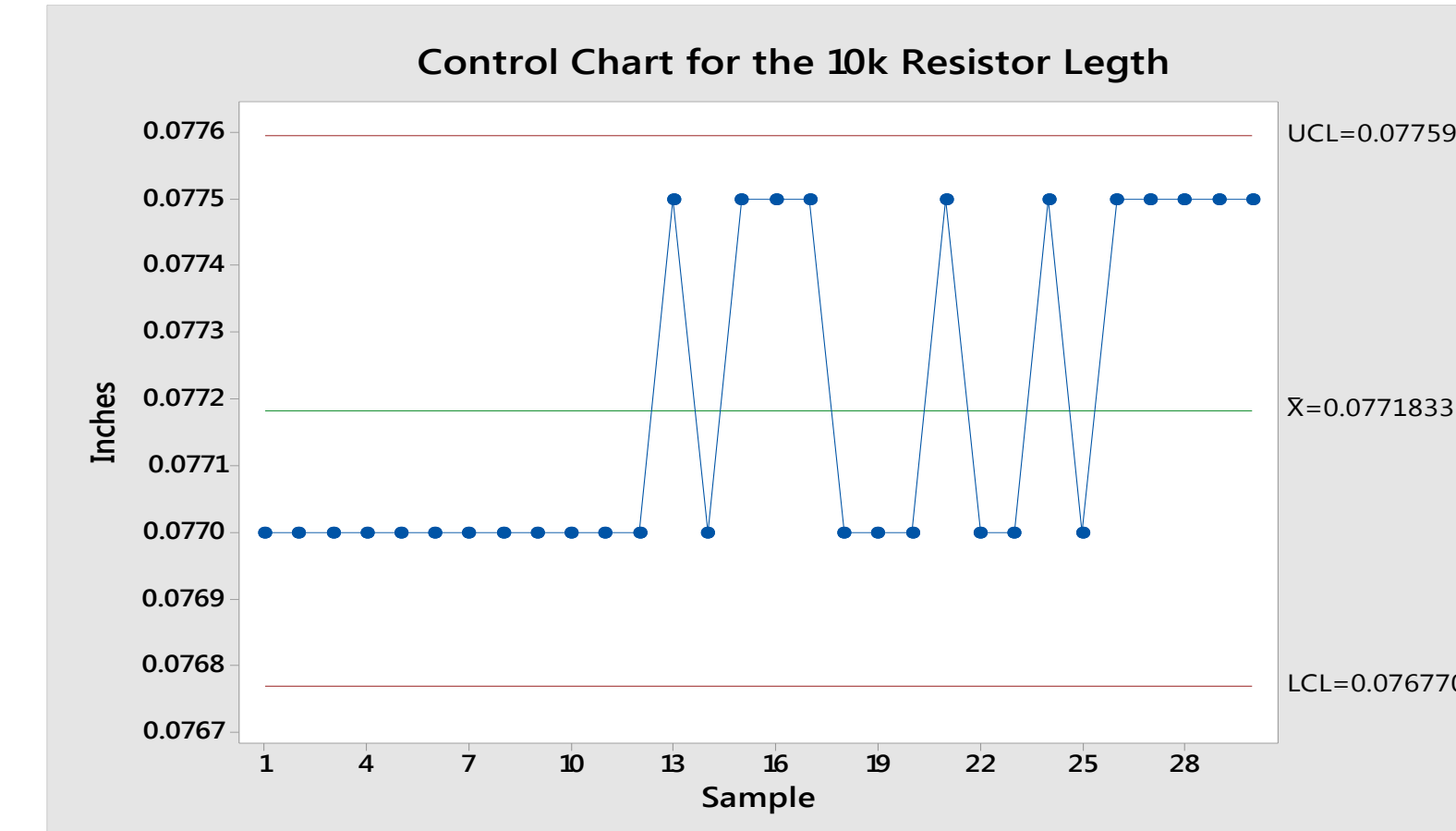
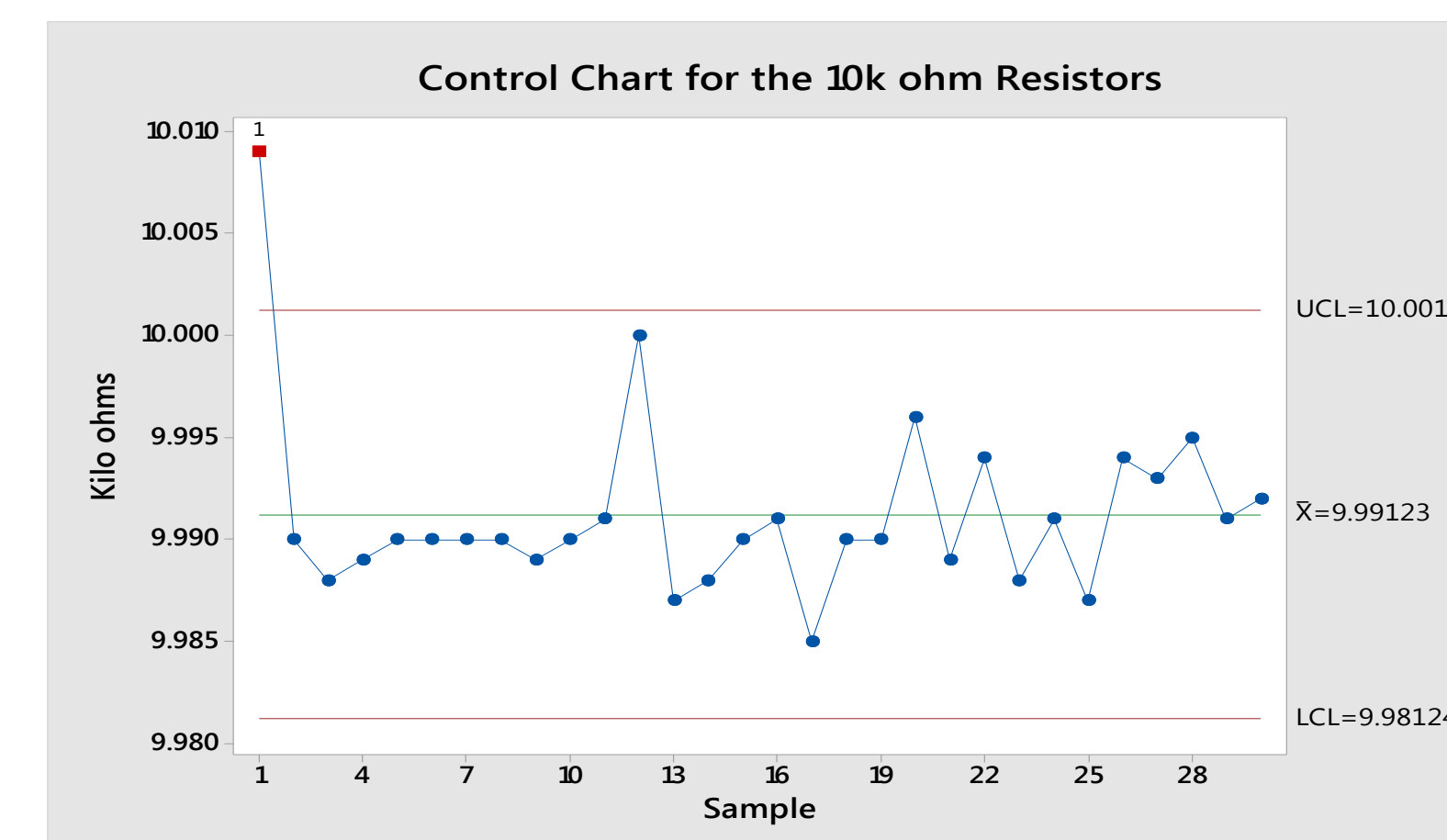
## Pilot Study

Equipment	Component	Type	Value
Caliper	1	Surface Mount Resistor	10k ohms, 1/10W, 1%
Multimeters			
Zero Ion Test Machine	2	Surface Mount Resistor	1M ohms, 1/8W, 0.5%
	3	Surface Mount Ceramic Capacitor	0.22 μ Farads, 10V, 10%
	4	Surface Mount Capacitor	1000 p Farads, 50V, 10%
	5	Lithium Battery	3 Volts
	6	PCB	N/A

30 Samples of each component were taken and were measured for:

- Capacitors: Capacitance and Dimensions
- Resistors: Resistance and Dimensions
- PCB: Ionic Contamination
- Batteries: Voltage

## Results and Discussion



## Recommendations

Rethink what is a critical measurement and what is not based on the component functionality. (Kaizen)

Components	Actual parameters tested	Recommended parameters to test
Resistor	Dimensions	Resistance
Capacitor	Dimensions	Capacitance
Battery	Dimensions and Voltage	Voltage
PCB	Ionic Contamination	Ionic Contamination

Reconsider the tolerance levels of the Zero Ion Test Machine.

Revision of the inspection process with special focus on the sampling size.

Provide additional training to the inspectors.

Start generating relevant data that can be used to create Control Charts and other statistical evaluation.

This is the way to understand the process and keep it in control, lowering the possible future problems in the production line.