Improvement in the Visibility of Nonconforming Product Inventory and Reduction

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Abstract

One of the major problems reported in a company is the Nonconforming product inventory, reducing the availability to use space for new production lines and storage of conforming product. Company wants to understand why the nonconforming products are exceeding the expected product disposition closure date, why the hold cages are full causing difficulty of locating a particular nonconforming production order in the storage areas. There are key elements of information to understand the actual status of nonconforming inventory. Therefore, the implementation of an optimized NC Monitoring Report system, through the using an ERP System, helps to prioritize Product Dispositions execution, reducing the aging of inventory and improving the allocation of resources to value added activities. After evaluation of current NC Monitoring Report system and proposed new NC Monitoring Report systems, waste removal in the cycle time is reduced from 223 minutes to 31, which represents a reduction of 86%.

Introduction

Improvement in the visibility and reduction of inventory of nonconforming products is the purpose of this study. Currently, the regulated industry inspect and verify that the product meets specifications prior to release and deliver the finish product to customers. When a nonconformance occurs, the product is segregated and placed on hold until complete product evaluation and final disposition. Therefore, it is necessary to have visibility of how many products are contained due to nonconformances to properly dispose of the product.

Problem

The main problem of this research is the lack of visibility of inventory of nonconforming products. Therefore, this research pursues the identification of factors associated with high inventory of nonconforming products to complete a reduction in a predetermined period.

Increasing the visibility of this product could help to assign priorities and establish internal targets to dispose of the product in a pre-defined period of time in order to reduce the inventory of nonconforming products. The expectation of this research is to conduct research using methodologies and techniques discussed in the courses to:

- Discuss the impact of having nonconforming products in the inventory.
- To conclude, how can increase the visibility of the nonconforming units?

Therefore, this research will help us to understand why nonconforming products are not disposed in a quick manner by improving the visibility of product placed on hold

Background

The inventory of nonconforming products is placed on hold pending to complete product dispositions following applicable procedures. As part of this process, it is necessary to monitor this type of inventory to ensure that product disposition is completed in a timely manner. The expectation is to reduce the nonconforming products to eliminate two (2) kinds of Lean Wastes:

| Defects	Wastes created due to defective product or service not meeting a specification.
Inventory	Wastes related to store excess of products or materials not processed. For example, nonconforming material pending for evaluation and final disposition.

Methodology

The research objectives will be achieved by using the following DMAIC Methodology :

- **Define:** Define the problem, project milestone and project deliverable by understanding the customer's expectations. The following tools were used to complete the Define phase: Voice of the Customer (VOC), process flow and Value Stream Map. Therefore, personnel involved in nonconforming product dispositions and Nonconforming Product Inventory Metric which includes but not limited to supervisors, quality, planning and stakeholders should be interviewed to understand the expected output.
- **Measure:** The purpose of the measure is to collect data of the current state of the process to be analyzed. Data will include hold documentation, a list of aging of nonconformance products at hold location, procedures, current Nonconforming Metric methodology, among others.
- **Analyze:** For the Analysis phase, all data gathered in the measurement phase will be evaluated. The analysis of data collected, current Value Stream Map and Spaghetti Diagrams are required to identify non-value-added activities in the nonconforming product dispositions. Therefore, based on the outcome of the analysis performed, a strategy will be defined as part of the implementation phase.
- **Implementation:** For the implementation phase, it is necessary to already understand how can be improved in the process to reduce the aging of Nonconforming product Inventory. Therefore, at this phase the actions to be implemented are clearly defined.
- **Control:** For the Control Phase, the implementation of all actions must be completed. In this stage, the effectiveness of the NC Monitoring Report process improvements is measured against the goals and key success measures previously defined in the Define phase.
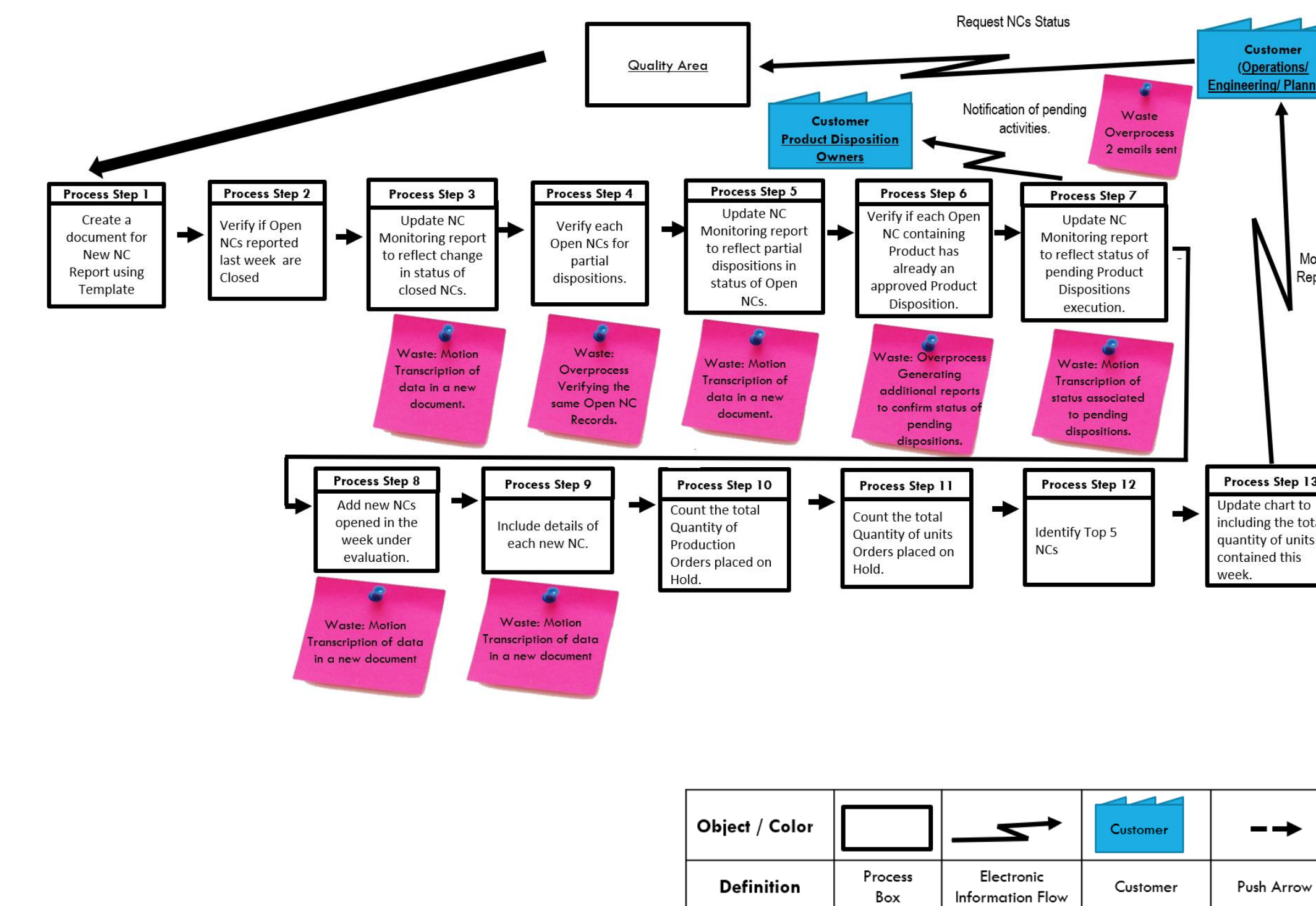
Results and Discussion

NC Monitoring Report process flow from the beginning, where the customer requests the NC status until the report is sent to them.

Process Flow: NC Monitoring Report
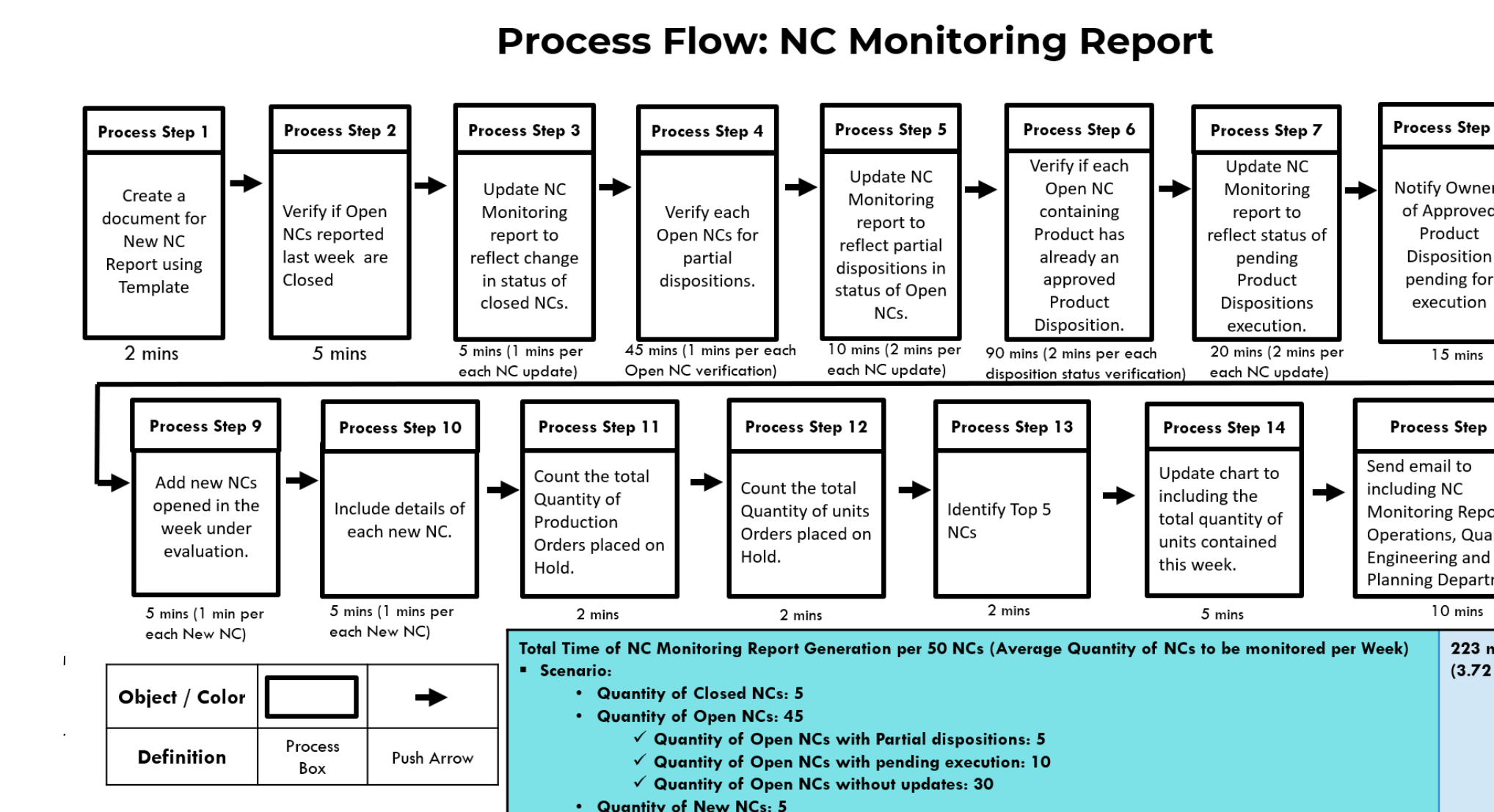
Value Stream Map was created to identify the non-value-added activities (from the customer's perspective).
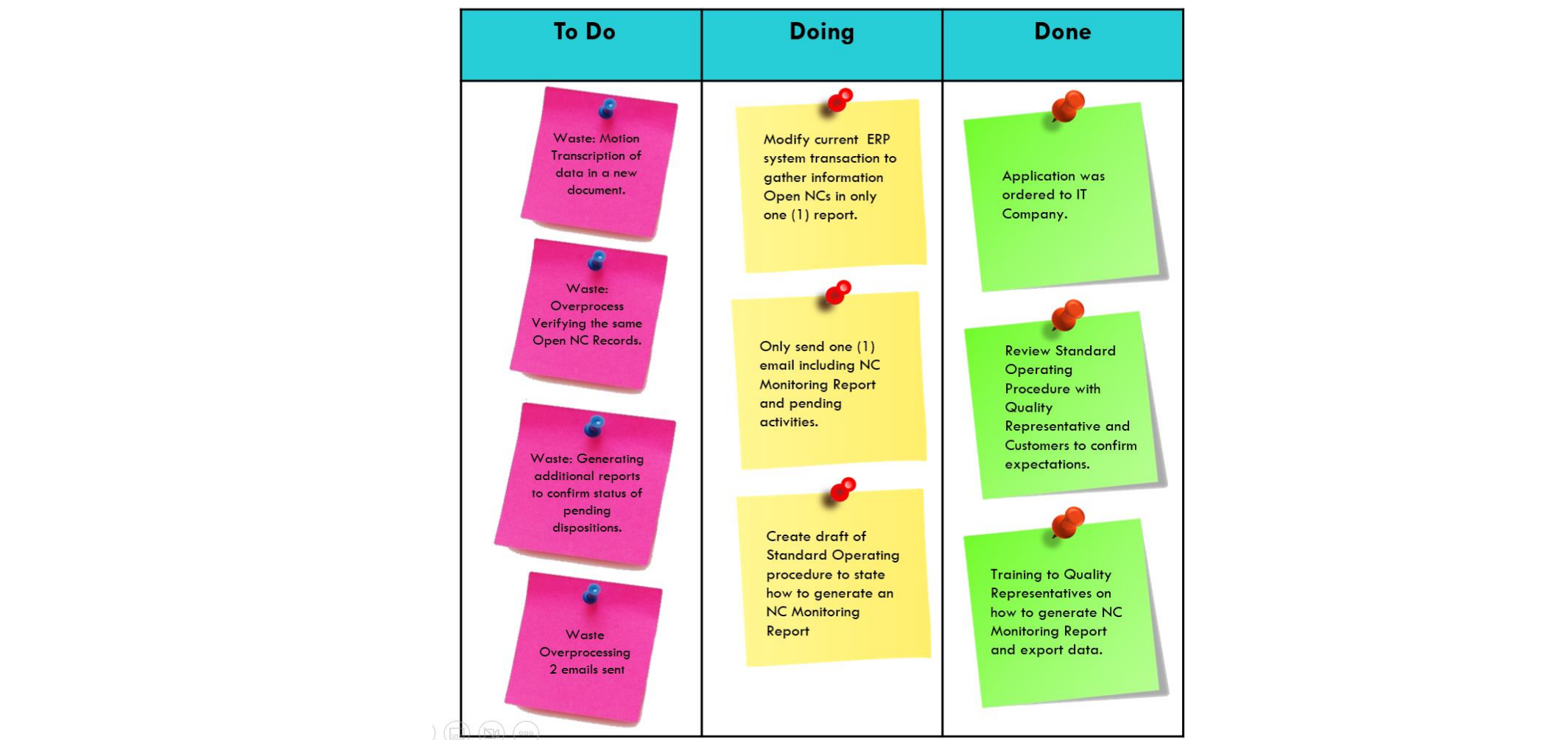

Current State - Value Stream Map: NC Monitoring Report Process

Based on the current Value Stream Map, the non-value-added tasks were identified; therefore, the improvements in the NC Monitoring Report process were focused on these process steps to reduce these wastes, overprocess and, motion. The wastes identified are the following:

- Generating more than one (1) ERP System report to gather information associated to Nonconformance Records (NCs) and impacted product status.
- Verifying more than one (1) report to generate NC Monitoring Report.
- Transcription of information from different ERP System reports to NC Monitoring Report.
- Sending two (2) emails with a different audience, one (1) email to Product Disposition Owners and 1 email to Operations/Engineering/Planning Departments instead to send one (1) email.

Results and Discussion

Future State - Value Stream Map: NC Monitoring Report Process
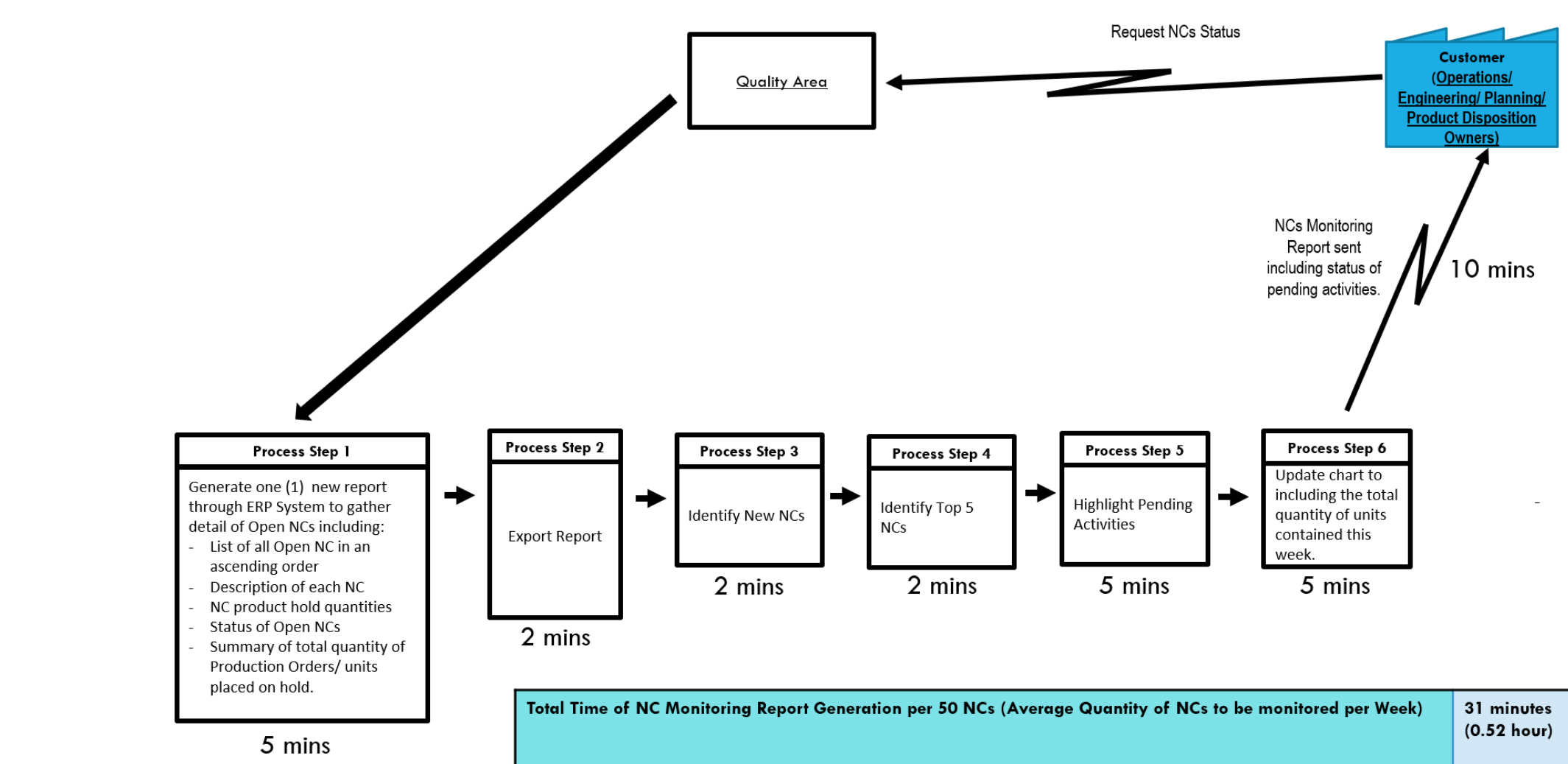
After waste removal, there was a reduction from 223 minutes to 31 minutes in the NC Monitoring Process, which represents a reduction of 86%.

Conclusions

The problem "Improvement in the Visibility of Nonconforming Product Inventory and Reduction" has been solved through the development of a new NC Monitoring Report and through the using an ERP System, taking into consideration key elements to prioritize the Product Disposition Execution: NC description, Material Information, Quantity of Impacted order, and units, Affected area, NC aging, among other relevant information.

The contribution of this research includes implementing an NC Monitoring Report that is generated in 86% less time than the original process and will improve the visibility of the non-conforming product in the storage areas, directly impacting Finish Goods' capacity inventory. This report will help the company to prioritize the execution of Product Dispositions with the highest quantity of time, improving the response time of the directly impacted departments, which includes the Planning Department and Operation Department and avoiding the impact of storage capacity.

Future Work

For future research, optimize the rework process executions associated with non-conforming Products. Product disposition execution related to the reworking process could vary the process steps and completion time based on their complexity. Identifying and standardizing a rework execution process could help the manufacturing area's response time and NC aging reduction.