SRR's "Next Step" in the Lean Journey –Taking Lean to the Workforce - 17247

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ABSTRACT

The Savannah River Site, a U.S. Department of Energy (DOE) facility, contracted Savannah River Remediation (SRR) to manage its liquid waste project, which is a unique, high hazard nuclear waste treatment and disposal facility consisting of 51, one million-gallon underground waste tanks, a solvent extraction processing unit, a vitrification facility for the highest radioactive waste, and a grout solidification and disposal facility for a decontaminated salt solution. Our Project mission is to treat the nuclear waste and close the associated storage and treatment facilities, of which, 8 tanks have been closed to date.

At SRR, the Lean business management system has been adopted to address site inefficiencies, aging infrastructure concerns and budget constraints. The Lean philosophy took root decades ago in the manufacturing sector and started with the work of W. Edwards Deming and his contemporaries. In more recent years the process has matured in the Toyota Production System and migrated into fields as diverse as services industries, healthcare, and now the DOE complex.

The first step of the SRR Lean Journey was to formally identify areas of improvement and initiate Value Stream Analysis (VSAs) and Rapid Improvement Events (RIEs). SRR has achieved improvements in procedure implementation, work planning and control, project schedule compression, and engineering requirements. SRR is now phasing in the next phase of Lean through Managing for Daily Improvement (MDI), Visual Management and 5S (sort, set in order, shine, standardize, and sustain). MDI is a fundamental Lean principle in that we use our most valuable asset, our employees, to drive continuous improvement versus a smaller population through formal events. Part of MDI includes visual management where the workforce can go to a "dashboard" to see and understand the company mission and status. 5S is a process where a work group improves performance in an area by addressing physical organization, efficiency, uniformity, standardization, and mechanisms to sustain improvements. 5S stands for: Sort, Set in Order, Shine, Standardize, and Sustain. This paper will focus on the "Next Step" in SRR's Lean journey by address how SRR is implementing MDI and 5S to improve CONOPs, Project efficiencies, and worker engagement in day to day operations.

INTRODUCTION

Significant budget challenges drove SRR to start a Lean Business System in 2013 and the resulting successes have propelled the program forward. SRR has conducted over 100 formal lean events, dozens of workplace organizational (5S) events, had

approximately 30% of its workforce participate in at least one formal Lean event and had over 30 instances where key outside stakeholders have come to the Project to be part of a continuous improvement effort. To date, SRR has identified over $1.9B in life cycle efficiencies, with some of the greatest rewards realized being a safer work environment for our employees.

The first two years of the program were dedicated to identifying the major problems, challenges, or constraints known to exist that are inhibiting the achievement of the organization's goals. Value Streams and their corresponding analysis or VSAs were developed to examine these areas for improvement opportunities. Depending on scope and complexity of the problems, Rapid Improvement Events (RIEs), Improvement Projects, Just-do-its (JDIs), or other similar events are initiated to investigate and eliminate these barriers to success.

As SRR enters its third year utilizing the Lean Business System, the company is now focusing their efforts on Managing for Daily Improvement and implementation of 5S principles. This next phase of Lean principles engages the strongest asset of our organization, our workforce to drive continuous improvement and effect efficiencies across the board.

DISCUSSION

Managing for Daily Improvement and Visual Management

This cycle of continuous improvement, known as Managing for Daily Improvement (MDI), involves adopting normal daily activities to monitor performance, solve problems, and standardize improved processes. The cycle is owned by the workforce and supported by leadership through the performance of Gemba Walks.

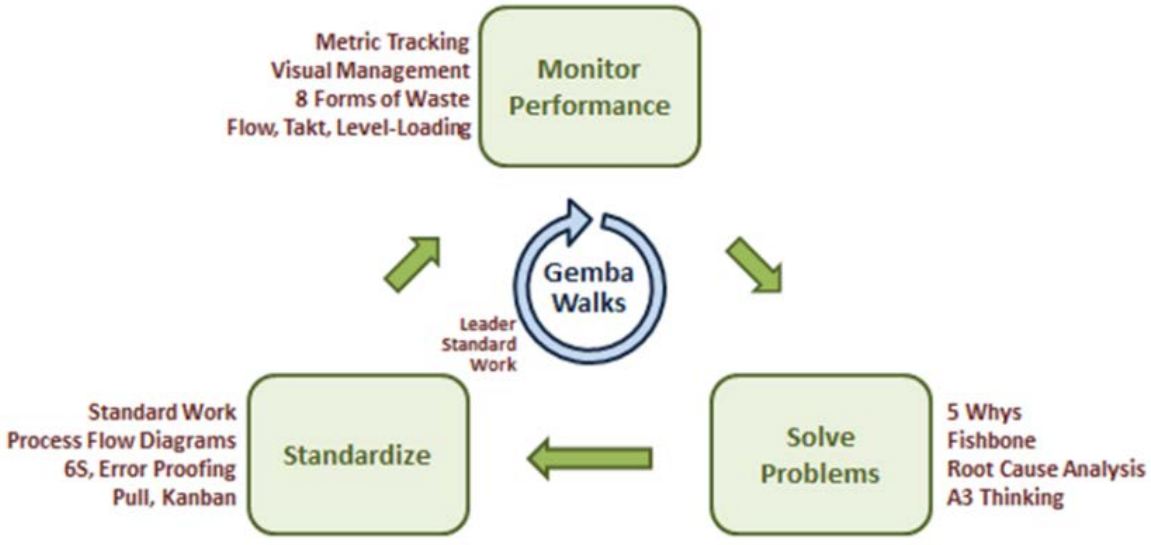


Figure 1: MDI daily cycle owned by the workforce and supported by leadership through the performance of Gemba Walks.

MDI provides a framework that allows an ongoing self-review of an organization. Its short-term function is to come up with an action plan to stay on track. This requires understanding the organization and demand enough to make a prediction about what the workload is, and how well the team can handle it. The long-term function of MDI is to enable more effective problem solving. It highlights abnormalities right at the time that the error occurred and ensures that the team addresses those issues before moving on. MDI requires ongoing scrutiny of the operation which means tracking each and every "unit". The last activity required by MDI is doing something about problems. Because they are identified so quickly, the root cause tends to be easier to uncover than, for example, if you waited until the end of the month to look for the source of production problems.

A vital part of the MDI process is Visual Management. "A picture is worth a thousand words" is a familiar phrase which accurately captures the intent of using Visual Management as a part of the Lean philosophy. In many cases, simple, intuitive visual systems can be used to communicate information about what activities are taking place in a work area and how effectively the area is performing.

Visual Management uses techniques that improve performance by means of visual stimuli. It communicates messages visually to manage work, understand systems, or follow directions. Visual Management creates a standardized work environment on how to get work done by visualizing instruction, direction, and reminders. These systems are designed to be self-ordering, self-explaining, self-regulating, and self-improving. In a Lean organization, managing the business is critically focused on managing processes in real-time at the place of work (Gemba). To achieve this, important business process information must be recorded and displayed in simple visual terms throughout the company for all to see and react to as it happens.

SRR has established MDI and corresponding Visual boards in several key areas to support both Operations and Projects. Operations have utilized the MDI approach along with a visual board for the daily operations of the MCU facility. MCU separates high level radioactive waste from the low level radioactive waste and then sends each stream to their corresponding facility.

The first board tracks how many gallons were transferred. If they did not meet their goal, then an impact and miss code are added to show why the target flow was not met.

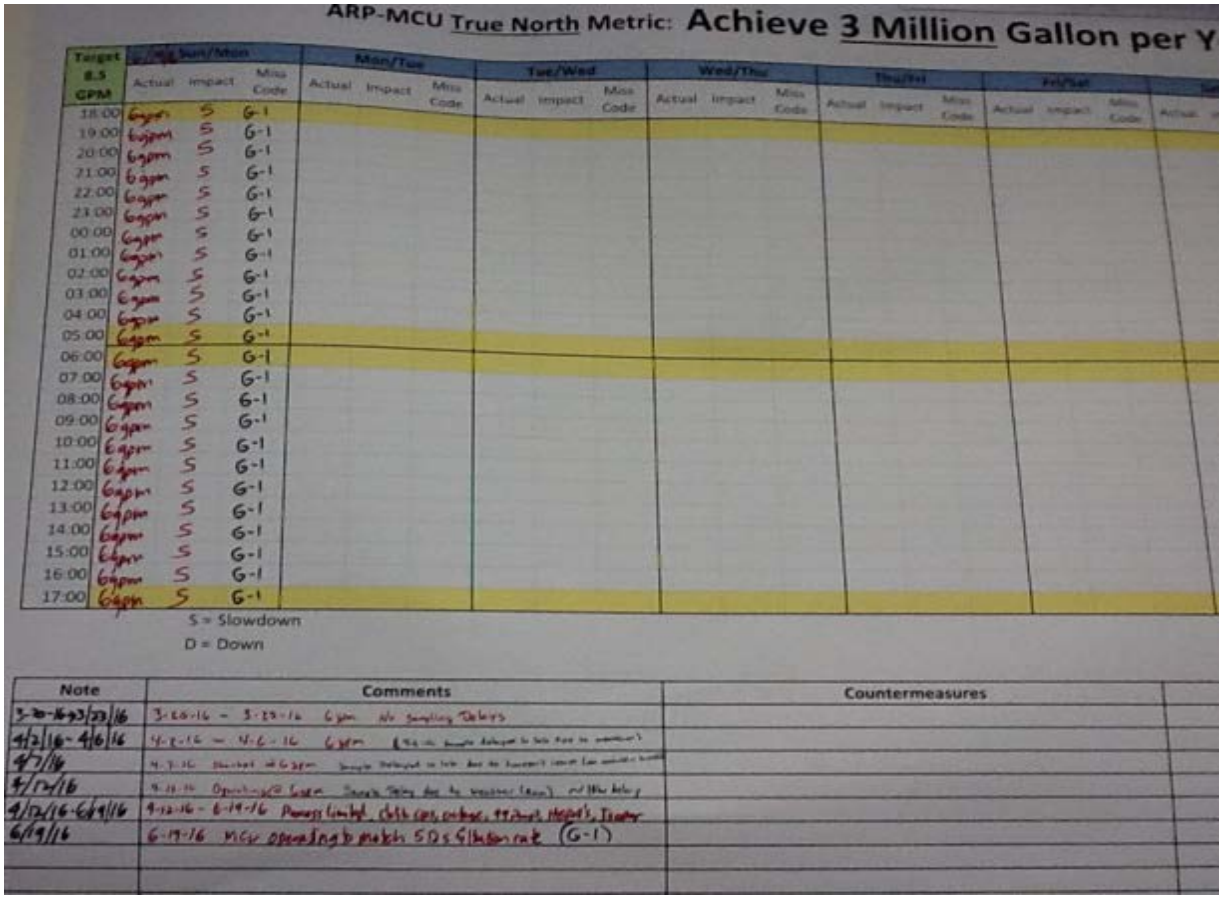


Figure 2: MCU Flow Rate Tracking Board with actual flow, impact, and cause code (Production example)

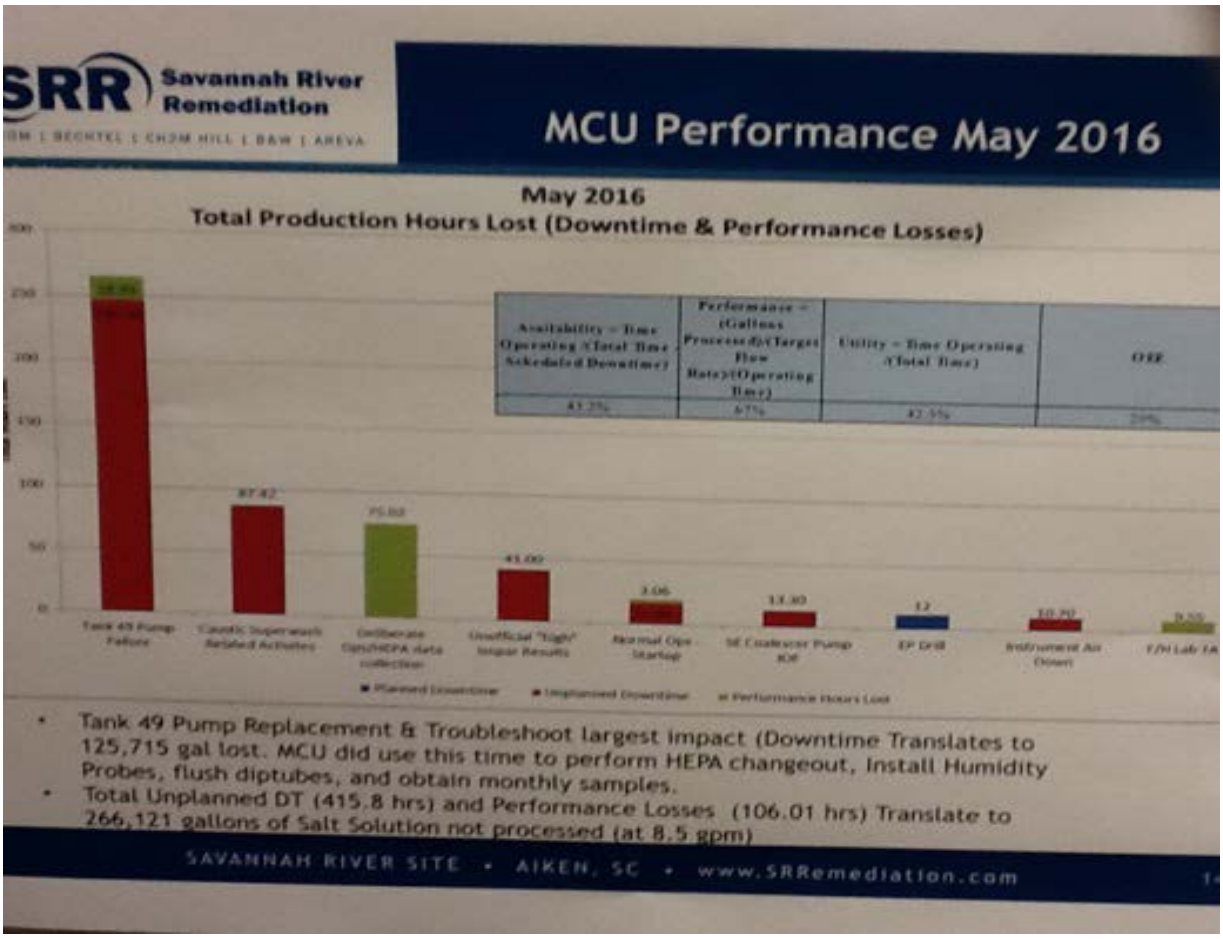


Figure 3: MCU Monthly Performance Graph showing downtime and the corresponding reason (Production example)

The second board tracks total production hours lost. This board shows the causes for downtime and their percentage impact to the processing facility.

These boards give the workforce real-time information about how the process is working and assists personnel in determining problems within the process. Each and every worker can see these boards and tell how the process is performing. This gives everyone the knowledge and information necessary to provide the best and fastest support required to improve the process.

A second example of MDI coupled with visual management is seen through major projects like the construction of the Salt Disposition Unit (SDU) #6 tank. SRR is currently building a 30 Million Gallon tank to hold salt waste at the Savannah River Site. Visual Boards were developed to help the construction personnel keep track of the work performed and the results of inspection testing.

The first board displays the critical KPIs for the construction of the tank and their current status. This board is updated daily and provides turnover from the day crew to the night crew.

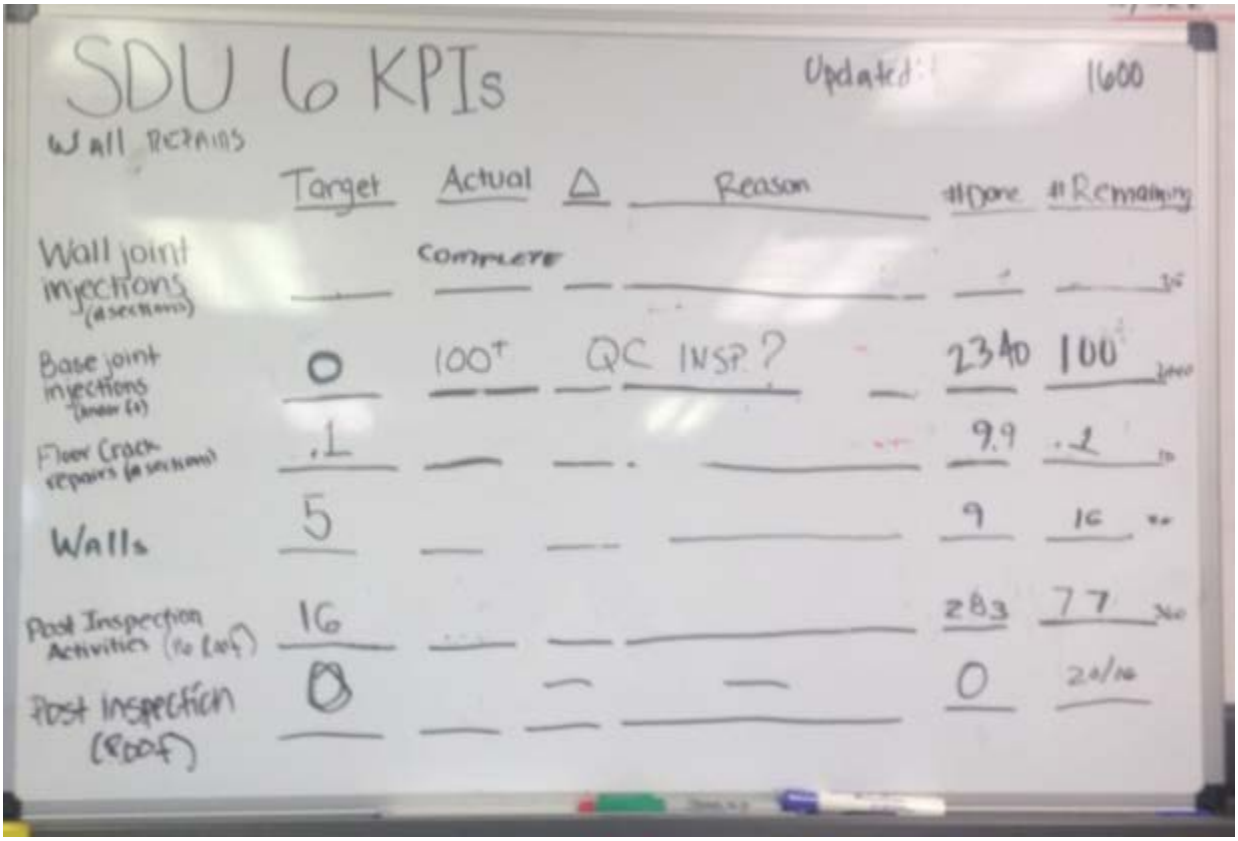


Figure 4: SDU 6 KPI Board showing major activities and their current status (Construction example)

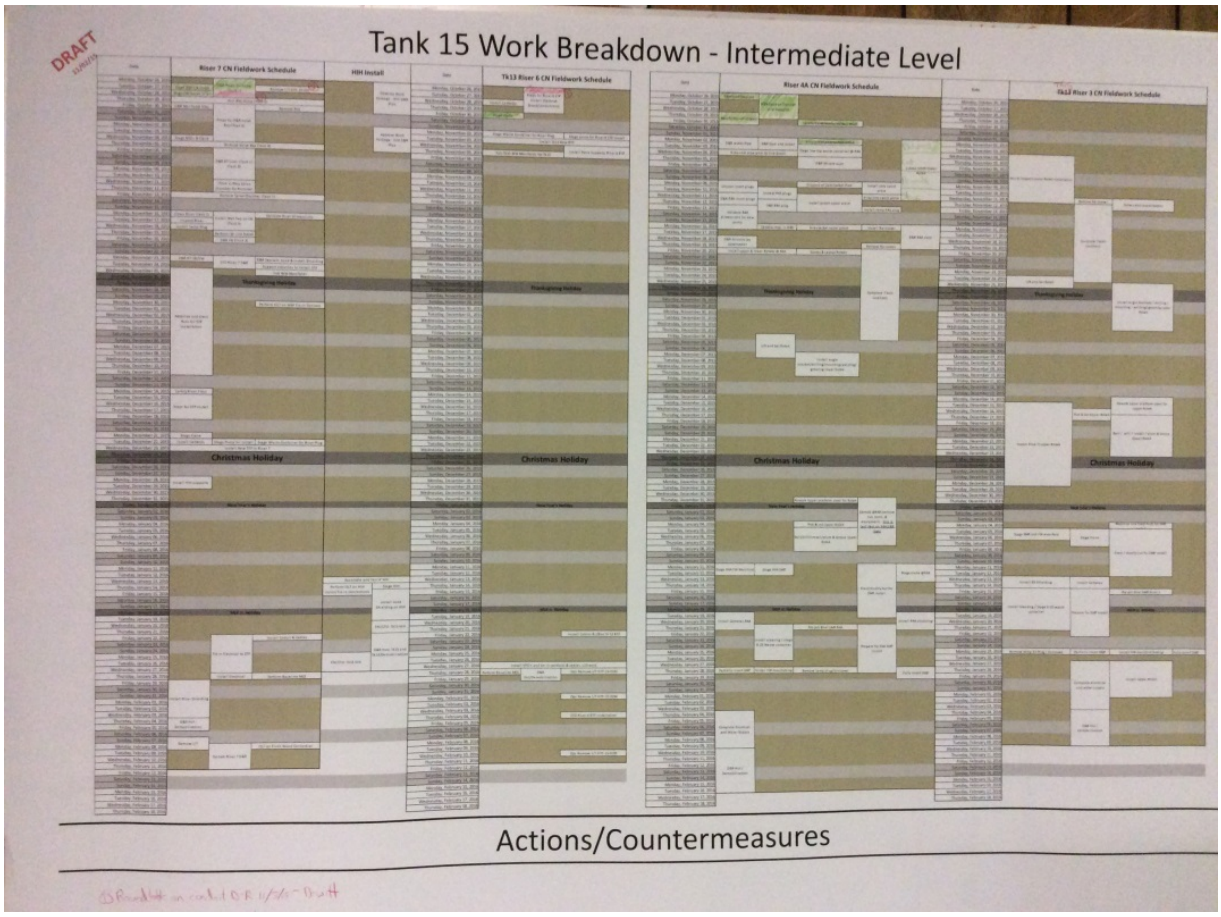


Figure 5: Tank 15 Construction Schedule

The second board is used to track Quality Control inspections and any repair work required for tank welds. The tank is divided into sections which Quality Control uses to inspect the welds of the tank. Once the welds have been inspected, a report is developed for any unacceptable welds. The construction crew performs the repairs and then closes the repair report. This board tracks when the inspections have been completed and any repairs required. This board is also updated daily and used for turnover from the day crew to the night crew.

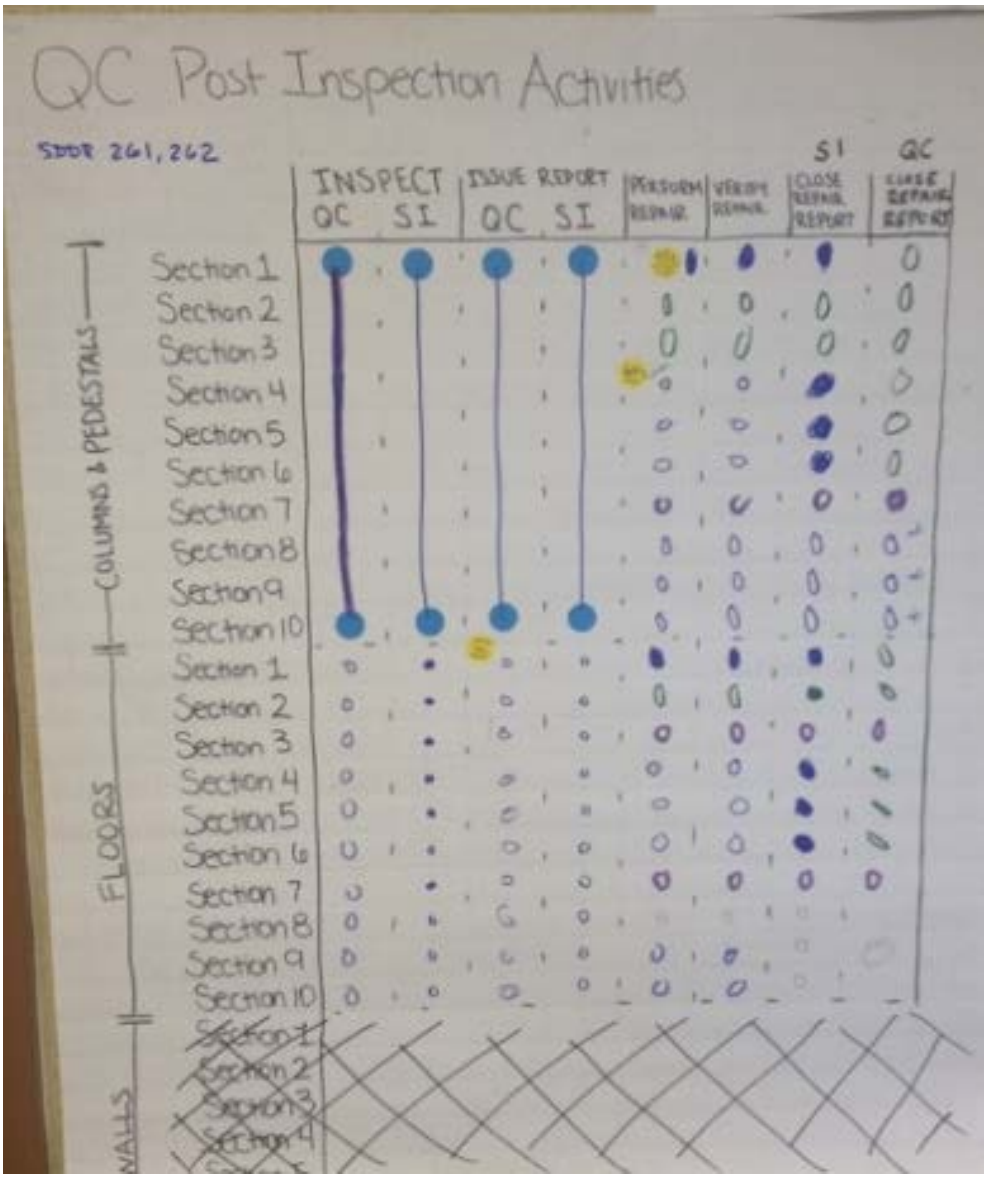


Figure 5: SDU 6 Inspection Board showing tank inspections and repairs required

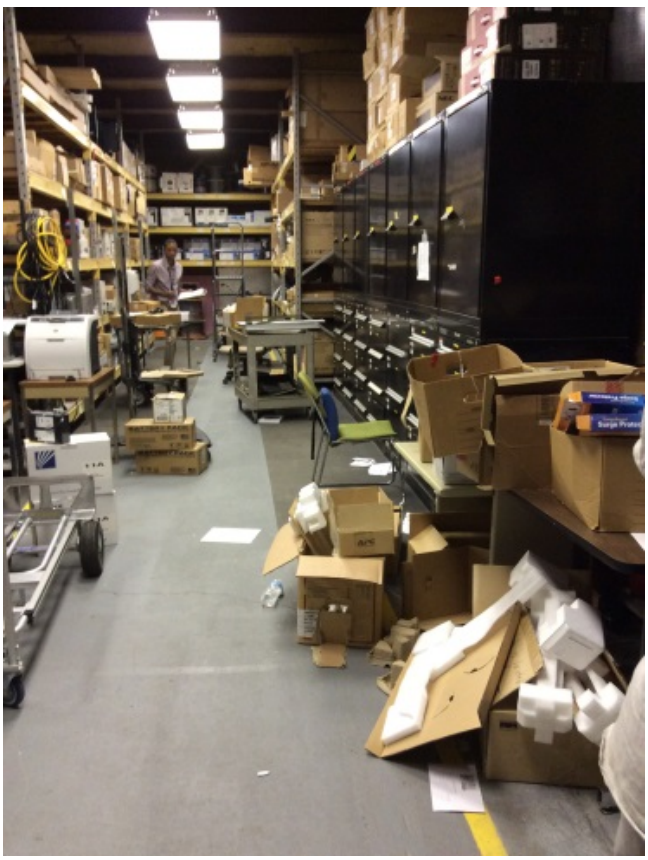
SRR will continue to implement MDI throughout the organization to empower the workforce with the knowledge and information on daily processing to allow for continuous improvement.

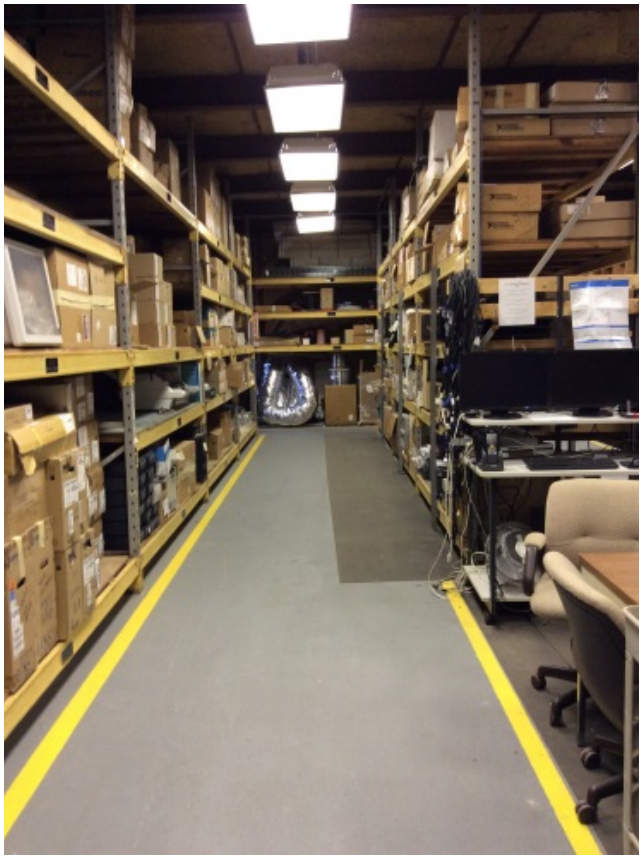
5S

SRR has also started a second new initiative utilizing 5S principles. 5S is a workplace organization methodology used to improve workplace efficiency through facility-wide organization and cleanliness. Each of the 5S guidelines help managers and workers achieve greater organization, standardization, and efficiency—all while reducing costs and boosting productivity.

The 5 phases are: Sort, Set in Order, Shine, Standardize, and Sustain. Implementing 5S organizes a work area to improve efficiency and safety. SRR has currently performed ten 5S initiatives across the liquid waste facilities. SRR began this initiative by developing a training which could be disseminated to the workforce before a 5S event was held. Areas were then identified which could benefit from a 5S event. Each event was facilitated similar to the method used for an RIE.

One event was held for the Process Controls Engineering Warehouse. This area is used to store old and new electronic and computer equipment for the process facilities. This area had no cataloging system and materials where placed in open spots with no regard for safety, standardization, or traceability. Personnel did not know what was in the warehouse or how to find anything. The 5S event: Labeled the storage area and all equipment, Sorted and stored like equipment together, Cleared the walkways and removed safety hazards, and dispositioned old and unusable equipment.





Figures 6 and 7: Before and after photos of the warehouse 5S event

A 5S event was also held in support of the Radiological Control organization. A Protective Clothing (PC) Room is where employees obtain and put on the required protective clothing for the radiological job they are about to perform. Issues were identified with the quality, inventory, and location of the Protective Clothing in the room. The 5S event examined the entire process of how PCs are ordered, stocked, and used. The room was rearranged to improve the flow of materials and a new system of marking the PCs was implemented to help with the ordering process to maintain a minimum level of PCs.

Figures 8 and 9: Before and after photos of radcon area in DWPF

CONCLUSIONS

SRR is still relatively new to the Lean Business System, but we have made tremendous strides in both the traditional, formal Lean events and the next phase of the Lean journey through the implementation of MDI and 5S. SRR will continue to strive for continuous improvement by empowering the workforce to take charge of their work areas and identify and improve their processes on a daily basis.