Delivering the Nuclear Promise
Top Innovative Practice

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SNC Fleet EQ Program Optimization
2022 Top Innovative Practice Winner

Summary

Southern Nuclear Company (SNC) has reduced the cost and burden of its Equipment Qualification (EQ) program by carefully refining the scope of the program and optimizing preventive maintenance schedules under the EQ program. The EQ program optimization was accomplished by:

1. Leveraging the 10 CFR 50.69[1] program by removing low safety significant components from the scope of the EQ program and applying alternative treatments at Plants Vogtle 1&2 and Farley.

2. Reviewing and optimizing the qualified life of components within the EQ program at Plants Vogtle 1&2 and Farley.

The company's EQ program optimization is expected to save the company over $23 million and 37,000 labor hours over the life of the plants.

Beginning in February 2020 with a dedicated, cross-functional project team utilizing Nuclear Energy Institute (NEI) and Electric Power Research Institute (EPRI) guidance, SNC implemented a process to maximize the benefits of 10 CFR 50.69 alternative treatments in EQ at Vogtle 1&2 and Farley. The result was large cost savings for the stations and alignment with the fleet's "Fix the Plant" strategic focus.

Regulation 10 CFR 50.69(b) specifies that equipment in the EQ program that is evaluated for safety significance in accordance with Regulatory Guide 1.201[2] and NEI 00-04[3] and determined to have low safety significance (RISC-3 structures, systems, and components (SSCs)) is eligible for alternative treatments. This is in lieu of the special treatments required for compliance with 10 CFR 50.49, "Environmental Qualification". 10 CFR 50.69(d)(2) allows equipment categorized as RISC-3 to be maintained by alternative treatments provided reasonable confidence can be established that the component will remain capable of performing its safety function under design basis conditions, including seismic and environmental conditions. With vendor support, and utilizing EPRI Technical Report 1009748, "Guidance for Accident Function Assessment for RISC-3 Applications," as the alternative treatment basis, SNC has justified removing 183 components from the scope of the EQ program and extended the frequency of 110 EQ preventive maintenance (PM) tasks thus far.

Beginning in 2021, in support of outage scope reduction for Vogtle and Farley stations, fleet EQ program

[1] Title 10, Code of Federal Regulations, Part 50.69, "Risk-informed categorization and treatment of structures, systems and components for nuclear power reactors"
[2] U.S. NRC Regulatory Guide 1.201, "Guidelines for Categorizing Structures, Systems, and Components in Nuclear Power Plants According to their Safety Significance", May 2006, Revision 1, ADAMS ML061090627.
[3] NEI 00-04, "10 CFR 50.69 SSC Categorization Guideline", Revision 0, July 2005. ADAMS ML052910035.

owners recommended performing an Equipment Qualification Preventative Maintenance (EQPM) optimization across a broad scope of EQ component types. The project focused on performing a review, analysis, and extension of EQ component qualified lives thus justifying EQPM frequency extensions. Plant Farley is the first station in the industry to perform this optimization across the full component population, impacting 954 EQPMs.

Innovation

While other stations in the industry have implemented 10 CFR 50.69 alternative treatments in their EQ programs, the approach taken at SNC has resulted in comparatively greater savings. Using the EPRI guidance as the technical basis, SNC has been able to double and, in some cases, triple PM frequencies of components removed from the EQ program via 10 CFR 50.69. In most cases, PM frequencies have been extended beyond the life of the plant, essentially removing the requirement to perform the work altogether. Because of these results, several utilities have sought to benchmark their approach against the SNC approach to EQ alternative treatments.

Safety

Utilizing 10 CFR 50.69 for risk insights allows the stations to place focus and resources on maintaining equipment that is most important to nuclear safety. Additionally, the reduction in work scope reduces opportunities for human performance events and lowers worker radiation exposure.

For example, in December 2021, SNC EQ program owners used this approach to extend a PM to replace a Neutron Flux detector which was scheduled to be performed in an upcoming Farley refueling outage. The removal of the PM from the outage scope saved workers an estimated 400 millirem in dose.

Cost Savings

The EQ program optimization achieved thus far will result in approximately $23.6 million in labor and parts savings over the life of the plants[4]. This number will rise to $38.3 million if both stations pursue subsequent license renewal and continue to operate for 80 years.

The 10 CFR 50.69 project accounts for $6.3 million of the savings thus far. This number will continue to grow for the fleet as more systems are categorized under the 10 CFR 50.69 project and alternative treatments are applied.

These estimates are conservative and only account for the parts and maintenance labor saved when reducing the number of times the PMs are performed over the life of the plant. Additional unquantified savings will also be realized due to the reduction in resources required for the following:

- Work Order planning and scheduling
- Writing and hanging required tagouts
- Item equivalencies needed to replace obsolete equipment

Productivity/Efficiency

PM extensions thus far have resulted in reduced outage scopes and allowed the stations to focus on maintaining the plant by performing the right work at the right time.

[4] Assuming a 60-year plant life.

Transferability

In a review of 10 CFR 50.69 alternative treatments, the EQ program owners determined there was an improvement to be made in the development phase of the evaluations.

As systems are categorized, all available alternative treatments are drafted and implemented. The SNC EQ program owners recommended developing the evaluations by component type, not system, allowing systems with similar components to easily use existing alternative treatments. Approaching the analysis in this manner reduces the amount of duplicate paperwork when developing future alternative treatments.

Using this method, SNC has saved time and resources on alternative treatment evaluation development and will continue to save as more systems are categorized across the fleet.

SNC has shared this approach with multiple utilities that are implementing 10 CFR 50.69 at their stations.

Team Members

- Owen McLaughlin, Fleet EQ Program Owner (SNC)
- Carrie Gilbreath, Fleet 10CFR50.69 Program Owner (SNC)
- David M. Reno, Fleet EQ Program Owner (SNC)
- James Bradford, Vogtle Station EQ and 10CFR50.69 Program Owner (SNC)
- Jose Cedeno, Farley EQ Program Owner (SNC)