CUSTOMER SUCCESS STORY

CHALLENGE

NuclearN
SOLUTION

RESULTS

99.7%
ACCURACY

40%+
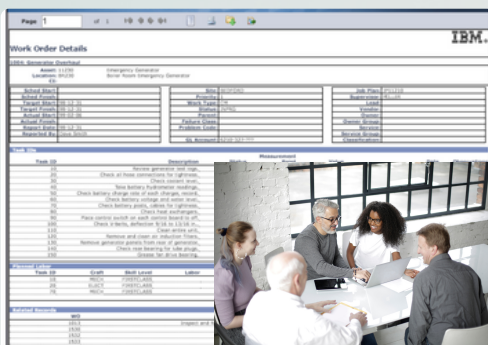**AUTOMATION**

The Challenge

Frontline managers and CAP experts would manually screen all CRs submitted across the two sites. The screening process involves reading the CR descriptions, classifying the safety significance level from 1 to 5, determining the responsible department for resolution, identifying regulatory and operations impacts, and suggesting corrective actions. This manual process consumed an average of over 6,500 personnel-hours per year. The sheer volume of CR's put a burden on resources and led to screening bottlenecks, backlogs, and inconsistencies.

To address these issues, the utility embarked on a digital transformation initiative in 2017. The goals were to increase the speed, quality, and consistency of CR screening while reducing personnel costs. However, automating such a complex process presented several challenges:

- Integrating an Artificial Intelligence (AI) system into their CAP management software and plant workflows without disruption.
- Building trust in AI recommendations among plant screening personnel unfamiliar with the technology.
- Achieving sufficient accuracy on subtleties like safety significance classifications.
- Maintaining stringent nuclear regulatory compliance during process changes.

After assessing internal options, NuclearN was chosen to be a technology partner. With in-house nuclear industry backgrounds and NEI award winning expertise in plant automation and CAP AI, NuclearN was well positioned to address the utilities challenges.

Solution

NuclearN applied its AutoCAP Screener AI to replicate the judgments of the utility's CAP screening experts. Using natural language processing and machine learning algorithms, NuclearN developed fine-tuned models trained on historical CR data.

The models could accurately classify CR classification levels, related regulations, responsible groups, and corrective actions by analyzing the natural language in the CR descriptions. The system was configured to only automate screening of CRs when they were above a user-configured confidence threshold, ensuring that manual review was maintained. When reviewers were confident in the AI classifications, the fields were applied directly in the CAP management system and manual reviews were bypassed.

To overcome any stakeholder concerns, NuclearN and the sites used a phased rollout:

- Initial testing helped benchmark the AI's accuracy against the CAP screening experts and identify areas for improvement.
- Automated CAP screening was implemented gradually, starting with a small percentage of low-risk CRs.
- Ongoing sampling of automated CAP screening ensured accuracy was sustained post-deployment.

This incremental approach allowed personnel to gain confidence in the system prior to full automation. The NuclearN team worked closely with the sites through each stage, adapting models based on user feedback until expectations were met.

Results

NuclearN Automated CAP Screening was fully deployed at both plants. The result was remarkable:

- Screening automated on over 40% of CRs, is estimated to save over $250,000 per year.
- Accuracy on key fields is over 99.7% post-deployment.
- Increased screening consistency is due to being unaffected by individual interpretation.
- CR processing time decreased by an average of 2 days per automated CR.
- CAP screening experts had greater work satisfaction focusing on more complex CRs.

Based on this success, the utility is expanding automation to other areas like CAP trending, evaluations, and maintenance planning.
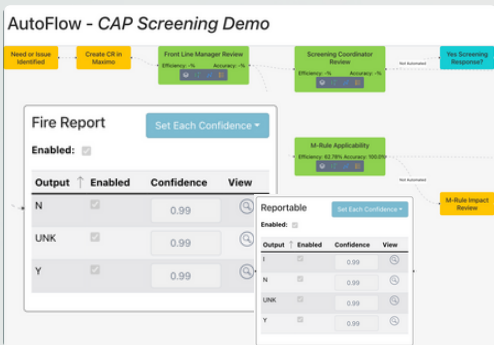
Key Lessons

This use case underscores several best practices for automating complex judgment-driven processes:

- Use phased rollout plans to build personnel confidence in AI recommendations.
- Integrate AI directly into existing software workflows for smoother adoption.
- Establish rigorous accuracy benchmarks and monitoring post-deployment.
- Partner with vendors that understand your industry and regulatory environment.

By following this model, industrial organizations can transform efficiency, safety, and regulatory capabilities through applied AI.