

## Ivara EXP Supports AP-913 Compliance at SONGS

*San Onofre Nuclear Generating Station (SONGS) in San Diego County, California, is one of the largest nuclear generating stations in the U.S. employing more than 2,000 people. The station's two generating units serve approximately 2.2 million households.*

### The Situation

SONGS provides nearly 20% of the power to more than 15 million people in Southern California. The company is committed to safe and reliable plant operations in compliance with all applicable federal, state and local standards and regulations. One of the primary industry standards adhered to by SONGS to ensure equipment reliability is AP-913.



Figure 1: San Onofre Nuclear Generating Station

AP-913 is an equipment reliability process description established by the Institute of Nuclear Power Operations (INPO). The process assists INPO member utilities in maintaining high levels of safe and reliable plant operation in an efficient manner. AP-913 integrates and coordinates a broad range of equipment reliability activities to:

- Identify and evaluate critical station equipment
- Develop & implement long-term equipment health plans
- Monitor equipment performance and condition
- Make continuing adjustments/improvements to the maintenance program

Striving for excellence in equipment performance is an ongoing effort at SONGS. While already adhering to the principles set out by AP-913, SONGS required a solution to better align and automate its maintenance and reliability processes with the best practices set out by INPO.

### The Challenge

There were several challenges SONGS needed to address in order to more efficiently comply with INPO's recommended process.

A key element of the AP-913 process is the monitoring of equipment performance and condition. While SONGS collected vast amounts of asset health data from visual inspections and predictive maintenance technologies, the information resided in dozens of disparate places. A basic evaluation of an asset's performance was complex and time-intensive; typically requiring many hours to extract and analyze the information. It was also difficult to identify which engineer owned each asset. With hundreds of thousands of maintainable assets (plant systems, structures and components), SONGS required a solution that would allow them to easily monitor equipment performance and condition, and to quickly access equipment performance data.

In order to develop and implement long-term equipment health plans in accordance with AP-913, SONGS needed to address the fact that critical equipment data being collected by engineers during their inspection routes or 'walk downs' was not being captured in an effective way. Paper records were not well organized, and it was difficult to retrieve information. Computerized records were stored as personal data with each engineer, making the data completely inaccessible to others.

In addition, the valuable information being collected by these engineers was at risk of being lost since a substantial number of engineering staff will be eligible to retire over the next five years. While the experienced engineers had become comfortable working this way, SONGS recognized that it would be difficult to train new employees as retirements occurred. Also, without a plan to capture and maintain the walk down data in an easily-retrievable fashion, SONGS' ability to establish and execute a long-term reliability strategy would be more difficult.

Continuing equipment reliability improvement is another key element of the AP-913 process. SONGS required a solution that would allow them to systematically review their maintenance programs and make adjustments to health and time-based PM tasks and frequencies in order to optimize reliability.

AP-913 also recommends that stations scope and identify critical components to ensure that their efforts focus on preventing problems on systems that are vital to station safety and reliability. As a result, SONGS needed a formal approach to assess the criticality of each asset so that they could prioritize their PM program and monitoring activities.

## The Solution

Following an extensive review of competitive solutions, SONGS selected Ivara EXP to integrate their reliability processes and support the implementation of AP-913 processes.

SONGS integrated over 35 data sources into EXP, consolidating information from online tools, predictive maintenance technologies and engineering inspections. EXP analyzes this critical information, identifying degrading trends and potential failures.

By assigning an Engineering Responsibility Code to each system and component with EXP, SONGS is now able to easily identify which engineer is responsible for each asset. Also, the solution's *My Desk* feature presents data in a context that is pertinent to each individual engineer, directly on their desktop. Engineers can access their system monitoring plan, with its functions, functional failures, failure modes as well as associated reliability program tasks and health indicators - right from their desktop.



Figure 2: Collecting Asset Health Data

With EXP, the data collected from engineering walk downs is captured in a systematic way that is easily retrievable. In the past, multiple engineers kept multiple libraries of equipment information collected during their walk downs on their local hard drives. The information was not indexed or directly available to others. EXP is now a central repository for all condition data, capturing the experience and expertise of workers before they retire. This new capability allows SONGS to develop and implement long-term equipment health plans and effectively monitor equipment performance and condition.

With all maintenance program information captured in EXP, SONGS was able to automate a proactive Double Filter Review process. This process is a robust method to ensure "as found" equipment conditions were assessed and the reliability program recommendations – either shortening or increasing the inspection frequency or changing the scope - were in place prior to the next scheduled work activity. SONGS can now easily trace potential failures back to the root cause and quickly identify why a PM task was executed or changed. The automation of the Double Filter Review process enables SONGS to demonstrate a very professional approach to complying with the AP-913 continuous improvement guideline.

Equally important, Ivara EXP provided SONGS with a systematic approach to identify and prioritize critical equipment. The solution's flexibility allowed SONGS to define criticality ranking in terms of the 26 criteria that apply in their business. This criticality information is now available online, and provides SONGS with a formalized way to define the critical and high risk assets - those whose failure results in the highest consequence to the business. SONGS is now able to easily prioritize its projects according to asset criticality – another key AP-913 requirement.

## The Result

With EXP, SONGS has dramatically improved its ability to manage asset performance and align its reliability processes with AP-913 guidelines. EXP's core functionality – defining and monitoring the effectiveness of maintenance programs - embodies the core principals of AP-913.

EXP has improved SONGS' ability to monitor equipment performance and conditions as required by INPO's guidelines. Where it formerly took hours to conduct performance analysis on an asset, it is now done online in minutes.

Asset health information collected by engineers during their routes is automatically captured in EXP ensuring this critical data is saved permanently, and available to all. This captured information enables SONGS to continually improve their proactive reliability programs as recommended by AP-913.

SONGS has also established a consistent understanding of which components and functions of a system are critical with Ivara EXP. The solution has allowed them to prioritize maintenance activities and more efficiently implement AP-913's guideline for scoping and identifying critical equipment.

### Conclusion

With Ivara EXP, SONGS has developed a single, integrated and coordinated approach to their compliance with AP-913. This progressive approach in applying AP-913 best practices puts them at the forefront of automated reliability systems in the nuclear industry and demonstrates their leadership in maintaining high levels of safe and reliable plant operations.

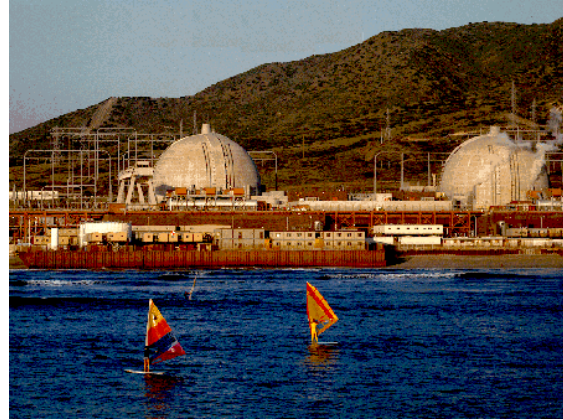


Figure 3: San Onofre Nuclear Generating Station