

What users like—and don't —about plant software

By Jason Makansi, Pearl Street Inc

Most US combined-cycle plants were installed over the last 10 years. Coincidentally, this also was a period when software applications proliferated at power stations. Operators, engineers, managers, and technicians depend on this software to improve performance, reduce costs, and manage risks. One would think that experience with software would be a popular subject at the many user-group meetings serving gas turbine (GT) and combined-cycle facilities.

Think again. At one user conference last March, comprising several hundred attendees, software rarely was mentioned over a two-day period. At a plant manager's workshop, software and knowledge management ranked way down the list of topics attendees were interested in discussing. Others have noted that GT user-group meetings rarely make software a priority, if at all.

To gain some insight into experience with plant software, Pearl Street undertook a research effort for several of its clients. The research included visits to combined-cycle plants and meetings with facility managers responsible for IT and performance; conversations with fleet monitoring and diagnostics managers; ad hoc discussions with plant personnel at multiple industry conferences; and telephone interviews. To the extent possible, researchers started with a common set of questions but then allowed the conversation to go where the other party took it. Not only did we learn what users like and don't like, but what they would like to see from software vendors in the future.

Although Pearl Street cautions subscribers not to read too much into this small data set, the company believes this is groundbreaking research and a start for addressing important issues affecting users.

Task management: thumbs down

One response was almost unanimous: Users don't care for their work or task management programs, also called CMMS (computerized maintenance management systems). One theory about this, validated by two plant managers, is that such software is collaborative and requires many users to input data regularly. Therefore, the software has to be rigid about how the data are input, likely frustrating users.

At the plant manager's workshop mentioned earlier, attendees noted that CMMS was a "major problem area," and that the "rules are changing all the time." One user did mention that such software is "invaluable" for disaster-recovery situations. A fleet manager responsible for multiple combined-cycle and GT plants reported that their CMMS is "very hard to use," and that you "need to be an expert to use it." Another manager, responsible for a centralized performance monitoring facility serving multiple utility plants, stated that they "had a difficult period figuring out" the CMMS software.

The facility GM went so far as to say, "No one has written a CMMS to fit a combined-cycle plant." He added that the one his plant recently has been forced to use (corporate selected it as a "platform") was written for a fleet of trucks. Back in the spring, the plant was on its "sixth different version" of the software. However, a positive comment was elicited from one manager who said that the vendor "worked with us" to develop a system we would be happy with.

Data historian: Thumbs up

At the other end of the spectrum, users seem universally satisfied with their data historian or repository software. Virtually all plants involved in this research use some version of PI, supplied by OSIsoft Inc, San Leandro, Calif. At some facilities, PI is used for more than a data historian. One manager noted that it is the "communications conduit" for the entire fleet performance monitoring system and that they had built a "fuel cost" framework within PI as well.

Another fleet manager stated that although they could do "lots of performance monitoring in the DCS, their approach was to do it through PI." This manager also appreciated that other software applications can be driven through PI. In particular, he called PI and a predictive analytics software package supplied by Smart Signal Corp, Lisle, Ill, a "killer app." Other plants use PI as a "troubleshooting tool." Perhaps one manager summed up many people's thoughts when he said, "PI got to where anybody could use it."

"If it's easy to use. . .

People will use it." That comment by one fleet manager gets at the heart of what most users still complain about with software: user-friendliness. Several owner/operators agree that most software, even products that have a high perceived value at the plant, does not pass the means test for the user interface. Users find "version control" annoying and expensive and that plant people

constantly have to be retrained on newer versions, re-adjusted security strategies, etc.

Plant people also make a distinction between software that “does something” and software that “propagates and presents.” For example, predictive analytics, thermal performance monitoring, and process optimization (usually for NO_x control), are three functions where data are extracted, calculations are made, and new information is output that serves as the basis for an action or decision. By contrast, other software packages essentially take data from the plant and package them differently, and propagate them to other PCs and servers within the owner/operator’s network.

HRSGs—help!

Most combined-cycle plants make extensive use of vendor-delivered programs for maintenance, performance improvement, and even operator assistance for the gas and steam turbines. However, this is not true for the heat-recovery steam generator (HRSG) and the balance of plant.

When users were asked how new software products and services might help them, two prevalent responses were associated with diagnostics around the HRSG and in managing water chemistry. “A good problem that could use a software solution would be detecting imminent tube leaks in the HRSG,” said one fleet manager. It is widely known that premature failure of HRSG tubes and other components is chronic at combined-cycle plants and predictive techniques around condition assessment are needed.

However, since these plants are mostly dispatched and heavily cycled (which is the root cause of the HRSG failures), the “signatures” are non-linear. This poses a different “problem set,” according to one software engineer. A performance manager for multiple CCs noted that water chemistry is a “gap” for software development at the plant level. This is an area of responsibility retained by the plants and not shifted to corporate or vendors. “It is up to the plant to have good calibrations on instruments,” he said.

Another fleet manager agreed that the need was there for HRSGs, but that the existing software still has “plenty of capability.” Rather than seek new software, his approach is to build the intelligence for HRSG con-

dition and water chemistry around the software they already are familiar with.

Dealing with the ‘mother ship’

A subtle, and perhaps insidious, undercurrent that inevitably surfaces when discussing plant software: the relative split in responsibility between centralized and plant staff and systems. One fleet manager unabashedly stated that the individual plants “trust” the centralized facility staff because typically the best people from the plants are recruited for the center.

This can’t make the plant staff very happy. It’s like being the farm system for a major league team. Some plant managers certainly feel like their staff has been “hollowed out,” and question the gain in overall value. One plant manager described the plant staff as “demoralized” by centralized engineering. Another fleet manager admitted, “We had a ‘big brother’ factor in the beginning and we had to get over it.”

Clearly, today’s software and IT systems are so powerful, data, information, and knowledge can be propagated to wherever they can be best used. During this research, there were some clear signs that the trend towards centralization of the last five years may be about to end, if not reversed. Playing a role here is the unintended consequences of the networked PC environment.

Two of these, according to one performance staff manager, are its inability to handle the real-time environment at the plant and the lack of cyber-security. Alarm management is another burning issue. More than

one plant person pointed out that anywhere from 25% to half of the alarms today are “system” alarms, or alarms pertaining to the control system itself, not the equipment. There are vastly more alarms and they are “functionally different,” these people say.

There are many aspects to this debate. On the one hand, there is a fear factor at the plant, that someone could trip the unit, observed one manager. On the other, the new reliability and cyber-security regulations coming from the Federal Energy Regulatory Commission (FERC) through the North American Electric Reliability Corporation (NERC) are forcing more oversight for the plants to the corporate level. Then there is the balance between software systems and plant staff. “Even if we had the data, we don’t have the people to look at them,” one plant manager conceded. “If it’s a choice between fixing the pump, or looking at the data, well, there is no choice.”

The corollary to the centralized versus individual-plant dilemma is differentiating between business systems and plant systems. One manager observed wryly that SAP enterprise-wide business software had become the “mother ship” and all plant software and IT systems had to be compatible. All software has to be “blessed” by the corporate IT department, all plant software has to be connected to SAP. “If it’s inside a [company] box, corporate IT has to approve!” Because of this, the company has to establish a “control system platform” for the vintage power stations within the fleet. On the other hand, a portfolio performance manager said that they maintain strict separation between business and plant systems. CCJ

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