ARC VIEW

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Daniel Offers Custody Transfer Measurement and Control in Standardized Package

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Summary

Representatives from Emerson Process Management's Daniel Measurement and Control division recently briefed ARC about their new DanPac measurement and control system for custody transfer and fiscal measurement of natural gas and liquefied petroleum applications. Custody transfer is a complex application, demanding high accuracy and strict adherence to government regulations and industry standards. However, until now, the industry relied largely on one-off, custom-built control solutions that are expensive to design and implement, and difficult to maintain and upgrade.

DanPac fulfills the industry's need for a standardized and smart fiscal metering control system that can help owner/operators lower their cost of ownership, speed implementation, and increase serviceability.

Custody transfer flow measurement is one of the most exacting and difficult applications in the hydrocarbon supply chain. Until now, pipeline operators have relied largely on custom control solutions that are difficult to support and maintain. Daniel's DanPac controller is a standardized solution that offers lower operating costs, enhanced functionality, and increased serviceability.

Custody Transfer: A Demanding Application

Custody transfer of hydrocarbons, whether in production, transportation, or distribution, is an intricate application. Measurement accuracy is paramount, particularly when oil and gas prices are high. Even the slightest disparity can result in significant loss of revenue. Pipeline operators and their customers need to be assured that custody transfer systems, which include flowmeters, controllers, and analytical instruments, are properly and regularly calibrated to very tight tolerances, and comply with all applicable government regulations and custody transfer measurement standards.

Measurement Skids Rarely "Off the Shelf"

Concern about accuracy and reliability, along with the conservative nature of oil and gas users, has historically meant that custody transfer measure-

ment skid suppliers like Daniel would be forced to build custom solutions that integrated PLCs or controllers that were compatible with a customer's existing DCS or SCADA system, whether from Emerson or another major automation supplier. Each customer had different requirements for how their metering systems worked and integrated with other systems. In addition to being expensive to develop and implement, these custom skids were also difficult to support, maintain, and upgrade to new software version releases of control system suppliers. Daniel found that supporting measuring skids was as nearly as demanding as developing them in the first place, forcing the company to stay current with nearly continuous changes in electronics, HMI technology upgrades, and new software versions. The status quo could not be maintained for long; development costs were high, and some customers struggled to keep metering skids operating due to the difficulty in maintaining and keeping them within spec to satisfy regulations and custody transfer standards, which vary by global region.

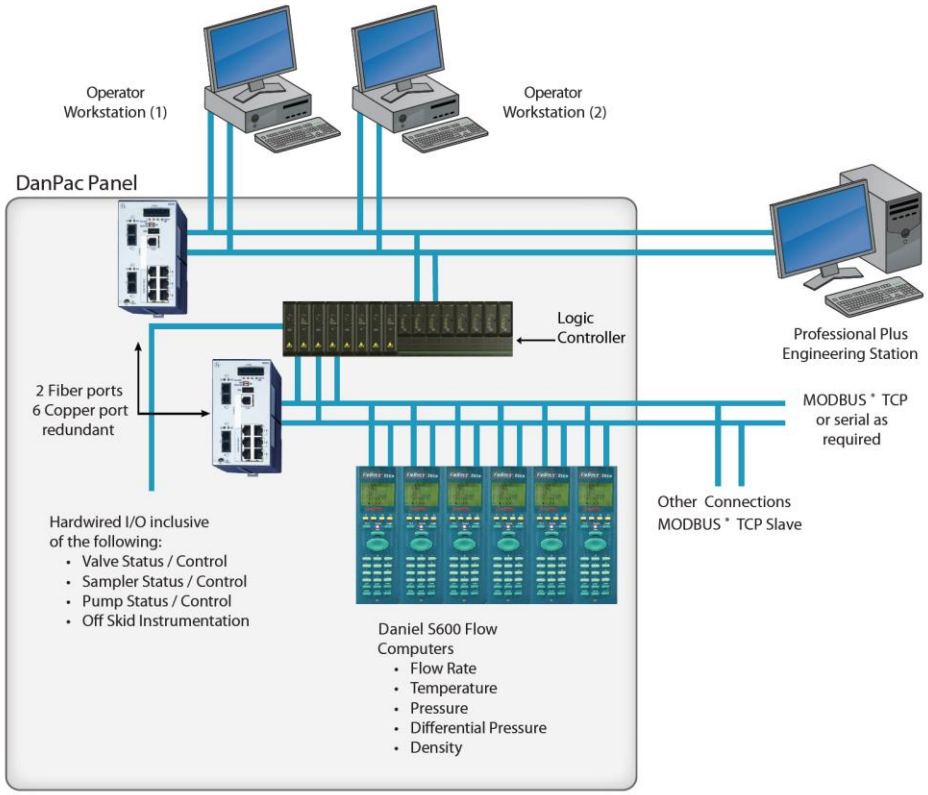
The DanPac Measurement and Control System

To address the increasing complexity of developing and maintaining custom solutions for customers, Daniel developed its own custody transfer control and reporting system that could meet user requirements, offer compatibility with third-party control systems, and be easier to maintain and update. As a part of Emerson Process Management, Daniel has access to a host of standard technologies, as well as the parent company's software development and engineering expertise. This enables the company to provide a stable, consistent product and focus its development efforts on improving its own controller and reporting technology, rather than scrambling to keep up with updates put out for competitors' controllers.

The DanPac system integrates Daniel S600 flow computers, Daniel custody transfer flowmeters, and other measurement technologies. DanPac supports multiple meter runs, offers a redundant architecture, and is compatible with a variety of DCS and SCADA host systems.

The system supports multiple flowmeters, provers, and analytical devices; DanPac is configured with a database that includes software libraries for these devices. Daniel works to maintain these libraries and keep them updated. DanPac has databases for three key application types: gas, liquid, and gas/liquid. The system can control up to ten flowmeters, depending on the complexity of the application. More complex liquid flows may re-

quire a dedicated controller, where multiple simple gas flows can be handled by a single unit.



DanPac System Architecture with Two Workstations (Source: Daniel Measurement and Control)

DanPac's integrated historical process trending capabilities enable operators to monitor the metering system and identify potential meter problems before they can adversely impact system performance. Today, operators can perform remote diagnostics on ultrasonic meters to check for pipe blockages or other meter-related issues (such as detecting liquid in a gas stream), allow them to closely monitor flow conditions, and be alerted if flow disturbances increase measurement uncertainty beyond specific limits. A technique under development is to use sonic waves to detect problems with skid equipment. Unusual noises can indicate cavitations in a turbine meter or air bubbles in the flow.

Components of the DanPac system include a logic control panel with MD Plus controllers, analog and digital I/O modules, virtual I/O modules that support TCP/IP and serial communication. The system also includes fast Ethernet switches, a Daniel S600 flow computer, a Windows XP worksta-

tion, and a powerful reporting package. Software shipped with the system includes DeltaV system software, along with a built-in web server that allows operators to view both system parameters and reporting data remotely.

Powerful Web Reporting

Daniel has made a considerable investment in an Enterprise Class Reporting Web Portal, that, according to the company, is the most powerful and flexible reporting package available for fiscal metering today. It provides customers with a flexible platform that can meet their growing technological needs. The portal publishes reports as protected PDF files. These eliminate any possibility of manipulating data, a key aspect of custody transfer and fiscal metering. Most competitors rely on text files and access databases, which can be manipulated easily and thus, cannot be considered "protected" files.

Users can also export reports "on-demand" in a variety of formats to fit their needs. Since it is all web-based, operators and managers alike can access the reports with a simple web browser. Another convenience is easy access to data needed for billing and auditing.

Flexible Upgrades for Customers

For users wishing to upgrade their control systems without replacing measurement and analyzers, Daniel can provide DanPac technologies while preserving much of the currently installed system. These upgrades will garner a similar level of engineering and service to provide seamless integration and turnkey delivery. Modernizing systems in steps allows users to minimize cost and risks associated with extended production downtime.

Given Daniel's extensive installed base of roughly 3,000 metering skids, the company offers three upgrade paths for customers who want to update their custody transfer control systems. The first is the DanPac HMI Upgrade, which upgrades the system HMI but leaves the existing metering panel, PLC, and flow computers in place. The second option replaces the HMI and PLC with a controller and I/O modules mounted in a common rack. A complete upgrade builds on these two options, adding a set of Daniel S600 flow computers. Thus far, DanPac has enjoyed great acceptance in the field; Daniel has sold 50 systems since 2009, and expects to install several more in coming years.

Conclusion

With its DanPac system, Daniel offers a standardized custody transfer metering solution that enhances metering accuracy and facilitates remote monitoring and control of metering stations. DanPac is a flexible, scalable solution that offers lower operating costs for users, and enables easy system upgrades and maintenance. It does much to address the complexities of the custody transfer of hydrocarbons. Daniel arguably has the "first mover" advantage with DanPac, but it is likely that competitors will soon develop their own custody transfer control systems in response. Successful installations, along with strong and responsive after-sale support and maintenance, will help Daniel keep its edge.

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