# Transforming completion and production service delivery at oil and gas well sites

## Reporting can be a challenge in the oil and gas industry due to the constant potential hazards, but mobile apps can help deliver accurate information and improve overall productivity

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The oil and gas industry has an intense focus on the safety of its workers and protection of the environment. Despite a work environment that often involves heavy equipment, hazardous materials, high temperatures and high pressures, the oil and gas industry has, overall, a strong safety record. Reducing injuries, dangerous circumstances and incident rates is a key focus for operational leadership who rely on a robust quality, health, safety and environmental (QHSE) management system to accomplish this objective.

### The challenge of reporting

Paper-based, peer-to-peer observations and incident reports, a standard in the oil and gas industry since the mid-1990s, provide the raw data for assessing and correcting at-risk behaviors, at-risk conditions and near misses. When analyzed, these reports form the basis for detecting root causes of safety issues.

Observation cards and incident reports are filled out in the field by employees to report non-optimum safety and process-related behaviors and conditions.  Inevitably, some of these reports are delayed, or lost in transit and do not make it back to the home office. Those that do are not necessarily entered into a database in a timely manner. Weeks or months may pass before the observations and incident reports are input.

Consequently, important data from these reports is frequently delayed, or in some cases missing for evaluation.  This limits the utilization of the data for review by managers directly in charge of day-to-day operations. Dependence on legacy methodologies, like manually-generated observation cards, makes it difficult to use the data.

A well-servicing company with 1,000 employees working in the field, for example, would expect to see approximately 4,000 observations per month. These need to be manually entered into a

database before meaningful analysis and trending can be performed. The time delay inherent in paper-based reporting is a real problem that applies to behavioral safety observations and all other forms of reporting.

## Transition from paper reporting to a mobile platform

In 2017, Ranger Energy Services was interested in creating a peer-based behavioral observation platform that would automate and provide digital, real-time access to its observation reporting. The platform needed to be based on smartphone and tablet devices, incorporate user-friendly software applications, and conform to existing company processes familiar to employees.

Ranger personnel from IT, QHSE and operations participated to ensure a fully-integrated solution could be designed. The company's QHSE and IT teams collaborated to develop the initial system functionality and then to populate it with Ranger work procedures, forms and technical specifications. Operations and QHSE teams then conducted a field test phase of the software and hardware. This phase enabled the team to refine the user interface, system functionality and content. During this field test phase, the teams realized they could easily extend the platform functionality to other applications of monitoring and reporting.

The result was a live mobile platform, Ranger Live, which is designed to provide a customized suite of applications to field crews for observation and incident reporting, learning management, audits, asset management, job reporting and field ticketing. Ranger Live also has enabled the company to automate all aspects of fleet and driver management including driver behavior, state and federal Department of Transportation (DOT) compliance.

## Behavior-based observation reporting

The mobile platform fully embodies the concept of integrated data capture and reporting. It has been designed to be as intuitive, easy to use, and as familiar to the user's paper reporting process as possible, to facilitate and encourage reporting. The app provides a digital representation of Ranger's paper-based reporting forms. The employees are already familiar with the format, which makes adopting the app much quicker.

A unique feature of is the ability to examine reports and send information to the originator immediately. This is something that is seldom, if ever, done with paper reporting. Near real-time response to critical issues builds a culture of trust and respect, which is the bedrock of safety and quality.

When an employee enters a new observation report into the app, it is immediately routed to the appropriate QHSE personnel. Depending on the severity and potential impact of the observation, it may be escalated to management for resolution. A root-cause analysis may be conducted, and the results of the analysis can be communicated directly to the originator.

Further, safety alerts are pushed out to all impacted employees to educate them about the situation and the corrective action. Each safety alert requires the user to acknowledge they have received, read and understand the alert by capturing their signature.

## Training management

Ranger's mobile app employs a learning management system (LMS) for documentation, tracking, reporting and delivery of training materials for technical and leadership competencies. This helps deliver training materials to the crews, track crews' progress, and manage record-keeping. The LMS enables

management to record individual employee scores, learning event scores and to identify benchmark scores.

Typically, employee training information is maintained in paper documents stored in physical file cabinets and compiled on spreadsheets. The platform makes this information digitally available to employees, and it provides alerts when training and certifications are becoming due, simplifying and streamlining the process. This feature also allows in-field examination of training records by customers.

The app provides employee access to the company's library of written and recorded compliance and training resources, including standard operating procedures (SOPs) for the company's various service lines. Each SOP details the skills required and the process to complete each task in connection with daily work plans and job safety analysis activities.

## Driver behavior

The app's driver behavior monitoring and reporting gives management a real-time view of driving behaviors in the field. Each driver has a monthly scorecard that presents their actual driving behavior for the previous month including miles driven, maximum speed achieved, drive time above certain speeds, acceleration and deceleration rates. This feature has significantly improved company driver behavior in a short time due to scorecard visibility.

For Ranger's DOT-regulated vehicles, Ranger Live ensures Federal Motor Carrier Safety Administration (FMCSA) compliance, by allowing the company's commercial drivers to complete their electronic logs and trip inspection reports. This enables dispatchers, supervisors and managers to ensure hours of service compliance with visibility to hours worked, hours driven and vehicle location.

The system ensures that any defects noted in the trip inspection reports, along with mileage, will populate a work order to ensure mechanics can timely complete preventive and routine maintenance and repairs.

## Equipment inspection and maintenance

From an asset management perspective, the app integrates with the company's preventive maintenance management (PMM) system to ensure that equipment is inspected and repaired routinely according to preventive maintenance schedules.

Ranger Live incorporates periodic equipment inspection forms that are completed in the field. These equipment inspections, and any unscheduled maintenance requirements, are then available for managers and field personnel to access for specific equipment being reviewed.

These functions enable managers and field personnel to access equipment-specific information, such as the last time an asset was serviced, when it was last certified, and when maintenance was performed. All of this data would historically be filed in a remote location or in filing cabinets. With the app, the user can either enter the asset number or scan a QR code for that piece of equipment into a smartphone or tablet on location, to access equipment-specific maintenance information.

## Electronic ticketing

The app incorporates Ranger's electronic ticketing system. The electronic ticketing system can be used to document activities and services performed during a job. At the end of each shift, or day, Ranger supervisors can print a hard-copy ticket for customer approval, then upload the approved ticket back into the system for invoicing. The electronic ticketing system creates

a database that can be queried for operational metrics and for financial reporting.

## Augmenting performance

Management can view real-time data and daily dashboards to make operational decisions in response to employee and customer needs. It can react or anticipate needs in a fraction of the time than would be possible otherwise. The ability to perform long-term data analytics and trend analysis provides management with actionable data.

This latest generation of smart mobile apps is a transformative technology for augmenting operational performance in the oil and gas industry, providing digital access to everything field employees need to effectively perform their jobs on location, while enhancing managements' ability to more effectively arrive at decisions that support operational performance and safety.

Original content can be found at Oil and Gas Engineering.

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