



RFID for Risk Management and Safety Inspections in Oil and Gas

Introduction

The oil and gas industry now faces its strongest set of challenges in terms of risk and compliance regulations. Recent events such as the BP Deepwater Horizon disaster in the Gulf of Mexico have further brought to light the presence and relevance of such regulations. In this whitepaper, we will consider the top areas where RFID technology is benefiting the oil and gas industry in maintenance recording, inspection audits and asset tracking. Top specialized providers of RFID technology for the petroleum industry, Xerafy and Holland1916 will share case studies about the use of RFID, and its potential to improve operations within the industry.

The Deepwater Horizon BP disaster brought with it many hard lessons learned by the oil and gas industry. The very process of offshore drilling is an extremely risky venture with the potential for widespread environmental damage with resulting economic ramifications. The need for orderly and systematic inspection, repair and on-going maintenance of oil and gas producing facilities, notably offshore installation, is in its highest demand ever. Another lesson learned is that quick and inadequate inspections as well as the maintenance and inspection of the safety equipment designed to protect oil and gas facilities can prove to be a deadly mistake.

Inclusive of these regulations are the EU IPPC Directive, ISO 14064, Clean Air Act and the Kyoto Protocol. Companies who are in the process of applying for these permits face labor-intensive initiatives including the need to manage and monitor operations and emissions permits. RFID technology brings the ability to streamline the audit process with the ability to track inspection, repair and general maintenance.



Oil & Gas Challenge for Compliance

Logistics wise, managing literally hundreds to thousands of wells and facilities which are in turn connected to macro scale pipelines leads to challenges in terms of managing the entire network for compliance. Data collection, information processing and data management in general become a huge challenge. The need for accurate and automated reporting as well as real-time information management is as strong as ever. With the need to reduce corporate liabilities as well as operational risks, companies are on the fast track to implementing solutions to address these areas.

Extreme Environment

Environmental conditions range from extreme cold to extreme heat depending upon where the facility is located. In addition, equipment is exposed to salt water, crude oil residue and other contaminants that make not only equipment operation, but also pose a huge challenge in terms of maintaining and tracking maintenance of equipment. Visual methods of identifying equipment including labels and plates are not always a reliable method due to the human readable data being obscured by environmental elements.

Identification Issues

Assets range in size and form from bolts to massive turbine pumps, propeller shafts and other components used to keep a platform and drill in operation. Finding the right pipe in a field and ensuring product meets API specifications based on outer diameter, wall thickness,

steel grade, weight / unit length, and type of coupling is a common scenario in the oil and gas industry, and errors could cost more than money.

Even if size isn't an issue, the quantity of specific parts in terms of inventory management and ensuring calibration and compliance become a challenge.

Wireless Technology Concerns

The need for intrinsically safe technology used in the tracking and maintenance of equipment is an essential requirement. Facilities in many cases rely on wireless communication as their vital lifeline of not only data but human communication around the world. Wireless technology is also used in the control and function of process critical components of a facility including drilling, pipeline regulators/delivery systems and also



FIGURE 2: XERAFY HIGH MEMORY XL TAGS

used in safety mechanisms which if needed, need to be 100% ready to operate without interference or impedance from other wireless or electrical sources. Xerafy's XII-Series passive UHF RFID tags are ATEX compliant to meet the safety requirements for the chemical, petroleum and gas processing industry.

Extreme RFID

RFID is widely used in numerous industries for effective asset / supply chain management. In addition, industries such as Automotive, Aerospace and Bio-Medical use this technology to track metrics such as maintenance cycles of calibration sensitive equipment/components, work in progress tracking of chassis and system production and also to meticulously track cleaning and autoclave cycles of sterilization of surgical instruments. EPC Class 1 Gen2 RFID utilizes a 96-bit Electronic Product Code (EPC), which contains up to 24 Hexadecimal characters that may be used for instant and unique asset identification. In addition, high memory RFID tags are available above and beyond the EPC to include up to 32 kbits of information used to track maintenance dates, metrics, processes or other critical parameters of an asset they may be accessed and updated instantly at asset level versus having to scan and lookup asset information via an external data base. Security features of RFID include the ability to password protect both read and write ability of the user memory, thus adding another level of security for asset information and management.

By integrating sensors, actuators and other technology with RFID, assets within the oil and gas industry could report on environmental conditions, equipment operation, safety data, regulatory compliance conditions and other information, in addition to location data. By extending the information network out to specific field assets, oil and gas companies could achieve a new level of visibility into remote operations that could both improve operational productivity, as well as safety.

RFID for Maintenance and Inspection

The standard method for recording maintenance logs is to record information manually, leaving significant room for error. Recent mandates in several industries including: airlines, oil and gas, and power, demand traceability and accountability for PM. The expensive machinery and the cost of downtime in these industries provide a short return on investment through automating the maintenance and support infrastructure. In a typical RFID PM monitoring system, the asset's entire repair and maintenance history is recorded automatically to the RFID tag, which can be affixed on a repair tag, attached to the asset, or embedded within the product. An RFID reader can scan equipment when it comes in for service and when it leaves. Service providers can also record all relevant information, including service date and time, who performed the service, what happened, and when the equipment should be serviced again with handheld readers.

Case Study: XERAFY

XERAFY and its partners are collaborating to provide custom solutions for the petroleum industry for asset tracking, quality control, and supply chain management. A high-end product in the XERAFY XII Series, the Micro^x II EPC Gen2 RFID tag, tracks large assets such as oil drill bits, pipes, pumps and even platform supports for the oil and gas industry. The Xerafy Micro^x II has a full range of features including ATEX certification with its long-range performance and ruggedized encapsulation to survive the abrasion, impact, salt spray, chemicals high temperatures and pressure common to the oil and gas environment.

The Micro^x II tag is utilized for asset tracking on oil



FIGURE 3: XERAFY MICRO^x II TAG

equipment to ensure inventory management and quality control over order fulfillment to make sure the right equipment is installed properly. In addition, the XERAFY embedded Micro-iN RFID tag provides greater durability compared to a tag merely attached externally to an asset. A permanently mounted RFID tag is the most secure and effective means of real-time tracking.

The RFID data collection equipment automatically tracks and manages supplies as they move from onshore operations facilities, to port transfer facilities, to offshore oil and gas rigs, and back.



FIGURE 4: RFID TAG INSERTED ON LIFT HOOK BY XERAFY PARTNER, HOLLAND1916, TO HELP STOP BP OIL LEAK

Typical supplies including critical consumables and equipment such as risers, choke valves, wire rope, stud tensioners, slings, wellheads, in addition to various containment units used to store and deliver material to the oil platforms.

Once you have the tracking database that RFID enables, you can use the information you gather in new ways to provide the operators with information, reports, and preventative maintenance instructions.

Case Study: Paws Energy Services and Holland1916

Paws Energy Services is an Oil and Gas rental equipment company that is the leader in pipe sling management for offshore drilling and production operations. Paws has locations in Louisiana and Texas. Paws Energy Services selected Holland 1916 to deliver extra rugged RFID sling tags for auto identification of their large rental fleet of pipe slings.

The previous methods for performing check ins, check outs and inspection events would rely on manually writing down serial numbers to identify the asset for the transaction. However, working with serial numbers is extremely cumbersome and error prone. And paper based systems do not provide sufficient reporting functionality that is crucial in today's fast paced business environment.

With the implementation of an RFID software system that leverages Holland 1916's heavy duty RFID tag solutions, Paws Energy Services has improved many of their rental processes as well as their asset fleet's overall safety compliance. When a rack of slings is prepared for shipment to a customer site, an operator first quickly scans each sling with an RFID reader. Next, under a dropdown menu on the reader, he simply selects the customer and the specific location that the slings are shipping to. And finally, he enters the contract number for the sling order. With those 3 simple inputs, all of the slings (most times numbered in the hundreds) are instantly updated with that information in the RFID software system and are ready for shipment. And now

that all this data is available in the software system, Paws Energy Services and their customers can run reports showing exactly how many slings are at each location, how long they've been there, when the contract is up, and much more!

Upon the return of the slings, they typically arrive in a large basket, are very tangled and unorganized, and slings from multiple contract numbers are mixed in as well. In the past, it was necessary to go through the painstaking process of copying each serial number down, cross referencing those numbers with data in notebooks containing each outstanding contract and the specific slings under that contract, and finally reconciling the account. But now, it is as simple as scanning each tag in the basket then entering them on the RFID reader as being received. Now Paws Energy Services can invoice much more quickly and they can positively identify the slings from a contract that were not returned or were damaged, and can invoice the customer for the replacement cost of that sling.

The ROI and value that RFID provides to a rental company is very evident. Not only does RFID enable processes to be streamlined requiring less time and labor, but it also increases asset visibility, enhances customer service, and improves safety compliance.

Conclusion

RFID technology streamlines asset identification to enhance the way you conduct field inspections and manage safety compliancy. No other identification methods can handle the rugged oil and gas environment and enable the sort of seamless, automated tracking in the way that RFID. RFID ties all areas of your business, including rentals and equipment in the field, with your inspections. It ensures workplace safety and compliancy with safety and inspection regulations all while decreasing labor hours and eliminating manual entry. With the industry focused on improving safety and reducing the chance of catastrophes at remote work sites, there is even more impetus to deploy this type of real-time technology at a significant return on investment.

About XERAFY

XERAFY is committed to bringing our customers the world's smallest and most reliable passive UHF RFID-On-Metal (ROM) and iN metal tags that are qualified and tested to meet extreme conditions over the lifetime of the asset. XERAFY's innovative technology offers the Industrial, Manufacturing, Defense, IT, and Supply Chain markets, an affordable, durable, high temperature smart tag that can be easily attached to or embedded to metal assets. XERAFY enables packaging solutions for automatic check-in / check-out tools, Work In Progress, IT auditing, product authentication and asset management with a competitive advantage in size, cost, design, quality, and performance of tags. XERAFY is headquartered in Hong Kong, and maintains sales & support offices in Dallas, Texas, Maryland and in Shanghai, China.

About Holland1916

Holland 1916 is a custom manufacturer of rugged RFID tag solutions. Typically, Holland investigates the customer's specific application to gain a complete understanding of the RFID tag challenges, designs a tag solution addresses all challenges the application presents and finally manufactures quality, cost effective tags. Holland1916 is headquartered in Kansas City, Missouri.

Contact Us

For more information on RFID tag applications, product overviews or any other questions, please visit Xerafy, www.xerafy.com.