

Get a Grip on Your Assets®



White Paper September 2015

ABSTRACT

There are hundreds of millions of power poles and components installed throughout the world. These structures serve as the backbone for delivering power to the consumer. The ability to locate and maintain those assets is a responsibility that lasts for many years. Comprehensive maintenance history of must be managed and accessible 24/7. Accurate and up to date records are critical to ensure the safety and reliability of those components.

Transmission line owners/operators are responsible for performing maintenance, inspection, replacement and repair of the structures that support those thousands of miles of power line.

JPL RFID's **Get a Grip on your Assets®** system combines a Cloud web service, handheld scanning device, and phone apps providing all the solution elements required to comply with energy industry Asset Tracking and Safety needs. This paper demonstrates how this system, utilizing barcode and RFID technology, delivers a complete solution for this client. The result is Increased Efficiency, Enriched Data Accuracy, Enhanced Safety/Compliance and significant Reduction in manual data entry.

INTRODUCTION

It is critical to maintain regular maintenance schedules for the structure and components. They endure high levels of stress from strong shifting winds and other environmental elements. Cracks and stress fractures can develop in many areas of the structure components.

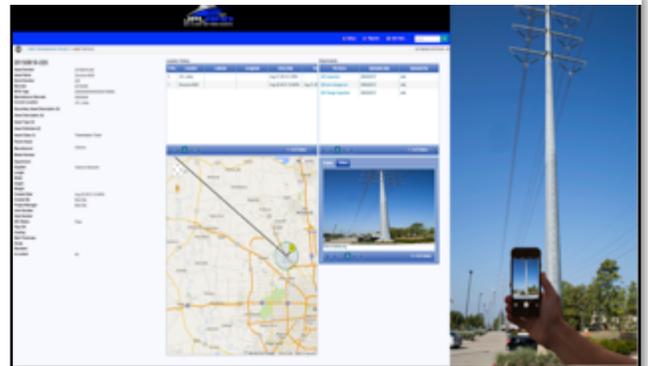
Today it is a challenge for service companies to rely on existing records to identify the location a component that is due for maintenance or inspection. It is currently a time consuming process to locate and identify the correct components. Having a system that can accurately detect and store location coordinates (GPS) matched to each individual asset can significantly reduce time in providing critical maintenance tasks.

Another opportunity for improvement is to provide accurate reporting of maintenance tasks and records specific to each component. JPL RFID's system provides multiple electronic methods based on industry leading technology to capture, store, and provide access to these critical records.



BENEFITS - JPL RFID's **Get a Grip on your Assets®** Asset Tracking Solution

- **Increased Efficiency**
 - All data and records are stored and managed via the Cloud providing 24/7 access to users with assigned permissions.
- **Decreased Labor**
 - Labor requirement are significantly reduced by inputting information directly into system on-site versus physically recording on paper and transfer the information manually at a later date.
- **Increased Data Accuracy**
 - Capturing structure and component location by using GPS coordinates greatly improves accuracy automatically creates GIS mapping within the system.
- **Improved Maintenance Performance**
 - Prior to JPL RFID's system, capturing maintenance data was typically manual – i.e. pencil and paper. Now it captured electronically on-site in the field via handheld scanner, laptop, or smart phone app.
 - Maintenance alerts and reports ensure timely maintenance performance. All tasks must be completed or reconciled to discontinue notifications.
- **Simple Data Import**
 - The ability to upload spreadsheet data directly into the JPL RFID asset tracking system eliminates previous errors made trying to copy and paste information between separate spreadsheets.
 - This sometimes resulted in missing data altogether.
- **GPS – GIS Mapping - Location Collection**
 - JPL RFID's mobile software will capture the location of each individual component as it is scanned with the handheld reader or updated with smart device.
- **Visual Location Display**
 - The location of each component is displayed in the Map View Report using Google Maps. The Map View Report is available online as well as on Tablet and phone app.
(Mobile device also provides instant driving directions)
- **Easy Access to Individual Data**
 - You can select an individual component in the Map View Report. View all attribute data associated with that specific asset.
 - The main dashboard also allows you to select a location to get a comprehensive list of all assets in that named location.
 - All data associated with that asset including the entire move history and any documents, photos, or video attachments is displayed on one simple to navigate page.



KEY PRODUCT FEATURES - JPL RFID's **Get a Grip on your Assets®** Asset Tracking Solution

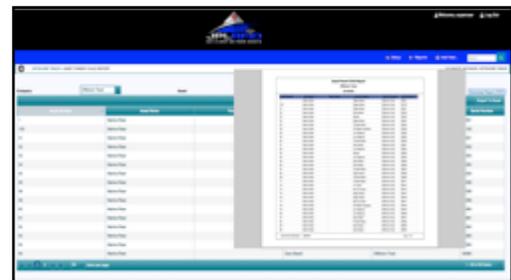
Handheld:

- WiFi Connectivity
 - Synchronizes all data with Cloud Web Service using WiFi connection
- Supports Barcode and RFID technology
- GPS Coordinate Capture
- Inventory
 - Found, Missing & Misplaced
- Geiger Function
 - Strength indicator adjusts with proximity from the selected asset
- Attribute Details
 - View asset attribute details on the display



Cloud Web Service:

- 24/7 Global Data Access
 - Data is synchronized with the Cloud web service. Authorized users can access data 24/7 via PC, tablet, or smartphone.
- Main Dashboard
 - Displays Total Asset Count, Locations, Assets by Location, Maintenance Details (current, past, ttl)
- Real Time Data
 - Using handheld, fixed readers, and/or GPS enabled tags, asset data is updated and synchronized with the Cloud web service with every transaction performed.
- Asset Taxonomy
 - Create unique levels of associated characteristics
- Parent/Child Association
 - Associate assets which built into or related to other "Parent" assets
 - "Child" assets can automatically change locations when Parent changes locations.
- Automated Data Import via Excel spreadsheet
 - Import Attribute Data using our Excel template.

KEY PRODUCT FEATURES

Cloud Web Service (continued):

- Data Transfer with existing ERP systems
 - Interface with popular ERP systems such as SAP, Oracle, MS Dynamics. Capability to develop Interfaces with many other systems as well.

- Movement Alerts
 - Receive alert when any asset is received or exits a selected location.
 - Receive alert anytime a selected asset makes a location change.

- File Attachment
 - Files such as Word, Excel, Powerpoint, PDF, etc. can be associated to any asset.
 - Photos and video files can also be associated to any asset.
 - File attachment can be done through the Cloud Web Service or Smartphone app.

- Barcode/RFID Printer Support
 - Print your own custom label template including Barcode
 - Program RFID tags with your own unique identifier
 - Save data to tag User Memory

- Maintenance Scheduling and Tracking
 - Define your own maintenance tasks, assign maintenance tasks to be performed
 - Assign scheduled maintenance times including recurring (weekly, monthly, etc.)
 - Set priorities for maintenance tasks
 - Receive alerts when maintenance is due for a selected asset, set reminder interval
 - Maintenance dashboard/reports show assets status (due, past due, etc)

- Smartphone App Support
 - Authorized users can access the Cloud web service on their smartphone using the iOS or Android app.
 - Find location of asset, see all attribute details, attach photos to selected asset.

- Customization Services Available



PROCESS FLOW AND SOLUTION

- **Manufacturer - Galvanizing**
 - Tracking components begins at the manufacturer.
 - The most effective means of managing data & tracking the component is accomplished by applying and associating a Kettle Tag® Heat Resistant Barcode Label at the time of fabrication.
 - This tag is heat resistant to 1,000°F to survive the entire galvanizing process.
- **Manufacturer - Shipping**
 - Manufacturer provides client the asset data in electronic format that is imported into JPL RFID's Cloud web service solution via JPL Asset Data Template.
- **Lay Down Yard - Receiving**
 - Upon arrival, the Kettle Tag® tag is scanned and identified by the unique barcode identifier.
 - Structure Arms receive 2 duplicate RFID-Barcode tags which are associated to the component in the database. 1 tag is permanently attached and the 2nd tag is temporarily attached and later applied to the structure base. (see photo 2)
 - The 1st tag stays attached for the life the component to ensure traceability. The 2nd tag will be placed in the appropriate position on a template (see photo 3) the base of pole. This tag can be scanned to identify an arm's location any given pole.
 - Tags are placed in the most advantageous area for long-term protection.
 - These tags are used solely for future repair/replacement and traceability.
 - If a tag is damaged, a replacement can be immediately Programmed In the field by referencing any of the component identifiers or by looking up the Parent Asset's details.
 - Previously handwritten notes were transcribed later. Now the barcode/RFID tags can be scanned and updated immediately into the handheld scanner. Data is electronically transmitted via WiFi from the scanner to the Cloud.

Photo 1



Photo 2



Photo 3



PROCESS FLOW AND SOLUTION (continued)

- Lay Down Yard Receiving (continued)
 - This automation improves data accuracy, efficiency, and the speed at which data is available.
 - After the new tags are placed on the arm, the arm is received to the Lay Down Yard. (see image 1)
- Location Alerts
 - The web service allows for location alerts to be set whenever any asset enters or leaves a location.
 - Email Alerts can be triggered whenever new assets are received to the yard and/or for any location change within the entire supply chain.
- Lay Down Yard Inventory
 - After being received, the arm is moved to a yard location. The arm tag is scanned using a handheld scanner and its location updated.
- Lay Down Yard Shipping
 - Arm is picked up and loaded onto truck for shipment to the field.
 - The arm tag is scanned and location updated to the truck.
 - The truck itself can simply be a named location or it can be configured as a mobile location.
 - As a mobile location, you can add a tracking device such as a GPS enabled device. That allows you to actively track the position of the truck, and therefore the assets, as it travels.
- Receive/Associate Arm to Pole
 - Once the arm arrives at the pole it will be attached to, it needs to be associated to that specific pole.
 - The first thing done is to place the second tag on the arm on the template at the base of the pole in the corresponding position of the arm on the pole (see image 2).
 - The arm tag is scanned and its information updated to associate the pole as the parent of the arm. This allows you to know the specific arms that are attached to each specific pole.
 - The arm tag is then scanned again and its location updated to the location of the pole.

Image 1

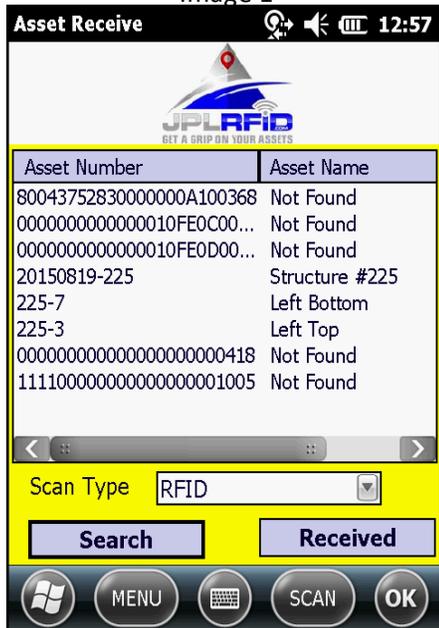


Image 2

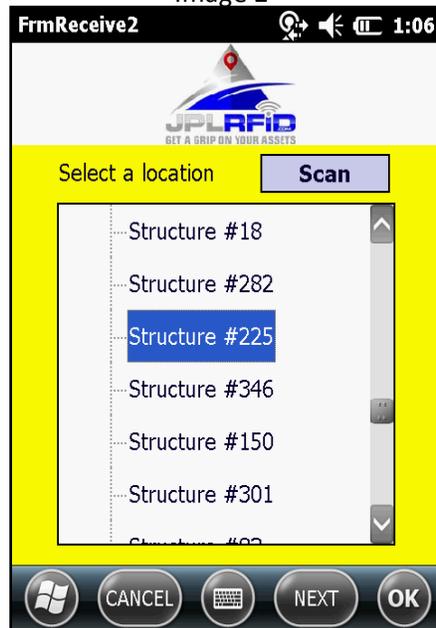
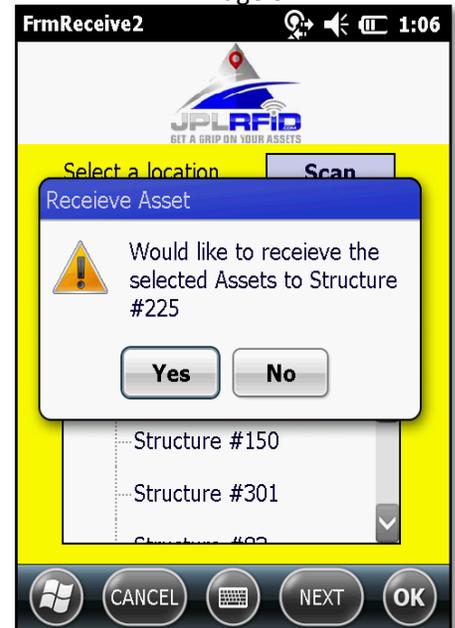


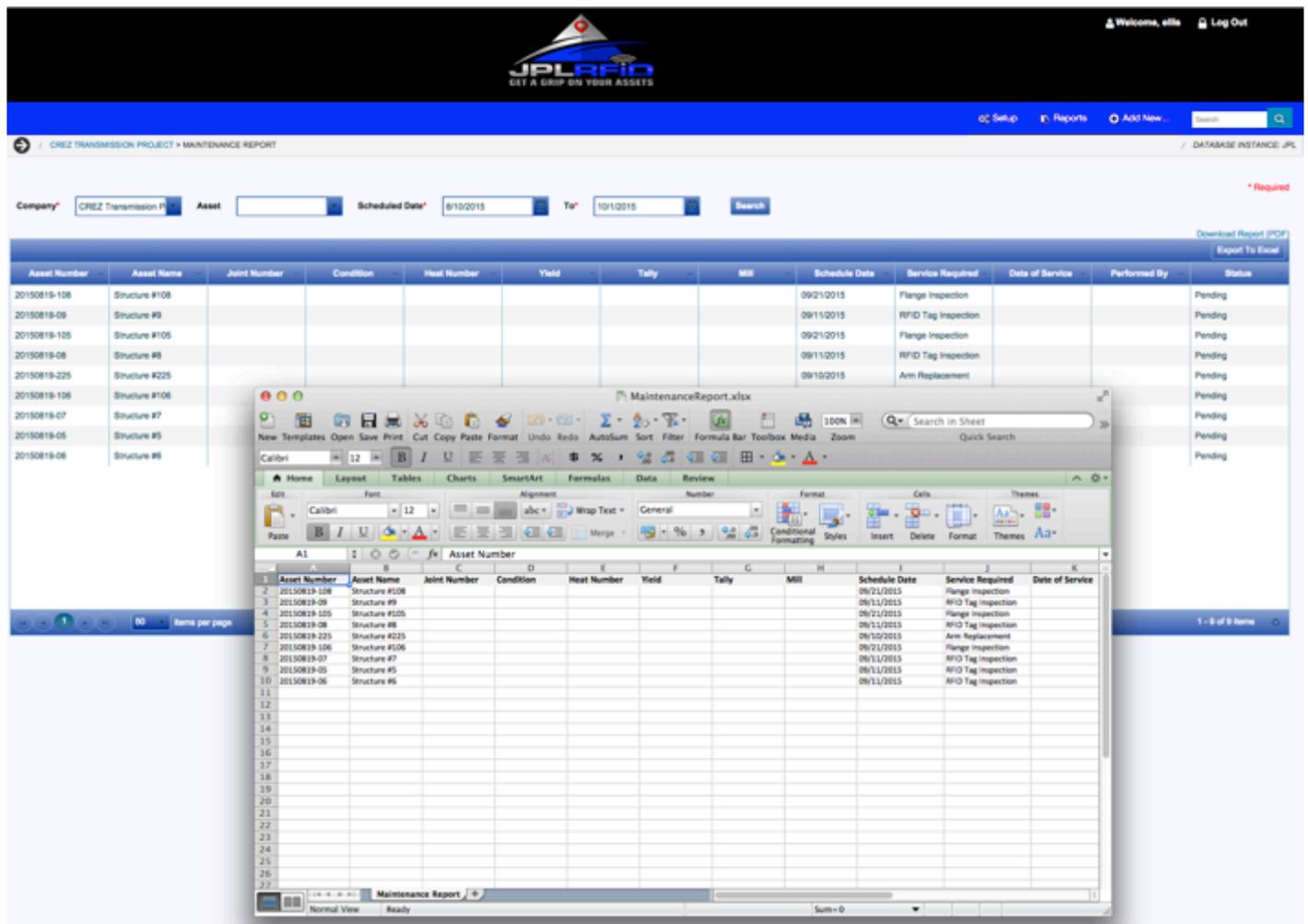
Image 3



PROCESS FLOW AND SOLUTION (continued)

MAINTENANCE

- See the Maintenance features in the Key Product Features, Cloud Web Service, Maintenance Scheduling and Tracking section above.
- Once an arm has been identified for maintenance, a service operator arrives at the pole with the arm needed for maintenance.
- The operator scans the RFID tag on the arm with the mobile handheld reader to identify the maintenance required for that arm.
- Once they have performed the required maintenance, they can then enter the updated maintenance performed.
- All updated maintenance information is then uploaded to the Cloud and available for review.



The screenshot displays the JPLRFID web application interface for a maintenance report. The top navigation bar includes the JPLRFID logo and user information (Welcome, ellis, Log Out). The main content area shows a search filter for 'CREZ Transmission Project' and a date range from 9/19/2015 to 10/1/2015. Below the search filters is a table with the following columns: Asset Number, Asset Name, Joint Number, Condition, Heat Number, Yield, Tally, Mill, Schedule Date, Service Required, Date of Service, Performed By, and Status. The table lists 10 assets with their respective maintenance schedules and statuses (all 'Pending').

An Excel spreadsheet titled 'MaintenanceReport.xlsx' is overlaid on the table, showing the same data in a grid format. The spreadsheet columns correspond to the table headers: Asset Number, Asset Name, Joint Number, Condition, Heat Number, Yield, Tally, Mill, Schedule Date, Service Required, and Date of Service. The data in the spreadsheet matches the data in the web application table.

| Asset Number | Asset Name | Joint Number | Condition | Heat Number | Yield | Tally | Mill | Schedule Date | Service Required | Date of Service | Performed By | Status |
|--------------|----------------|--------------|-----------|-------------|-------|-------|------|---------------|---------------------|-----------------|--------------|---------|
| 20150819-108 | Structure #108 | | | | | | | 09/21/2015 | Flange Inspection | | | Pending |
| 20150819-09 | Structure #9 | | | | | | | 09/11/2015 | RFID Tag Inspection | | | Pending |
| 20150819-105 | Structure #105 | | | | | | | 09/21/2015 | Flange Inspection | | | Pending |
| 20150819-08 | Structure #8 | | | | | | | 09/11/2015 | RFID Tag Inspection | | | Pending |
| 20150819-225 | Structure #225 | | | | | | | 09/15/2015 | Arm Replacement | | | Pending |
| 20150819-106 | Structure #106 | | | | | | | | | | | Pending |
| 20150819-07 | Structure #7 | | | | | | | | | | | Pending |
| 20150819-05 | Structure #5 | | | | | | | | | | | Pending |
| 20150819-06 | Structure #6 | | | | | | | | | | | Pending |



CONCLUSIONS

Significant time and expense goes into keeping track of condition and location of these structures. Accurate installation & maintenance records are the key to ensuring minimal service interruptions. Unfortunately existing record keeping programs still rely on manual P&P (pen-paper) procedures. This produces errors and incorrect data availability to companies responsible for the installation and maintenance.

Thanks to our client choosing to “Get a Grip on Their Assets” they are demonstrating to the industry a new path of innovation and improvement.

They have proven it is cost effective to:

- Track components from manufacture to the final field location accurately & dependably using JPL RFID’s technology and solutions
- Capture and update key asset data at remote job sites
- Automatically record GPS coordinates of assets in remote areas
- GPS paired with RFID tags to locate and confirm the correct assets due maintenance
- Being able to use multiple current technology methods to collect and report information with mobile handheld readers, tablets, and smartphones
- Value 24/7 global access to asset and maintenance data real time
- Access all data available using modern technology with PC, tablet, or smartphone

Adopting a fully integrated approach with JPL RFID’s **Get a Grip on your Assets®** system has allowed this customer to significantly improve the reliability of our nation’s energy infrastructure and create an industry leading solution.

COMPANY OVERVIEW

JPL RFID was founded with the ultimate goal of assisting companies improve their operations by sharing our resources of experience and expertise. Our team possesses a wealth of intellectual property in the I.T., Logistics and Oil & Gas industry. With headquarters in the Technology Corridor of Houston, TX, JPL RFID provides superior RFID Solutions for the implementation of Asset & Warehouse Management Systems in the Oil & Gas Industry, serving both the domestic and international sectors. JPL RFID brings a fresh and innovative approach to RFID consulting services providing turnkey solutions including software, hardware, RFID Tags and accessories that support the Internet of Things.

Our mission is to utilize our knowledge and expertise in RFID, I.T. and Logistics to deliver comprehensive solutions that will enable our clients to increase profitability. We accomplish this by integrating the latest technologies to improve safety, efficiency and visibility of assets and people.

Our goal is to exceed the expectations of every client by offering outstanding customer service, increased flexibility, and greater value, thus optimizing system functionality, corporate profitability and improving operation efficiency. Our associates are distinguished by their functional and technical expertise combined with their hands-on experience, thereby ensuring that our clients receive the most effective and professional service.

Our vision is to embrace the Internet of Things to improve access to analytical Big data by the integrated adoption of leading edge technologies including RFID.

Visit www.jplrfid.com and www.pipelinetrack.com for more details.