

## **Electronic Outfall Inspection Application- 12007**

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### **ABSTRACT**

In early 2009 an exciting opportunity was presented to the Geographic Information Systems (GIS) team at the Savannah River Site (SRS). The SRS maintenance group was directed to maintain all Outfalls on Site, increasing their workload from 75 to 183 outfalls with no additional resources. The existing outfall inspection system consisted of inspections performed manually and documented via paper trail. The inspections were closed out upon completion of activities and placed in file cabinets with no central location for tracking/trending maintenance activities. A platform for meeting new improvements required for documentation by the Department of Health and Environmental Control (DHEC) outfall permits was needed to replace this current system that had been in place since the 1980's. This was accomplished by building a geographically aware electronic application that improved reliability of site outfall maintenance and ensured consistent standards were maintained for environmental excellence and worker efficiency. Inspections are now performed via tablet and uploaded to a central point. Work orders are completed and closed either in the field using tablets (mobile application) or in their offices (via web portal) using PCs. And finally completed work orders are now stored in a central database allowing trending of maintenance activities.

### **INTRODUCTION**

Since its introduction in 1972, the National Pollutant Discharge Elimination System (NPDES) permit program is responsible for significant improvements to our Nation's water quality. As authorized by the Clean Water Act, the NPDES permit program controls water pollution by regulating outfalls that discharge pollutants into waters of the United States. Outfalls are considered discrete conveyances such as pipes or man-made ditches (Figure 1). Individual homes that are connected to a municipal system, use a septic system, or do not have a surface discharge do not need an NPDES permit; however, industrial, municipal, and other facilities must obtain permits if their discharges go directly to surface waters. In most cases, the NPDES permit program is administered by authorized states.



Figure 1. Typical Savannah River Site Outfall Station

The authorizing state agency for the Savannah River Site (SRS) is the South Carolina Department of Health and Environmental Control (DHEC). The SRS currently contains 183 discharge outfalls. The six requirements set forth by DHEC for maintenance of outfalls are:

1. Ditch and drain maintenance
2. Sample station structure maintenance
3. Storm water and drainage grading
4. Erosion controls
5. Periodic walk down and assessment
6. Weed cutting and mowing

The current system for meeting DHEC requirements involves Preventative Maintenance Work Orders developed to perform inspections manually and documented via paper trail. It is extremely resource and labor intensive and not in compliance with future DHEC reporting requirements. The new Electronic Outfall Inspection Application (EOIA) was built to:

1. Replace the paper based system
2. Reduce potential for human transcription errors

3. Streamline workflow
4. Provide on demand reporting and data analysis
5. Develop a foundation for multiple use expansion
6. Meet improvements required for documentation by the new DHEC permits
7. Reduce potential for outfall location errors

## METHOD

The current system for outfall maintenance involves issuing Preventative Maintenance (PM) work orders developed using the Asset Suite work order management system (Figure 2). The PM work order is then printed out and distributed to field inspectors who fill them out by hand during physical inspections. The completed work orders are then submitted to work control and after proofing manually entered back into the Asset Suite work order management system.

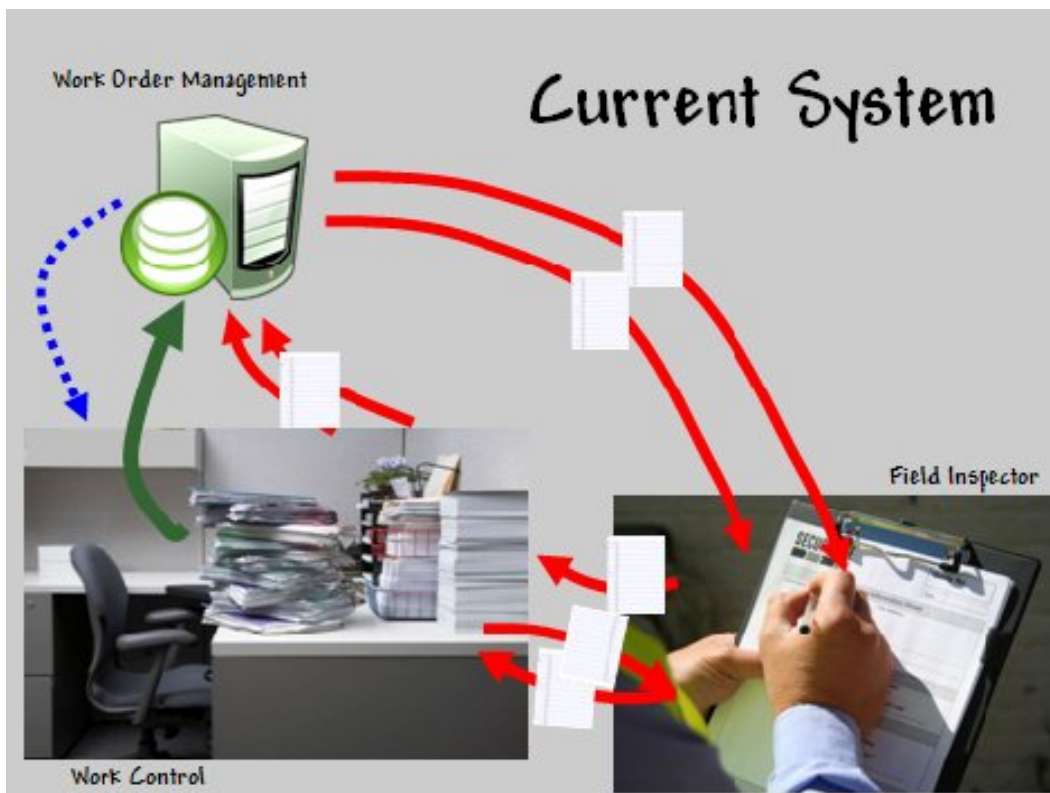


Figure 2. Current Outfall Inspection System Schematic

The new EOIA was designed to be run on PC tablets by the field workers during inspections, eliminating the paper based system while also cutting down on human transcription error (Figure 3). The EOIA runs continuously on the PC tablet, acting as a

data traffic coordinator between the centralized control GIS system Oracle enterprise tables and the PC tablet field inspection Microsoft Access tables. This allows not only for a streamlined workflow but because the EOIA service runs every 10 seconds, allows for quick reporting and data analysis by management and work control. To eliminate potential for outfall location errors the PC tablets are all GPS enabled providing exact location to the field workers as well as the centralized control GIS system. Finally the centralized control GIS system is integrated with the Asset Suite work order management system to maintain DHEC documentation requirements.

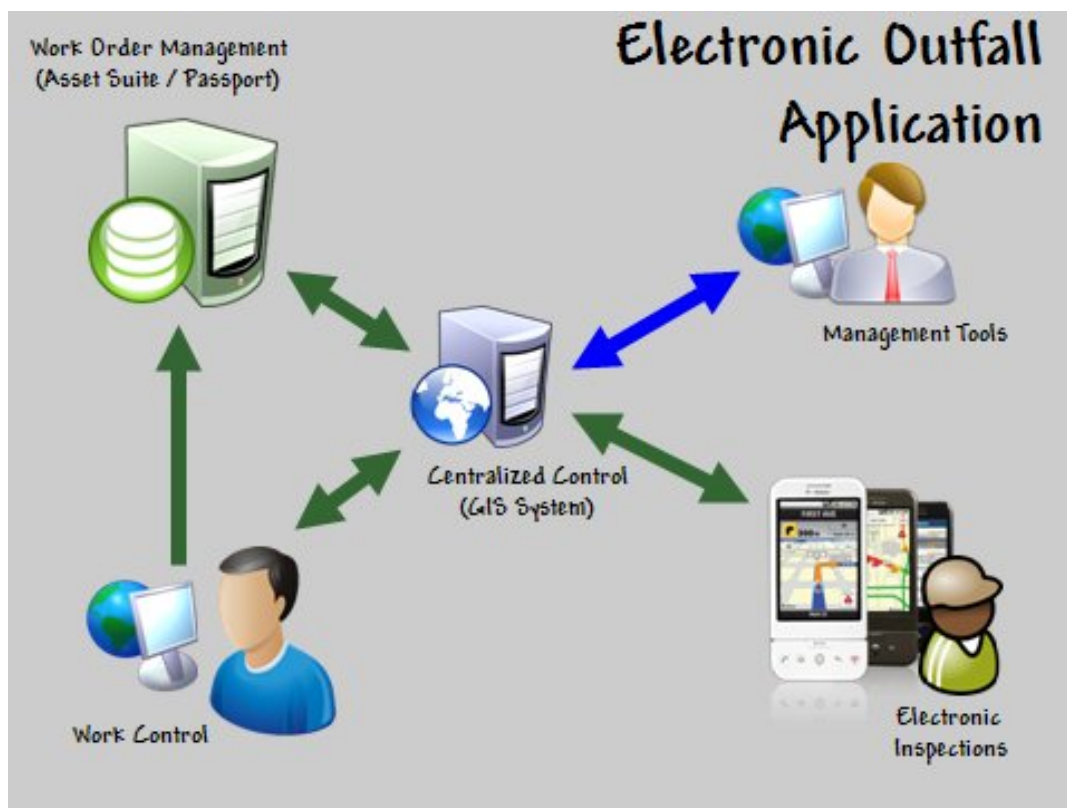


Figure 3. New EOIA Inspection System Schematic

## RESULTS

The new EOIA system meets and exceeds improvements for documentation by the DHEC outfall permits. It also displays quickly the status of the six requirements set forth by DHEC in an easy to read Graphical User Interface (Figure 4).



Figure 4. EOIA PC Tablet View

EOIA tablets are currently being used in the field now with full integration planned for late 2012. Financially this project has been a complete success with a 100% return on investment in 12 months and a projected efficiency increase of up to 50%.

## DISCUSSION

While the EOIA has been a resounding victory for the SRS GIS group, its current use just scratches the surface of the systems capabilities. Additional functionalities such as mobile navigation and route planning are built in. When connected to a wireless network the system can provide real time updates to both management and work control. It will eventually be used for time accounting of field workers. One of the updates in development would allow seamless integration of sampling data contained in external databases, opening the door to a standardized system that could be used across SRS disciplines. Currently SRS maintenance and operations utilities are funding a new project based on the standardized EOIA system. It is entirely possible that in the immediate future one multi-disciplined trained field worker using this mobile tablet PC solution could do all environmental, emergency management, and utility inspections.

## REFERENCES

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