



**Title:**

eInspection Application  
OGSAIR Oil and Gas Surface Activities Inspection Report

**Category:**

Digital Government: Government to Business

**State:**

Pennsylvania

**Contact:**

Sean Crager, CIO  
Department of Environmental Protection  
[scrager@pa.gov](mailto:scrager@pa.gov)

**Project Initiation and End Dates:**

February 24, 2016 – November 17, 2016

## Executive Summary

The Pennsylvania Department of Environmental Protection has begun a massive modernization effort to address a decade's worth of cuts to its technology budget—many millions in lost investments and reduced capacity. When these cuts are adjusted for inflation, the divestment over fiscal years 2005 to 2015 is a net value of \$83 million. DEP has also taken considerable criticism regarding transparency and its ability to effectively execute its responsibilities due to lacking or aging technology systems and an overall reduction in total complement. The department has taken an aggressive approach to providing improved service offerings to both internal employees and external customers, focusing on the improvement of efficiencies and effectiveness through system improvements and business process reengineering. One of the key tenets of this modernization effort is the development of mobile technologies to increase the ability of field staff to interact and provide more timely information to the industries that they regulate and monitor.

The Department of Environmental Protection's mission is to protect Pennsylvania's air, land and water from pollution and to provide for the health and safety of its citizens through a cleaner environment. Protection of the vast array of land, water, and air is controlled by the different bureaus within the agency.

The DEP Office of Oil and Gas manages the laws and regulations regarding the development of oil and gas wells and associated activities. About fifty percent of their role is ensuring that surface activities are conducted in a manner that protects the health, safety, and environment of citizens in this Commonwealth. They are continuously evaluating environmental reporting procedures for ways to increase efficiency in processes without impacting environmental protection.

In alignment with the Governor's and DEP's strategic goal to increase efficiency through modernization and streamlining process and to address the significant increase in gas well development due to the Marcellus Shale gas boom, DEP looked at opportunities to streamline the DEP Oil & Gas Management Program Surface Activities inspection process. Driven by a need to provide a solution to enhance the information captured and recorded by DEP inspectors, DEP Bureau of Oil and Gas Planning and Program Management and DEP Bureau of Information Technology (BIT) worked together to design a mobile inspection application for the surface mine inspectors.

The eInspection mobile application has significantly changed the way the inspectors interact with the oil and gas operators. The eInspection application was designed with the capabilities of collecting and documenting information while onsite at an inspection, automatically updating/synchronizing the data to the enterprise database and producing the inspection results before leaving the site. The inspector uses the mobile application during the inspection, eliminating the need to return to the office to compile, summarize, and then input the inspection results into the enterprise database. All data is synchronized via cellular data connectivity in the field. The mobile application also includes enhancements that allows the inspector to capture photos and incorporate them into the inspection report, along with the notes or observations found during the inspection. The photos along with corresponding remarks under them, provide more detailed inspection observations to the oil and gas operators thus allowing them the ability to more effectively understand the deficiencies and provide for a more complete and thorough remediation. Results are also posted to the web data portal in a shorter period of time so that the public has access to recent and relevant data.

Providing mobile enhancements for field inspections of oil and gas surface activities will increase the number of inspections performed annually, reduce errors, significantly decrease the time for inspections to be reviewed, provide improved data in a timely manner to regulated industry, increase transparency, and ultimately ensure DEP is able to more effectively carry out its mission. Over time, the Department of

Environmental Protection is looking to increase the productivity of all its inspectors working to protect our air, soil and water by utilizing the mobile application technology for inspectors working in the field.

## Concept

The DEP Office of Oil and Gas manages the laws and regulations to ensure that surface activities pertaining to the development of oil and gas wells and associated infrastructure are conducted in a manner that protects the health, safety, and environment of the citizens. A major aspect of enforcing the laws and regulations is to conduct approximately 33,000 inspections during the critical stages of the surface activities performed by the oil and gas companies within the Commonwealth.

Pennsylvania Governor Tom Wolf has made investing more resources in inspections a priority. In alignment with the Governor and DEP's strategic goal to increase efficiency and eliminate waste through modernization and streamlining processes, DEP looked for opportunities to improve the inspection process, working diligently to move the inspection process and procedures into the digital age, as many are still driven exclusively by paper. Seeking a solution to enhance the information captured and recorded by DEP inspectors, DEP Bureau of Oil and Gas Planning and Program Management and DEP Bureau of Information Technology (BIT) worked together to design a mobile inspection application for the inspectors that will provide a benefit to the oil and gas operators, and remove the inspectors' redundant information entry process. It was determined by the DEP team that the mobile application created must provide inspectors with the ability to work more efficiently and with more consistency and provide immediate results of the surface activities inspections to the oil and gas operators.

The mobile application would be developed to meet these goals:

- Provide the inspectors with a mobile application to record inspection results in real time and automatically populate the results to the DEP enterprise database.
- Provide the inspectors access to permit(s) information, previous inspections reports, citizen complaint data, well pad information, and open violations stored on the DEP enterprise database while conducting the inspection.
- Provide the inspectors the ability to consult regulations and guidance documents available on the iPad, while onsite at the inspection, alleviating the need to carry heavy manuals/regulations.
- Provide the ability to copy inspection reports to serve as a template for additional inspection reports being written for the same site.
- Provide the ability to filter through 1,000 + regulation citations, based upon subject category and sub- category, to provide the inspector with a short list of relevant citations to choose from.
- Provide the ability to take photographs with the iPad that will automatically be incorporated and formatted into the into the inspection report.
- Provide internet connectivity as a resource in the field.
- Capitalize on features available from downloaded products like Terrain Navigator to map, search and collect field and parcel data and generate a detailed map picture of the inspected area.
- Provide real time signed inspection results to the oil and gas operator, significantly reducing the delays experienced prior to the mobile inspection.
- Provide the ability for the DEP inspector to spend more time in the field to perform additional inspections.
- Provide inspections results to the web in a shorter duration for public review and consumption.

Prior to updating the inspection process, the DEP surface activities inspectors pulled and reviewed paper files in the office of the sites to be inspected; traveled site to site; ultimately recording the inspection

results on a paper form, or into an electronic MS Word version of the form on their laptop. The process involved an inspector walking around an oil and gas site; taking photographs with a camera; interviewing people; writing notes on paper and recording the field instruments data in a notebook. When the inspector returned to their office during the week, they needed to rely on their notes; measurements and photographs to recall, compile and summarize each of the site inspection results, which may span up to 4 days' worth of oil and gas site inspections, into an inspection report form. The inspector would then enter the inspection results for each of the inspections into an application that updates the DEP enterprise database and web portal. The inspector would print a paper copy of the inspection report; sign it and submit it to their supervisor for approval. Once approved, the inspector would make a PDF copy of the approved signed paper inspection report form and attach it to an email that would be sent to the oil and gas operators. Additionally, the PDF file of the inspection report form needed to be uploaded to a shared folder and the paper copy sent to file. This caused a delay of the receipt of the inspection results for oil and gas operators and unnecessary costs to the DEP. Overall, the tasks of returning to the office to compile and enter the results of each of the inspections under the old system consumed about 20% of an inspector's work week. Additionally, all required information was not being entered into the enterprise database by the inspectors in a consistent manner.

DEP identified another state agency that had already successfully built and implemented mobile applications on the iPad for their agency's field staff. In support of the Governor's initiative for agency collaboration, DEP worked with the Pennsylvania Department of Transportation (PennDOT) to repurpose their user interface for the eInspection application, helping DEP accelerate the production release of the application. DEP avoided issues PennDOT had experienced by leveraging their lessons learned with mobile technology using an iPad.

Following best practices for agile project methodology, the eInspection project team worked with the Bureau of District Oil and Gas Operations by engaging subject matter experts in the surface activities inspector community. Together the team worked through requirements and solutions using a collaborative effort of the cross functional team. The surface activities inspectors were engaged on the team from kickoff through production implementation providing requirements and reviewing progress of the application as it evolved through the sprints. The project team gained confidence in the eInspection application by participating as active testers of the system and providing their input for future enhancements from end to end as it evolved through the agile process.

The eInspection application requirements included the following:

- Provide the inspector the ability to find the location of a well site, using the iPad GPS capability, while in the field.
- Provide the inspector the ability to retrieve well and site data from the DEP enterprise database and the details associated with the well site including permits, open violations, and previously approved inspection results, while in the field.
- Provide the ability to enter inspection results while in the field.
- Automatically generate an inspection report form that is automatically emailed to the oil and gas operator upon submission to the enterprise database.
- Prompting the inspector to submit all desired information to the enterprise database by making many fields required prior to proceeding to the next field.
- Establish business rules to ensure proper numbers, dates, and times are entered.
- Prompt the inspector to add narrative at stages when observations are being documented throughout the inspection process.

- Provide an internal process to establish connectivity to the DEP enterprise database, performing data validation and data formatting in a manner that enabled the mobile data to be stored in the DEP enterprise database.
- Provide the inspector the ability to capture photos, add comments and incorporate the photos into the inspection.
- While at the site, allow the inspector to electronically sign the inspection report using the iPad, and send it to his supervisor for approval or directly to the enterprise database.
- Provide a supervisor the ability to review and approve the inspection by creating a .Net based application for supervisors to use to access, review and approve inspection results remotely.
- The ability to collect data in an offline status that can be synchronized later due to limited connectivity in remote areas.

DEP decided to use the Apple iOS platform on the iPad to take advantage of the closed architecture and advanced technologies that provide end to end control and security for devices, data, and applications. The iPad also offered a superior end user experience, had extended battery life, and provided a reduced glare viewing surface for outdoor inspections.

The DEP surface activities inspectors are using the DEP eInspection application, on Commonwealth issued iPads, to record the mobile inspection results. Using the eInspection application, the inspectors record their observations of the various categories and sub-categories of statutory/regulatory requirements directly into the eInspection application. After the data is entered on the iPad, using the DEP connectivity architecture, the inspection results are validated, formatted, and stored in the DEP enterprise database. The eInspection application creates a PDF document that lists the results of each inspection category/sub-category topic that was inspected into a readable format for the end user. A significant enhancement to the electronic signature process includes the ability for the inspector to electronically sign the inspection report and submit it while at the inspection site. The electronic signature will eliminate the exorbitant administrative steps of printing the inspection report, signing it and creating a PDF file in-order-to email a copy to the operator. This will eliminate expenditure of time, paper, and physical filing cabinet storage while speeding up the delivery of the inspection results to the oil and gas operators thus allowing them the ability to remediate any inspection deficiencies in a timely manner and reducing the duration and impact of the deficiency.

The link between the eInspection application and DEP's enterprise database was developed by DEP using the Oracle Service Oriented Architecture (SOA) Suite 12c software. It supports all the capabilities needed to deliver robust, agile, and reliable SOA services and solutions. This software provides detailed analytics to avoid performance, security, and scalability issues. SOA provides easy management of the services and will allow for "plug-and-play" with this application and all future applications accessing the DEP enterprise database.

On November 17, 2016, the eInspection application began with a pilot of 12 surface activities inspection field staff equipped with iPads. By February 16, 2017 all 46 surface activities field staff were trained on how to use the iPad eInspection application and started using it for their field inspections. DEP is also currently building dashboards to allow for management staff to monitor and evaluate the efficiencies created by moving to a mobile solution.

### Significance

Governor Tom Wolf is committed to government reforms that increase efficiency, he has been praised statewide for his moves towards transparent government that works in Pennsylvania. This project aligns with Governor Tom Wolf Executive Order establishing the Governor's Office of Transformation, Innovation, Management and Efficiency (GO-TIME) working to modernize government operations to

reduce costs and improve services. GO-TIME works with agencies, boards and commissions to identify opportunities to share resources, collaborate, and engage employees in transformational activities.

The eInspection application aligns with the following NASCIO 2016 state CIO priorities:

Security and Risk Management – DEP’s use of the Apple iOS platform on the iPad provides the advantage of a closed architecture and advanced technologies that provide end to end control and security for devices, data, and applications. The iOS platform conforms to the DEP IT, and Commonwealth of PA standards providing secure customer information while ensuring system performance.

Consolidation/ Optimization – Elimination of the dual entry process, along with optimizing the inspection application brings with it the ability to provide the inspection results to the oil and gas operators instantaneously, containing more thorough and consistent results, including standardized violation citations in the inspection report. There is an added benefit to both the inspector and the oil and gas operator that the iPad has reference materials, such as regulations, manuals, and guidance documents available for any questions or concerns raised during an inspection. The mobile application also increases data quality through use of required fields, data validation and pre-filled data fields.

Enterprise Vision and Roadmap for IT – eInspection aligns with the DEP and Governor’s strategic goals, and the Commonwealth’s overall IT vision and roadmap. The application enhancements are included in the efficiencies identified in the GO-TIME project, working to modernize government operations to reduce costs and improve services.

Budget Cost and Control – DEP reduced development costs by repurposing an existing iPad mobile application helping to accelerate the production release of the application. A considerable amount of paper and resource time will be saved due to the paperless nature of the application. Inspector time will be saved by reducing redundancy, travel time, and regular office visits.

Agile and Incremental Software Delivery – The eInspection application was developed using Agile best practices, utilizing an iterative development approach. Benefits of using the Agile process included engaging the team of inspectors to assist with the application requirements, and providing input when prototyping the application features, and participating in the test process as iterations were released.

## Impact

The process of recording an inspection was a double entry process, recording on paper and after returning to the office to update in the DEP enterprise database. The use of the eInspection mobile application will transform the way inspection information is collected, recorded and reported back to the oil and gas operator operators.

Immediate impact of the eInspection application includes the following

- More thorough and detailed inspection reports for oil and gas operators, by enhancing the inspection report’s format to be easier to read, including notes relating to the photographs
- Automatically generated emails sent to the oil and gas operator with the inspection report attached allowing operators to begin work on remediation in a shorter duration of time.

- Public availability of the inspection reports within 48 hours via the agency's data portal website.
- Improved consistency of information provided in the inspection reports by incorporating business rules to prompt the inspector to input required information.
- More consistent violation citations by incorporating a filtering process programed in the application which only displays the relevant citations based upon the category/subcategory being inspected.
- The end to a double entry system—inspections conducted with carbonless paper and then keyed into the DEP enterprise database will be replaced with the synchronization process from the mobile app.
- Improved data quality through use of required information fields, additional data validation and more pre-filled data fields.
- Inspectors are now able to spend 5 days in the field, eliminating the need to return to the office to enter the inspection information into the DEP enterprise database. Productivity increase of 20%.
- Alleviate the need for additional filing room space by going paperless.
- The eInspection pilot application is designed to be extensible. Future enhancements will serve other DEP agency inspection types.

By using the mobile application, the inspectors have reduced costs by reducing the number of trips back and forth between the inspection sites and the office. Inspectors spend less time pulling files for inspections and organizing inspection results for updates when returning to the office, since the results are capturing during the inspection. The iPads are equipped with a GPS feature, that can be used to help inspectors, while out in the field, locate the surface mine and drive to the location. While working in the field, the inspector can stay in close contact with the office, easily accessing their Outlook email accounts.

Use of the eInspection application for field inspections of oil and gas surface activities will increase the number of inspections performed yearly. All 46 oil and gas surface activities inspectors are currently using eInspection and DEP is currently developing a version for 32 oil and gas sub-surface inspectors.

DEP has also conducted an analysis of all inspection and field activities within DEP to identify candidates for mobile application development. With a shrinking workforce and stale or reduced budgets, any efforts that increase the effectiveness of the existing workforce pay dividends in multiple ways. DEP is committed to providing the best possible service to its customers while supporting its mission to protect Pennsylvania's air, land, and water from pollution and to provide for the health and safety of its citizens through a cleaner environment.