Introducing an Online Interface for Locating Abandoned and Orphaned Wells in Tioga County

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ABSTRACT

This project is focused on the discovery and mapping of abandoned, orphaned, and plugged gas and oil wells in Tioga County, Pennsylvania. This data is plotted using GIS and presented by online maps published on ArcGIS Online as mobile phone apps accessed via mobile browser. Visitors to this map, the informational app, can view known active and inactive wells, in addition to local watersheds and streams. A second online map and phone app presented by Cecil Cooper will also allow for individuals to report newly discovered abandoned wells. Knowing the location of these abandoned wells is crucial for both the petroleum industry and for individuals to prevent further environmental and safety concerns, including “blowouts” caused during exploration of new sites and prevention of further pollution by tracking water leakage into local watersheds.

RATIONALE

With an estimated 200,000 abandoned, orphaned and lost wells in Pennsylvania, knowing not only the location but also the status of these wells is paramount. Abandoned wells are defined as a well no longer in use, whether dry, incomplete or no longer productive, while orphaned wells are those that have not been plugged and are no longer supported financially by a company. With continued exploration of the Marcellus and Utica Shale deposits within the state, each unplugged well is an environmental disaster waiting to happen, as newly drilled wells can intercept unknown older wells and cause “blowouts” of polluted water. Pennsylvania’s DEP has a well plugging program; however, it is underfunded and understaffed. With public participation and input, the locations of these wells can be recorded and reported. By facilitating both the location of these wells to stakeholders, and allowing the report of these wells from the public to the DEP for plugging and remediation, this project will help to keep the land and waters of Pennsylvania clean and usable for today and the future generations.

STUDY AREA

The focus of this project is Tioga County, Pennsylvania (Figure 1) because of historic oil exploitation and more recent natural gas development driven by fracking. The primary exploration of the Marcellus Shale formation began in 2005 and ended in 2013. Further exploration of the Marcellus and Utica shale deposits within the state, each unplugged well is an environmental disaster waiting to happen, as newly drilled wells can intercept unknown older wells and cause “blowouts” of polluted water. Pennsylvania’s DEP has a well plugging program; however, it is underfunded and understaffed. With public participation and input, the locations of these wells can be recorded and reported. By facilitating both the location of these wells to stakeholders, and allowing the report of these wells from the public to the DEP for plugging and remediation, this project will help to keep the land and waters of Pennsylvania clean and usable for today and the future generations.

METHODS

Initial data was compiled from the Pennsylvania DEP’s Gas and Oil Well mapping database using criteria was to show only abandoned, plugged, or orphaned gas and oil wells within Tioga County, PA (Figure 2). Figure 2 displays a map of known abandoned wells in the county from this interface. Figure 3 displays additional well locations from a separate PADEP database and other well locations derived from other records. Figure 3 also includes information such as municipality and political locations to aid stakeholders in planning and remediation of such wells. Together, the data from Figures 2 and 3 serve as the basis for our informational app.

Additional historical records published by the Pennsylvania Geological Society and housed in the North Hall Library at Mansfield University also suggest the presence of potentially hundreds more abandoned and orphaned wells in the county (Figure 4). Mapping and confirmation of these well locations is still in progress and will be included in the well informational app when confirmed via field observation.

PADEP’s online abandoned well interface denotes a total of just 24 abandoned, orphaned or plugged gas and oil wells in Tioga County (Figure 2) Separate data from DEP and other sources shows 82 plotted abandoned, orphaned or plugged wells in Tioga County (Figure 3), inconsistent with DEP online map.

Other historical records suggest a number of other abandoned or orphaned wells elsewhere in the county; mapping these wells for confirmation is still in progress (Figure 4).

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PRODUCT

The creation of these mobile apps allow for the compilation of known abandoned and orphaned wells locations, the presentation of these locations in an easy-to-use interface, and the ability for the larger community to add more wells as additional locations are found.

The informational app (Figure 5) will be extremely valuable to the general public as well as the ongoing oil and gas exploration in Tioga County. With each verified report the ecological safety of our state is that much more secure. Additional data will be reported using the Well Reporting App, and these locations will be field-verified before inclusion in this data set.

To visit these mapping apps, please visit the project website at http://wells.muearthlab.org or by scanning the QR code to the right.

FUTURE PLANS

The informational map of abandoned and orphaned well locations will be shared widely, not only with the government agencies tasked with remediating the wells, but with the local business community and other local stakeholders.

This map will serve as a central clearinghouse for abandoned well locations and data in Tioga County. As other data gathered from historical sources (such as Figure 4) and other sources (the Well Reporting App) is acquired, this data will be field-checked and added to the main informational app database.

To gather more data, we are currently developing connections to a number of key partners through outreach, including the DCNR, PA Game Commission, Penn State Agricultural Extension Office. PA Farm Bureau. Other outreach will include displays at the Tioga County Fair and local firearms shows. By engaging these stakeholders, we hope that these apps will become a platform to identify and locate abandoned, orphaned and lost gas and oil wells throughout the state.

SELECTED REFERENCES

- http://depgis.state.pa.us/PaOilAndGasMapping