

DEVELOPMENT OF A DATA MANAGEMENT SYSTEM FOR
ASSISTANCE IN CONDUCTING AREA OF REVIEWS (AORS) ON
CLASS II INJECTION WELLS IN OKLAHOMA

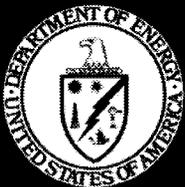
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By:
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**National Energy Technology Laboratory
National Petroleum Technology Office
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Class II Injection Wells in Oklahoma

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Abstract: The purpose of this project is to provide the resources and capabilities necessary to permit the State of Oklahoma to conduct Area of Review (AOR) variance analysis on a statewide level. The project allows for the analysis and identification of areas which may qualify for AOR variances, the correlation of information from various databases and automated systems to conduct AORs in area which do not qualify for variances, the evaluation of the risk of pollution, during permitting and monitoring, using risk-based data analysis, and the ability to conduct spatial analysis of injection well data in conjunction with other geographically referenced information.

I. Executive Summary

The Oklahoma Corporation Commission is committed to assisting the oil and gas exploration and production industry in our State. This project saves the State and the E&P industry much time, effort and resources in our environmental protection efforts. We are actively combining the various data base resources available at the state level and the private sector. This enables the state to review existing and new permit applications for compliance with existing standards.

The commission was unable to complete the project by the scheduled extension date of March 13, 1999. As of this date, the Commission has yet to complete the entire stated scope of this project. The Commission has found that collecting and automating data functions that previously existed only in manual form to be difficult. Several functions within the scope of the project however have been completed and implemented. Other functions within the scope of the project are still in the developmental or testing stages. Since the scheduled completion date, the Commission has continued to fund this project through its own internal resources and will continue such until the project's scope is fully implemented. The Commission's dedication to the development of Oklahoma's oil and natural gas resources is substantial and commensurate to the value of this industry to the State of Oklahoma.

II. Introduction

This project has one primary objective. This objective is to provide the resources and capabilities to permit the State of Oklahoma to conduct Area of Review (AOR) variance analysis on a statewide level. This objective includes four primary tasks: 1) the analysis and identification of areas which may qualify for AOR variances; 2) the correlation of information from various databases and automation systems to conduct AORs in areas that do not qualify for variances; 3) the evaluation of the risk of pollution, during permitting and monitoring, using risk-based data analysis; and 4) the ability to conduct spatial analysis of injection well data in conjunction with other geographically referenced information.

The Corporation Commission is completely rewriting its oil and gas data management system to meet this objective and perform the tasks stated. This is a long, complicated and often frustrating process. All the equipment and software have been purchased and installed. The production servers and personal computers have been installed in the central office and the personal computers installed in the four remote district offices. All are functioning as designed. This has enhanced the communication with our remote offices.

Many data were made available through the private sector (Information Handling Services or IHS) and previously through a DOE contractor, BDM Oklahoma. The state also contributed \$170,000 toward the data entry of well plugging information for the project and has dedicated a full-time employee to remap the state's ground water resources. These data are required to fully implement the proposed operating system.

III. Results and Discussion

During the project the Oil and Gas Conservation Division employed professionals to assist in the reconciliation of the UIC data base with that of the Well Data Maintenance System (WDMS), the division's main data base. The two systems were developed and maintained independently since UIC primacy was granted in 1982 and the well data maintained on the UIC data management system were incomplete. The data is still being corrected on a daily basis. This is and has been a major goal of the UIC Section and the Oil and Gas Conservation Division. The project has allowed the division to identify several problem areas in its day to day operations and data collection methods that have been corrected and is allowing a much cleaner and accurate database for use. Progress toward achieving the ultimate goals of this project hinges on compatible data. This is the most integral portion of this process and is ongoing.

The Commission's programming and technical staff completed all Oracle database software training courses. The new application specialists were hired and trained in Oracle programming. The major portions of the system rewrite, the database storage and browse functions, have been completed. The data entry screens are in development at this time. Likewise the GIS functions and the digitizing of the ground water information have not been completed.

The training for the ArcView GIS software was finally completed in the third calendar quarter of 2000. The training will continue as the software and GIS server becomes available for use by more personnel. The software is available to our district office personnel but has yet to be made available to our field inspection staff.

The last portion of the Oracle database software was installed to enable the web server to be able to run Oracle HTML applications. This will allow people to use the Internet to actually query and gather oil and gas information without having to physically come to the central office. The Commission received additional appropriations for the State Fiscal Year 2002 to assist in developing the web applications portion stated.

The project staff completed the development of and has implemented four major functions associated with the UIC Department. The implemented functions include the well inventory, 1015 permitting, orders, the 1012 annual reporting, and the mechanical integrity tests (MIT). Report generation and some smaller functions are still under development. The GIS functionality portion of the system is still pending. Accomplishment of this long standing goal is paramount to the division and the completion of the goals of the project.

One primary delay in the completion of this phase is the problem encountered in data acquisition from the Geoinformation Systems Department or the University of Oklahoma, the Natural Resources Information System or NRIS. The Commission believes strongly that the failure of the University of Oklahoma to release these data to the Commission is a violation of the Federal Freedom of Information Act and the State's Open Record Act. The NRIS data were originally created with federal funding assistance from DOE and the University of Oklahoma agreed to release these data to the Commission for our use. Although several verbal and written requests for information have been made to DOE regarding any and all agreements and contracts made with the University regarding the development, use and release of these data, no information has been forwarded. Much of the project's completion hinged on use of these data. These data are required for accurately displaying and mapping the wells within an area of review or within the zone of potential influence from an injection well.

The well spot information we have acquired from IHS but the well construction information we need from the University to fully implement the automation of this process.

The division has remapped the base of the drinking water as defined by the U.S. in 21 counties. We anticipate that the remapping phase will take another 3 years. Three additional central counties (the Oklahoma City metropolitan area) were remapped by a private contractor obtained by the Ground Water Protection Council. This will assist the State in this process. Once the counties are properly mapped, the maps will be converted to a digital format. This will allow the division to view the ground water information in the GIS analysis of the Area of Review.

The Commission did image all of its historic oil and gas well records (more than 2,000,000 pages). Many of the images need further indexing to fully automate the data retrieval functions anticipated as many historic documents lacked valuable key fields such as API Numbers. The division is currently performing Quality Assurance and Quality Control functions on these images as well as identifying and correcting index problems. The software used to store and retrieve the images (KeyFile) is being changed out to a more standard off-the-shelf TIFF storage and retrieval software. Once this process is completed, the well construction information acquired, the ground water information digitized, and the GIS functions implemented, the AOR process can be fully automated and the project fully completed.

IV. Conclusion

The complete development of the applications and the data collection and automation efforts are taking longer to achieve than previously believed. The commission then must test and implement the programming changes to ensure that all are functioning as planned. All the necessary hardware and software have been ordered, received, installed. All is functioning according to specifications. Data acquisition and reconciliation issues are still unsolved but possible solutions are present. The GIS functionality portion of the project is pending.

