

## **Characterization of the Moxa Arch for Geological Carbon Sequestration: Assembling Well Data and Assessing Spatial Locations**

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Carbon capture and storage (CCS) has been proposed as one means of reducing the emission of anthropogenic carbon dioxide over the next fifty years. Of the various storage techniques currently being investigated, geological sequestration has been advanced as a particularly promising method. Identifying, characterizing and validating geologic storage sites for safe carbon storage requires a large amount of geologic data. A primary source of this information is boreholes, primarily oil and gas wells, which penetrate the site. Boreholes provide a variety of indirect, i.e. logs, and direct, e.g. cuttings and cores, information. Thus, one of the primary tasks of site characterization process is to compile a catalog of the boreholes in the area of interest as well as the information available from them. Indeed EPA's new Class VI GS well regulation requires cataloging all artificial penetrations in the Area of Review (AoR) of a geological sequestration site.

As part of an investigation of the Moxa Arch's potential for sequestration, a catalog of boreholes in the project Area of Review (AoR) was completed. Because the Moxa investigation did not involve computational modeling of an injected CO<sub>2</sub> plume (an EPA requirement for defining AoR), the spatial footprint of the Moxa Arch seismic survey was used to define a provisional AoR. Data from wells in the AoR and a 500 m buffer were downloaded from the Wyoming Oil and Gas Conservation Commission website. Based on WOGCC's information, 94 wells were identified in the Moxa Arch AoR. These represent 17 operating companies with the majority of wells located on Federal land. Most of these wells were or are permitted as gas wells. Thirty-four percent of the wells in the AoR are permanently abandoned whereas 56 are producing gas wells. The majority of the wells in the provisional AoR are completed in the Frontier formation and none penetrate potential sequestration reservoirs or their seals.

To evaluate well location accuracy, the location of each well in the AoR was checked via a variety of mechanisms. First, well locations were compared to air photos to see if they plotted on visible well pads. Of the 94 wells in the AoR, 25 (27%) did not plot on visible well pads. However in all cases, there was a pad near the well. The positions of these displaced wells were subsequently field checked by GPS. One of the wells displaced from its pad is 6,925 feet to the southeast. Aside from this well, the average well displacement is 565 feet varying from 123 to 799 feet. All of these wells except two are displaced to the south. In addition, one well was identified in the field that did not show up in the WOGCC database.