

CASE STUDY OF DEVELOPMENT DRILLING AT MOORE-JOHNSON FIELD BEFORE AND AFTER AN EXPLORATION SOIL GAS SURVEY

Morrow Stateline Trend, Greeley Co., Kansas

A case study is presented that documents development drilling at Moore-Johnson (MoJo) Field in Greeley Co., Kansas both before and after an exploration soil gas survey was conducted by Exploration Technologies, Inc. (ETI) in April 1992. ETI conducted a proprietary four-foot exploration soil gas survey for a client in the area during April 1992 (Figure 1). The soil gas survey, consisting of 1034 sites, was conducted over a very large area from just south of Second Wind Field in Cheyenne Co., Colorado to two miles south and 5 miles southeast of MoJo Field in Greeley Co., Kansas (Figure 1). The 53 square mile area of the soil gas survey was conducted at the time when there were only 3 producing wells in MoJo Field. A portion of the soil gas data from this survey is presented in a four square mile area around MoJo Field (Figure 2).

MoJo Field in Greeley Co., Kansas was discovered in 1989. The oil wells were completed in the sands of the V-7 valley fill sequence of the Morrow Formation. This interval in the Morrow Formation was initially named the Stockholm Sand. By April 1992, 8 wells had been drilled in the immediate area of MoJo Field consisting of 3 producing wells and 5 dry holes (Figure 2). The purpose of the soil gas survey was threefold: (1) calibration of the survey to the production at MoJo Field, (2) to aid in further development drilling at MoJo Field, and (3) to determine other areas along trend that exhibited soil gas microseepage and therefore would have exploration potential.

An ethane concentration contour map, constructed from soil gas analytical data in the vicinity of the present day Mo Jo Field, is included as Figure 3. There are 14 new producing oil wells (drilled since April 1992) and they are located both east and north of the original 3 producing oil wells of MoJo Field and are located within the ethane soil gas anomalies (Figure 4).

There are presently 17 producing wells in MoJo Field (Bowen and Weimer, 2003). During development drilling after the soil gas survey (April 1992 to present day), in addition to the 14 new oil well completions, 7 additional dry holes were drilled. Clearly, 4 of these 7 dry holes (3 wells along the west edge of the field and 1 well in the northwest end) are definitely outside of any ethane soil gas anomalies and have no basis for being drilled based solely on geochemical data (Figure 4).

The success ratio at MoJo Field prior to the soil gas survey was 37% (3 productive wells, 5 dry holes; see Figure 2). This is considered a somewhat poor success ratio for development/exploitation drilling. Success ratio at MoJo Field after the soil gas survey was 82% (14 productive wells and 3 dry holes). This calculation disregards the four dry holes mentioned above that were not near geochemical soil gas anomalies. Therefore a case can be made that the soil gas survey increased the success ratio at MoJo Field by a factor of 2.2.

Reference

Bowen, D.W., and Paul Weimer, 2003, Regional sequence stratigraphic setting and reservoir geology of Morrow incised-valley sandstones (lower Pennsylvanian), eastern Colorado and western Kansas: AAPG Bull., v 87, n 5, p 781-815.

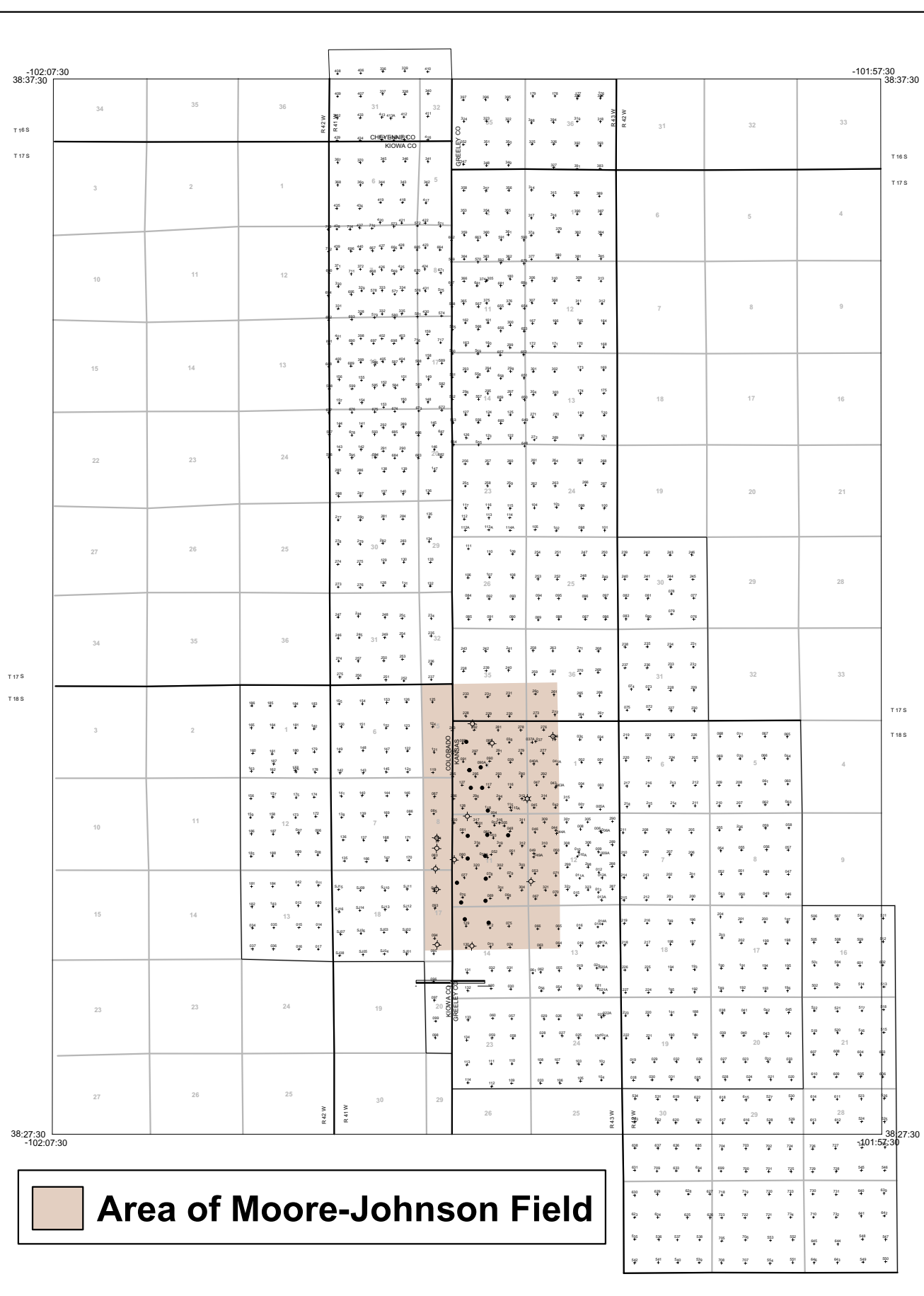
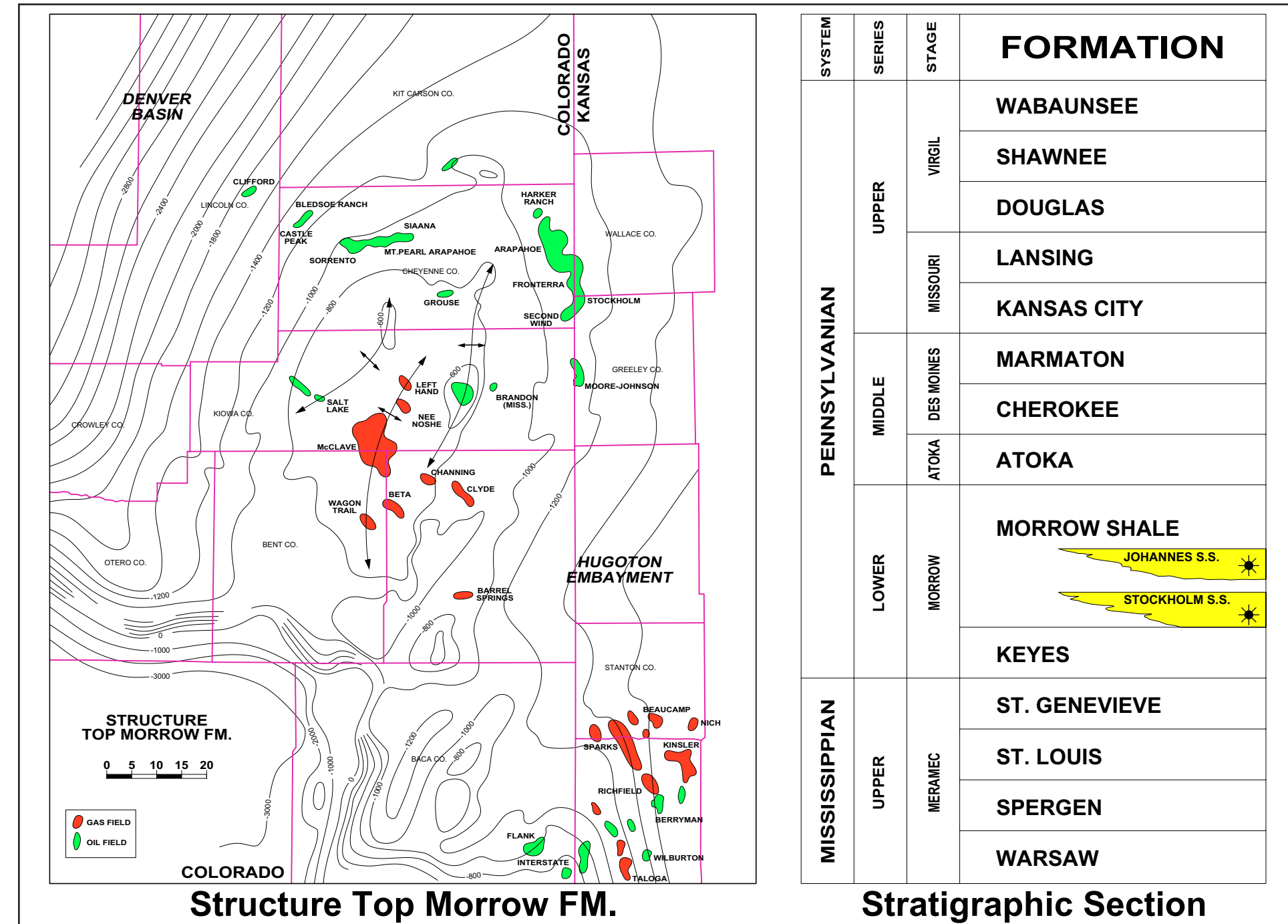


Figure 1
Location of Sites in Soil Gas Survey

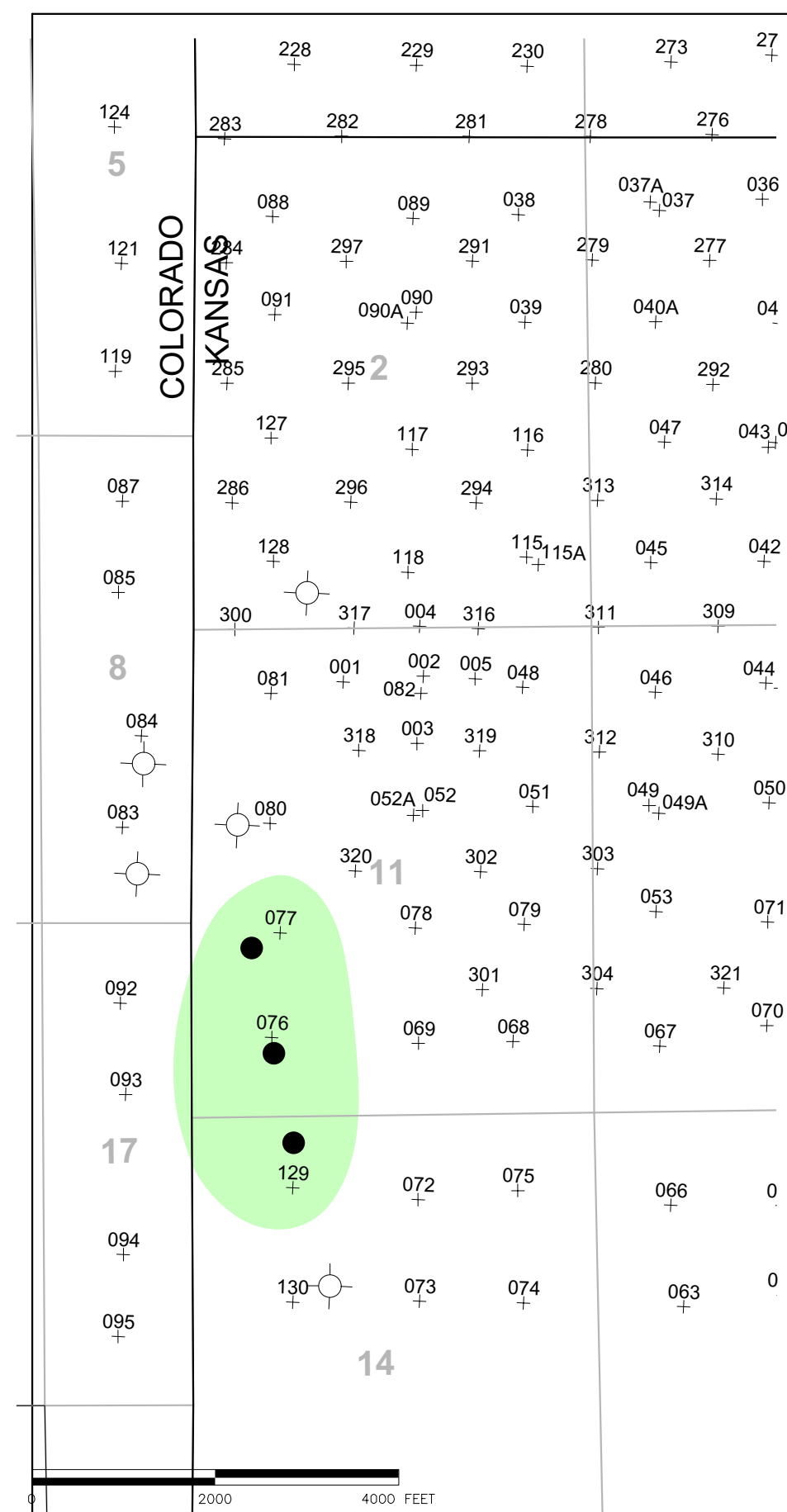


Figure 2
Location of Soil Gas Sites Moore-Johnson Field Area April 1992

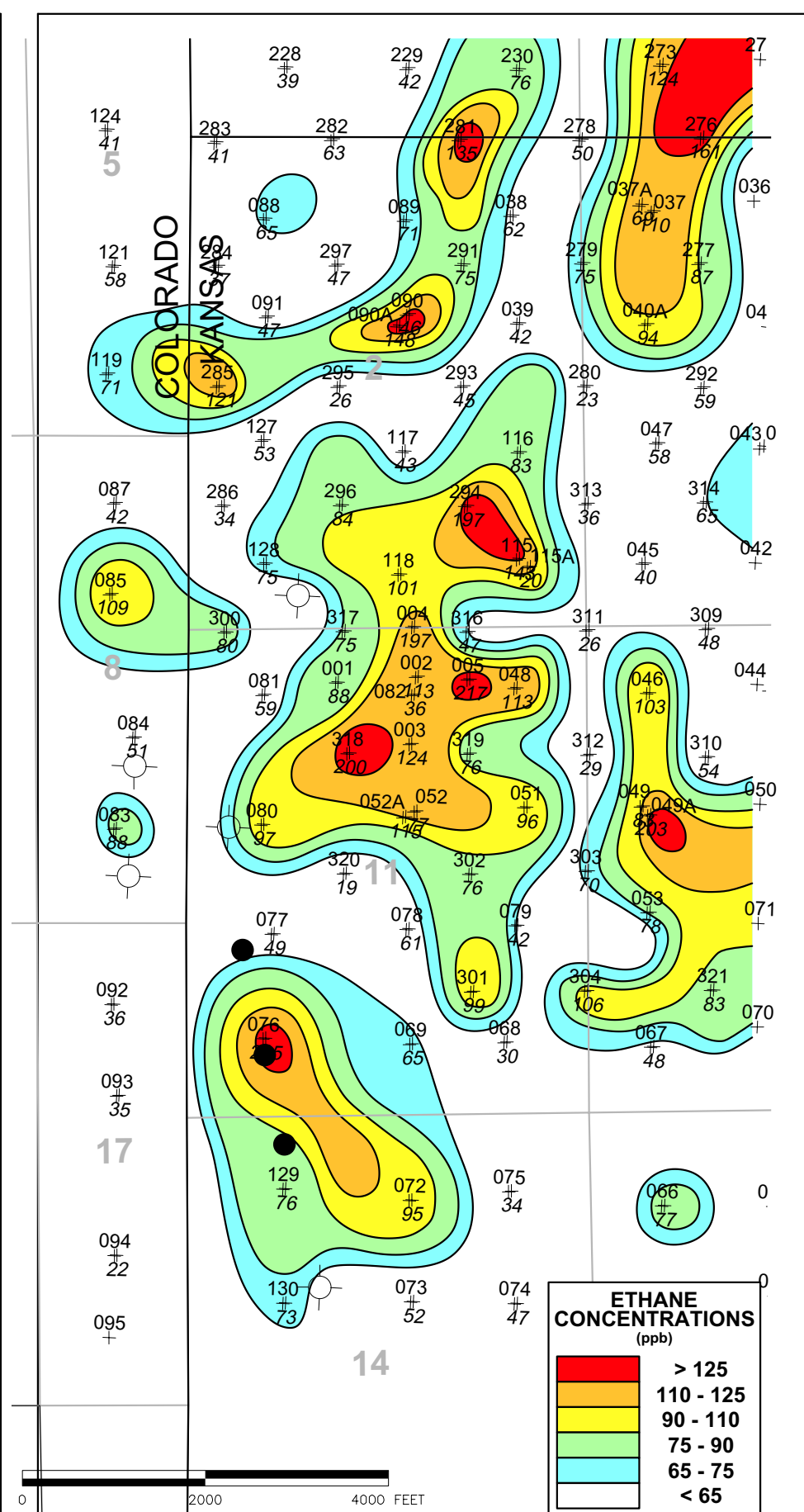


Figure 3
Contour Map of Ethane Concentrations (ppb) April 1992

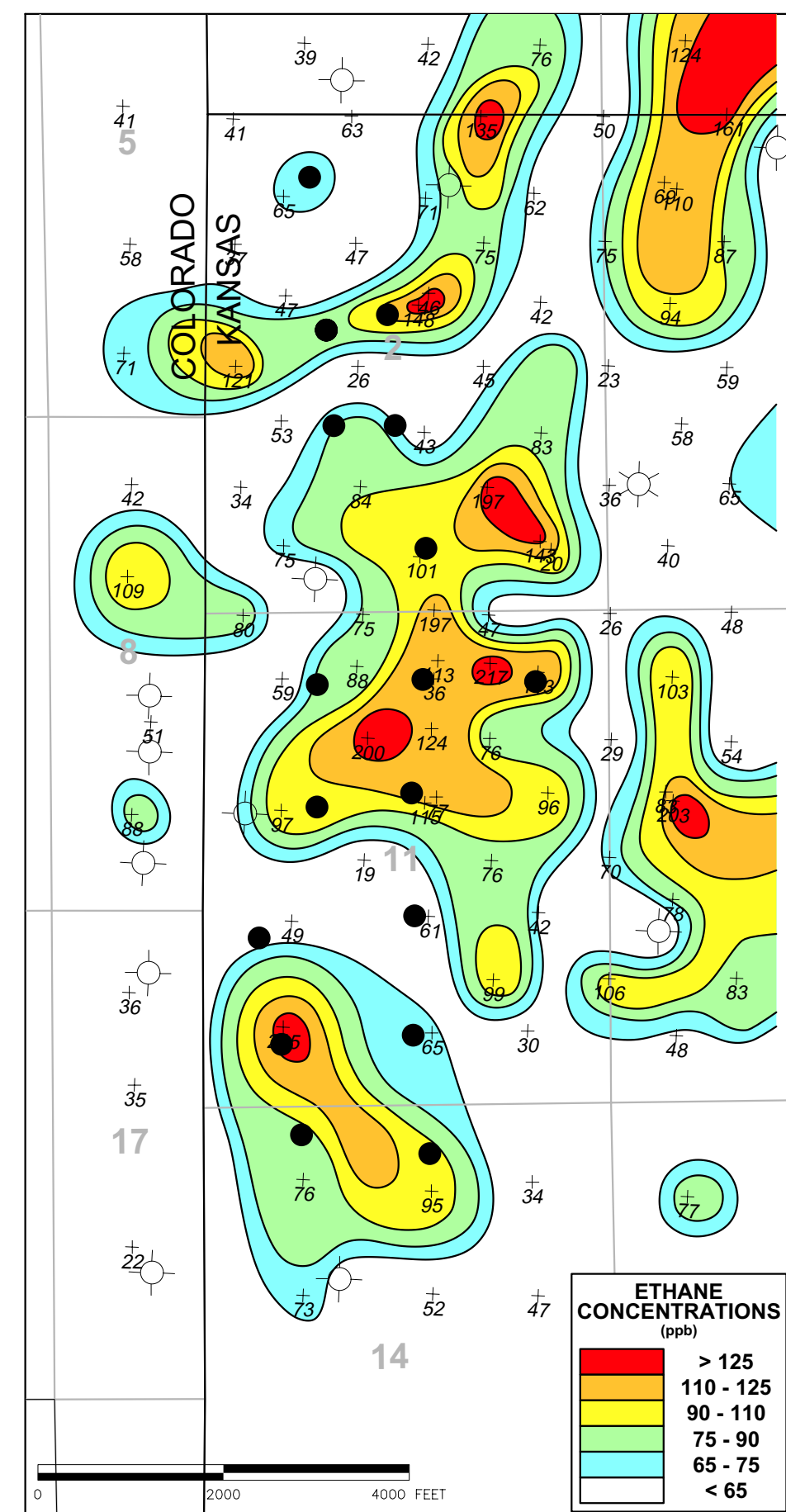


Figure 4
Contour Map of Ethane Concentrations (ppb) Producing Wells Drilled Since April 1992