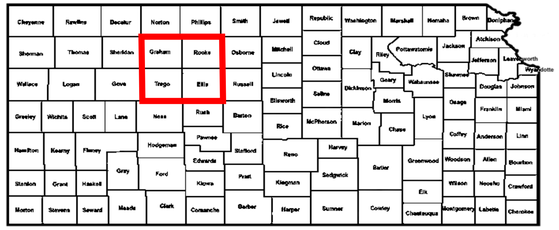
# SUBSURFACE MAPPING OF INTRA-ARBUCKLE SHALE USING GIS




FHSU GEOSCIENCES

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## ARBUCKLE FORMATION

- Discovered in the early 1900's and located throughout the central US.
- **Cambrian** and **Ordovician** in age (541-480 million years ago), and mostly made up of **Dolomite** and **Limestone** at **500 ft to 6000 ft**
- Arguably the most important formation to the Kansas oil industry having produced **35-40 % of all KS oil.**
- There is a lack of **Arbuckle Maps** and **Well Log Studies.**

## WHAT IS A SHALE?

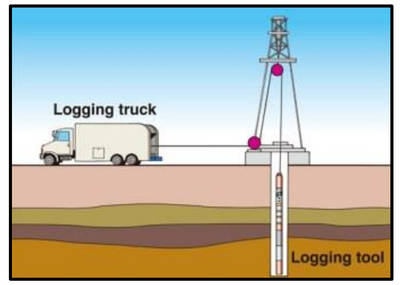
- A type of **sedimentary rock** made up of very small grains, mud, and clay.
- Can be highly **impermeable** and non-porous.
- They can act as a barrier, seal, or trap to hydrocarbon flow through a petroleum system.
- **Knowing the distribution** of a shale can be very important for understanding a petroleum system and its potentials.

## MICRO-RESISTIVITY WELL LOGS

- **Well Logs** are electronically generated measurements taken by lowering a special instrument down into a bore hole.
  - The **KGS (Kansas Geological Survey)** makes a majority of KS well logs available for public viewing.
- There are several different kinds of well logs like **Micro-resistivity, Gamma Ray, and Dual Induction Logs**
- Micro-Resistivity logs are used to measure resistance in a formation and can tell us if a formation is **Permeable.**

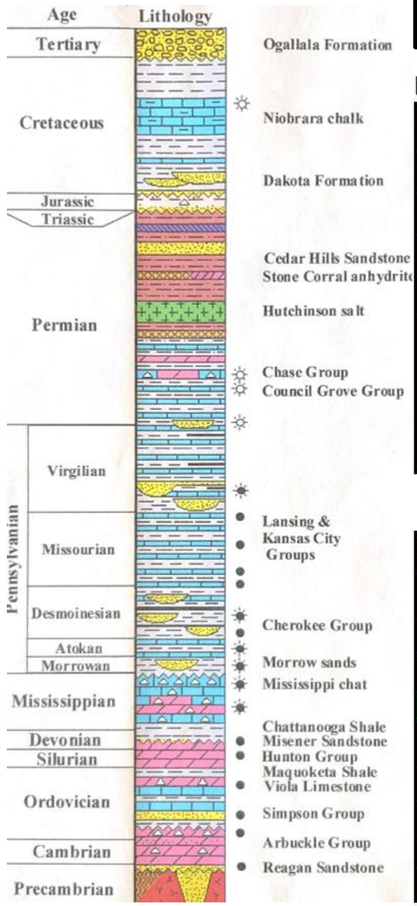
## GEOSPATIAL INFORMATION SYSTEMS

- GIS is a modern technology that has been used to create **data driven maps** like Google Maps. GIS can be used to determine **spatial characteristics** of a dataset. The software can be used to create road maps, vegetation dist. maps, precipitation maps, and even **Subsurface Geology Maps.**
- Using **IDW and Kriging** tools through GIS allows for the mapping of a dataset like the occurrence of the **Intra-Arbuckle Shale.**

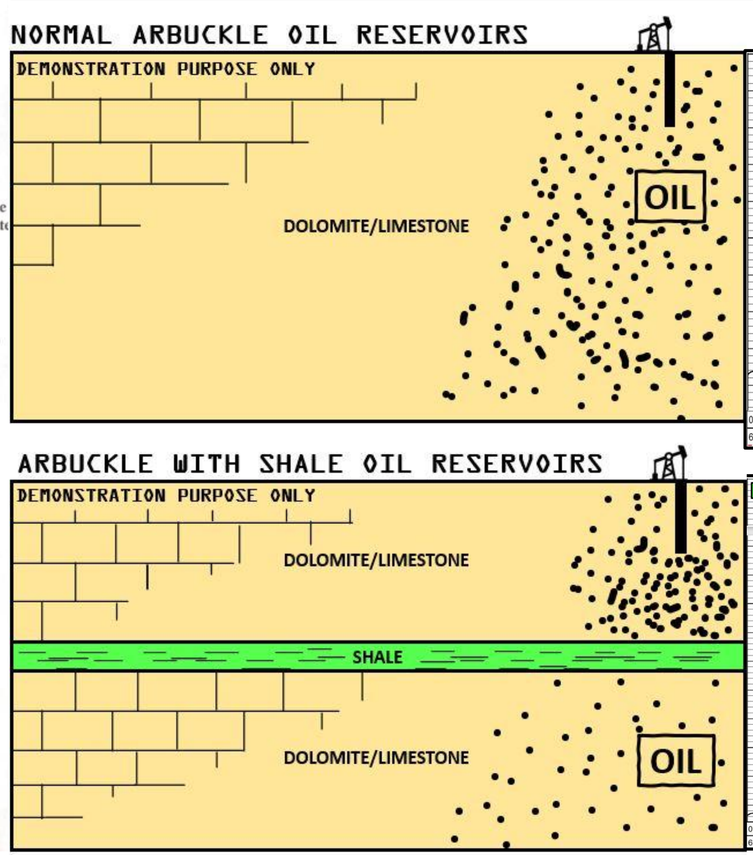




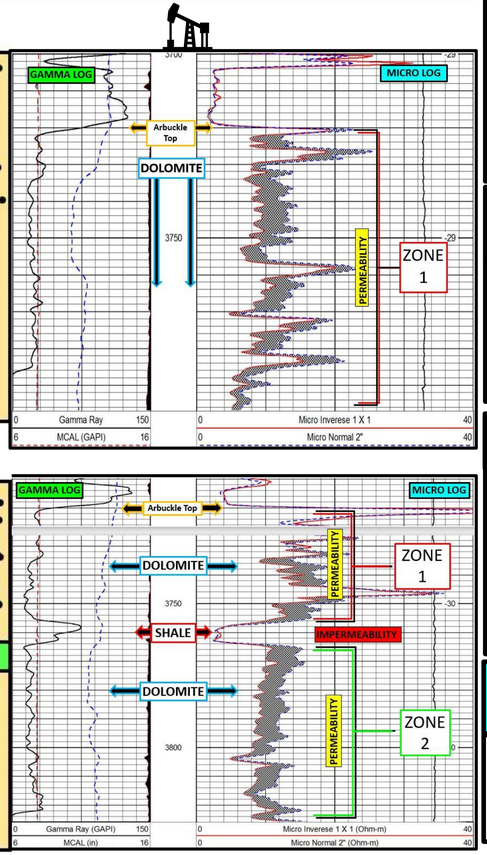
## MAPPING THE INTRA-ARBUCKLE SHALE




## WHY IS THIS IMPORTANT?




## GRAHAM Co WELL LOGS




**MAP**
OCCURENCE OF SHALE

GREEN = NO SHALE
YELLOW = LOWEST CHANCE
PURPLE = HIGH CHANCE
WHITE = SHALE PRESENT

**CONTOUR**
PROBABILITY OF SHALE OCCURENCE

INSIDE RED = HIGH PROBABILITY
OUTSIDE BLUE = LOW PROBABILITY

**MAP**
OCCURENCE OF SHALE

GREEN = NO SHALE
YELLOW = LOWEST CHANCE
PURPLE = HIGH CHANCE
WHITE = SHALE PRESENT

**CONTOUR**
PROBABILITY OF SHALE DEPTH

RED = 3900FT.
ORANG = 3850 FT.
YELLW = 3800 FT.
GREEN = 3750
BLUE = 3700