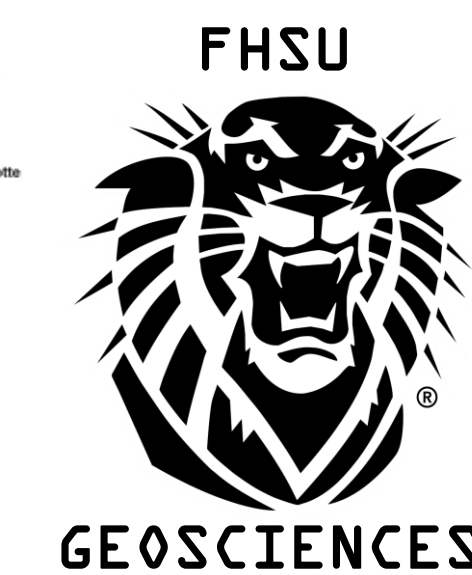


ARBUCKLE FORMATION

- 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.

SUBSURFACE MAPPING OF INTRA-ARBUCKLE SHALE USING GIS

Cherokee	Rowles	Decker	Norton	Phillips	Smith	Jewell	Republic	Washington	Marshall	Maraha	Brown	Dodge		
Shoeman	Thomas	Sheldahl	Graham	Rooks	Dubonia	Madell	Cloud	Clay	File	Antietam	Jackson	Atchison	Lansing	Wichita
Wallace	Logan	Gove	Trigo	Ellis	Russell	Lincob	Ottawa	Sabre	Stikinson	Malvern	Shelburne	Dodge	Franklin	Miami
Greely	Holbrook	Scott	Lane	Ness	Rush	Barton	Bice	McPherson	Marion	Chase	Collyer	Anderson	Lin	
Harbin	Keary	Flacey	Hodgden	Pawnee	Stuffed	Reno	Harvey	Greenwood	Woodson	Allen	Boatman			
Stanley	Grant	Haskell	Gray	Ford	Edwards	Pratt	Kiaghon	Sedgewick	Barber	Greenwood	Woodson	Allen	Boatman	
Morton	Stevens	Seward	Mead	Clart	Cowanche	Barber	Hager	Sumner	Covey	Cherokee	Rowles	Decker	Norton	Phillips



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GEOSPATIAL INFORMATION SYSTEMS

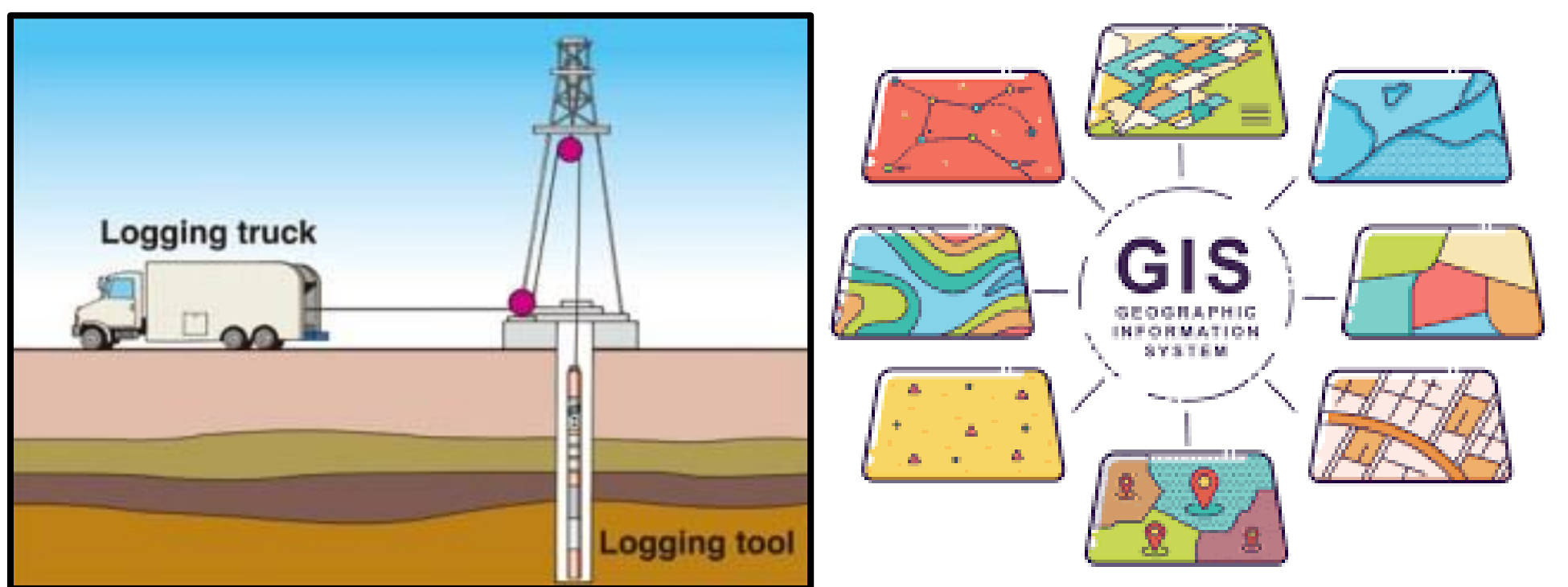
- GIS is a modern technology that has been used to create data driven maps like Google Maps. GIS can be used to determine spatial characteristics of a dataset. The software can be used to create road maps, vegetation dist. maps, precipitation maps, and even Subsurface Geology Maps.
- Using IDW and Kriging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

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

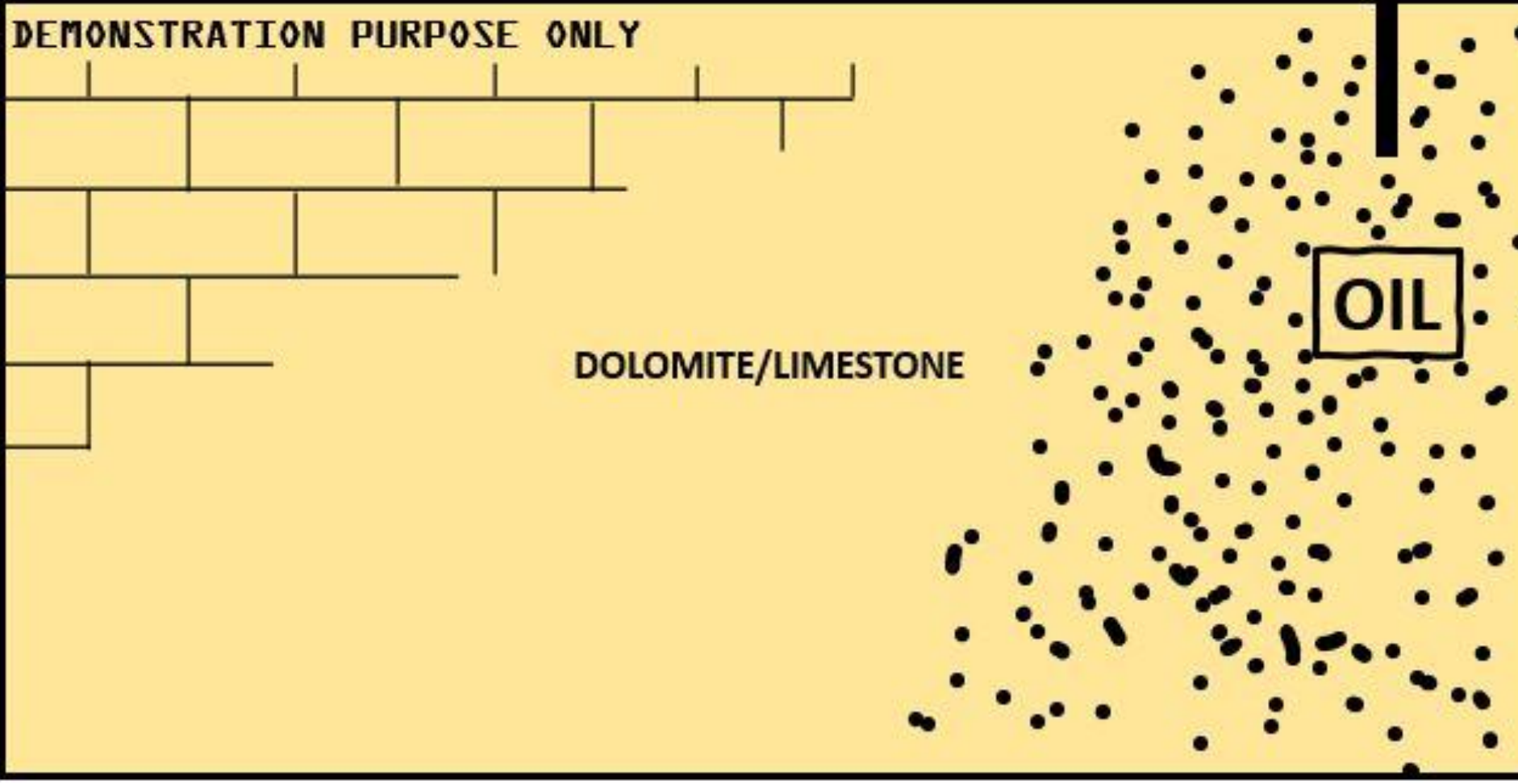
- Well Logs are electronically generated measurements taken by lowering a special instrument down into a bore hole.
 - The KGS (Kansas Geological Survey) makes a majority of KS well logs available for public viewing.
- There are several different kinds of well logs like Micro-resistivity, Gamma Ray,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



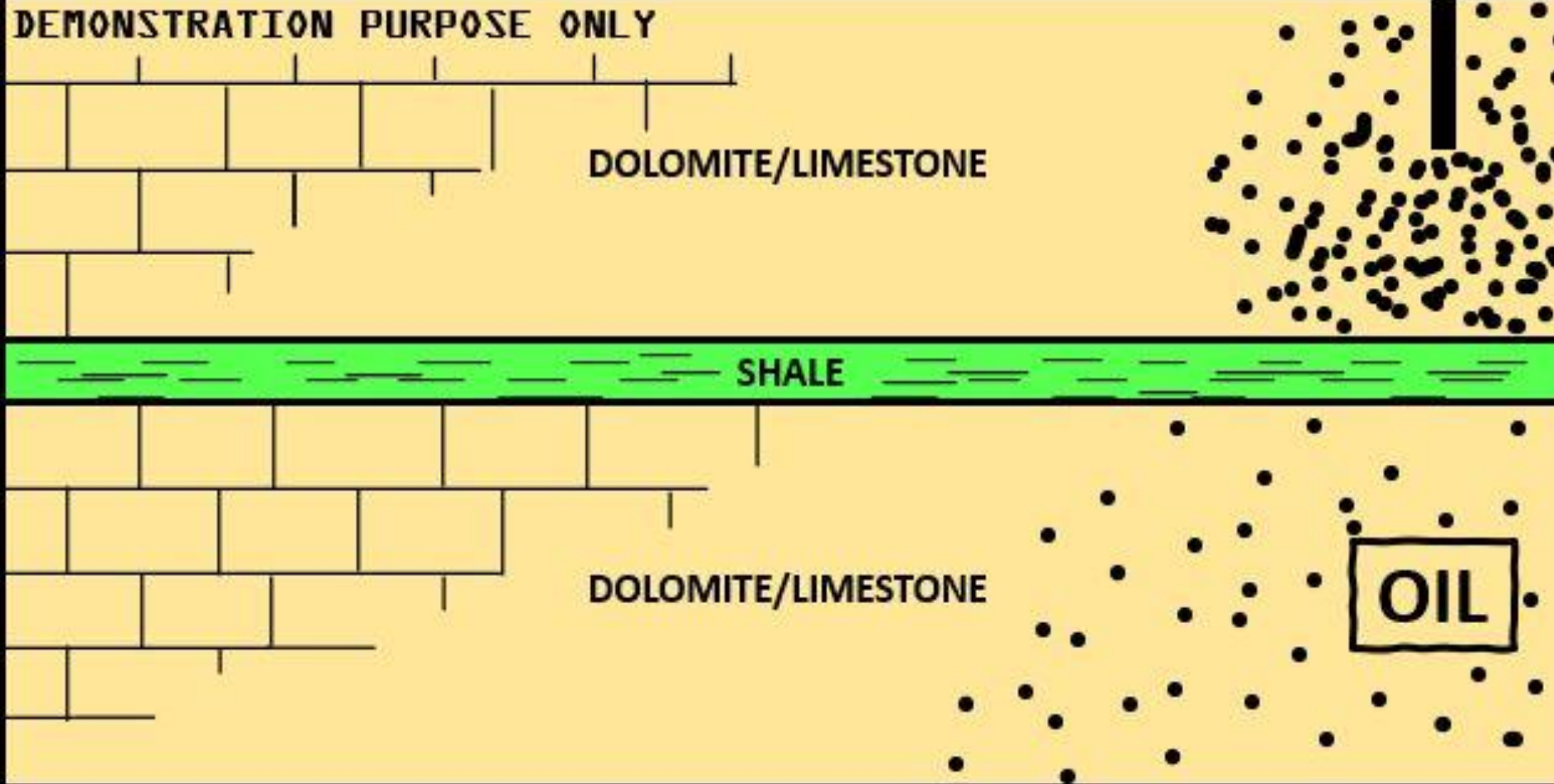
Age	Lithology
Tertiary	Ogallala Formation
Cretaceous	Niobrara chalk
	Dakota Formation
Jurassic Triassic	Cedar Hills Sandstone
	Stone Corral anhydrite
Permian	Hutchinson salt
	Chase Group
Pennsylvanian	Council Grove Group
	Lansing & Kansas City Groups
Missourian	Cherokee Group
	Morrow sands
Mississippian	Mississippi chat
	Chattanooga Shale
Devonian	Misener Sandstone
	Hunton Group
Silurian	Maquoketa Shale
	Viola Limestone
Ordovician	Simpson Group
	Arbuckle Group
Cambrian	Reagan Sandstone
Precambrian	

WHY IS THIS IMPORTANT?

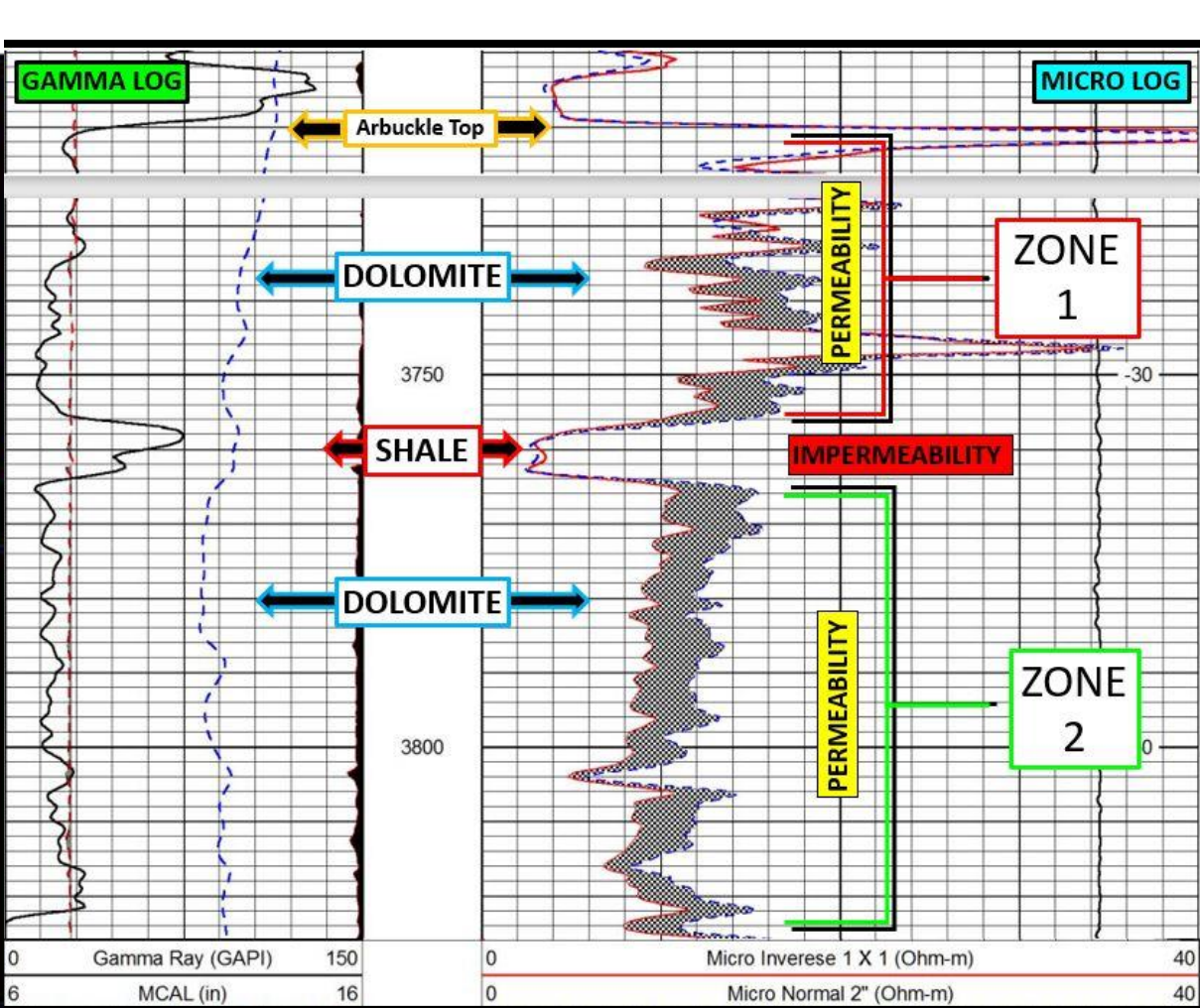
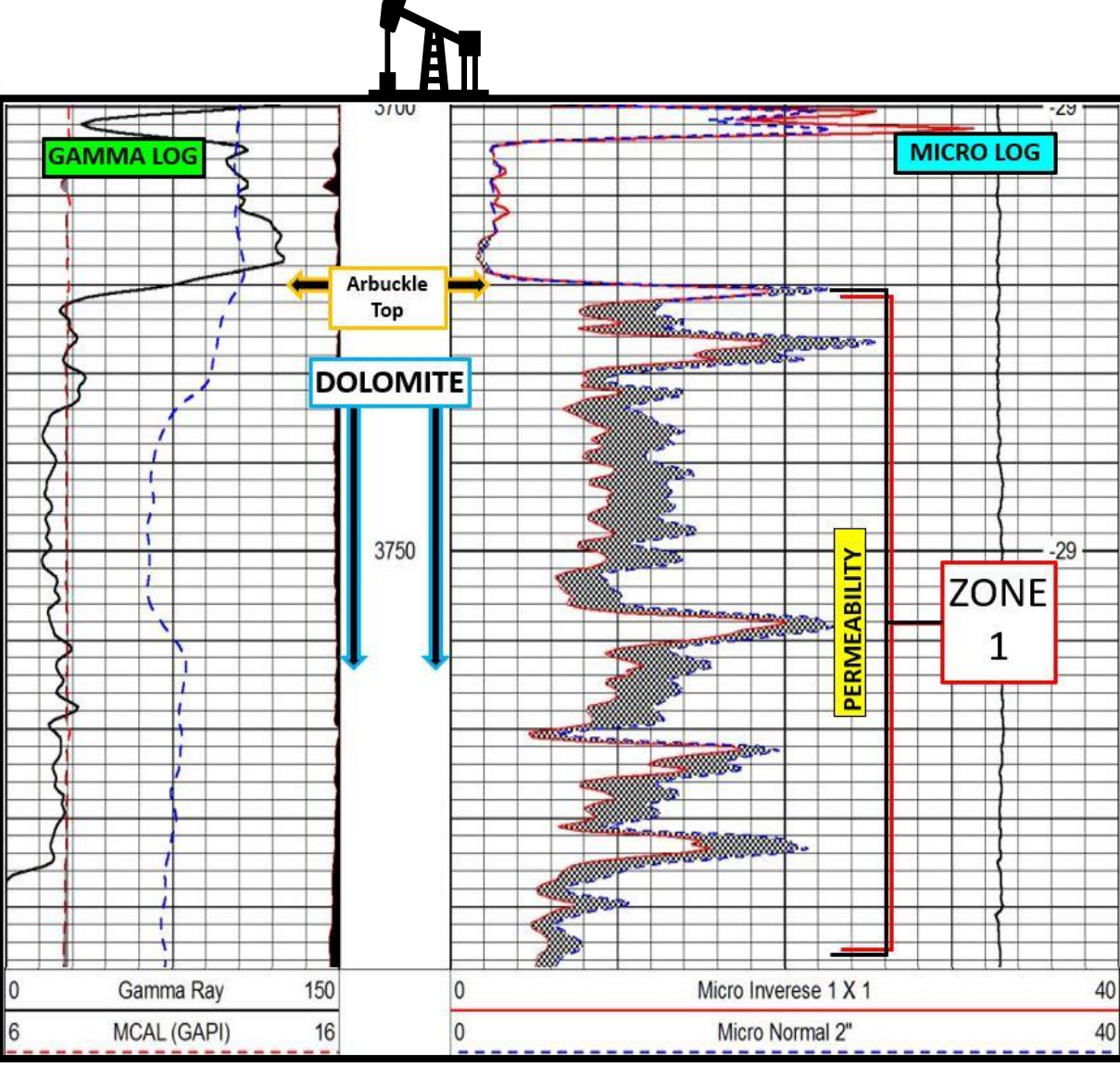
NORMAL ARBUCKLE OIL RESERVOIRS



ARBUCKLE WITH SHALE OIL RESERVOIRS



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

MAPPING THE INTRA-ARBUCKLE SHALE

