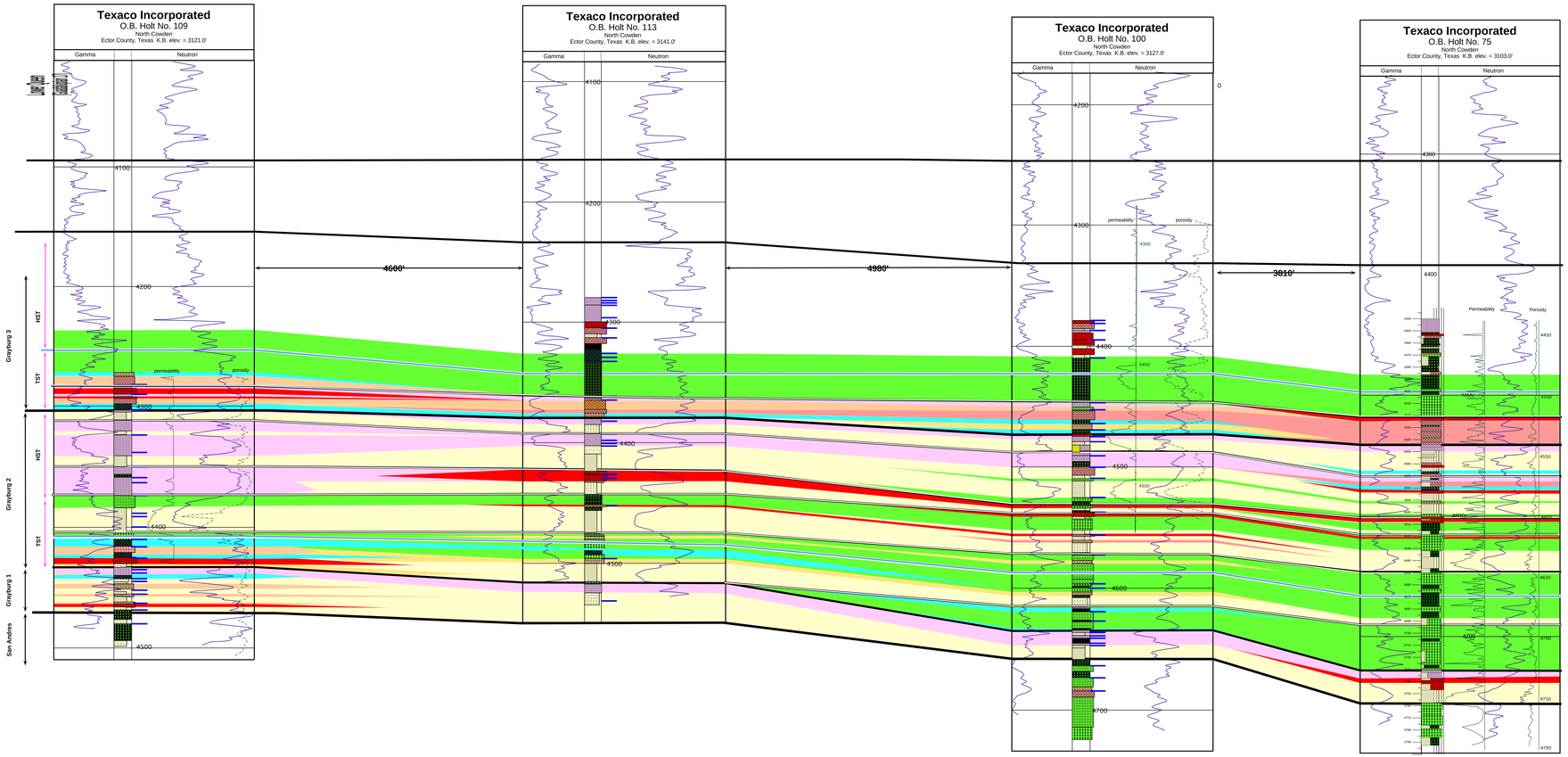
GRAYBURG FORMATION SEQUENCE FRAMEWORK

HOLT GRAYBURG UNIT



Texaco Holt Unit, North Cowden Grayburg Field, West-to-East Transect

Geology by C. Kerans, S. C. Ruppel, and Mike Ye
Constructed by Kirt Kempter and Mike Ye

Overview: This reservoir-scale cross-section (5 in=100 ft) covers the uppermost San Andres (Guadalupian 13) and the lower half of the Grayburg Formation using log, core description, and core analysis data. Production from the Grayburg Formation in the Texaco Holt area and in Amoco's North Cowden Unit immediately south is dominantly from sandstones within the Guadalupian 14b or Grayburg 2 HFS.

Stratigraphic Units:

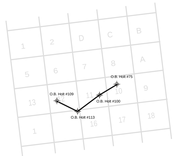
Guadalupian 13: Upper San Andres Guadalupian 13 strata are outer-ramp fusulinid-peloid grain-dominated packstones and packstones with minor intercalated dolomitic siltstone. The upper surface of the San Andres is a sharp truncation surface in the Holt no. 75 well on the eastern side of the cross section. This truncation surface, which is directly overlain by sandstone followed by fenestral peritidal carbonates, records a major facies tract offset associated with the upper San Andres-Grayburg sequence boundary.

Guadalupian 14a - Grayburg 1: The Grayburg 1 in this cross section consists entirely of aggradationally stacked peritidal cycles with siliciclastic-rich bases. Permeability in this interval is restricted to the eastern well, most of the more shelfward sections contain mud-dominated carbonates and dolomitic silts that are tightly cemented.

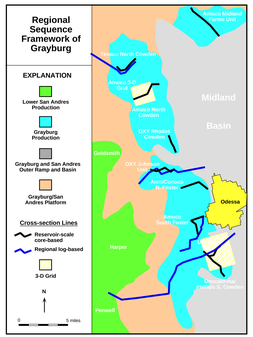
Guadalupian 14b - Grayburg 2: The Grayburg 2 contains retrogradational fusulinid-dominated cycles followed by aggradational cycles that contain peritidal facies on the shelfward side of the section and fusulinid outer ramp facies on the eastern side. A critical component of this HFS is the cycle-base siltstone-fine sandstones which form the dominant productive interval. On the east side of the cross section, both sands and carbonates contribute to the total Kfh of the reservoir, making a complex scenario for advanced recovery. The upper sequence boundary of the Grayburg 2, or Guadalupian 14b, is marked by basinward stepping peritidal capped cycles of the latest highstand followed by backstepping ooid-peloid facies of the Guadalupian 15a or Grayburg 3 HFS.

Guadalupian 15a - Grayburg 3: The Grayburg 3 is only partially cored in this data set, but does illustrate the major transgressive phase of deposition within the Grayburg, in this cross section and in the Permian Basin in general. A retrogradational cycle set of ooid packstones and grain-dominated packstone cycles followed by fusulinid-peloid wackestone-packstone cycles records this major transgression. The relatively "hot" gamma response of this cycle set reflects a high organic content rather than siliciclastic content, and carbonates are dark-colored and mud-rich. This flooding event is one of the key marker intervals in the Grayburg of the Permian Basin.

Location of Texaco North Cowden Cross-section
T & P. R.R. Co., Block 43, T-1-N



Bureau of Economic Geology



EXPLANATION

- Silty pisolitic wackestone
- Skeletal wackestone (mollusks, dasys)
- Fusulinid-peloid grain-dominated packstone
- Fusulinid-peloid packstone
- Fusulinid wackestone
- Cross-laminated to cross-stratified sandstone / siltstone
- Massive sandstone siltstone
- Dolomitic sandstone siltstone
- Burowed, silty peloid wackestone
- Dolomudstone
- Fenestral, sheet-cracked tepeed tidal flat cap
- Peloid packstone
- Skeletal peloid packstone / grain-dominated packstone
- Ooid-peloid grain-dominated packstone
- Ooid-peloid grainstone locally cross-stratified
- High Frequency Sequence boundary
- Maximum Flooding Surface (HFS scale)
- Cycle Sets
- Cycle Top