PART 1 PLATE 1
COUNTY GROUNDWATER STUDIES 24
BULLETIN 67

PLATE 1 GEOLOGIC MAP OF GRANT AND SIOUX COUNTIES

NORTH DAKOTA GEOLOGICAL SURVEY
NORTH DAKOTA STATE WATER COMMISSION

EXPLANATION

QUATERNARY SYSTEM

RECENT

Qa — Alluvium; yellowish brown silt, clay and sand.

PLEISTOCENE

Qt — Till; yellowish brown pebbly, sandy, silty clay.

TERTIARY SYSTEM

PALEOCENE

Tsb — **SENTINEL BUTTE FORMATION**
Interbedded carbonaceous shale, lignite, and light brown and light gray silt, clay and sand.

Ttr — **TONGUE RIVER FORMATION**
Interbedded carbonaceous shale, lignite and buff colored silt, clay and and; map unit includes Slope Formation.

Tlc — **CANNONBALL AND LUDLOW FORMATIONS**
Cannonball Formation--Interbedded yellowish brown, fine-grained sand and medium gray and brownish gray clay shales and silt.
Ludlow Formation, Tullock Member--Interbedded lignite and brownish gray to light gray silt clay and sand. Present as a thin band along contact with Hell Creek Formation.

CRETACEOUS SYSTEM

Khc — **HELL CREEK FORMATION**
Somber colored fine-grained sand, silt and carbonaceous and bentonitic clays.

Kfh — **FOX HILLS FORMATION**
Upper part: yellowish brown to light gray, fine to medium-grained sand.
Lower part: Banded beds of light gray and brownish gray silt, sand and clay, and beds of sand, yellowish brown, fine grained.

Kp — **PIERRE FORMATION**
Medium to dark gray shale.

SYMBOLS

Geologic contact

Geologic contact between Slope and Tongue River Formations

PLATE 2 CROSS SECTION OF LOWER CRETACEOUS FORMATIONS OF GRANT AND SIOUX COUNTIES

D

D'

5496
134-90-5 bd
Alt. 2420'KB.

4953
131-86-19 bb
Alt. 2009'KB.

6664
129-85-27 dd
Alt. 2331' K. B.

6143
130-81-32 cc
Alt. 2190 K.B.

G.R. Res. S.P. Res. S.P. Res. S.P. Res.

MOWRY FORMATION

NEWCASTLE FORMATION

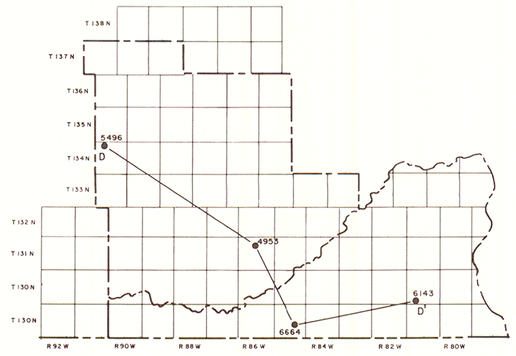
NEWCASTLE FORMATION

SKULL CREEK FORMATION

INYAN KARA FORMATION

JURASSIC SYSTEM

4000 4200 4400 3000 3200 3400 3400 2800 3000



EXPLANTION

DATUM-Top of Mowry Formation

Sandstone

Shale or Mudstone

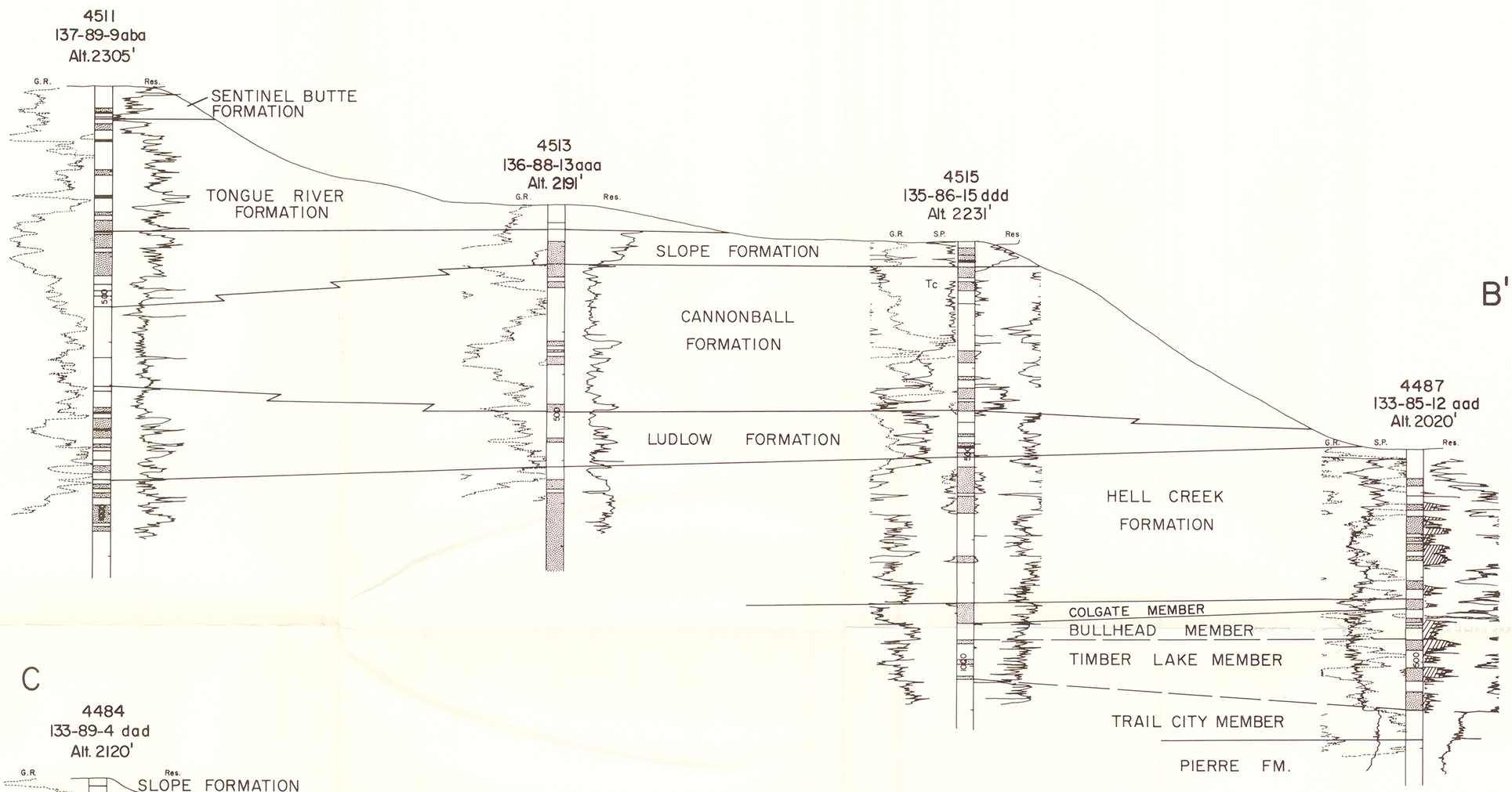
4200 Depth in feet.

K.B. Kelly Bushing

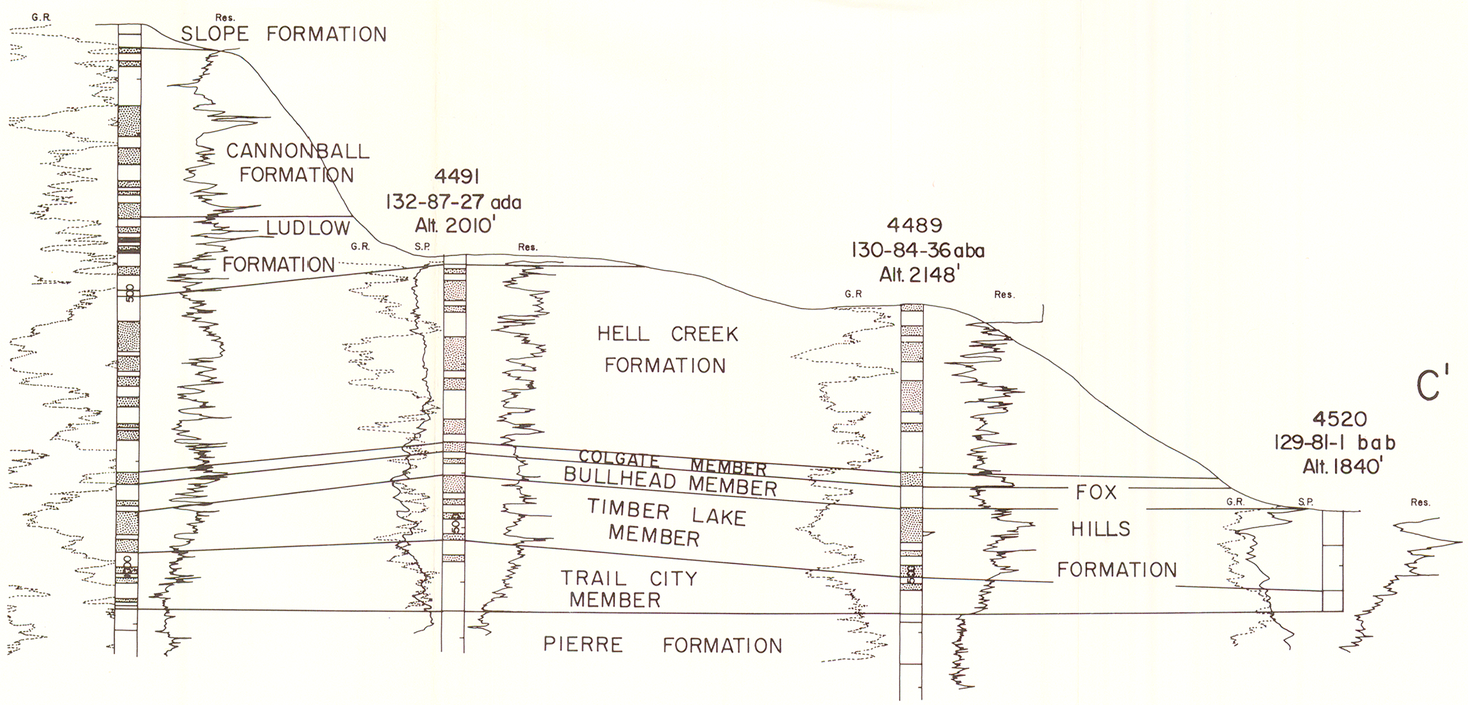
6143 NDGS Well Number

PLATE 3 CROSS SECTIONS OF UPPER CRETACEOUS AND TERTIARY FORMATIONS OF GRANT AND SIOUX COUNTIES

B



C



EXPLANTION

Datum - Top of Pierre Formation

4542 NDSWC Testholes

Sand

Fine Clastics, Silt or Clay and Lignite.

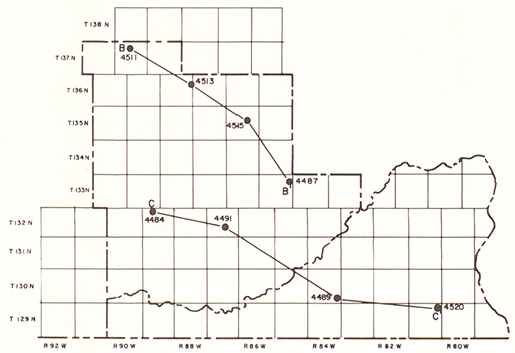
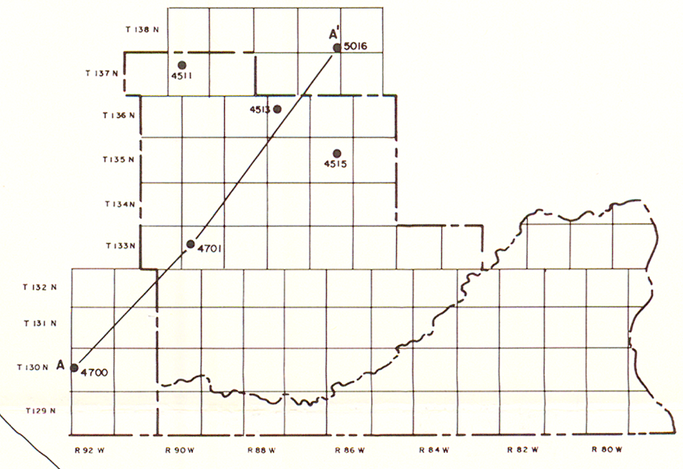


PLATE 4 CROSS SECTION OF UPPER CRETACEOUS AND TERTIARY FORMATIONS FROM ADAMS TO MORTON COUNTIES

A

4700
130-92-18 dc
Alt. 2485' K.B.

4701
133-89-19 cc
Alt. 2385' K.B.



TONGUE

RIVER

SLOPE

FORMATION

FORMATION

S.P.

Res.

SLOPE TONGUE

CANNONBALL

FORMATION

Tc

LUDLOW

FORMATION

Te

HELL

CREEK

FORMATION

FOX

HILLS

FORMATION

COLGATE MEMBER

BULLHEAD MEMBER

TIMBER LAKE MEMBER

TRAIL CITY MEMBER

5016
138-86-36 cd
Alt. 1930' K.B.

A'

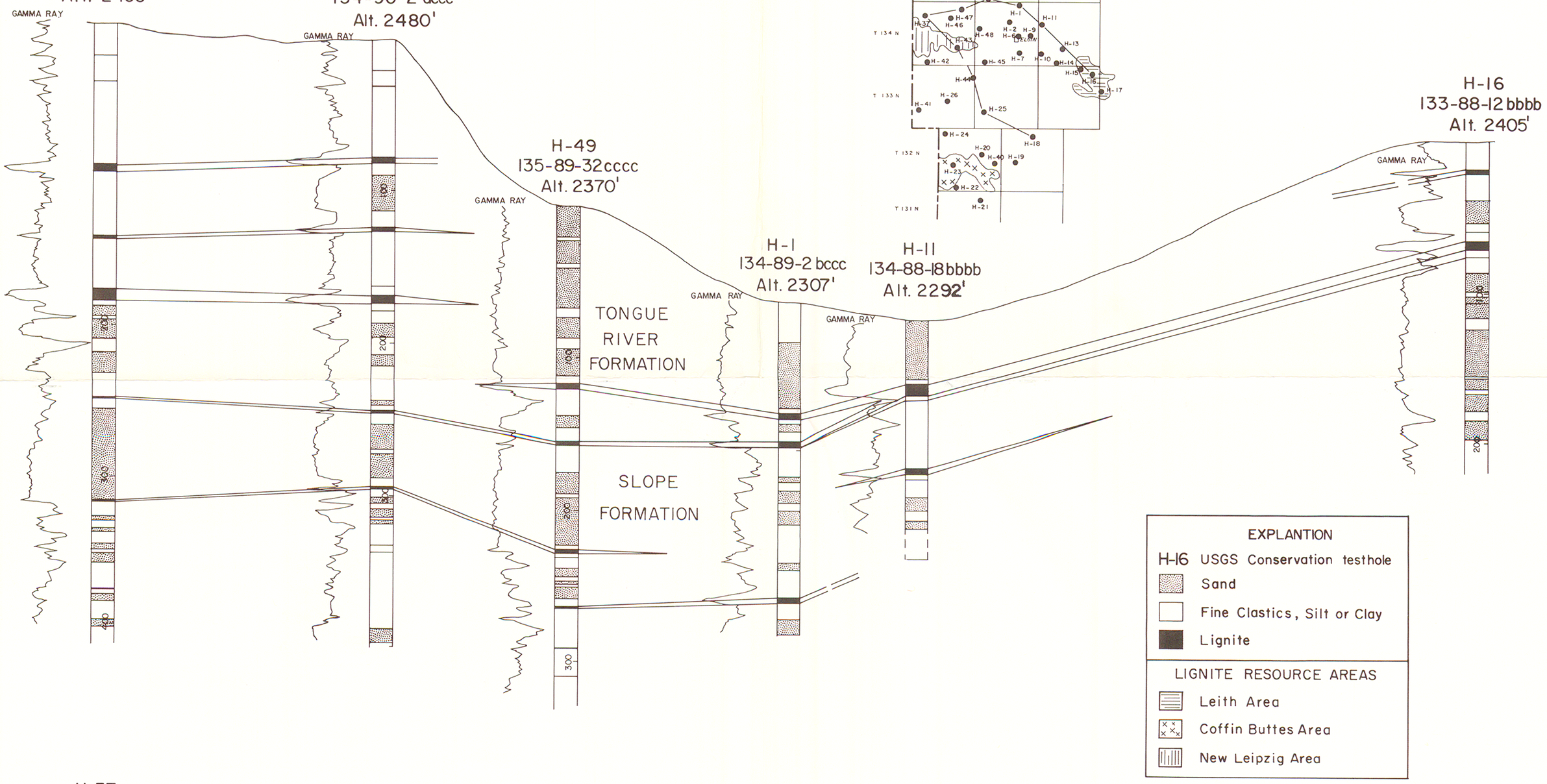
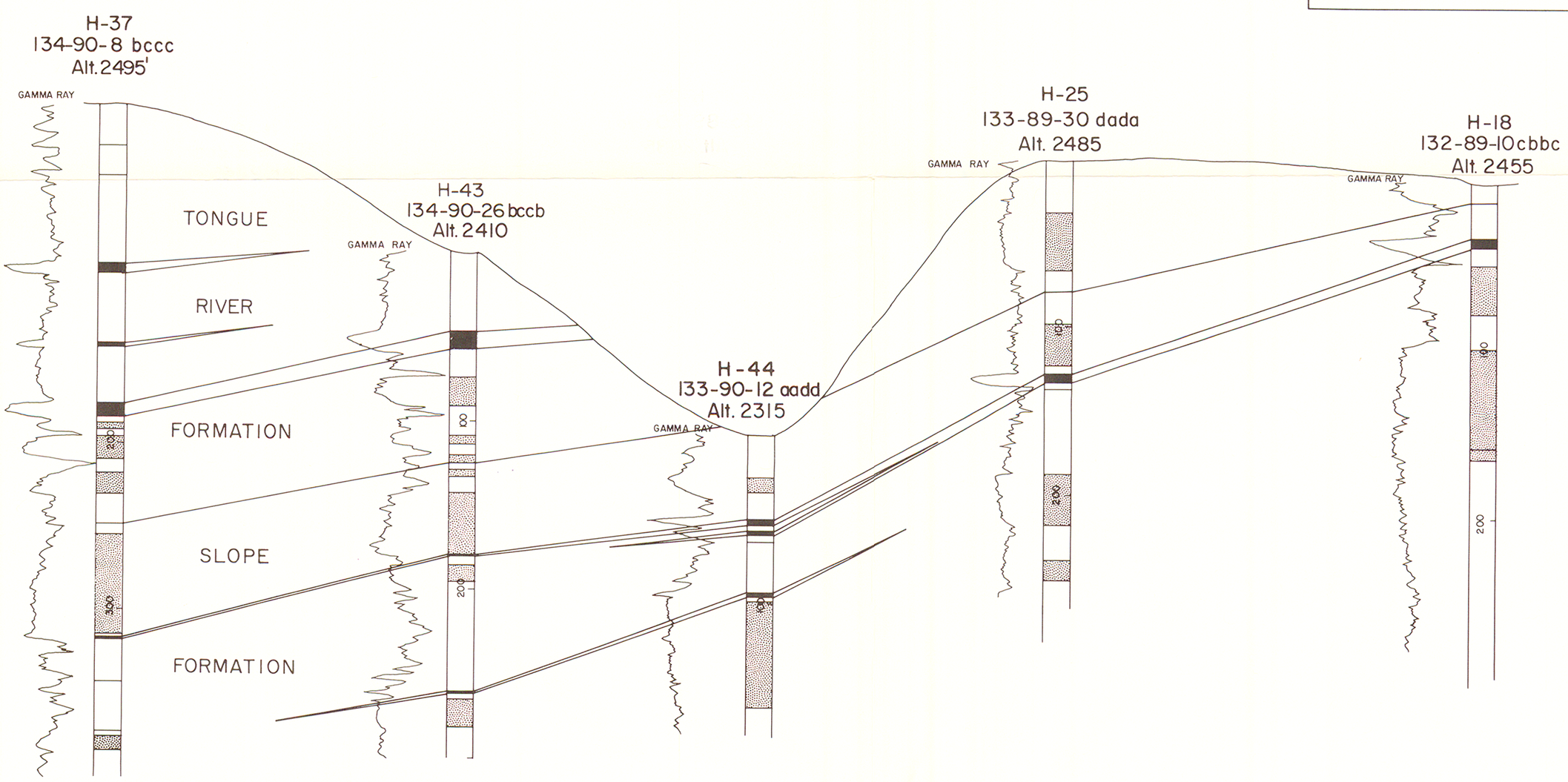



PLATE 5 CROSS SECTIONS OF FORT UNION STRATA IN GRANT COUNTY