THE UNIVERSITY OF TEXAS AT AUSTIN BUREAU OF ECONOMIC GEOLOGY

TO ACCOMPANY MAP—HOBBS SHEET GEOLOGIC ATLAS OF TEXAS

# GEOLOGIC ATLAS OF TEXAS HOBBS SHEET

WILLIAM BATTLE PHILLIPS MEMORIAL EDITION



VIRGIL E. BARNES, Project Director 1976

Figure 2-14 Geologic Atlas of Texas, Hobbs Sheet (7 Pages)

### **EXPLANATION**

Mine Waste Dumps and storage areas for waste materials produced during recovery of potash minerals; confined to New Mexico Oal **Alluvium** Floodplain and pediment deposits; includes low terrace deposits along streams, and bedrock locally in stream channels; pediment deposits of sandy silt locally modified by Recent (Holocene) sheetwash action Qcd **Eolian deposits** Sand, calcareous, mainly brown to grayish brown; mostly derived from and rests on lacustrine deposits; confined to New Mexico Qsd Qsu Os Windblown sand Sand and silt in sheets, Os, locally includes cover sand; dunes and dune ridges, Osd, dark brown to grayish brown, derived from lacustrine, fluviatile, and eolian deposits, mostly rests on lacustrine deposits; and sand sheets, dunes, and dune ridges undivided, Osu, light brown to reddish, overlies windblown cover sand, Ocs, in much of western part of area, mostly derived from Gatuña Formation in western area; thickness 5 to 10 feet Qр Playa deposits Recent Holocene) and Pleistocene Clay and silt, sandy, light to dark gray, in shallow depressions; those of Wisconsinan age usually covered by thin deposit of Recent sediment NOTE: Water in depressions not shown Qcc Caliche Caliche stripped of covering materials mapped separately; thickness up to 10 feet

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Qau Alluvium and other Quaternary deposits Recent (Holocene) and Pleistocene Intimately associated alluvium and Qao deposits undivided, in dissected areas in Texas Osgc Colluvial deposits Sand, silt, and gravel deposited by slopewash, and talus from Ogallala, red to gray; in part calichified, caliche 1 to 20 feet thick; may include weathered Gatuña Formation locally; rests mainly on Triassic and Permian rocks Qt Fluviatile terrace deposits Gravel, sand, and silt; commonly with pebbles and cobbles of limestone, sandstone, and chert Qun Pond deposits Gastropod-bearing sandy silt and silty clay, gray to light gray, deposited in ponds and shallow swales, locally may include upper part of Tahoka deposits Qu Pleistocene Pleistocene surficial deposits undivided Brown and grayish-brown silty sand and sandy silt deposited mainly by sheetwash action as broad, gently sloping sheets; one outcrop on eastern border of sheet Qao Other Quaternary deposits Mostly boulders, cobbles, and pebbles of Cretaceous limestone and chert, locally overlain by brown silt; probably equivalent to "Qs3" of Seymour Formation of Big Spring Sheet; confined to Texas Qg

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Gatuña Formation

Mostly sand, fine, friable, yellowish to reddish orange, red; some conglomerate, gypsum, limestone, and siltstone, gray, purplish, red, and shale, greenish; upper few feet calichified; may exceed 300 feet in thickness at head of Cedar Canyon, in many places only a few feet thick. (Probably underlies part of the Querecho Plains, Mescalero Sands, San Simon Swale, and Monument Draw); confined to New Mexico

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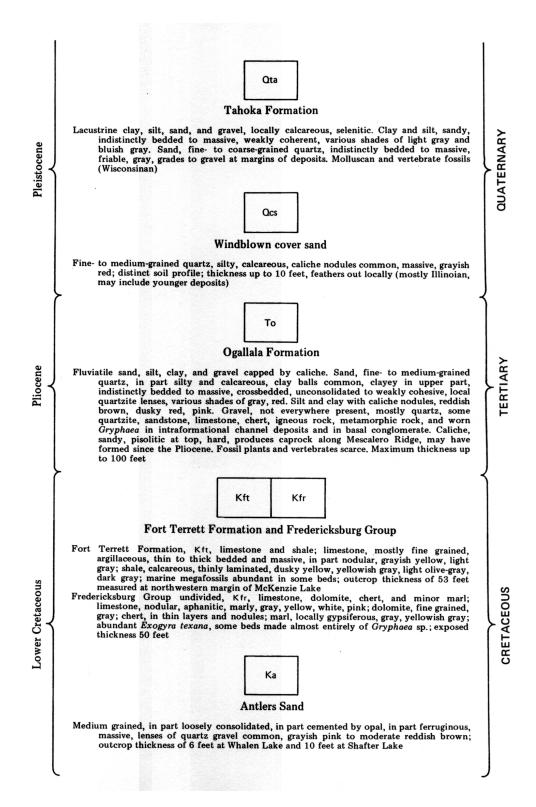
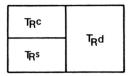


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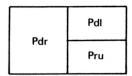


## Santa Rosa Sandstone, Chinle Formation, and Dockum Group undivided

In New Mexico, Chinle Formation, T<sub>Rc</sub>, in eastern part, Santa Rosa Sandstone, T<sub>Rs</sub>, in western part, and Dockum Group undivided, T<sub>Rd</sub>, in southern part as well as in Texas Chinle Formation, T<sub>Rc</sub>, claystone, micaceous, greenish, red with reduction spots, interbedded with sandstone, fine grained, in thin beds; thickness up to 300 feet

Santa Rosa Sandstone, TRs, mostly crossbedded sandstone, conglomerate, some clay, claystone, and siltstone, pale red to reddish brown; thickness 50 to 70 feet

Dockum Group undivided, TRd, shale, sandstone, siltstone, limestone, and gravel; mostly shale, micaceous, thin bedded, variegated; thickness up to 300 feet



#### **Dewey Lake Redbeds and Rustler Formation**

Dewey Lake Redbeds, Pd1, Rustler Formation, Pru, and Dewey Lake Redbeds and Rustler Formation undivided, Pdr

Dewey Lake Redbeds, Pdi, siltstone and fine-grained quartz sandstone, laminated, locally crossbedded, reddish orange, reddish brown, brownish yellow, greenish-gray reduction spots up to an inch in size common; thickness 200 to 250 feet

Rustler Formation, Pru, limestone, siltstone, sandstone, gypsum, marl, and clay. Upper part—limestone and dolomitic limestone; thickness 50+ feet. Middle part—siltstone and sandstone, yellowish gray; thickness 50 to 70 feet. Lower part—siltstone and fine-grained sandstone, thin to medium bedded, red, interbeds of earthy to sparry red gypsum, a few beds of red and greenish-gray marl and clay; thickness 50+ feet



#### Diapirs and collapse structures

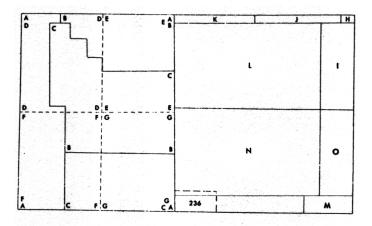
Small circular structures in potash-mining area attributed to upward movement of salt, followed in some structures by solution and collapse

#### VIRGIL E. BARNES, PROJECT DIRECTOR

Geologic mapping in part from sources shown on index map. Geologic mapping field checked and compiled on high-altitude aerial photographs by G. K. Eifler, Jr., and C. C. Reeves, Jr., for Texas and New Mexico, respectively. Geologic mapping in New Mexico in cooperation with New Mexico Bureau of Mines and Mineral Resources, Frank E. Kottlowski, Director. Map scribed by R. L. Dillon. Mapping reviewed by West Texas Geological Society, Geologic Atlas Committee, D. M. Norman (Markay Oil & Gas Company), Chairman, Clifford H. Sherrod, Jr. (Consulting Geologist), and Thomas J. Hansen (Marshall & Winston Inc.)

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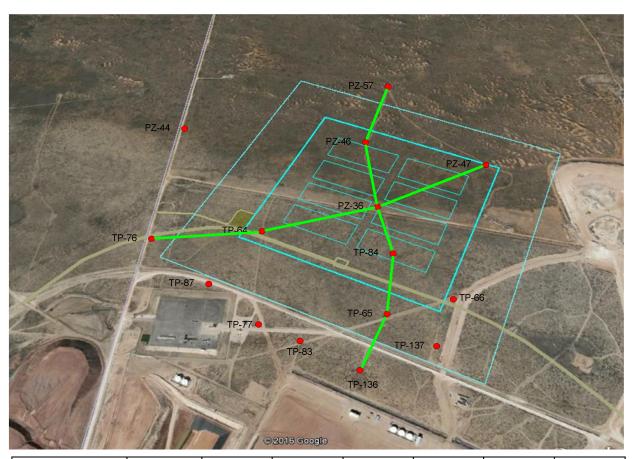


#### INDEX OF GEOLOGIC MAPPING

For New Mexico, area A, see C. H. Dane and G. O. Bachman (1958) Preliminary geologic map of the southeastern part of New Mexico (scale 1:380,160): U. S. Geol. Survey Misc. Geol. Investigations Map I-256; for area B, see S. R. Ash and A. Clebsch, Jr. (1961) Cretaceous rocks in Lea County, New Mexico: U. S. Geol. Survey Prof. Paper 424, pp. D139-142; for area C, see A. Nicholson, Jr., and A. Clebsch, Jr. (1961) Geology and ground-water conditions in southern Lea County, New Mexico: New Mex. Bur. Mines and Mineral Resources Ground-Water Rept. 6, 123 p.; for areas D, E, F, and G, see A. D. Lovelace (1971-72) Maljamar quadrangle no. 107, Hobbs quadrangle no. 108, Potash quadrangle no. 119, and Eunice quadrangle no. 120, respectively. In Geology and Aggregate Resources District II, New Mexico State Highway Department. For Texas, the numbers in outlined areas refer to items in bibliography in "Index to Areal Geologic Maps in Texas, 1891-1961," by T. E. Brown (1963) Bureau of Economic Geology, The University of Texas at Austin.

Soil surveys consulted and others available since field checking was completed: (Area H) Mowery, I. C., McKee, G. S., and Templin, E. H. (1959) Soil survey of Lynn County, Texas: U.S. Dept. Agriculture, Soil Conserv. Service, in coop. with Texas Agr. Expt. Sta., Series 1953, No. 3. (Area I) Sanders, D., Templeton, K. M., Mitchell, H. E., Miller, W. M., Novosad, C. J., Wagner, B. J., and Oakes, H. (1960) Soil survey of Dawson County, Texas: U. S. Dept. Agriculture, Soil Conserv. Service, in coop. with Texas Agr. Expt. Sta., Series 1957, No. 6. (Area J) Miller, W. M., Sanders, D., Whitmire, M. J., Boden, P. M., McAndrews, J. D., and Hyde, H. W. (1962) Soil survey of Terry County, Texas: U.S. Dept. Agriculture, Soil Conserv. Service, in coop. with Texas Agr. Expt. Sta., Series 1959, No. 6. (Area K) Dittemore, W. H., Jr., and Hyde, H. W. (1964) Soil survey of Yoakum County, Texas: U. S. Dept. Agriculture, Soil Conserv. Service, in coop. with Texas Agr. Expt. Sta., Series 1960, No. 15. (Area L) Dittemore, W. H., Jr., DeLozier, W. L., McClennon, D. L., and Hyde, H. W. (1965) Soil survey of Gaines County, Texas: U.S. Dept. Agriculture, Soil Conserv. Service, in coop. with Texas Agr. Expt. Sta., Series 1961, No. 34. (Area M) Hyde, H. W., Conner, N. R., and Stoner, H. R. (1973) Soil survey of Midland County, Texas: U. S. Dept. Agriculture, Soil Conserv. Service, in coop. with Texas Agr. Expt. Sta. (Area N) Conner, N. R., Hyde, H. W., and Stoner, H. R. (1974) Soil survey of Andrews County, Texas: U. S. Dept. Agriculture, Soil Conserv. Service, in coop. with Texas Agr. Expt. Sta. (Area O) Stoner, H. R., and Dixon, M. L. (1974) Soil survey of Martin County, Texas: U. S. Dept. Agriculture, Soil Conserv. Service, in coop. with Texas Agr. Expt. Sta.

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| Monitoring Well/<br>Piezometer Name | Date Drilled/<br>Completed | Total Depth<br>Well<br>(ft btoc) | Bottom of<br>Well<br>Elevation<br>(ft msl) | Ground<br>Elevation<br>(ft msl) | Top of<br>Casing<br>Elevation<br>(ft msl) | Depth to<br>Top of Red<br>Beds<br>(ft bgs) | Top of Red<br>Bed<br>Elevation<br>(ft msl) |
|-------------------------------------|----------------------------|----------------------------------|--|---------------------------------|---|--|--|
| PZ-36                               | 7/20/05                    | 78.98                            | 3419.51                                    | 3494.79                         | 3498.49                                   | 75.0                                       | 3419.79                                    |
| PZ-44                               | 1/22/08                    | 82.98                            | 3416.90                                    | 3496.59                         | 3499.88                                   | 77.1                                       | 3419.49                                    |
| PZ-46                               | 1/23/08                    | 93.83                            | 3412.04                                    | 3502.38                         | 3505.87                                   | 87.4                                       | 3414.98                                    |
| PZ-47                               | 1/24/08                    | 92.22                            | 3411.56                                    | 3500.60                         | 3503.78                                   | 87.0                                       | 3413.60                                    |
| PZ-57                               | 1/23/08                    | 99.56                            | 3415.44                                    | 3511.79                         | 3515.00                                   | 93.5                                       | 3418.29                                    |
| TP-64                               | 1/11/08                    | 70.81                            | 3433.99                                    | 3502.08                         | 3504.80                                   | 65.3                                       | 3436.78                                    |
| TP-65                               | 1/11/08                    | 57.68                            | 3436.07                                    | 3490.40                         | 3493.75                                   | 52.5                                       | 3437.90                                    |
| TP-66                               | 1/10/08                    | 57.78                            | 3430.88                                    | 3485.45                         | 3488.66                                   | 51.0                                       | 3434.45                                    |
| TP-76                               | 2/7/08                     | 53.42                            | 3436.78                                    | 3487.06                         | 3490.20                                   | 47.1                                       | 3439.96                                    |
| TP-77                               | 2/7/08                     | 51.30                            | 3436.09                                    | 3484.19                         | 3487.39                                   | 45.4                                       | 3438.79                                    |
| TP-83                               | 2/11/08                    | 55.55                            | 3435.60                                    | 3487.77                         | 3491.15                                   | 49.8                                       | 3437.97                                    |
| TP-84                               | 2/12/08                    | 65.24                            | 3429.59                                    | 3491.56                         | 3494.83                                   | 58.7                                       | 3432.86                                    |
| TP-87                               | 3/15/08                    | 49.02                            | 3438.47                                    | 3484.17                         | 3487.49                                   | 43.3                                       | 3440.87                                    |
| TP-136                              | 3/20/09                    | 55.21                            | 3438.01                                    | 3490.17                         | 3493.22                                   | 50.5                                       | 3439.67                                    |
| TP-137                              | 3/20/09                    | 56.46                            | 3434.68                                    | 3488.00                         | 3491.14                                   | 51.5                                       | 3436.50                                    |

Figure 2-15
Boring Locations in the Vicinity of the WCS CISF

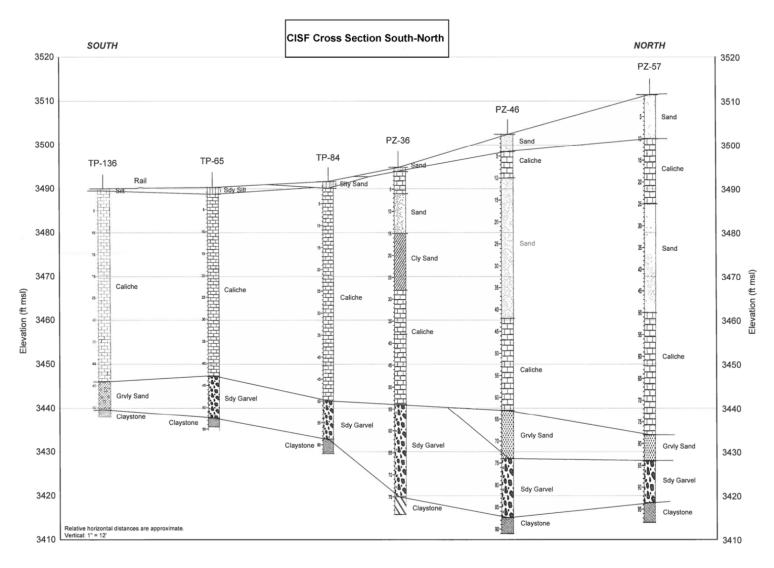


Figure 2-16
WCS CISF Cross Section West-East

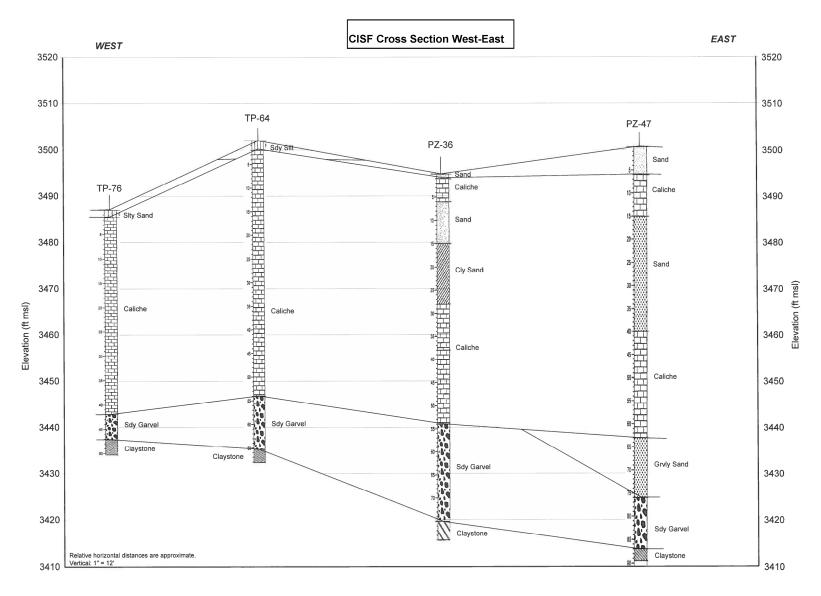


Figure 2-17
WCS CISF Cross Section South-North

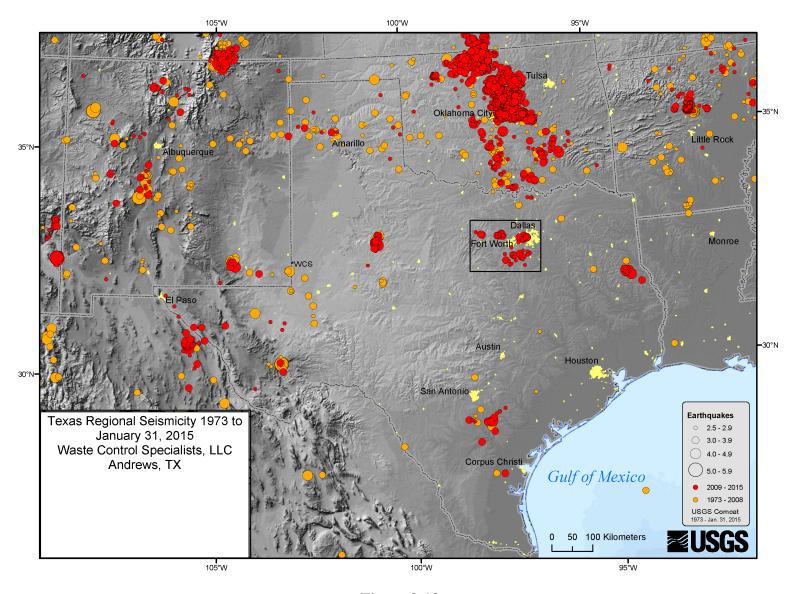


Figure 2-18 Texas Regional Seismicity 1973 to January 31, 2015

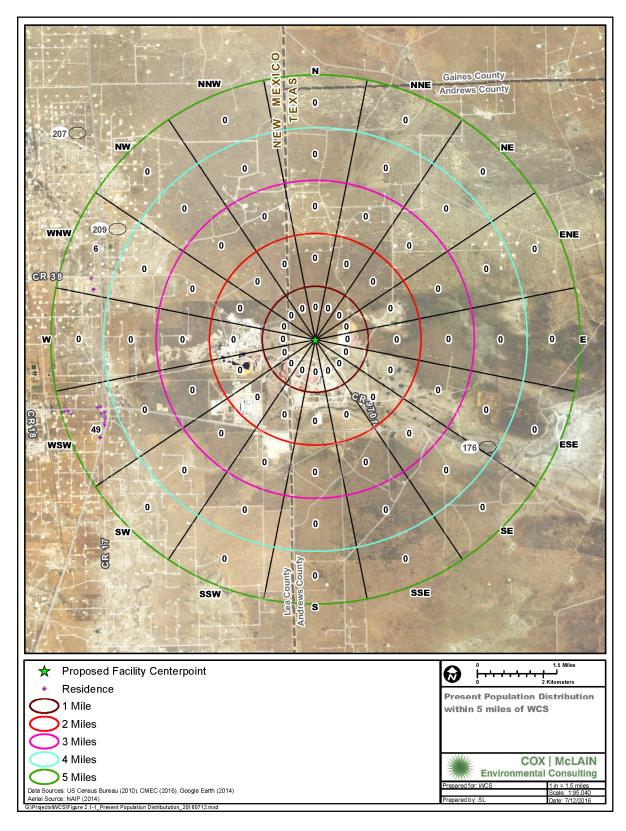


Figure 2-19
Present Population Distribution within 5 Miles of WCS