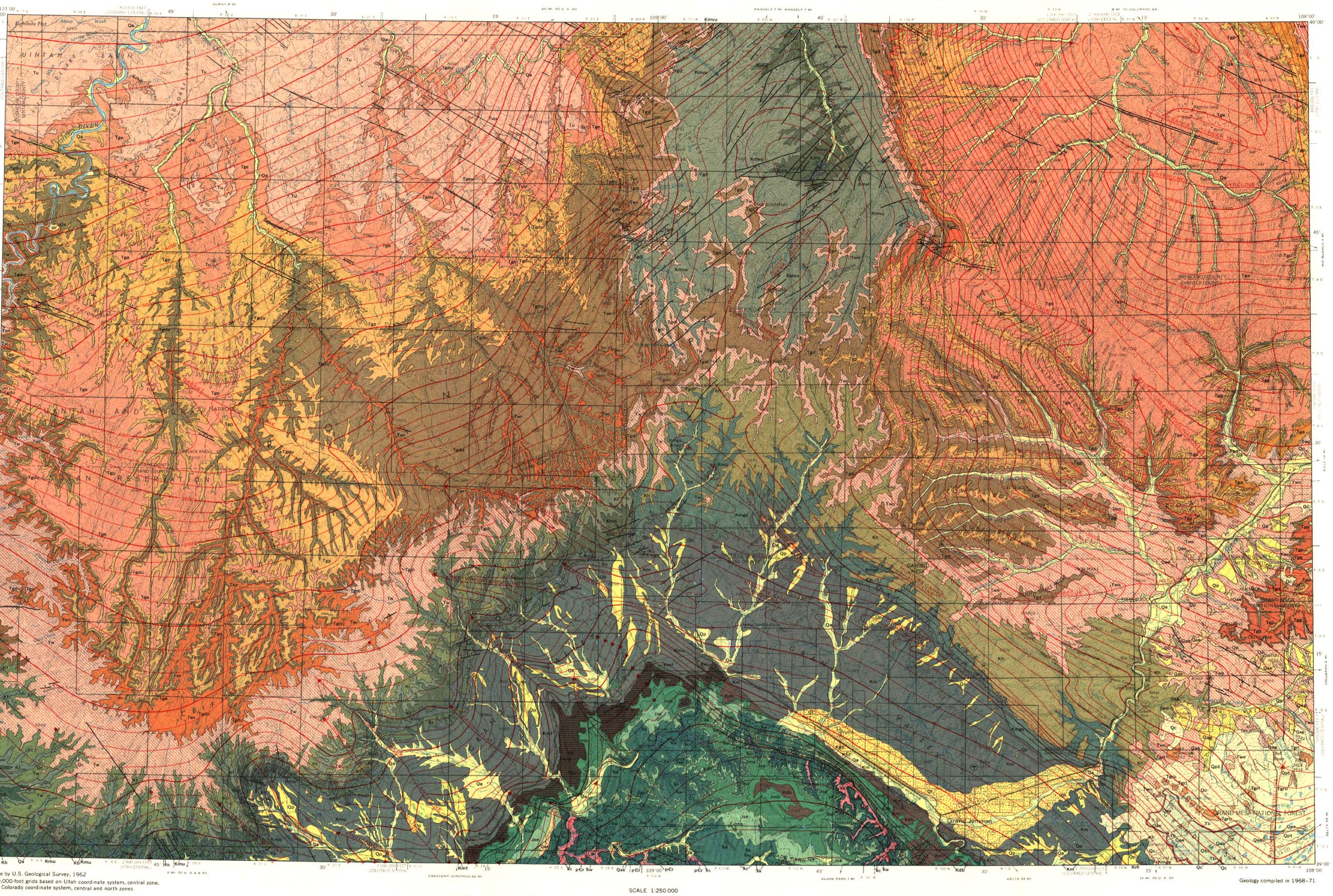
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

MISCELLANEOUS GEOLOGIC INVESTIGATIONS
MAP I–736



Base by U.S. Geological Survey, 1962
100,000-foot grids based on Utah coordinate system, central zone, and Colorado coordinate system, central and north zones

Geology compiled in 1968–71

SCALE 1:250 000

CONTOUR INTERVAL 200 FEET
WITH SUPPLEMENTARY CONTOURS AT 100-FOOT INTERVALS
DATUM IS MEAN SEA LEVEL

1973 MAGNETIC DECLINATION FOR THIS SHEET VARIES FROM 15°00' EASTERLY FOR THE CENTER OF THE WEST EDGE TO 14°23' EASTERLY FOR THE CENTER OF THE EAST EDGE. MEAN ANNUAL CHANGE IS 0°02½' WESTERLY

EXPLANATION

QUATERNARY

Pleistocene and(or) Holocene

Qa, Qae — Alluvial and eolian deposits
Qa, alluvial deposits; chiefly silt, sand, and gravel in flood plains, fans, and low terraces
Qae, alluvial, eolian, and lake deposits; chiefly silt and sand on ridges and mesa tops

Qc — Colluvial deposits
Earthflow, mudflow, landslide, and talus deposits

Qt — Terrace gravel
Terrace deposits formed during earlier cycles of erosion

Pleistocene

Qag — Alluvial gravels
Terrace and fan deposits formed during several cycles of erosion

Qp — Pediment deposits
Sand and gravel veneering pediment surfaces formed during several cycles of erosion

Qpt, Qbt — Till
Stony glacial debris
Qpt, of Pinedale(?) age
Qbt, of Bull Lake(?) age

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TERTIARY

Pliocene

Tb — Basalt
Scoriaceous and vesicular lava capping Grand Mesa and Mount Callahan. Represents several flows on Grand Mesa

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Eocene and Paleocene

UINTA BASIN

Uinta, Green River, and Wasatch Formations
Uinta Formation:
Tu, main body: brown, red, and green sandstone, siltstone, and shale
Tuu, unnamed tongue: yellow-brown sandstone and siltstone
Green River Formation:
Tge, Evacuation Creek Member: gray marlstone and yellow-brown siltstone and sandstone
Tgeu, unnamed tongue: gray marlstone and yellow-brown siltstone, sandstone, and tuff
Tgp, Parachute Creek Member: gray marlstone and dark-gray oil shale; some yellow-brown sandstone, siltstone, and tuff
m, Mahogany oil-shale bed
Tgd, Douglas Creek Member: brown and gray sandstone and siltstone, green shale, and brown oolitic limestone
Tgdu, upper tongue: simplified from Cashion (1967, pl. 1) showing more details on intertonguing between Douglas Creek Member (Tgd) and Renegade Tongue (Twr) of Wasatch Formation
Tgdl, lower tongue: coextensive with Renegade Tongue (Twr) and where the lower tongue is thin it is mapped with the Renegade
Wasatch Formation:
Twr, Renegade Tongue: brown and gray sandstone and siltstone and red, green, and gray shale
Tw, main body: lithology similar to that of Renegade Tongue

PICEANCE CREEK BASIN (EXCLUDING GRAND MESA)

Green River, Wasatch, and Ohio Creek Formations
Green River Formation:
Tge, Evacuation Creek Member: gray and yellow-brown marlstone, siltstone, sandstone, and tuff
Tgp, Parachute Creek Member: gray and yellow-brown marlstone and tuff and dark-gray and blue-gray oil shale
m, Mahogany oil-shale bed: dark-gray and blue-gray ledge-forming oil shale
Tgg, Garden Gulch Member: dark-brown and gray flaky shale and brown sandstone and limestone
Tgd, Douglas Creek Member: gray and brown sandstone, siltstone, and limestone and gray and green shale
Tga, Anvil Points Member: gray and brown sandstone, siltstone, and limestone and gray and green shale
Two, Wasatch and Ohio Creek Formations: red, gray, and brown sandstone and siltstone and red, gray, and green shale. Basal conglomerate (Ohio Creek Formation) present locally

GRAND MESA

Green River, Wasatch, and Ohio Creek Formations
Green River Formation:
Tgru, upper member: principally yellow-brown sandstone and siltstone; interbeds of marlstone and some oil shale. Mahogany oilshale bed is 25–100 feet above base
Tgrl, lower member: brown and gray sandstone and siltstone, and green and gray shale
Two, Wasatch and Ohio Creek Formations: red, gray and brown sandstone and siltstone and red, gray, and green shale; conglomerate (Ohio Creek Formation) at base

Paleocene

CENTRAL BOOK CLIFFS

Tnu — Upper part of North Horn Formation
Gray and brown sandstone, variegated shale, and some conglomerate. Boundaries from Spieker (1946, pl. 23A)[1]. Equivalent to lower part of Wasatch Formation (Tw) in Uinta Basin

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EASTERN BOOK CLIFFS AND GRAND MESA

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CRETACEOUS

Upper Cretaceous

Kt — Tuscher Formation
Light-gray massive sandstone separated by thin beds of gray and greenish-gray shale. Contains some conglomerate. Thickness 130–600 feet

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Kh — Hunter Canyon Formation
Buff and gray medium- to coarse-grained massive cliff-forming sandstone and gray to greenish-gray shale. Thickness 375 to 1,400 feet

Mesaverde Group

Kf — Farrer Formation
Sandstone and greenish-tinged gray shale. Thickness 410–1,085 feet

Kns — Neslen Formation and Sego Sandstone
Neslen Formation: principally gray and buff sandstone and shale. Contains four coal zones. Upper boundary is gradational. Thickness 250–410 feet
Sego Sandstone: gray and buff cliff-forming sandstone; some gray shale. Thickness 115–200 feet

Kmgs — Mount Garfield Formation and Sego Sandstone
Mount Garfield Formation: buff and gray fine- to medium-grained sandstone and gray shale. Upper part contains very little coal. Lower part contains thick persistent coal beds. Rollins Sandstone Member (not mapped separately) occurs in coal-bearing sequence
Sego Sandstone: buff and light-gray fine-grained massive sandstone and gray shale. Consists of upper and lower units that are principally sandstone separated by Anchor Mine Tongue of the Mancos Shale (mapped with the Sego Sandstone). Thickness a few feet–300 feet, thins eastward

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DOUGLAS CREEK AREA

Kmvu, Kmvl — Mesaverde Group
Kmvu, upper part: brown and yellowish-gray massive sandstone and gray shale. Lower part contains principal coal beds of the Douglas Creek area. Near base is a zone that has been reddened by burning of coal beds
Kmvl, lower part: light-gray and brown massive sandstone, gray shale, and some coal. Upper boundary is approximately same horizon as top of Trout Creek Sandstone Member (Rollins Sandstone Member equivalent) of the Iles Formation

Kmb — Buck Tongue of Mancos Shale
Gray shale and sandy shale and a few thin lenticular beds of limestone

Kmb — Buck Tongue of Mancos Shale
Dark-gray soft shale; some gray and brown sandstone

Mesaverde Group

Kc — Castlegate Sandstone
Buff and gray very fine to fine grained massive predominantly crossbedded cliff-forming sandstone; some gray shale. Thickness 0–130 feet; thins eastward

Kb — Blackhawk Formation
Gray and grayish-brown fine-grained thin-bedded to massive sandstone and gray shale. Locally contains thin coal beds. Westward the formation can be divided into three members but only upper two members extend into this quadrangle. Formation is equivalent to part of the upper shale member (Kmu) of the Mancos Shale of the eastern Book Cliffs. Present only in southwestern part of quadrangle. Thickness 0–325 feet

Kmu, Kmf, Km, Kml — Mancos Shale
Dark-gray to black soft shale; thin sandstone beds at various horizons. Upper beds intertongue with, and grade vertically into, the Castlegate Sandstone (Kc) and Blackhawk Formation (Kb). Maximum thickness about 4,000 feet
Km, Mancos Shale undifferentiated
Kmu, upper shale member
Kmf, Ferron Sandstone Member: fine-grained thin-bedded sandstone and sandy shale; occurs near base of Mancos Shale; mapped with Mancos Shale undifferentiated (Km) along northeastern flank of Uncompahgre uplift
Kml, lower shale member

Lower(?) and Upper Cretaceous

Kd — Dakota Sandstone
Yellowish-brown and gray friable to quartzitic sandstone and conglomeratic sandstone and interbedded gray to black carbonaceous shale. Contains a few thin very lenticular coal beds. Plant impressions common; basal conglomerate is locally present. Thickness 100–200 feet

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Lower Cretaceous

Kbc — Burro Canyon Formation
White, gray, and buff fine- to coarse-grained sandstone interbedded with green and purplish siltstone, shale, and mudstone, and thin beds of impure limestone. Sandstone is locally conglomeratic, particularly at base. Thickness a few feet–125 feet

Kdb — Dakota Sandstone and Burro Canyon Formation

JURASSIC

Upper Jurassic

Jmb, Jms — Morrison Formation
Jmb, Brushy Basin Shale Member: gray, pale-green, red, and light-purple mudstone and siltstone; a few lenses of gray sandstone, limestone, and conglomerate. Thickness 200–300 feet
Jms, Salt Wash Sandstone Member: white, gray, rusty-red, and buff sandstone interbedded with red, gray, and green mudstone; thin limestone beds near base. Thickness 100–300 feet

San Rafael Group

Jse — Summerville Formation and Entrada Sandstone
Summerville Formation: alternating thin beds of gray, green, and red siltstone, gray, greenish-gray, and reddish-brown fine-grained sandstone, and red and greenish-gray shale. Thickness 40–60 feet
Entrada Sandstone: buff, white, and pink medium-grained massive crossbedded sandstone. Thickness 100–300 feet

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TRIASSIC(?)

Upper Triassic(?)

Glen Canyon Group

Jk — Kayenta Formation
Irregularly interbedded red, buff, and gray fine- to coarse-grained sandstone and lavender shale and siltstone. Thin beds of limestone-pebble and shale-pellet conglomerate locally present. Thickness 0 to 200 feet

TRkw — Kayenta Formation and Wingate Sandstone

TRIASSIC

Upper Triassic

TRw — Wingate Sandstone
Buff, reddish-brown, and grayish-orange fine-grained massive prominently crossbedded sandstone. In most exposures forms vertical cliffs and exhibits dark-brown desert varnish on weathered surfaces. Thickness 300–400 feet

TRc — Chinle Formation
Red and reddish-brown siltstone interbedded with lenses of red sandstone and shale, limestone-pebble and shale-pellet conglomerate; lenses of grit and quartz-pebble conglomerate near base. Thickness 80–120 feet

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PRECAMBRIAN

pCr — Complex of gneisses and schists
Intruded by silicic to intermediate igneous rocks

Contact

Fault
Dashed where hypothetical, dotted where concealed. Bar and ball on downthrown side

Folds
Showing direction of plunge
Anticline — Syncline

Structure contours
5000
Drawn on base of Dakota Sandstone. Solid arrowheads indicate that vertical accuracy is within 125 feet; open arrowheads indicate that accuracy is probably between 125 and 250 feet; elsewhere vertical accuracy is possibly not within 250 feet. Contours are drawn to depict displacement on vertical fault planes although there are some high-angle normal faults in the quadrangle. Contour interval 250 feet

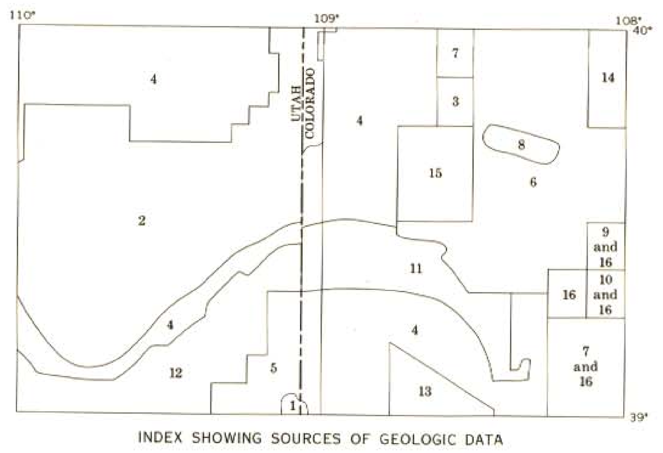
Gilsonite vein

Uranium ore deposit
Limits cannot be plotted at map scale; production totals less than 20,000 pounds U_3O_8 (20,000 pounds U_3O_8 = 10 short tons U_3O_8 = 8.48 short tons U)

Uranium prospect
Rocks contain 0.01 percent or more U_3O_8 or a uranium mineral, but no ore is known to have been produced; queried where prospect is approximately located

NOTE.—Host rocks for uranium deposits are the following stratigraphic units:
Tu, Uinta Formation
Tgr, Green River Formation
Tw, Wasatch Formation
Location and classification of uranium deposits and prospects furnished by U.S. Atomic Energy Commission.

[1] Spieker, E. M., 1946, Late Mesozoic and early Cenozoic history of central Utah: U.S. Geol. Survey Prof. Paper 205–D.



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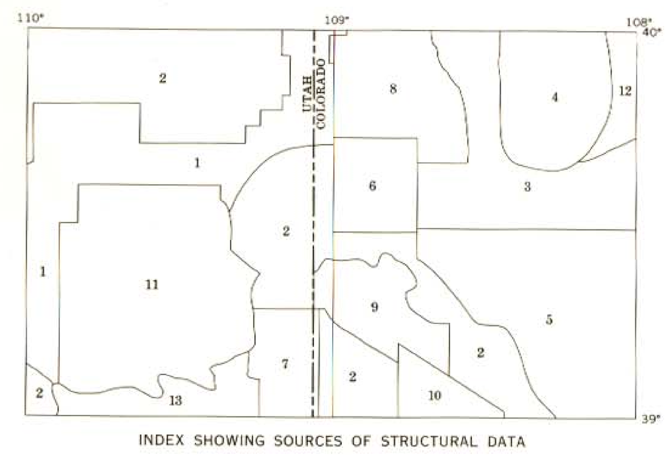

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Each reference has been adjusted to the base of the Dakota Sandstone with use of available surface and well control.

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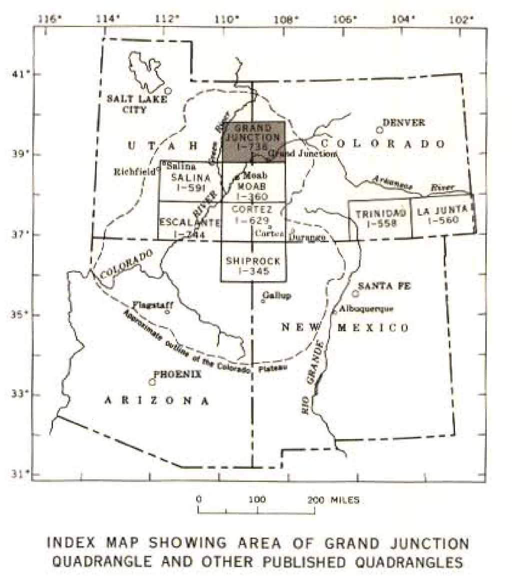

INDEX MAP SHOWING AREA OF GRAND JUNCTION QUADRANGLE AND OTHER PUBLISHED QUADRANGLES

GEOLOGIC AND STRUCTURE MAP OF THE GRAND JUNCTION QUADRANGLE, COLORADO AND UTAH

Compiled by
William B. Cashion
1973

INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D.C.—1973—G72033

For sale by U.S. Geological Survey, price $1.00