DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH THE
U. S. ATOMIC ENERGY COMMISSION

MINERAL INVESTIGATIONS
FIELD STUDIES MF-200

Base map by Topographic Division. Topography subject to revision pending preparation of 1:62,500 scale 15-minute quadrangle maps

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EXPLANATION

Qal — **Alluvium** — *Chiefly stream-deposited silt, sand, and gravel, but including some wind-deposited sand and silt*

Qls — **Landslide and slump** — *Developed locally at base of Moss Back member of Chinle formation*

QUATERNARY

UNCONFORMITY

Jn — **Navajo sandstone** — *Predominantly gray to white, locally weathering tan or buff, massive with sweeping large-scale cross-laminations, fine-grained quartz sandstone; forms steep, rounded cliffs where cut by deep canyons, but irregularly rounded domes and spires on mesa tops. Appears to intertongue with underlying Kayenta formation. Where thick sections are exposed the upper part may include rocks equivalent to Carmel formation. Ranges from 300 to 450 feet in thickness*

Jk — **Kayenta formation** — *Gray to white, purple, red, and buff, thick- and thin-bedded, lenticular interbedded sandstone and siltstone with some limestone; generally forms a succession of benches between underlying Wingate sandstone and overlying Navajo sandstone. Intertongues with and locally may be gradational into underlying Wingate; the contact is commonly well expressed topographically. Ranges in thickness from about 250 feet to 300 feet*

JURASSIC AND JURASSIC(?)

JURASSIC(?)

Glen Canyon group

Trw — **Wingate sandstone** — *Red and buff massive to thick-bedded cross-laminated medium- to fine-grained quartz sandstone; generally weathers to steep cliff, but where parallel bedding planes are more abundant or where higher strata have been removed it weathers to a series of ledges. Generally about 270 feet thick. Locally intertongues with underlying Chinle formation*

Tcu, Tcm, Tcl, Tcls — **Chinle formation** — *Upper part of the Chinle formation, Tcu, red, gray, and brown, generally thin-bedded, evenly bedded, locally shaly, fine- to very fine-grained sandstone, siltstone, and claystone; generally forms a steep slope below the Wingate sandstone, except for a prominent zone of maroon thick-bedded sandstone at the top, which crops out as blocky ledges. Upper part of the Chinle appears to be conformably above and may intertongue with the Moss Back member. Upper part of the Chinle ranges from about 500 feet to about 600 feet in thickness generally thinning (with some local variation) from south to north. Moss Back member, Tcm, gray to brown thick- and thin-bedded, cross-bedded, lenticular fine- to coarse-grained sandstone and conglomeratic sandstone; forms continuous blocky ledge capping a prominent bogback ridge west of Cottonwood Wash. Contact with the underlying lower part of the Chinle appears, at least in part, gradational or intertonguing but is locally marked by shallow scour depressions; although generally not well exposed it commonly forms a topographic slope break. The Moss Back is generally from 80 to 100 feet thick with some local variation. Lower part of the Chinle, Tcl, chiefly blue, gray, and red massive lenticular mudstone with variable amounts of disseminated medium and fine sand grains, interbedded with and grading into some thin lenses of brown thin-bedded flaggy sandstone and lenses of sandstone and conglomeratic sandstone lithologically very similar to those of the Moss Back member; generally expressed as a slope or bench below the overlying Moss Back. Contact with underlying Moenkopi formation is a slightly irregular erosion surface; the contact with the locally underlying sandstone of the lower part of the Chinle is gradational and intertonguing. The lower part of the Chinle is generally from 100 to 120 feet thick and may be thicker locally. Only known outcrops of sandstone lenses of the lower part of the Chinle, Tcls, lying directly on the Moenkopi are shown. Tcls, may be correlative, in part, with sandstone mapped as the Shinarump member of the Chinle in the Deer Flat and White Canyon areas to the west of Elk Ridge. Lenses consist of light-grey to brown, crossbedded discontinuous lenticular medium-, coarse-, and fine-grained sandstone and conglomeratic sandstone (chiefly pebbles but locally cobbles) with interbedded lenses of mudstone and muddy sandstone similar to those of the lower part of the Chinle. The basal parts commonly fill scour depressions in the top of the underlying Moenkopi. Where present, these sand lenses rarely exceed 20 feet in thickness. Sandstone at this horizon contains important uranium deposits in the Cottonwood Wash area of this quadrangle, and on Elk Ridge to the west*

UNCONFORMITY

Upper Triassic

TRIASSIC

Lower and Middle(?) Triassic

Tem — **Moenkopi formation** — *Red, brown, and buff, thin- and thick-bedded, evenly bedded discontinuous interbedded very fine- to medium-grained sandstone and sandy siltstone, commonly shaly to flaggy, with thick-bedded discontinuous sandstone beds more common in the middle third of the formation than in the upper and lower thirds; generally forms steep slope with intermittent discontinuous ledges between overlying lower part of the Chinle and underlying Hoskinnini tongue of the Cutler formation. Contact with the underlying Hoskinnini appears conformable. Thickness generally ranges from 180 feet to 220 feet but may be somewhat thinner locally*

Pch, Pco, Pcc — **Cutler formation** — *Hoskinnini tongue, Pch, red to buff, locally bleached white to gray, massive and thick-bedded, cross-laminated medium- to fine-grained silty sandstone containing generally sparsely disseminated coarse well-rounded frosted sand grains; commonly forms blocky or rounded ledge between overlying Moenkopi formation and underlying Organ Rock tongue of the Cutler; commonly about 85 feet thick. Contact with underlying Organ Rock appears generally conformable. Organ Rock tongue, Pco predominantly red even-bedded very fine-grained sandstone and (or) sandy siltstone with some gray cross-laminated fine- to medium-grained sandstone lenses interbedded near the base; generally forms a uniform slope below the ledge of the Hoskinnini; generally about 200 feet thick, but may vary as much as 50 feet locally. Contact with the underlying Cedar Mesa sandstone member is intertonguing and gradational. Cedar Mesa sandstone member, Pcc light-gray to tan, thick-bedded to massive, cross-laminated fine- to medium-grained sandstone beds separated by thin partings of red to gray siltstone and limy siltstone; the partly eroded upper surface controls the form of the near dip slope to the east of Chimney Park. In deep canyons forms massive and ledgy vertical cliffs. Generally about 1,000 feet thick; contact with the underlying Rico formation is conformable*

PERMIAN

PPr — **Rico formation** — *Gray thin limestone interbedded with red shaly calcareous siltstone, medium- and fine-grained calcareous sandstone, thick-bedded cross-laminated medium- to fine-grained sandstone, and some irregularly bedded thin chert and cherty limestone; in deep canyons generally forms a ledgy steep slope below the Cedar Mesa sandstone member of the Cutler. Marine fossils are rare and generally poorly preserved. Base not exposed*

PENNSYLVANIAN AND PERMIAN(?)

Contact — *Dashed where approximately located; short dashes where inferred*

High-angle fault — *Dashed where approximately located; dotted where concealed; U, upthrown side; D, downthrown side*

Monocline — *Showing trace of axial plane and direction of plunge of axis; dashed where approximately located*

Anticlinal bend — *Arrow barbed on side of steeper dip*

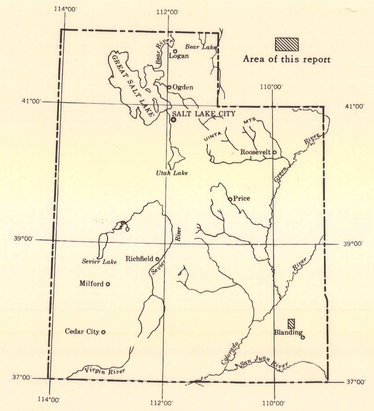
Synclinal bend — *Arrow barbed on side of flatter dip*

Strike and dip of beds

7000 — Structure contours

Drawn on the base of the Moss Back member of the Chinle formation and the base of the Kayenta formation. Dashed where approximately located; short dashes indicate projection above surface. Contour interval 100 feet. Datum is mean sea level

Uranium mine or prospect



INDEX MAP

PRELIMINARY GEOLOGIC MAP OF THE ELK RIDGE 1 SW QUADRANGLE, SAN JUAN COUNTY, UTAH

By
Richard Q. Lewis, Sr., and Russell H. Campbell

Scale 1:24000
1 ½ 0 1 Mile

Contour interval 40 feet
Datum is mean sea level

1959

TRUE NORTH — 15° — MAGNETIC NORTH
APPROXIMATE MEAN DECLINATION, 1959

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