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GEOLOGIC MAP OF THE ESCALANTE QUADRANGLE,

GARFIELD COUNTY, UTAH

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INTRODUCTION

The Escalante quadrangle is in central Garfield County, south-central Utah. The western part of the quadrangle is in the Kaiparowits Plateau-Escalante Benches section, and the eastern part is in the Circle Cliffs-Teasdale anticlines section of the Colorado Plateau physiographic province (Stokes, 1977). Except for lowland flats near Escalante and the irregular mesas of the Black Hills in the western part of the quadrangle, the rugged landscape consists of benches of bare rock bordered by irregular, steep cliffs that descend to deep, narrow canyons. Total relief in the quadrangle is about 2,480 ft. The principal streams, the Escalante River and its tributary Pine Creek, have large seasonal and annual ranges in flow. The major periods of flow are usually in early spring in response to melting of highland snow, and in midsummer as a result of sporadic torrential downpours. Escalante (1980 population, 652) is the largest town and the main supply center for central and eastern Garfield County. The paved highway in the southwestern part of the quadrangle connects Escalante with towns to the west and northeast. An improved dirt road along Pine Creek leads northward to pine and aspen forests. Most of the quadrangle is inaccessible by car, and much is difficult to traverse on foot. Farming, lumbering, and serving the tourist trade are

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the chief occupations. Although quadrangle contains a maganese prospect, the mineral potential of the quadrangle is low.

The area was included in smaller scale geologic maps by McFall (1956), McFall and Peterson (1971), Hackman and Wyant (1973), Doelling (1974), Sargent and Hansen (1982), and Williams (1985). Detterman (1955) compiled a photogeologic map of the quadrangle at the 1:24,000 scale. The present geologic map is based primarily on the field work of V.S. Williams in 1978. L. S. Beard, assisted by D. C. Ferris in 1980, and G. W. Weir in 1980 and 1986 added details of the Morrison Formation and the Entrada and Page Sandstones.

STRATIGRAPHY

Bedrock formations exposed in the Escalante quadrangle range in age from Triassic(?) and Jurassic to Late Cretaceous, and total about 3,200 ft in thickness. Thin Quaternary surficial deposits cover much of the area.

TRIASSIC(?) AND JURASSIC SYSTEMS

Upper Triassic(?) and Lower Jurassic Series

Navajo Sandstone (J₮n)

The formation is composed of well-sorted, subrounded, frosted, very fine to medium but chiefly fine grains of clear quartz and very small amounts of white chert and feldspar. The sandstone is mostly very light grayish orange, but locally it is reddish gray to yellowish orange. Iron staining that varies from reddish orange to black occurs sporadically. The rock is poorly to well cemented by calcite and weathers to loose sand. The sandstone is characterized by large-scale trough sets, commonly 6-18 ft thick, of high-angle crossbeds. Contorted beds are locally common; horizontal beds are rare. Grayish-red siltstone is irregularly interstratified in sparse thin lenses. The formation erodes to form towering cliffs, fin-shaped ridges, irregular rounded knobs, and hummocky mesa tops commonly mantled by a thin layer of locally derived sand. In the Escalante quadrangle, only about 780 ft of the formation is exposed. The total thickness of the Navajo is about 1,500 ft as indicated by logs of exploratory wells in the area (Heylmun and others, 1965, p. 68-71).

JURASSIC SYSTEM

Middle Jurassic Series

Page Sandstone

Harris Wash Tongue (Jph). The lower tongue of the Page Sandstone is light-grayish-orange, fine-grained quartz sandstone in large-scale trough sets, commonly 3-18 ft thick. Horizontal beds, a few inches to a few feet thick and locally iron stained, characterize the top few feet of the tongue. The Harris Wash is lithologically similar to the underlying Navajo Sandstone and was included in the Navajo by most previous workers. It is separated from that formation by an obscure unconformity marked by sparse granules and very small pebbles of chert (Peterson and Pipiringos, 1979, p. 820-829). It is separated from the Thousand Pockets Tongue of the Page Sandstone by the Judd Hollow Tongue of the Carmel Formation. The Harris Wash forms a ledge that caps cliffs and mesas carved in the Navajo Sandstone. The tongue attains its greatest thickness of about 50 ft near the southeast corner of the quadrangle, and it thins northwestward along Pine Creek to about 10 ft at the west edge of the quadrangle.

Thousand Pockets Tongue (Jpt). The upper tongue of the Page Sandstone is mostly yellowish-gray to very light gray, fine- to medium-grained quartz sandstone. A conspicuous layer, 3-9 ft thick, of reddish-brown calcitic siltstone is near the middle of the tongue. Trough and planar sets of crossbeds are dominant in the sandstone, but horizontal beds occur. Much of the bedding is wavy, and locally the whole unit is contorted. The tongue forms a ledge that caps mesas in southern and eastern parts of the quadrangle and forms flatirons along the east side of Pine Creek. The Thousand Pockets ranges irregularly in thickness from about 30-80 ft. The Thousand Pockets and Harris Wash Tongues of the Page Sandstone and the interstratified Judd Hollow Tongue of the Carmel Formation are combined into a single unit (Jpct) in the cross section; the combined tongues range from about 140 to 180 ft in thickness.

Carmel Formation

Judd Hollow Tongue (Jcj). This unit, interstratified between tongues of the Page Sandstone, consists of moderate-reddish-brown siltstone, light-gray to reddish-brown, fine-grained sandstone, and yellowish-gray to pale-orange very fine grained limestone. Much of the bedding is wavy, and in places the whole unit is contorted along with the overlying Thousand Pockets Tongue of the Page Sandstone. The Judd Hollow is a poorly exposed slope-forming unit that ranges irregularly in thickness from about 20 to 110 ft and generally thickens northward.

Upper member (Jcu). The upper member of the Carmel constitutes the bulk of the formation, and is composed of shale and sandstone interbedded with lesser amounts of limestone and gypsum. The shale is silty to clayey, commonly calcitic, and reddish brown mottled with greenish gray and light grayish yellow. The sandstone is moderate reddish brown and yellowish gray, very fine to fine grained, commonly silty, and weakly to firmly cemented by calcite and locally by gypsum and iron oxides. It is mostly in thin horizontal beds but locally is in thin lenses of crossbeds. The limestone is light gray and yellowish gray, micrograined, and in places silty and dolomitic. The limestone is in ledge-forming sets of laminae and thin beds, commonly crinkled, and weathers to yield abundant platy fragments. Shell fragments occur in a few beds. Peterson and Pipiringos (1979, p. B38-B39) noted poorly preserved shells of the pelecypod Pronoella uintahensis Imlay in limestone about 103 ft above the base of the upper member in a section measured near Pine Creek in SW 1/2 sec. 29, SE 1/4 sec. 30 (projected), T. 34 S., R. 3 E. The gypsum is mostly light gray, locally reddish brown and yellowish green, commonly clayey to fine sandy. It occurs in sets, as much as 10 ft thick, of irregular thin beds. The gypsum layers and enclosing beds are slightly to very contorted. Generally, the upper member is poorly exposed on an irregular slope interrupted by small ledges. It is about 350-400 ft thick in exposures along Pine Creek, and thickens northwestward to about 750 ft in the adjacent Wide Hollow Reservoir quadrangle (Stephens, 1973, aheet 2).

Entrada Sandstone

Lower member (Jel). The basal member of the Entrada is reddish-brown, crossbedded very fine to fine-grained, in part silty, sandstone. Interstratified with the sandstone are sparse sets of dusky-red mudstone and very sparse thin beds of light-yellowish-gray, fine-grained sandstone. The member is fairly resistant and forms steep slopes and rounded ledges. It is estimated to range in thickness from about 250 to 350 ft in this quadrangle.

Middle member (Jem). This member of the Entrada is composed of alternating sets of light-gray to light-brownish-gray and pale-red sandy siltstone to silty sandstone and mudstone and thin beds of reddish-brown, silty, fine-grained sandstone. The member is less resistant than the underlying or overlying members, but it forms a steep slope in the exposures along Pine Creek. It is estimated to range from about 300 to 400 ft in thickness in this quadrangle.

Upper member (Jeu). This member of the Entrada is composed of light-gray to pale-orange, fine-grained sandstone in trough and planar sets of high-angle crossbeds bounded by flat truncation planes. It is fairly resistant and forms conspicuous light-colored, rounded cliffs north and west of Escalante. The upper member is estimated to be about 200-250 ft thick in this quadrangle. The total thickness of the formation ranges from about 750-1,000 ft and increses generally southward.

Upper Jurassic Series

Morrison Formation

Tidwell Member (Jmt). The lower member of the Morrison Formation consists of sandstone, mudstone intergrading with siltstone, and minor limestone. The sandstone is light gray and light yellowish gray, fine grained, laminated to thin bedded, and in part crossbedded. Mudstone and siltstone are dominantly reddish brown and greenish gray. Gray limestone, micrograined but locally recrystallized to coarse grained, is in lenses 1-2 ft thick. The member forms a steep ledgy slope. The basal contact is a regional unconformity (Peterson, Fred, 1980, p. 69-70; in press). The member is about 120-140 ft thick in this quadrangle.

Salt Wash Member (Jmbs). The upper part of the Morrison Formation in this quadrangle consists of pinkish-gray and yellowish-gray sandstone and conglomerate and grayish-green to dark-reddish-brown mudstone. The sandstone is fine to medium grained and contains rare to abundant pebbles and grades to conglomerate. The pebbles are commonly subrounded, 1/8 to 1/4 in. in diameter, and are mostly yellowish-gray and tan chert. Less abundant but conspicuous and characteristic of the member are pebbles of grayish-red, orange-red, and grayish-green chert. The sandstone and conglomerate are in fairly persistent ledge-forming sets as much as 40 ft thick. The member forms an irregular low to moderate slope. The Salt Wash is about 120-160 ft thick in the Escalante quadrangle. The map unit (Jmbs) includes the overlying Brushy Basin Member.

Brushy Basin Member. The upper member of the Morrison is a poorly exposed slope-forming unit composed of light- to dark-gray, pale-green, reddish-brown, and purple bentonitic mudstone. Sparse lenses of light-brown conglomeratic sandstone are composed of small red, green, gray, and black chert pebbles in a matrix of medium-grained sandstone. The member ranges from 0 to about 150 ft in thickness; the total thickness of the Morrison Formation ranges from about 250-450 ft in this quadrangle.

CRETACEOUS

Upper Cretaceous Series

Dakota Formation (Kd)

The Dakota Formation consists chiefly of interbedded sandstone and shale. The sandstone is light brown, fine- to medium-grained, calcitic, mostly crossbedded, and is in ledge-forming beds, commonly a few feet to several tens of feet thick. It is interstratified with olive-gray to black, slightly to very carbonaceous shale and gray siltstone, and a few beds of coal. Iron-stained impressions of fossil plant material are common in sandstone. In the upper part of the formation the pelecypods Ostrea and Exogyra are locally abundant in sandstone. Most shale contains flakes of black carbonaceous material and in places grades to very carbonaceous mudstone and thin lenses of coal; these rock types form slopes and are poorly exposed. The upper part of the formation is mostly shale and crops out poorly. At the base of the Dakota is a southward-truncating regional unconformity, commonly marked by channels filled with iron-stained lenses of conglomerate composed chiefly of pebbles and cobbles of chert and quartz. The Lower Cretaceous Cedar Mountain Formation, a light-gray conglomerate composed chiefly of pebbles and cobbles of white to gray quartz and chert in a medium- to coarse-grained sandstone matrix, crops out about 1 mi west of the quadrangle in lenses as much as 40 ft thick (Weir and Beard, 1981b). The Cedar Mountain may be represented in this quadrangle by sporadic lenses, less than 3 ft thick, of light-gray quartz and chert conglomerate at the base of the Dakota. Thickness of the map unit ranges from about 130 to 170 ft.

Tropic Shale (Kt)

The Tropic is a dark-greenish-gray marine shale. Thin, white bentonite beds are common in the basal 50 ft. A zone of light-gray limestone concretions containing marine fossils is about 10 ft above the base. The formation forms slopes and generally is very poorly exposed. Only about the lower 300 ft of the Tropic Shale is present in this quadrangle. The formation is 800 ft thick in the adjoining Wide Hollow Reservoir quadrangle (Stephens, 1973, sheet 2).

TERTIARY(?) AND QUATERNARY SYSTEMS

Pliocene(?) and Pleistocene Series

High volcanic-gravel terrace alluvium (QTat). This alluvium is composed mainly of rounded cobbles and boulders, as much as 6 ft across, of dark-gray to dark-brown basaltic andesite and minor amounts of other volcanic rocks in a matrix of pebbles and sand. Locally, near the base of the deposits are cobbles of resistant sandstone from local bedrock formations. Yellow-brown, red, and orange chert in irregular blocks and small rounded pebbles of black chert are sparse but locally conspicuous. The deposits are generally poorly consolidated; they are irregularly cemented with calcite. Many boulders and cobbles are coated in whole or part with white to light-yellowish-gray, pedogenic calcium carbonate.

Bedding is obscure, but a few exposures display crudely graded beds and trough sets of crossbeds in channel fills. The deposits are veneered irregularly by wind-blown sand. The high volcanic-gravel terrace alluvium is a stream deposit, probably derived from debris slides and flows that issued from the Aquarius Plateau north of this quadrangle (Williams, 1985). Only a few remnants, less than 30 ft thick, of this high-level alluvium are in the Escalante quadrangle. They lie on the Navajo Sandstone near the junction of Pine Creek and the Escalante River and on the Morrison Formation northwest of Escalante. The deposits rest on an erosion surface, about 400-430 ft above stream level, that predates the cutting of the canyon of the Escalante River.

QUATERNARY SYSTEM

Pleistocene Series

Intermediate volcanic-gravel terrace alluvium (Qat_5, Qat_4). These deposits are lithologically similar to the high volcanic-gravel alluvium described above. Generally, they are less indurated and lack coatings of calcium carbonate. The intermediate volcanic-gravels occur in a few small remnants, probably as much as 30 ft thick, resting on the Navajo Sandstone along Pine and Sand Creeks. The older deposits (Qat_5) lies about 260 ft above stream level; the younger deposits (Qat_4) lie about 180 ft above stream level.

Pleistocene and Holocene(?) Series

Low quartzite- and volcanic-gravel terrace alluvium (Qat_3, Qat_2). These deposits are similar to the intermediate volcanic-gravel alluvium, but they contain sparse to abundant pebbles and cobbles of quartzite, quartz, and fine-grained metamorphic rocks, all derived from Cretaceous or Tertiary formations north of the quadrangle, and admixtures of local bedrock. These deposits are along Pine Creek and in the southwest corner of the quadrangle, and are as much as about 30 ft thick. The Pleistocene terrace alluvium (Qat_3) lies about 60 ft above stream level; the Holocene(?) alluvium (Qat_2) lies about 40 ft above stream level.

Pleistocene and Holocene Series

Debris-slide colluvium (Qms). This deposit is composed mostly of dark-gray and dark-brown subangular to rounded boulders, as much as 6 ft across, of basaltic andesite in a sandy to clayey matrix. It includes a few subangular blocks of sandstone and at the base irregular masses of shale. The deposit was formed by sliding of part of the Tropic Shale that was overlain by high volcanic-gravel terrace alluvium in the Black Hills west of Pine Creek. The deposit is estimated to be as much as 200 ft thick.

Block-slide deposits (Qmb). In the southern part of the Black Hills are deposits consisting of fairly intact, large slide blocks of the Dakota Formation. Undistorted bedding in the blocks has been rotated back to dip steeply (as much as 50°) toward the source cliffs a short distance away. The long axes of the slide deposits are parallel to the topographic contours. The block masses are as much as 1,500 ft long, 300 ft wide, and 60 ft thick.

Pleistocene(?) and Holocene Series

Volcanic-boulder colluvium (Qcv). This material consists chiefly of rounded boulders, as much as 3 ft across, of basaltic andesite in a sandy to clayey matrix. The colluvium was derived from erosion of the debris-slide colluvium of the Black Hills and high volcanic-gravel alluvium on the east side of Pine Creek, and moved downslope by creep, rolling, and sliding. The deposits lie on the Dakota Sandstone and Jurassic formations on the west side of Pine Creek and on the Navajo Sandstone on the east side of the creek. The larger deposits bordering the Black Hills probably attain a thickness of about 100 ft.

Fan alluvium (Qaf). These deposits are yellowish-gray to dark-reddish-brown silt and sand and sparse to abundant pebbles, cobbles, and boulders derived from local bedrock and surficial deposits. Stratification is obscure but in part is laminae and thin beds and lenses of low-angle cross laminae.

The material has been deposited by streams and sheetwash in fan-shaped bodies, as much as 60 ft thick, at the mouth of stream valleys, mostly in the southwestern part of the quadrangle.

Holocene Series

Sandstone talus (Qmts). These small deposits of rockfall colluvium are fallen angular blocks of light-grayish-orange and reddish-gray sandstone and sand. They have accumulated at the angle of repose on steep slopes below cliffs of Navajo Sandstone along the Escalante River, the upper reaches of Death Hollow, and the west side of Pine Creek, and below cliffs of the Salt Wash Member of the Morrison Formation northwest of Escalante. Maximum thickness of the rockfall colluvium is probably about 25 ft.

Sandstone-boulder colluvium (Qcs). These deposits consist of subangular clasts, as large as 10 ft across, of brown limy sandstone from the Dakota Formation and lesser amounts of multicolored chert-pebble conglomerate from the Salt Wash Member of the Morrison Formation, generally in a matrix of sand and chert pebbles. The deposits occur only in the Black Hills in the western part of the area. They are derived from nearby outcrops and probably are as much as 50 ft thick.

Fine-grained terrace alluvium (Qat_1). These low-level terrace deposits are medium-gray to grayish-orange-pink silt and sand and locally gravel in laminae, ripple laminae, graded beds, and trough crossbeds. The deposits form much of the valley floor around Escalante and cover a few small benches along Pine Creek. They are estimated to be as much as 50 ft thick.

Floodplain alluvium (Qal). Alluvium on modern floodplains and in narrow channels in this quadrangle consists of yellowish-gray to grayish-orange-pink silt and fine sand and variable admixures of pebbles to boulders of basaltic andesite, quartzite, and sandstone. Ripple laminations, trough crossbedding, graded bedding, and imbricated gravels occur locally in these deposits, which are probably as much as 15 ft thick along the Escalante River, Pine Creek, and Death Hollow. The mapped alluvium includes a few areas of fine-grained terrace alluvium and low gravel terrace alluvium too small to show separately.

Sheetwash alluvium and eolium (Qae). These deposits, formed by water flowing in sheets and shallow channels and modified by wind, consist of yellowish-brown to dark-reddish-brown and grayish-orange-pink silt, sand, and small rock fragments. They locally contain and intergrade with windblown sand. They cover much of the valley flats near Escalsnte and part of Antone Flat near the center of the quadrangle. These deposits are probably not more than 10 ft thick.

Sandy residuum (Qrs). In the northwest corner of the quadrangle the Navajo Sandstone is exposed on a nearly flat surface and has weathered to produce a residuum, about 3 ft thick, of yellowish-gray to grayish-orange-pink sand and unsorted angular fragments of sandstone. The deposit is veneered locally with wind-blown sand. Similar patches of residuum, too small to show at this map scale, are common on relatively flat outcrops of the Navajo.

Windblown sand (Qes). The eolian deposits are composed of unconsolidated yellowish-gray to pale-red, fine grains of quartz and minor silt. They are derived mainly from the Navajo and Page Sandstones on which most of these deposits rest. Bedding is obscure, but in part the sand is in small-scale trough and planar sets of crossbeds. The sand forms many broad thin sheets on the relatively flat upland areas in the eastern two-thirds of the quadrangle. The maximum thickness of these deposits is estimated to be about 12 ft.

Artificial fill (Qfh, Qfl). Unsorted boulder to pebble gravel mixed with sand and silt has been quarried locally from the Entrada Sandstone, Carmel Formation, and alluvium and colluvium. The material has been used as highway fill (Qfh) and for stock-pond dams and landfills (Qfl).

STRUCTURAL GEOLOGY

The major structure of the Escalante quadrangle is the asymmetric Escalante anticline, whose gently southeast-plunging axis crosses the quadrangle from near the northwest corner to near the middle of the south edge. Dips on the east flank are relatively gentle, mostly from 3° to 8°. The west flank is much steeper, having dips as much as 40°, and has been referred to as the Escalante monocline (Stephens, 1973; Weir and Beard, 1981a, b). The Black Hills in the western part of the quadrangle contain a poorly defined, shallow, northwest-plunging syncline. The southeast corner of the quadrangle contains part of the gently south-plunging Slickrock Saddle syncline. This syncline was included in a broad regional structure called the Sand Creek syncline by Hackman and Wyant (1973, sheet 2).

The Navajo Sandstone, which crops out over much of the quadrangle, is cut by many vertical and near-vertical joints. The joints for the most part are closely spaced, and although locally obscure, are generally conspicuous because they control many small topographic forms. Not all joints are shown on the map; the symbols indicate representative, well-defined sets of joints. The joint pattern is in places complex, but northwesterly trends are most common.

ECONOMIC GEOLOGY

The mineral potential of the Escalante quadrangle is low. Geochemical reconnaissance, which included the eastern part of the quadrangle as well as adjoining areas in the north, east, and south, did not indicate the presence of mineralized terranes (Weir and Lane, 1981a, b, 1983).

The only known mineral deposit is the Van Hamet manganese prospect in sec. 24, R. 3 E., T. 35 S. (projected) near the south edge of the quadrangle. The deposit consists of purplish-black manganese minerals in irregular nodular concretions, as much as 6 in. across, in reddish-brown, fine-grained sandstone in the Judd Hollow Tongue of the Carmel Formation. The mineralized material is scattered through layers less than a foot thick in a sandstone lens, about 6 ft thick, and makes up less than 5 percent of the host rock. It lies within an area less than 200 ft (60 m) in diameter. Samples of the mineralized rock collected by Doelling (1975, p. 138) ranged from about 16 to 27 percent manganese and from 45 to 54 percent silica. The deposit appears to be too small to yield ore in commercial quantities. Furthermore, geologically similar deposits elsewhere in western Utah have not proved economical (Crittenden, 1951, p. 14). Thus, the manganese potential of the quadrangle is negligible.

Small, low-grade uranium-copper deposits are in Triassic formations in the Circle Cliffs about 15 mi east of the quadrangle (Davidson, 1967, p. 65-91; Doelling, 1975, p. 107-109, 131-135). The same Triassic formations underlie the Escalante quadrangle at depths of several thousand feet and may contain similar depósits, but the potential host rocks are unlikely to warrant exploration. Gypsum occurs in small lenses in the Carmel Formation, but potentially economic thicker beds are known elsewhere in Garfield County (Doelling, 1975, p. 146-149).

Road material has been quarried on a small scale near the quadrangle from Quaternary surficial deposits consisting mainly of volcanic rocks and quartzite, and from siltstone, shale, and sandstone of the lower part of the Carmel Formation. None of this material has been trucked more than a few miles.

Of interest to mineral collectors are fragments of brightly colored chert, probably derived from volcanic deposits on the Aquarius Plateau, that occur in surficial deposits composed mainly of volcanic rocks. Fragments of dinosaur bone from the Morrison Formation and petrified wood from Cretaceous strata also occur in some surficial deposits. All these materials are sparse and erratically distributed.

The oil and gas potential of the area is low, although oil is produced from Triassic and Permian strata in a fold, similar to the Escalante quadrangle anticline, in the Upper Valley field about 10 mi southwest of the Escalante quadrangle (Peterson, P.R., 1973). The Escalante anticline was tested in the south-central part of this quadrangle by the Gulf Oil Co. No. 1 Garfield-X well in 1972. The well penetrated Triassic and Permian rocks and bottomed in the Cedar Mesa Sandstone Member of the Cutler Formation (Permian) at a depth of 4,399 ft with no recorded show of oil and gas. Five other tests of Triassic and Permian strata drilled 8-10 mi north of the area on the Escalante anticline were, except for some nonflammable gas, also dry wells (Heylmun and others, 1965, p. 68-69; (unpublished well records, Bureau of Land Management, Salt Lake City, Utah).

Thin, lensing beds of coal occur near the middle of the poorly exposed Dakota Formation in the Black Hills and in outcrops in the southwest corner of the quadrangle. These beds are unlikely to be developed because large reserves of coal in thick beds are in the Kaiparowits basin, a few miles west of Escalante (Doelling, 1975, p. 68-78).

Water for domestic and agricultural purposes for Escalante and vicinity is supplied by diversions from the Escalante River and Pine Creek. Reserves of ground water in the lower part of the Entrada Sandstone and in the Navajo Sandstone are thought to be substantial (Goode, 1969).

A major natural resource in the quadrangle is the magnificent canyon and rock-monument scenery created by the erosion of the Escalante anticline (Carter and Sargent, 1983). Many hikers traverse the desert and riverside trails near Escalante (U.S. Bureau of Land Management, 1979; Lambrechtse, 1985).

GEOLOGIC HAZARDS

Floods are the chief natural hazard in the Escalante quadrangle. Summertime cloudbursts in the northern part of the quadrangle or adjacent areas can result in rock-laden floods suddenly coursing down narrow canyons. In addition, temporary dams formed by rockfalls may give way to release an unexpected torrent far downstream.

Debris-slide colluvium and shale and mudstone in Cretaceous formations and in the upper part of the Morrison Formation, all in the Black Hills, are potentially unstable. Planning for construction in this area should take this danger into account. Hikers in the cliff-and-canyon topography in the eastern part of the quadrangle should beware of possible rock falls as well as flash floods.

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______ 1981b, Mineral resources of the Escalante Canyon Instant Study Area, Garfield County, Utah: U.S. Geological Survey Open-File Report 81-559, 17 p.

______ 1983, Mineral resource potential map of The Box-Death Hollow Roadless Area, Garfield County, Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-1319-B, scale 1:48,000.

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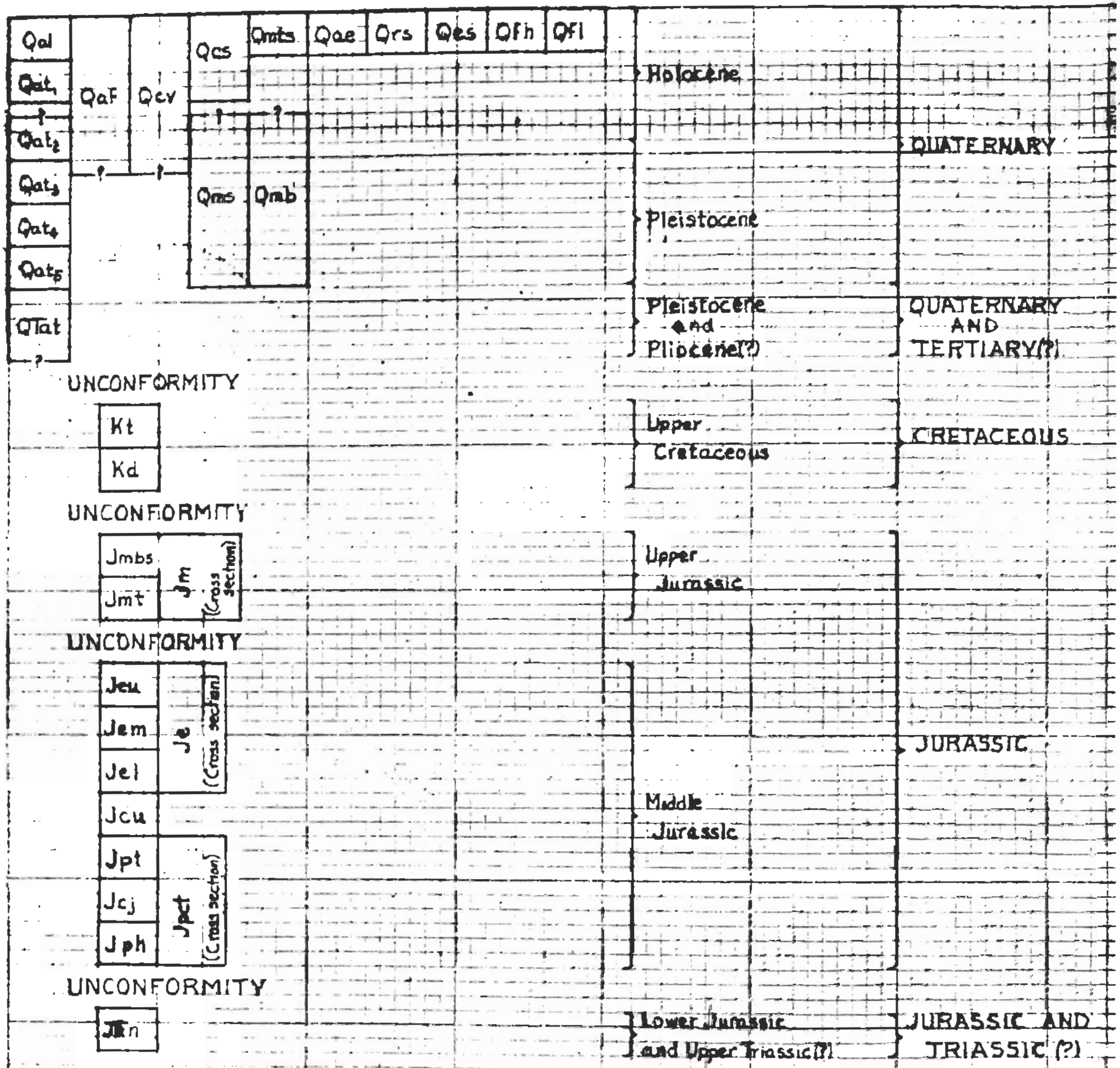
REVIEW #3

CORRELATION OF MAP UNITS



Escalante Qd., Utah
Williams, Weir, & Beard
G.W.W. 3/3/87, 7/3/87

SYSTEM	SERIES	FORMATION	MEMBER	SYMBOL	THICKNESS IN FEET
QUATERNARY	Pleistocene to Holocene	Alluvium		Qal, Qae, Qat1, Qaf, Qat2, Qat3, Qat4, Qat5	0 - 200
		Colluvium		Qcs, Qcda, Qcu, Qmb, Qms	
TERTIARY(?)	Pliocene(?)	Eolium and Residuum		Qes, Qrs	
		Artificial Fill		Qfb, QFl	
		Oldest Alluvium		QTat	0 - 30
CRETACEOUS	Upper Cretaceous	Tropic Shale		Kt	300+
		Dakota Formation		Kd	130 - 170
JURASSIC	Upper Jurassic	Morrison Formation	Brushy Basin Member	Jm (Composite) Jmbs	250-450 (0-100)
			Salt Wash Member		(150-160)
			Tidwell Member	Jmt	(150-160)
	Middle Jurassic	Entrada Sandstone	Upper member	Je (Cross section) Jeu	750-1000 (200-250)
			Middle member	Jem	(300-400)
			Lower member	Jel	(250-350)
		Carmel Formation	Upper member	Jcu	350 - 400
		Page Sandstone	Thousand Pockets Tongue	Jpt	140-180 ([illegible])
		Carmel Formation	Judd Hollow Tongue	Joj	([illegible])
		Page Sandstone	Harris Wash Tongue	Jph	([illegible])
TRIASSIC(?) AND JURASSIC	Upper Triassic(?) and Lower Jurassic	Navajo Sandstone		JTRn	780+

LITHOLOGY:

ESCALANTE Qd, Utah
Williams, War, & Beard
1/27/87, 5/4/87, 7/8/87

Gordon W. Weir
USGS, 2255 N. Gemini Drive
Flagstaff, Arizona 86001

REVIEW #3

Notes

(Map heading, to be centered below map)

GEOLOGIC MAP OF THE ESCALANTE QUADRANGLE, GARFIELD COUNTY, UTAH

By

Van S. Williams, Gordon W. Weir, and L. Sue Beard

U.S. Geological Survey

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(Topographic credit, to be placed below lower left corner)

Base from U.S. Geological Survey Escalante Quadrangle, 1964

(Geologic mapping credit to be placed below lower right corner)

Geology mapped by V. S. Williams, 1978; L. S. Beard assisted by D. C. Ferris, 1980; and G. W. Weir, 1980, 1986

REVIEW #3

ESCALANTE QUADRANGLE
GWW 7/3/87

SYMBOLS

CONTACT--Boundaries of surficial deposits are approximately located

(Red) ANTICLINE--Showing trace of axial plane and plunge of axis; dashed where approximately located

(Red) SYNCLINE--Showing trace of axial plane and plunge of axis; dashed where approximately located

STRIKE AND DIP OF INCLINED BEDS

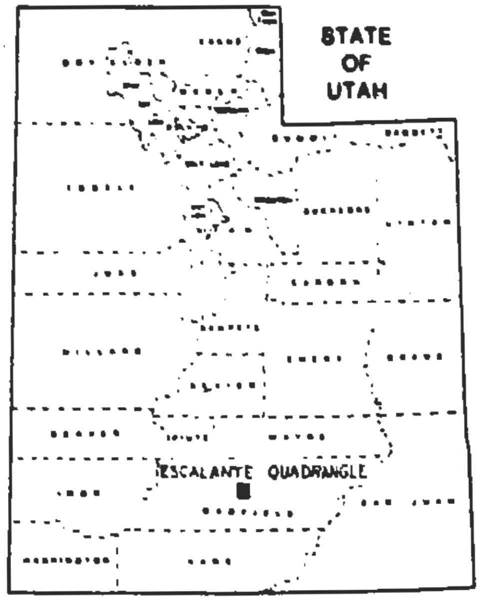
STRIKE OF VERTICAL AND NEAR-VERTICAL JOINTS

MANGANESE PROSPECT

OIL WELL--Dry hole, showing name of well

(Red) 6000 STRUCTURE CONTOURS--Drawn on top of Navajo Sandstone. Long dashed where control less accurate. Short dashed where datum is above land surface. Contour interval 100 ft; 200 ft locally on west flank of Escalante anticline

REVIEW # 3



LOCATION MAP