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INTERIM GEOLOGIC MAP OF THE SEEP RIDGE 30' X 60' QUADRANGLE, UINTAH, DUCHESSNE, AND CARBON COUNTIES, UTAH, AND RIO BLANCO AND GARFIELD COUNTIES, COLORADO

by
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2009

Base from U.S. Geological Survey Seep Ridge Quadrangle, 1981
Projection: UTM, Zone 12
Units: Meters
Datum: NAD 1927

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SCALE 1:100,000

0 10000 20000 30000 40000 50000 60000 FEET

0 2.5 5 10 14 16 MILE

0 1 2 4 6 8 10 12 14 16 KILOMETER

CONTOUR INTERVAL 50 METERS

This map is a plot of Geographic Information System (GIS) files created to visually represent the content of the GIS data files. It contains many features that do not meet UGS cartographic standards, such as automatically generated labels that may overlap other labels and lines.

Description of Map Units

- Qal** STREAM ALLUVIUM (HOLOCENE) - Unconsolidated silt, sand, and gravel in flood plains of Green and White Rivers, Nine Mile Creek, and other larger perennial creeks; locally grade into Qac; 1-30 m thick.
- Qal*** STREAM TERRACE DEPOSITS (HOLOCENE AND PLEISTOCENE[?]) - Unconsolidated to lightly cemented silt, sand, cobbles, and boulders; at least three levels of fluvial terraces between the Green and White Rivers; the youngest deposit is about 10-15 m above modern flood plain, the intermediate-age deposit is about 50 m above modern flood plain, and the oldest deposit is about 130 m above modern flood plain and may be related to deposits mapped as basin alluvium (Qa); each deposit is less than a few tens of meters thick.
- Qn** BASIN ALLUVIUM (HOLOCENE AND PLEISTOCENE[?]) - Variably consistently poorly to moderately sorted silt, sand, gravel, cobbles, and boulders deposited on near-planar bedrock surfaces in northwest corner of map area; poorly to well-developed soil profile preserved in some deposits; less than 2 m thick.
- Qal*** ALLUVIAL-FAN DEPOSITS (HOLOCENE AND PLEISTOCENE[?]) - Unconsolidated, poorly sorted boulders, gravel, sand, and silt; locally grades into Qac; less than 30 m thick.
- Qc** COLLUVIUM (HOLOCENE) - Heterogeneous mixture of boulders, cobbles, sand, and silt; may grade into talus, landslide, and alluvial deposits; 10 m thick.
- Qe** EOLIAN DEPOSITS (HOLOCENE) - Unconsolidated, well-sorted, fine-grained, windblown sand and silt along Green River; less than 10 m thick.
- Qms** SLIDES, SLUMPS, AND FLOWS (HOLOCENE AND PLEISTOCENE) - Landslides, slumps and debris flows; locally may include colluvium and talus deposits; some map areas include mass-movements deposits of slightly different ages that share a common boundary.
- Qml*** TALUS DEPOSITS (HOLOCENE AND PLEISTOCENE[?]) - Unconsolidated and unstratified angular rock fragments at the base of cliffs; includes colluvium locally; less than 5 m thick.
- Qml*** TALUS DEPOSITS OF BAKED ROCK (HOLOCENE) - Reddish fragments of baked rock in talus below burned outcrops of the Mahogany oil-shale zone; includes colluvium locally; mapped in the Weaver Ridge quadrangle; 30 m thick.
- Qac** MIXED ALLUVIUM AND COLLUVIUM (HOLOCENE AND PLEISTOCENE[?]) - Unconsolidated clay, silt, sand, and gravel in stream drainages and in areas of low topographic relief; less than 10 m thick.
- Qae** MIXED ALLUVIUM AND EOLIAN DEPOSITS (HOLOCENE) - Unconsolidated alluvium (clay, silt, and sand) mixed with windblown sand and silt located on near planar surfaces; less than 10 m thick.
- Tub** MEMBER B OF UINTA FORMATION (EOCENE, UINIAN) - Light-gray, light-greenish-gray, light-brown, and light-purple, mudstone and claystone with interbeds of greenish-gray, yellow, and brown fine-grained sandstone; contains minor conglomerate and tuffaceous beds; forms nonresistant slopes and thin resistant ledges; consists mostly of Horizon B of Osborn (1929), Peterson and Kay (1931), and Kay (1934); these beds are included in the informal Wagonhound member of some workers; contains significant gilsonite deposits; 30-225 m thick.
- Tua** MEMBER A OF UINTA FORMATION (EOCENE, UINIAN) - Yellowish-gray and yellow-brown, fine- to very fine-grained sandstone and siltstone; contains minor conglomerate, shale, and tuffaceous interbeds; forms resistant beds; consists of Horizon A of Osborn (1929), Peterson and Kay (1931), and Kay (1934); these beds are included in the informal Wagonhound member of some workers; contains locally mappable tuff beds (bed A of Cashion [1974] and Keighin [1977]); intertongues with the underlying Parachute Creek Member of the Green River Formation; the amount of Green River beds increases westward across the quadrangle; intertongues with and in part equivalent to the sandstone and limestone facies of the Green River Formation in the western part of the quadrangle; a gradational contact on the map at Big Pack Mountain represents where the approximate ratio of Tua to Tgsl map units change, although areas mapped as Tua are also Big Pack Mountain include strata of the Tgsl and areas around Hill Creek mapped as Tgsl include strata of Tua; the lower contact is irregular and bedding is contorted because of soft-sediment deformation; generally thin northward; 60-140 m thick.
- Tgsl** SANDSTONE AND LIMESTONE FACIES OF GREEN RIVER FORMATION (EOCENE, UINIAN) - Alternating beds of light- to medium-brown, fine-grained, interbedded siltstone, claystone, and limestone; grades to light-gray limestone; unit has a banded appearance; intertongues with and in part equivalent to member A of the Uinta Formation; see description of Tua; thickens westward (see Price 30' x 60' quadrangle [Weiss and others, 1990]); 0-180 m thick.
- Tgp** PARACHUTE CREEK MEMBER OF GREEN RIVER FORMATION (EOCENE, BRIDGERIAN) - Poorly to moderately resistant, light- to medium-gray, light- to medium-green, yellow, organic-rich marlstone, siltstone, sandstone, and oolitic limestone; contains pods of the mineral nahcolite, NaHCO₃ of which have been leached leaving cavities; contains several oil shale beds including the mapped Mahogany oil-shale zone; Horse Bench Sandstone is a mapped regional marker bed in the Parachute Creek Member (see description in Map Symbols section); contains locally mappable tuff beds (see bed B of Cashion [1984]) that are not shown on this map; generally mapped as upper member (Tgu) in adjoining Price 30' x 60' quadrangle by Weiss and others (1990); upper part of Parachute Creek intertongues with overlying Uinta Formation; 247-950 m thick.
- Tgd** DOUGLAS CREEK MEMBER OF GREEN RIVER FORMATION (EOCENE, BRIDGERIAN) - Poorly to moderately resistant, light- to medium-gray, light- to medium-brown, yellow, and light-gray siltstone, sandstone, shale, and cherty and oolitic limestone; includes the distinctive reddish-brown, fine-grained sandstone, yellowish-brown marlstone, and bluish-gray to dark brown oil shale of an intertonguing unit in the Dragon quadrangle (shown in Scott and Pantea, 1985); base of member is mapped on the light-brown and reddish limestone (0.5 m thick) of Long Point Bed of Johnson (1984); may include upper part of the Green River-Wasatch Formations transition zone in Burnt Thicket, Cooper Canyon, Bates Knolls, Agency Draw NE, and Agency Draw NW quadrangles where the Long Point Bed was not shown on source maps; generally mapped as middle member (Tgm) by Weiss and others (1990); thickens southward and northward from Each Bench area; 45-620 m thick.
- Tg-tw** GREEN RIVER-WASATCH FORMATIONS TRANSITION ZONE (EOCENE, BRIDGERIAN AND WASATCHIAN) - Intertonguing beds of Green River Formation and Renegade Tongue and unnamed tongue of the Wasatch Formation; represents interval between the base of Long Point Bed and the main body of the Wasatch Formation; mapped as part of Colton Formation in adjoining Price 30' x 60' quadrangle by Weiss and others (1990); about 60-220 m thick.
- Tw** WASATCH FORMATION (EOCENE AND PALEOCENE[?]) WASATCHIAN AND CLARKFORKIAN - Red, yellow, and light-gray friable sandstone, siltstone, mudstone, and conglomerate; conglomerate is thin bedded and contains chert (black, brown, and gray) and quartzite pebbles; upper part intertongues with overlying Douglas Creek Member of Green River Formation where the transition zone is not identified; in Davis Canyon quadrangle (Pantea, 1987), base of Wasatch is at lowestmost conglomerate bed; the Wasatch Formation in the Steep Ridge 30' x 60' quadrangle is mapped as part of Colton and Wasatch Formations in adjoining Price 30' x 60' quadrangle by Weiss and others (1990); Wasatch Formation may include limestone beds of the Flagstaff Member of Green River Formation (Tgr) in the subsurface of the western part of the quadrangle but pinches out eastward (see Johnson and Johnson, 1991); 280-830 m thick.

- Tgf** FLAGSTAFF MEMBER OF GREEN RIVER FORMATION (EOCENE[?] AND PALEOCENE, CLARKFORKIAN AND TIFFANIAN) - Mostly medium- to dark-gray carbonate, light-gray sandstone, light-gray to green-gray claystone; only identified in subsurface from lithologic and geophysical well logs; intertongues with Wasatch Formation; shown on cross section only; 0-600 m thick.
- Kmv** MESAVERDE GROUP UNDIVIDED (UPPER CRETACEOUS, MASTRICHTIAN AND CAMPANIAN) - Exposed part is moderately resistant, light-gray to pale-grayish-orange, medium- to fine-grained, lenticular cross-bedded sandstone, gray-green shale, and local conglomerate of the Tüschler Formation; subsurface part is light-gray, tan, and light-yellow, cross-bedded sandstone with subordinate gray carbonaceous shale and coal of Farrer and Neslen Formations; likely includes beds of the Segó Sandstone, Buck Tongue of the Mancos Shale, and Castlegate Sandstone (Johnson and Roberts, 2003); exposed thickness 30 m; 620-805 m thick in subsurface.

THE FORMATIONS BELOW ARE NOT EXPOSED IN THIS QUADRANGLE. DESCRIPTIONS ARE FROM SAMPLE LOGS AND CUTTINGS OF WELLS IN THE QUADRANGLE AND FROM EXPOSURES IN THE VERNAL 30' X 60' QUADRANGLE (SPRINKEL, 2007) AND WESTWATER 30' X 60' QUADRANGLE (GUALTIERI, 1988).

- Kms** MANCOS SHALE (UPPER CRETACEOUS, CAMPANIAN TO CONIACIAN) - Dark-gray, soft, slope-forming calcareous shale containing beds of siltstone and bentonitic clay; 1035-1400 m thick.
- Kfd** FRONTIER SANDSTONE, MOVRY SHALE, AND DAKOTA SANDSTONE, UNDIVIDED - These formations are shown as one unit on the cross section; see below for descriptions and thickness; combined thickness is 30-190 m.
- Kfd** Frontier Sandstone (Upper Cretaceous, Turonian) - Upper part is resistant, light-brown to light-gray and yellow, fine-grained and ripple-marked sandstone with local petrifed wood and fossils; lower part is soft, light- to dark-gray calcareous shale; may include minor limestone and coal beds in the lower part; likely mapped as Ferron Sandstone Member of Mancos Shale in adjoining Westwater 30' x 60' quadrangle by Gualtieri (1988); 10-110 m thick.
- Kfd** Movry Shale (Upper and Lower Cretaceous, Cenomanian and Albian) - Dark-gray, siliceous shale that weathers silver gray; contains abundant fossil fish scales; age based on Obradovich and Cobban (1975), Cobban and Kennedy (1989), Molenaar and Cobban (1991), and unpublished paleontological data; likely mapped as lower shale member of Mancos Shale in adjoining Westwater 30' x 60' quadrangle by Gualtieri (1988); 10-35 m thick.
- Kfd** Dakota Sandstone (Lower Cretaceous, Albian) - Upper and lower resistant, yellow and light-gray, medium- to coarse-grained sandstone beds separated by a carbonaceous shale; contains coal beds in exposures in the Vernal 30' x 60' quadrangle (Doelling and Graham, 1972); 10-45 m thick.

- Klcm** CEDAR MOUNTAIN FORMATION AND MORRISON FORMATION - Cedar Mountain is shown with the underlying Morrison Formation in the cross section because these formations are too thin to show separately at cross section scale; the top of the Morrison Formation is identified in petrophysical and sample logs as variegated mudstone beds that underlie a basal conglomeratic sandstone (Burro Canyon Member) of the Cedar Mountain Formation; combined thickness is 90-285 m.
- Klcm** Cedar Mountain Formation (Lower Cretaceous, Albian and Aptian) - Purple, gray, and greenish-gray mudstone, siltstone, minor sandstone, and limestone; includes basal conglomeratic sandstone; contains calcareite beds; 40-95 m thick.
- Klcm** Morrison Formation (Upper Jurassic, Tithonian and Kimmeridgian) - Upper Brushy Basin Member consists of soft, banded, variegated (light-gray, olive-gray, red, and light-purple) shale, claystone, and light-red, cross-bedded sandstone, conglomerate, and bentonite. Lower Salt Wash Member consists of resistant, light-gray to white, cross-bedded sandstone; contains dinosaur remains at Dinosaur National Monument; 50-190 m thick.

- Jsc** STUMP FORMATION, ENTRADA SANDSTONE, AND CARMEL FORMATION, UNDIVIDED - These formations are shown as one unit because they are too thin to show separately at cross section scale; see below for unit description and individual formation thickness; combined thickness is 65-300 m.
- Jsc** Stump Formation (Upper Jurassic, Oxfordian) - Upper Redwater Member is greenish-gray and light-green, slope-forming shale with banded, fossiliferous (belemnites) sandstone and limestone. Lower Curtis Member is resistant, light-gray to greenish-gray, cross-bedded, fossiliferous, glauconitic sandstone and fissile shale; polymorph assemblage from base of Curtis indicates Oxfordian age (Wilson and Currie, 2006; Brian Currie, Miami University (Ohio), verbal communication, March 15, 2006); J3 unconformity of Pipinginos and O'Sullivan (1978) is at base of the Curtis Formation; Redwater Member of Stump correlates to the Summerville Formation, and the Curtis Member correlates to the Moab Member of the Curtis Formation (Doelling, 2001); formerly a member of the Entrada Sandstone (Wright and others, 1962); 40-145 m thick.

- Jrc** ENTRADA SANDSTONE (MIDDLE JURASSIC, CALLOVIAN) - Upper reddish-brown siltstone and fine-grained sandstone and a lower light-gray, pink, and light-brown sandstone; lower sandstone is resistant to erosion and forms cliffs and ridges; 15-95 m thick.
- Jrc** Carmel Formation (Middle Jurassic, Callovian to Bajocian) - Medium- to dark-red, green, and gray sandy shale, sandstone, siltstone, limestone, and gypsum; upper part is mostly slope-forming red shale, siltstone, and sandstone underlain by a middle gypsiferous unit; lower part is mostly red siltstone and thin, ledge-forming limestone, which is commonly oolitic and fossiliferous; 10-60 m thick.
- Jrn** NUGGET SANDSTONE (LOWER JURASSIC AND UPPER TRIASSIC, TOARCIAN TO RHAETIAN) - Pink, light-gray, and light-brown, resistant, massive-weathering, large-scale cross-bedded sandstone; locally contains carbonate lenses (playa) and fluvial lenses (wad) near top; forms cliffs and ridges; called Glen Canyon Sandstone by Poole and Stewart (1984), a term that is confusing and is not the same as the Glen Canyon Group; Jurassic-Triassic age is supported by Early Jurassic dinosaur tracks near the top of Nugget Sandstone at Red Fleet Reservoir (Hamblin and others, 2000) and Late Triassic vertebrate tracks in lower 10 m of Nugget Sandstone (Lockley and others, 1992); 180-255 m thick.

- Jrg** GLEN CANYON GROUP, NAVAJO SANDSTONE, KEYENTA FORMATION, AND WINGATE SANDSTONE (LOWER JURASSIC AND UPPER TRIASSIC, TOARCIAN TO RHAETIAN) - An upper light-pink, fine-grained sandstone is the Navajo Sandstone; a middle reddish, fine-grained sandstone, siltstone and thin reddish and dark-gray shale is the Keyenta Formation; and a lower light-brown, fine-grained sandstone is the Wingate Sandstone; Navajo Sandstone is 11-62 m thick; Keyenta Formation is 8-35 m thick; Wingate is 76-130 m thick; total group thickness is 95-227 m.

- Tcm** CHINLE AND MOENKOPI FORMATIONS, UNDIVIDED - Combined where formations are too thin to show separately at cross section scale; see below for descriptions and thickness; combined thickness is 45-331 m.
- Tc** CHINLE FORMATION (UPPER TRIASSIC, RHAETIAN TO CARNIAN) - Purplish-red, purple, light-gray, greenish-gray, light-green, ripple-marked siltstone, sandstone, claystone, shale, and conglomerate that locally contains abundant petrifed wood; generally forms slopes; upper 26-36 m is light-reddish-brown planar laminated sandstone, cross-bedded sandstone, siltstone, and variegated mudstone; base is resistant conglomerate unit named the Gatra Member; 45-176 m thick.
- Tc** MOENKOPI FORMATION (LOWER TRIASSIC, OLENEKIAN TO INDIAN) - Medium- to dark-red, reddish-brown, green, and gray, ripple-marked siltstone, fine-grained sandstone, and shale with gypsum and limestone beds; mostly "soft," slope-forming unit; pinches out over ancestral Uncompahgre uplift; 0-155 m thick.

- Pb** PARK CITY AND PHOSPHORIA FORMATIONS (LOWER PERMIAN, LEONARDIAN) - Combined thickness of Park City and Phosphoria Formations is 0-125 m; pinches out to east and south.
- Pb** Franson Member of Park City Formation - Gray, thick- to thin-bedded cherty limestone and dolomite interbedded with brownish-gray sandstone and red to ochre shale; generally resistant and forms ledges and cliffs.
- Pb** Meade Peak Phosphatic Shale Member of Phosphoria Formation - Slope-forming, dark-gray phosphatic shale with interbeds of sandstone and limestone.

- Ppw** WEBER SANDSTONE (LOWER PERMIAN TO MIDDLE PENNSYLVANIAN, WOLFCAMPIAN TO DESMOINESIAN) - Light-gray to yellowish-gray, very thick bedded sandstone with interbeds of limestone in the lower part; highly cross-bedded sandstone in upper part; forms steep cliffs and ridges; thins and grades into the Maroon Formation from the northern part of quadrangle to east and south; 0-400 m thick (maximum thickness based on approximate Weber thickness in the adjoining Vernal 30' x 60' quadrangle).

- Pp** MAROON AND MORGAN FORMATIONS (LOWER PERMIAN TO MIDDLE PENNSYLVANIAN, WOLFCAMPIAN TO DESMOINESIAN) - Maroon Formation (Wolfcampian to Desmoinesian) is shown with the underlying Morgan Formation (Desmoinesian) where these formations are too thin to show separately at cross section scale; both units thin southward in the quadrangle and pinch out on the north flank of the ancestral Uncompahgre uplift; 0-78 m thick.

- Pp** MAROON FORMATION (LOWER PERMIAN TO MIDDLE PENNSYLVANIAN, WOLFCAMPIAN TO DESMOINESIAN) - Light red to white, fine- to coarse-grained, poorly sorted arkosic sandstone; interbedded with conglomerate; conglomerate clasts composed of white quartz, chert, and gray shale; intertongues with Weber Sandstone in the subsurface in northern part of quadrangle; 0-525 m thick.

- Pm** MORGAN FORMATION (MIDDLE PENNSYLVANIAN, DESMOINESIAN) - Light- to medium-red, yellow, and gray shale and siltstone, light- to medium-gray fossiliferous and red cherty limestone, and light-red-gray, fine-grained, locally cross-bedded sandstone; 0-140 m thick.

- M** LEADVILLE LIMESTONE (UPPER AND LOWER MISSISSIPPIAN, MERAMECIAN TO KINDERHOOKIAN) - Mostly dark-gray, medium to coarse crystalline, cherty limestone and dolomite; chert is typically light gray; regionally contains numerous caves and sinkholes; unit thins southward in the quadrangle and pinches out on the north flank of the ancestral Uncompahgre uplift; regionally 0-275 m thick.

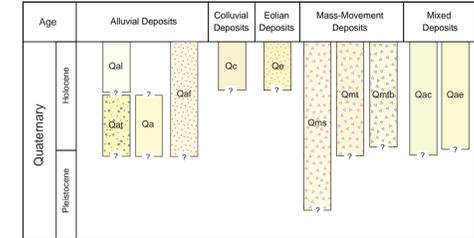
- D** DEVONIAN ROCKS, UNDIVIDED (UPPER DEVONIAN, FARMENIAN) - White to light-gray dolomite limestone, dark-gray argillaceous limestone, brown-gray sandy dolomite and sandstone; may consist of only the Ouray Limestone; 0-40 m thick; not shown on cross section but identified in wells east of cross section.

- Cc** CAMBRIAN CARBONATE ROCKS, UNDIVIDED (UPPER CAMBRIAN, SUNWAPTAN[?]) - Dark-gray to blue-gray, finely crystalline dolomite with some green micaceous shale in the lower part of the section; unit thins southward in the quadrangle and pinches out on the north flank of the ancestral Uncompahgre uplift; 0-275 m thick.

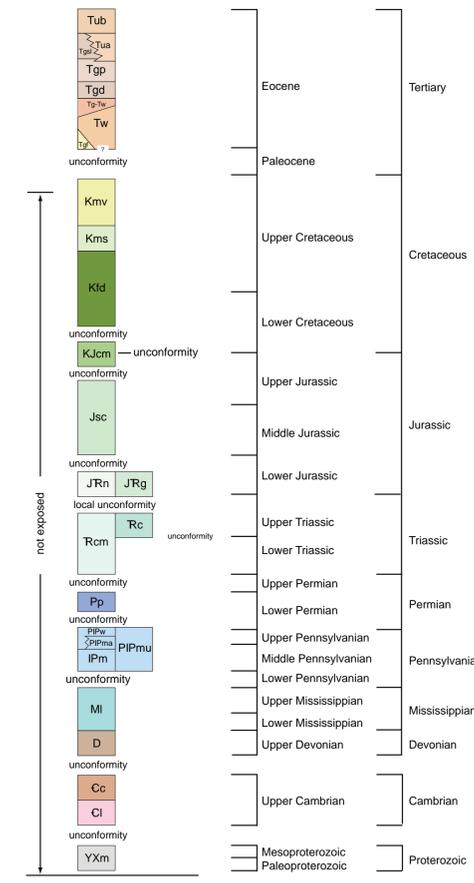
- Ci** LODORE FORMATION (UPPER CAMBRIAN, SUNWAPTAN[?]) TO STEPTOEAN[?] - Light-brown to greenish-gray sandstone underlain by pink to tan to pale-greenish-gray glauconitic shale interbedded with tan to pale-green sandstone; base is variegated (pink, gray, and pale-green), coarse- to medium-grained, cross-bedded sandstone; locally pebbly; unit thins southward in the quadrangle and pinches out on the north flank of the ancestral Uncompahgre uplift; 0-180 m thick.

- Yxm** METAMORPHIC ROCKS (MESOPROTEROZOIC AND PALEOPROTEROZOIC) - Well outcrops include a mix of medium- to dark-gray, coarse-grained metamorphic and meta-igneous rocks; minerals include quartz, biotite, hornblende, orthoclase, and plagioclase; these rocks are likely similar to meta-igneous gneiss and migmatitic meta-sedimentary rocks exposed near Grand Junction, Colorado, and described by Scott and others (2001); outcrops also include dark-gray, fine-grained rocks that may be similar to Mesoproterozoic lamprophyre dikes exposed near Grand Junction, Colorado (see Scott and others 2001); dates on these rocks from near Grand Junction, Colorado, are preliminary discordant U/Pb zircon ages of 1721±14 Ma on meta-igneous rocks, 1741±14 Ma on meta-sedimentary rocks, and 40Ar/39Ar age of 1400 Ma on lamprophyre dike rocks (Scott and others, 2001); maximum thickness unknown.

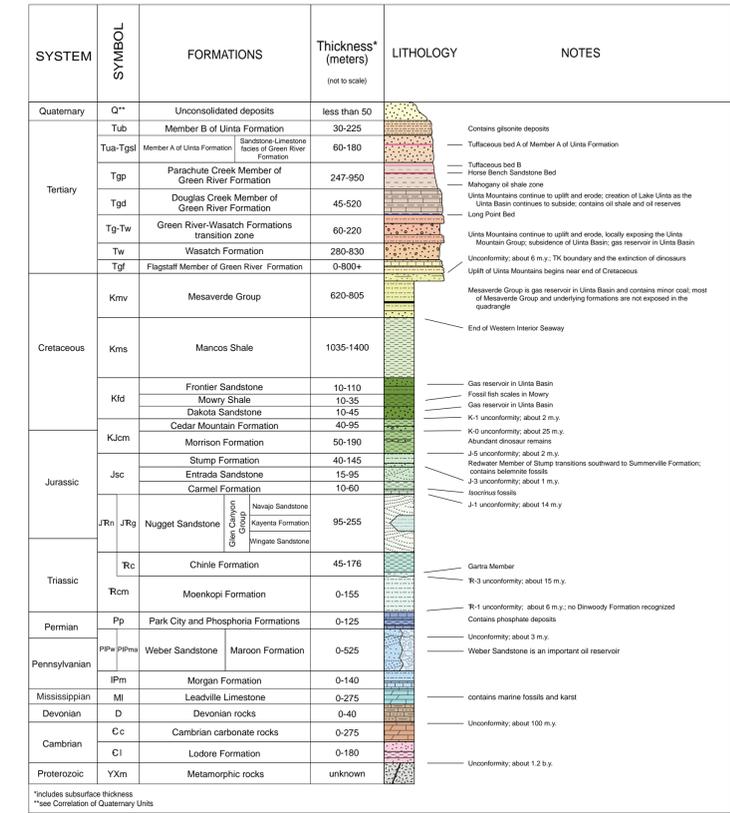
Correlation of Quaternary Units



Correlation of Bedrock Units



Stratigraphic Column



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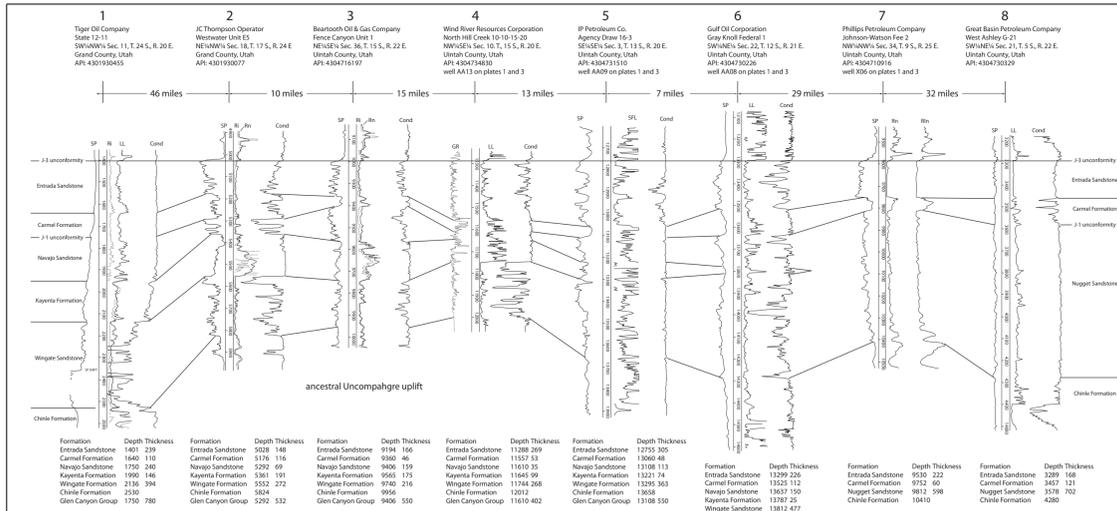
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This cross section shows the correlation of Lower and Middle Jurassic formations from near Moab, Utah, northward to near Vernal, Utah. It was drawn to highlight the change in nomenclature between the Glen Canyon Group and the Nugget Sandstone based on regional changes of the petrophysical log signatures, supported by limited sample descriptions and cuttings. The Glen Canyon Group includes the Wingate Sandstone, Keyenta Formation, and Navajo Sandstone, in ascending order. The Wingate and Navajo are sandstone beds of predominantly eolian origin whereas the Keyenta is sandstone, siltstone, and minor limestone beds of fluvial-lacustrine origin. The Nugget Sandstone is predominantly of eolian origin. The cross section shows the Glen Canyon-Nugget interval thinning over the ancestral Uncompahgre uplift, mostly at the expense of the Navajo Sandstone. In addition, Keyenta also thins northward and eventually pinches out. The nomenclature change between Glen Canyon Group and Nugget Sandstone is where the Keyenta Formation is no longer identified in wells. The Keyenta Formation is characterized by having a more positive SP response and higher resistivity as compared to the overlying Navajo and underlying Wingate. The cross section datum is the J-3 unconformity at the top of the Entrada Sandstone.

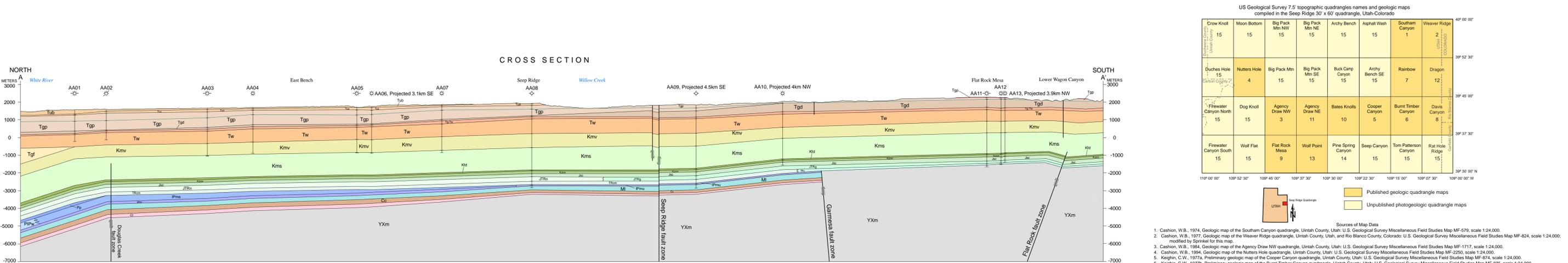
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All depths and thicknesses reported in feet



Locations of pinchouts and lithofacies changes approximate and based in part on wells in Table 2. See Stone (1977) for fault names.

TABLES OF WELL TOS USED IN CROSS SECTION AND REGIONAL CONTEXT

Table 1. Wells on cross section A-A' showing formation tops

ID	Cross Section	Well Information	Formation	Unit Symbol	Top (feet)	Thickness (feet)	Elevation (feet)	Top (feet)	Thickness (feet)	Elevation (feet)	Comments and Source of Top (Specialized picked tops for this report unless otherwise noted)	
AA01	A-A'	Kim-McDoe Oil & Gas Division NBU 201	Member A of Uta Formation	Twp	0	222	1052	0	730	909	Ground elevation of well	
AA01	A-A'	Kim-McDoe Oil & Gas Division NBU 201	Member A of Uta Formation	Twp	222	61	1330	730	200	430	500' top estimated from structural maps by Johnson and Roberts (2003)	
AA01	A-A'	Kim-McDoe Oil & Gas Division NBU 201	Parashack Creek Member of Green River Formation	Twp	283	806	1326	2940	4163	3000' top estimated from structural maps by Johnson and Roberts (2003)		
AA01	A-A'	Kim-McDoe Oil & Gas Division NBU 201	Member of shale zone	Twp	1071	421	1803	1330	2038	1305	500' top estimated from structural maps by Johnson and Roberts (2003)	
AA01	A-A'	Kim-McDoe Oil & Gas Division NBU 201	Green River-Washatch Transition zone	Twp	1492	1179	2671	3850	5029	1158	420' top estimated from structural maps by Johnson and Roberts (2003)	
AA01	A-A'	Kim-McDoe Oil & Gas Division NBU 201	Washatch Formation	Twp	2671	1312	3983	5295	6607	1312	700' top estimated from structural maps by Johnson and Roberts (2003)	
AA01	A-A'	Kim-McDoe Oil & Gas Division NBU 201	Neural Buttes field	Twp	3983	384	4367	4367	4751	384	700' top estimated from structural maps by Johnson and Roberts (2003)	
AA02	A-A'	Gas Production Enterprises NE 14E1/4 Section 16, T. 10, R. 2, E. 2	Member B of Uta Formation	Twp	0	70	1560	0	230	517	Ground elevation of well	
AA02	A-A'	Gas Production Enterprises NE 14E1/4 Section 16, T. 10, R. 2, E. 2	Member A of Uta Formation	Twp	70	185	1485	310	3112	4507	4800' top estimated from structural maps by Johnson and Roberts (2003)	
AA02	A-A'	Gas Production Enterprises NE 14E1/4 Section 16, T. 10, R. 2, E. 2	Parashack Creek Member of Green River Formation	Twp	155	849	1634	610	2476	3127	500' top estimated from structural maps by Johnson and Roberts (2003)	
AA02	A-A'	Gas Production Enterprises NE 14E1/4 Section 16, T. 10, R. 2, E. 2	Member of shale zone	Twp	940	186	1818	1818	1889	3696	500' top estimated from structural maps by Johnson and Roberts (2003)	
AA02	A-A'	Gas Production Enterprises NE 14E1/4 Section 16, T. 10, R. 2, E. 2	Green River-Washatch Transition zone	Twp	1126	119	1937	1937	2056	119	1190	1190
AA02	A-A'	Gas Production Enterprises NE 14E1/4 Section 16, T. 10, R. 2, E. 2	Washatch Formation	Twp	2056	402	2458	2458	2860	402	2056	402
AA02	A-A'	Gas Production Enterprises NE 14E1/4 Section 16, T. 10, R. 2, E. 2	Neural Buttes field	Twp	2458	105	2563	2563	2668	105	2458	105
AA03	A-A'	Kim-McDoe Oil & Gas Division NBU 201	Member B of Uta Formation	Twp	0	85	1670	0	280	547	Ground elevation of well	
AA03	A-A'	Kim-McDoe Oil & Gas Division NBU 201	Member A of Uta Formation	Twp	85	135	1805	280	410	547	500' top estimated from structural maps by Johnson and Roberts (2003)	
AA03	A-A'	Kim-McDoe Oil & Gas Division NBU 201	Parashack Creek Member of Green River Formation	Twp	170	864	1669	690	2551	4788	500' top estimated from structural maps by Johnson and Roberts (2003)	
AA03	A-A'	Kim-McDoe Oil & Gas Division NBU 201	Member of shale zone	Twp	1034	561	1595	1595	1687	3156	500' top estimated from structural maps by Johnson and Roberts (2003)	
AA03	A-A'	Kim-McDoe Oil & Gas Division NBU 201	Green River-Washatch Transition zone	Twp	1595	119	1714	1714	1833	119	1595	119
AA03	A-A'	Kim-McDoe Oil & Gas Division NBU 201	Washatch Formation	Twp	2714	623	3337	3337	3456	623	2714	623
AA03	A-A'	Kim-McDoe Oil & Gas Division NBU 201	Neural Buttes field	Twp	3337	105	3442	3442	3547	105	3337	105
AA04	A-A'	Kim-McDoe Oil & Gas Division Biter Creek 1220	Member B of Uta Formation	Twp	0	70	1699	0	230	524	Ground elevation of well	
AA04	A-A'	Kim-McDoe Oil & Gas Division Biter Creek 1220	Member A of Uta Formation	Twp	70	89	1769	230	290	594	500' top estimated from structural maps by Johnson and Roberts (2003)	
AA04	A-A'	Kim-McDoe Oil & Gas Division Biter Creek 1220	Parashack Creek Member of Green River Formation	Twp	140	814	1658	690	2551	4788	500' top estimated from structural maps by Johnson and Roberts (2003)	
AA04	A-A'	Kim-McDoe Oil & Gas Division Biter Creek 1220	Member of shale zone	Twp	954	39	1093	1093	1132	2032	500' top estimated from structural maps by Johnson and Roberts (2003)	
AA04	A-A'	Kim-McDoe Oil & Gas Division Biter Creek 1220	Green River-Washatch Transition zone	Twp	1093	110	1203	1203	1322	110	1093	110
AA04	A-A'	Kim-McDoe Oil & Gas Division Biter Creek 1220	Washatch Formation	Twp	2122	623	2745	2745	2864	623	2122	623
AA04	A-A'	Kim-McDoe Oil & Gas Division Biter Creek 1220	Neural Buttes field	Twp	2745	105	2850	2850	2955	105	2745	105
AA05	A-A'	Kim-McDoe Oil & Gas Division Lave 1213-149	Member B of Uta Formation	Twp	0	30	1725	0	100	560	Ground elevation of well	
AA05	A-A'	Kim-McDoe Oil & Gas Division Lave 1213-149	Member A of Uta Formation	Twp	30	140	1655	100	460	560	500' top estimated from structural maps by Johnson and Roberts (2003)	
AA05	A-A'	Kim-McDoe Oil & Gas Division Lave 1213-149	Parashack Creek Member of Green River Formation	Twp	170	773	1528	2550	3320	4090	500' top estimated from structural maps by Johnson and Roberts (2003)	
AA05	A-A'	Kim-McDoe Oil & Gas Division Lave 1213-149	Member of shale zone	Twp	943	62	1005	1005	1067	2065	500' top estimated from structural maps by Johnson and Roberts (2003)	
AA05	A-A'	Kim-McDoe Oil & Gas Division Lave 1213-149	Green River-Washatch Transition zone	Twp	1005	814	1819	1819	1938	814	1005	814
AA05	A-A'	Kim-McDoe Oil & Gas Division Lave 1213-149	Washatch Formation	Twp	1819	623	2442	2442	2561	623	1819	623
AA05	A-A'	Kim-McDoe Oil & Gas Division Lave 1213-149	Neural Buttes field	Twp	2442	105	2547	2547	2652	105	2442	105
AA06	A-A'	XTO Energy Inc Fisher 12-12-12	Member B of Uta Formation	Twp	0	30	1725	0	100	560	Ground elevation of well	
AA06	A-A'	XTO Energy Inc Fisher 12-12-12	Member A of Uta Formation	Twp	30	140	1655	100	460	560	500' top estimated from structural maps by Johnson and Roberts (2003)	
AA06	A-A'	XTO Energy Inc Fisher 12-12-12	Parashack Creek Member of Green River Formation	Twp	170	773	1528	2550	3320	4090	500' top estimated from structural maps by Johnson and Roberts (2003)	
AA06	A-A'	XTO Energy Inc Fisher 12-12-12	Member of shale zone	Twp	943	62	1005	1005	1067	2065	500' top estimated from structural maps by Johnson and Roberts (2003)	
AA06	A-A'	XTO Energy Inc Fisher 12-12-12	Green River-Washatch Transition zone	Twp	1005	814	1819	1819	1938	814	1005	814
AA06	A-A'	XTO Energy Inc Fisher 12-12-12	Washatch Formation	Twp	1819	623	2442	2442	2561	623	1819	623
AA06	A-A'	XTO Energy Inc Fisher 12-12-12	Neural Buttes field	Twp	2442	105	2547	2547	2652	105	2442	105
AA07	A-A'	Esday Resources LLC SE 14E1/4 Section 22, T. 12, S. 1, R. 2, E. 1	Member B of Uta Formation	Twp	0	30	1857	0	100	600	Ground elevation of well	
AA07	A-A'	Esday Resources LLC SE 14E1/4 Section 22, T. 12, S. 1, R. 2, E. 1	Member A of Uta Formation	Twp	30	140	1827	100	570	670	500' top estimated from structural maps by Johnson and Roberts (2003)	
AA07	A-A'	Esday Resources LLC SE 14E1/4 Section 22, T. 12, S. 1, R. 2, E. 1	Parashack Creek Member of Green River Formation	Twp	158	720	1478	2670	3390	4060	500' top estimated from structural maps by Johnson and Roberts (2003)	
AA07	A-A'	Esday Resources LLC SE 14E1/4 Section 22, T. 12, S. 1, R. 2, E. 1	Member of shale zone	Twp	878	62	940	940	1002	2002	500' top estimated from structural maps by Johnson and Roberts (2003)	
AA07	A-A'	Esday Resources LLC SE 14E1/4 Section 22, T. 12, S. 1, R. 2, E. 1	Green River-Washatch Transition zone	Twp	940	108	1048	1048	1156	108	940	108
AA07	A-A'	Esday Resources LLC SE 14E1/4 Section 22, T. 12, S. 1, R. 2, E. 1	Washatch Formation	Twp	1048	623	1671	1671	1733	623	1048	623
AA07	A-A'	Esday Resources LLC SE 14E1/4 Section 22, T. 12, S. 1, R. 2, E. 1	Neural Buttes field	Twp	1671	105	1776	1776	1881	105	1671	105
AA08	A-A'	Oil Corporation S9N1/4E1/4 Section 22, T. 12, S. 1, R. 2, E. 1	Member B of Uta Formation	Twp	0	131	1844	0	430	678	Ground elevation of well	
AA08	A-A'	Oil Corporation S9N1/4E1/4 Section 22, T. 12, S. 1, R. 2, E. 1	Member A of Uta Formation	Twp	131	247	1613	430	812	949	500' top estimated from structural maps by Johnson and Roberts (2003)	
AA08	A-A'	Oil Corporation S9N1/4E1/4 Section 22, T. 12, S. 1, R. 2, E. 1	Parashack Creek Member of Green River Formation	Twp	378	339	1652	1133	1528	1133	378	339
AA08	A-A'	Oil Corporation S9N1/4E1/4 Section 22, T. 12, S. 1, R. 2, E. 1	Member of shale zone	Twp	717	304	1021	1021	1083	2083	500' top estimated from structural maps by Johnson and Roberts (2003)	
AA08	A-A'	Oil Corporation S9N1/4E1/4 Section 22, T. 12, S. 1, R. 2, E. 1	Green River-Washatch Transition zone	Twp	1021	182	1203	1203	1322	182	1021	182
AA08	A-A'	Oil Corporation S9N1/4E1/4 Section 22, T. 12, S. 1, R. 2, E. 1	Washatch Formation	Twp	1203	623	1826	1826	1888	623	1203	623
AA08	A-A'	Oil Corporation S9N1/4E1/4 Section 22, T. 12, S. 1, R. 2, E. 1	Neural Buttes field	Twp	1826	105	1931	1931	2036	105	1826	105
AA09	A-A'	Projected 3.1km SE	Member B of Uta Formation	Twp	0	70	1560	0	230	517	Ground elevation of well	
AA09	A-A'	Projected 3.1km SE	Member A of Uta Formation	Twp	70	185	1485	310	3112	4507	4800' top estimated from structural maps by Johnson and Roberts (2003)	
AA09	A-A'	Projected 3.1km SE	Parashack Creek Member of Green River Formation	Twp	155	849	1634	690	2476	3127	500' top estimated from structural maps by Johnson and Roberts (2003)	
AA09	A-A'	Projected 3.1km SE	Member of shale zone	Twp	940	186	1818	1818	1889	3696	500' top estimated from structural maps by Johnson and Roberts (2003)	
AA09	A-A'	Projected 3.1km SE	Green River-Washatch Transition zone	Twp	1126	119	1937	1937	2056	119	1126	119
AA09	A-A'	Projected 3.1km SE	Washatch Formation	Twp	2056	402	2458	2458	2860	402	2056	402
AA09	A-A'	Projected 3.1km SE	Neural Buttes field	Twp	2458	105	2563	2563	2668	105	2458	105
AA10	A-A'	Projected 4.5km SE	Member B of Uta Formation	Twp	0	70	1560	0	230	517	Ground elevation of well	
AA10	A-A'	Projected 4.5km SE	Member A of Uta Formation	Twp	70	185	1485	310	3112	4507	4800' top estimated from structural maps by Johnson and Roberts (2003)	
AA10	A-A'	Projected 4.5km SE	Parashack Creek Member of Green River Formation	Twp	155	849	1634	690	2476	3127	500' top estimated from structural maps by Johnson and Roberts (2003)	
AA10	A-A'	Projected 4.5km SE	Member of shale zone	Twp	940	186	1818	1818	1889	3696	500' top estimated from structural maps by Johnson and Roberts (2003)	
AA10	A-A'	Projected 4.5km SE	Green River-Washatch Transition zone	Twp	1126	119	1937	1937	2056	119	1126	119
AA10	A-A'	Projected 4.5km SE	Washatch Formation	Twp	2056	402	2458	2458	2860	402	2056	402
AA10	A-A'	Projected 4.5km SE	Neural Buttes field	Twp	2458	105	2563	2563	2668	105	2458	105
AA11	A-A'	Projected 3.9km NW	Member B of Uta Formation	Twp	0	162	2283	0	532	740	Ground elevation of well	
AA11	A-A'	Projected 3.9km NW	Member A of Uta Formation	Twp	162	407	2116	532	1330	2116	7100' top from Johnson and Roberts (2003)	
AA11	A-A'	Projected 3.9km NW	Parashack Creek Member of Green River Formation	Twp	268	112	2395	1330	1442	2450	500' top estimated from structural maps by Johnson and Roberts (2003)	
AA11	A-A'	Projected 3.9km NW	Member of shale zone	Twp	380	704	4509	2132	2130	5170	500' top estimated from structural maps by Johnson and Roberts (2003)	
AA11	A-A'	Projected 3.9km NW	Green River-Washatch Transition zone	Twp	1084	648	1732	1732	1851	648	1084	648
AA11	A-A'	Projected 3.9km NW	Washatch Formation	Twp	1732	309	2041	2041	2160	309	1732	309
AA11	A-A'	Projected 3.9km NW	Neural Buttes field	Twp	2041	105	2146	2146	2251	105	2041	105
AA12	A-A'	Projected 3.9km NW	Member B of Uta Formation	Twp	0	67	2098	0	220	490	Ground elevation of well	
AA12	A-A'	Projected 3.9km NW	Member A of Uta Formation	Twp	67	54	1931	180	245	310	480' top estimated from structural maps by Johnson and Roberts (2003)	
AA12	A-A'	Projected 3.9km NW	Parashack Creek Member of Green River Formation	Twp	121	47	1978	180	232	360	420' top estimated from structural maps by Johnson and Roberts (2003)	
AA12	A-A'	Projected 3.9km NW	Member of shale zone	Twp	168	61	2039	240	249	310	420' top estimated from structural maps by Johnson and Roberts (2003)	
AA12	A-A'	Projected 3.9km NW	Green River-Washatch									