UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

Measured Sections of the Lower Member and Salt Wash Member of the Morrison Formation (Upper Jurassic) in the Henry Mountains Mineral Belt of Southern Utah

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Open-File Report 78-1094

1978

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Measured Sections of the Lower Member and Salt Wash Member of the Morrison Formation (Upper Jurassic) in the Henry Mountains Mineral Belt of Southern Utah

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INTRODUCTION

Eight sections of the Salt Wash Member and lower member of the Morrison Formation (Upper Jurassic) measured in and near the Henry Mountains mineral belt of southern Utah are presented in this report (fig. 1). A third member at the top of the formation, the Brushy Basin Member, is not included because it does not contain significant quantities of uranium and because it does not appear to have any bearing on uranium mineralization in the underlying Salt Wash Member.

The lower and Salt Wash Members comprise a series of strata that were divided into three fluviolacustrine sequences by Peterson (1977). Facies relations in the lower and middle of these sequences are illustrated in figure 2. Two of the sections (numbers 1 and 8) were measured outside the mineral belt and are typical of the lower and Salt Wash Members in unmineralized regions; the rest of the sections were measured in the mineral belt. Thus, the sedimentology of the mineral belt can be compared with the sedimentology of unmineralized regions. The primary difference is that the Salt Wash within the mineral belt contains certain types of lacustrine beds that are intimately associated with the uranium deposits, whereas the Salt Wash away from the mineral belt lacks these beds.

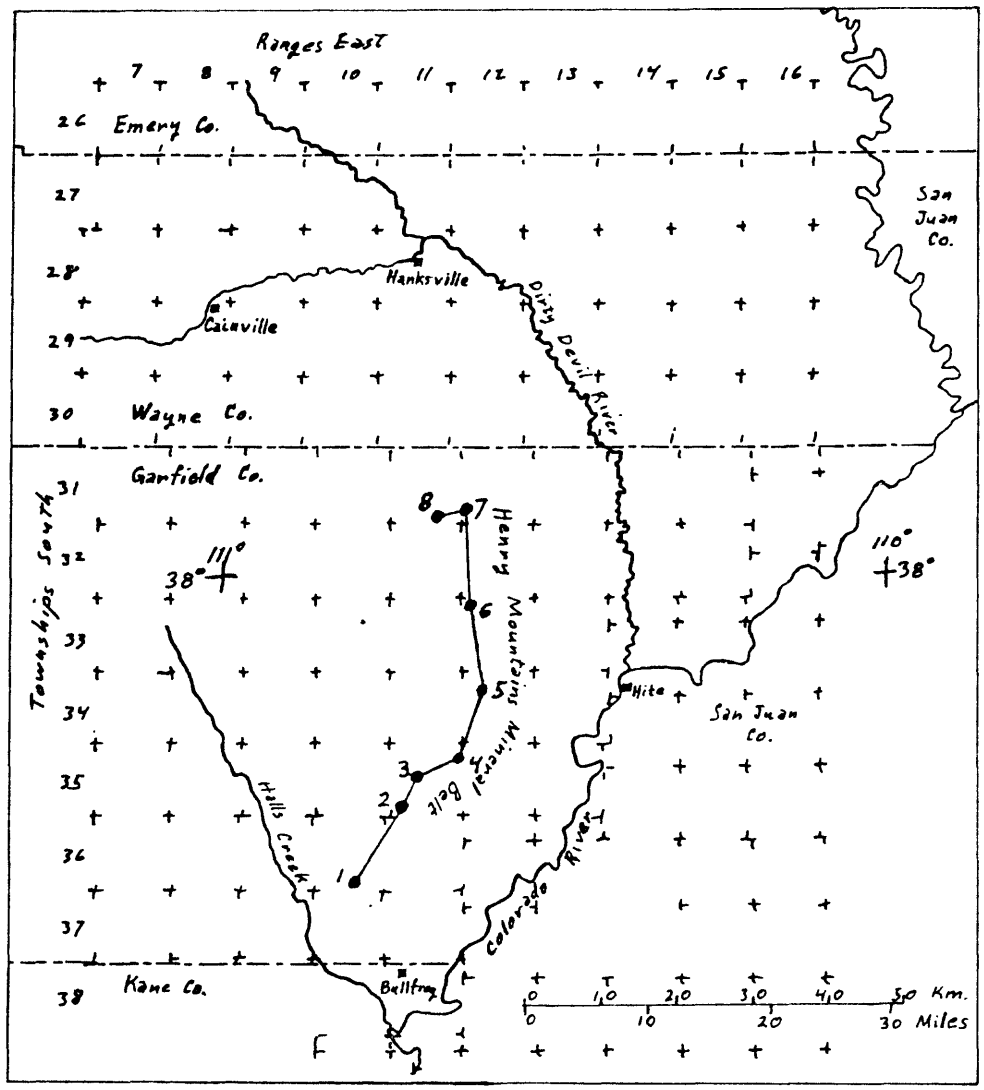

Figure 1.--Index map showing location of measured sections in southern Utah.

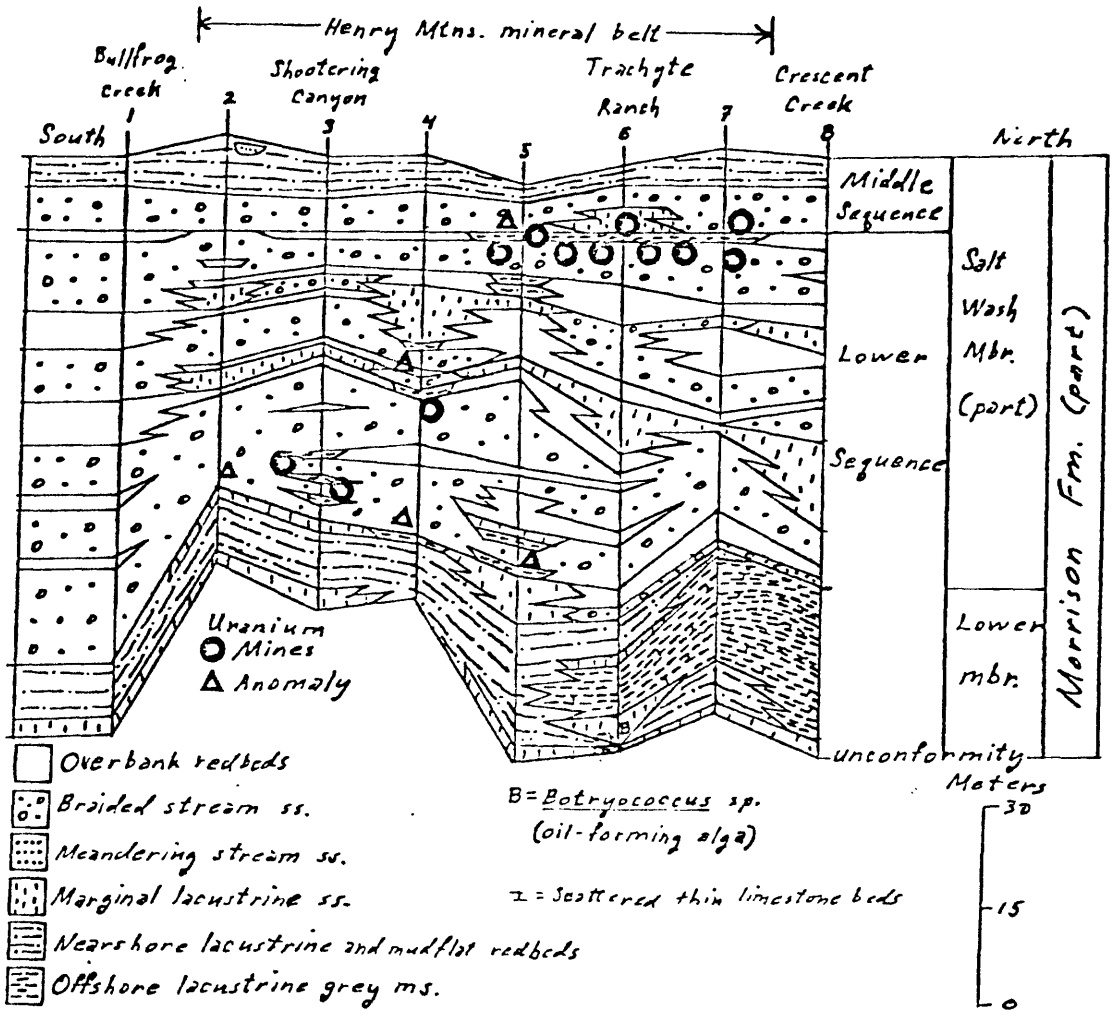

Figure 2.--Stratigraphic section along the Henry Mountains mineral belt showing measured sections and facies relations in the lower and middle fluviolacustrine sequences.

Salt Wash uranium deposits occur mainly in braided stream or marginal lacustrine sandstones where these beds are adjacent to a distinct type of offshore lacustrine primary gray mudstone. This mudstone can be identified easiest by the carbonized plant debris within it which occurs as minute shredded fragments less than about 0.5 mm long and usually requiring a 10X hand less to identify conclusively. In addition, these mudstones are either noncalcareous or only slightly calcareous, contain scarce minute iron sulfide crystals (probably pyrite), locally contain detrital biotite grains, and have yielded a suite of spores and pollen that lacks Botryococcus (palynomorphs identified by R. H. Tschudy). Some of these features indicate reducing conditions in the bottom sediments of the lakes in which these beds were deposited.

Other gray mudstones that also occur in the region but that bear no relation to the ore deposits include oil shale and calcareous types and bleached red mudstones. The oil shale type also contains minute plant fragments but, in addition, contains small irregular blebs of a brownish-black structureless carbonaceous substance that appears to be dried oil, and the palynomorphs obtained from these beds include the oil-forming alga Botryococcus sp. The calcareous gray mudstones lack carbonaceous material and palynomorphs, and they locally contain interbedded thin gray limestone beds, some of which are dark gray and fetid. The bleached red mudstones can be identified readily by their close association with red mudstones; in most cases the color boundary between the red and gray will cut across the bedding, indicating that the color change is a secondary phenomenon.

A model was recently proposed (Peterson, 1977; Turner-Peterson, 1977; Turner-Peterson and Peterson, 1978) to explain the apparent facies control of uranium mineralization. Because the gray mudstones associated with mineralized sandstone contain plant debris and were deposited in oxygen deficient and mildly alkaline conditions in the offshore part of lakes, it was suggested that these mudstones were the source of soluble humic substances (humic and fulvic acids) which are known to be capable of fixing large quantities of uranium (Szalay, 1958; Kochenov and others, 1965). It was postulated that the humic substances were expelled by compaction from the mudstones into the adjacent sandstone beds. Polyvalent cations and clays in a near-neutral pH environment within the sandstone beds fixed the expelled humic substances as tabular humate deposits. Uranium was subsequently carried into the region by ground water and was fixed and concentrated by the humate into the tabular uranium deposit.

MEASURED SECTIONS

The following definitions were used in describing the measured sections. Grain size is the median diameter as estimated in the field with a hand lens; the size of the largest grains or pebbles is also given. Bedding types are listed in increasing order of abundance as estimated or measured in the field. Bedding terminology follows that of McKee and Weir (1953) but it is modified slightly to follow the bedding terminology used by Smith (1970). Marginal lacustrine beds have many horizontal laminations (as much as 95 percent), locally abundant burrows, and locally contain gently inclined laminations (less than about 10 degrees) which may be thin deltaic foresets such as described by McGowen (1970). Because deltaic forsets and other deltaic sandstone beds cannot be readily distinguished from beach or shallow water lacustrine sandstone beds, they are all included under the term marginal lacustrine. Measurements were made in feet and later converted to meters; for this reason the meters column may not add. To emphasize the close relation of uranium deposits in sandstone beds to nearby offshore lacustrine gray mudstone beds, units that contain the gray mudstone have an asterisk (*) following the unit number, and the unit number of the associated uranium-bearing sandstone bed is underlined.

Section 1.--Bullfrog Creek

[Section begins at hairpin curve of main dirt road leading northwest from Bullfrog Marina to Notom and ends on the southwest side of a prominent hill of 4636-ft elevation in CW 1/2 NE 1/4 sec. 34, T. 36 S., R. 10 E.; E 1/2 sec. 3, T. 37 S., R. 10 E.; W 1/2 SE 1/4, SW 1/4 NE 1/4 sec. 34, T. 36 S., R. 10 E., Garfield County, Utah]

	Thickness	
	Feet	Meters

Morrison Formation (part):

Brushy Basin Member (part):

29. Mudstone, light-gray, some dark reddish-brown, dark-reddish-purple, grayish-yellow, grayish-blue; laminated to thin-bedded; contains dark-gray limestone nodules and thin sandstone beds generally 6 in.-1 ft (0.15 to 0.3 m) thick; several burrowed zones found about 50 ft (15 m) above base; weathers to "popcorn" soil covered slope. Nearshore lacustrine and mudflat deposits------100 30.00+

28. Sandstone, light-gray weathers dark brown; fine grained, maximum medium grained; bedding obscured, appears mottled and burrowed; forms slight ledge. Probably overbank deposit---------2.0 0.61

Section 1.--Bullfrog Creek--continued

Morrison Formation (part)--continued

Brushy Basin Member (part)--continued

	Thickness	
	Feet	Meters
27. Sandstone, siltstone, and mudstone, interbedded; moderate reddish brown; very fine grained and finer; laminated to very thin bedded; forms red slope. Overbank deposits---	4.0	1.22
Total Brushy Basin Member measured----------	106.0+	32.31+

Salt Wash Member:

(Upper fluviolacustrine sequence)

26. Sandstone, light-gray weathers yellowish gray; fine grained, maximum 25 mm pebbles; planar crossbedding, horizontal laminations, and trough crossbedding; contains grayish-green mudstone chips and thin lenses; bone fragments scattered locally on top; yellow rounded cliff. Braided stream deposit----------	82.0	21.95
25. Sandstone, siltstone, and mudstone; same as unit 27; top 1 ft (0.3 m) is grayish-green mudstone----------	5.5	1.68

Section 1.--Bullfrog Creek--continued

Morrison Formation (part)--continued

Salt Wash Member--continued

		Thickness	
		Feet	Meters
24.	Sandstone, light-gray, fine-grained, maximum 25 mm pebbles; planar crossbedded, horizontal laminations, and trough crossbedding; contains grayish-green mudchips at base and 3 ft (1 m) above base; blocky cliff. Braided stream deposit----------	25.0	7.62
23.	Sandstone, siltstone, and mudstone; same as unit 27; contains 2-3 percent limestone in thin lenses 1 ft (0.3 m) long as much as to 1 in. (2.5 cm) thick----------	12.5	3.81
22.	Sandstone, very light gray; fine-grained, maximum 6 mm pebbles; planar crossbedding, trough crossbedding, and horizontal laminations; about 500 ft (150 m) to northwest a thin wedge of red mudstone separates the top 20ft (6 m) of sandstone from the main part of the bed; forms rounded, blocky cliff. Braided stream deposit----------	68.0	20.73

Section 1.--Bullfrog Creek--continued

Morrison Formation (part)--continued

Salt Wash Member--continued

		Thickness	
		Feet	Meters
21.	Sandstone, siltstone, and mudstone; same as unit 27; contains some light-gray to light-grayish-green sandstone and siltstone beds that are very thin bedded to thin-bedded; petrified log fragments from a log about 3 ft (1 m) in diameter and at least 26 ft (8 m) long; slabby slope. Overbank deposit---------	13.5	4.11
20.	Sandstone, light-gray, fine-grained; maximum 8 mm pebbles; planar crossbedding, horizontal laminations, trough crossbedding; ripple cross-bedding locally at top; ledgy cliff. Braided stream deposit----------	13.0	3.96
19.	Sandstone, siltstone, and mudstone, same as unit 27; several beds mottled and burrowed---------	12.0	3.66
18.	Sandstone, light-gray, fine-grained maximum coarse-grained; planar crossbedding, horizontal laminations, and trough crossbedding; smooth rounded cliff. Braided stream deposit-	23.5	7.16

Section 1.--Bullfrog Creek--continued

Morrison Formation (part)--continued

Salt Wash Member--continued

	Thickness	
	Feet	Meters
(Middle fluviolacustrine sequence)		
17. Sandstone, siltstone, and mudstone; same as unit 27; burrows scarce----------	5.0	1.52
16. Sandstone, siltstone, and mudstone; same as unit 27; unit is a wedge that replaces the top 17 ft (5.2 m) of unit 15 farther southwest although not present where section was measured; scarce burrows; farther southwest this unit and unit 17 make up a single red slope-forming unit 22 ft (6.70 m) thick-------		
15. Sandstone, light-gray; fine-grained, maximum 25 mm; planar crossbedding, horizontal laminations, trough crossbedding; to southwest top 17 ft (5.2 m) grades laterally into red sandstone, siltstone, and mudstone that is vertically continuous with unit 17; bone and petrified log fragments found on surface and probably from this bed; forms smooth rounded cliff. Braided stream deposit----------	35.0	10.67

Section 1.--Bullfrog Creek--continued

Morrison Formation (part)--continued

Salt Wash Member--continued

	Thickness	
	Feet	Meters
(Lower fluviolacustrine sequence)		
14. Sandstone, siltstone, and mudstone; same as unit 27; pinches out to north between fluvial sandstone beds----------	4.0	1.22
13. Sandstone, light-gray; fine-grained, maximum 10 mm; trough crossbedded; horizontal laminations, planar crossbedding; top 10 ft (3 m) contains burrows; forms smooth rounded cliff. Braided stream deposit----------	36.0	10.97
12. Sandstone, siltstone, and mudstone; same as unit 27; top 10 ft (3 m) mainly light gray sandstone that is thin to thick bedded and contains scattered scarce lenses of light-grayish-green sandstone, siltstone, and mudstone; topmost 15 cm is moderate-reddish-brown to light-grayish-green siltstone and mudstone; forms red slope at base to gray cliff at top. Overbank deposit--------	18.0	5.49

Section 1.--Bullfrog Creek--continued

Morrison Formation (part)--continued

Salt Wash Member--continued

	Thickness	
	Feet	Meters
11. Sandstone, light-gray; weathers brown to grayish brown; fine grained, maximum 25 mm pebbles; horizontal laminations, planar crossbedding, trough crossbedding; scattered mudchips at base, conglomerate lenses and scattered pebbles mainly in lower half of unit; forms sheer yellow cliff. Braided stream deposit----------	22.5	6.86
10. Sandstone, siltstone, and mudstone; same as unit 27; contains several white sandstone ledges that are laminated to very thin bedded, cross-bedded, or ripple crosslaminated. Overbank deposits----------	24.0	7.32
9. Sandstone, light-gray; fine- to medium-grained, maximum 15 mm pebbles; horizontal laminations, planar crossbedding, trough crossbedding; forms blocky cliff. Braided stream deposit----------	27.0	8.23

Section 1.--Bullfrog Creek--continued

Morrison Formation (part)--continued

Salt Wash Member--continued

	Thickness	
	Feet	Meters
8. Sandstone, siltstone, and mudstone; light-gray, moderate- to dark-reddish-brown, and grayish-green; laminated to very thin bedded; 3 ft (1 m) above base is 2 ft (0.6 m) thick light-gray sandstone bed with ripple drift crosslaminations; forms red slope. Overbank deposits----------	6.0	1.83
7. Sandstone, light-gray, fine-grained, maximum 10 mm pebbles; horizontal laminations, planar crossbedding, trough corssbedding; forms blocky cliff with brown cap. Braided stream deposit-	23.0	7.92
6. Sandstone, light-gray; fine-grained, maximum 10 mm pebbles; horizontal laminations, trough crossbedding; bench on top correlates with a thin red mudstone unit that comes in about 500 ft (150 m) to north; forms blocky cliff. Braided stream deposit----------	26.0	7.92

Section 1.--Bullfrog Creek--continued

Morrison Formation (part)--continued

Salt Wash Member--continued

	Thickness	
	Feet	Meters
5. Sandstone, light-gray, fine-grained, maximum medium-grained; very thin bedded; prominent notch separating sandstone beds. Overbank deposit----------	1.0	0.30
4. Sandstone, light-gray to light-grayish-green, weathers grayish brown; fine-grained, maximum 15 mm pebbles; trough crossbedded, horizontal laminations, planar corssbedding; basal 1 ft (0.6 m) very thin to thin bedded; forms blocky cliff. Braided stream deposit----------	24.0	7.32
Total Salt Wash Member----------	496.5	151.33

Section 1.--Bullfrog Creek--continued

Morrison Formation (part)--continued

	Thickness	
	Feet	Meters
Lower member:		
3. Sandstone and mudstone, moderate- to dark-reddish-brown and some light-gray to light-grayish-green; laminated to very thin bedded; about 5 ft (1.6 m) above base is 15 cm dark-grayish-brown to light-gray limestone bed; containing desiccation cracks at the top; 18 ft (5.5 m) above base is 7.5 cm thick bentonite that is grayish green at the base and purple at the top; 19 ft (5.8 m) above base is another bentonite 15.0 cm thick that is purple at the base and grayish green at the top; forms reddish-gray slope. Nearshore lacustrine and mudflat----------	28.5	8.69
2. Sandstone, light-gray; fine-grained, maximum 3 mm granules; irregular very thin to thin bedded; granules are well rounded and colorful (red, orange, green, black, brown, and gray chert); basal Morrison marker bed; forms slabby ledge. Marginal lacustrine----------	6.0	1.83
Total lower member----------	34.5	10.53

Section 1.--Bullfrog Creek--continued

Morrison Formation (part)--continued

Lower member--continued

	Thickness	
	Feet	Meters
Total upper fluviolacustrine sequence----------	245.0	74.68
Total middle fluviolacustrine sequence----------	40.0	12.19
Total lower fluviolacustrine sequence (includes lower member)----------	246.0	74.98
Total all three fluviolacustrine sequences----------	531.0	161.85

Unconformity determined from regional studies. Contact here is sharp and planar.

Summerville Formation (part):

1. Siltstone and mudstone, moderate- to dark-reddish-brown and some light-grayish-green; laminated to very thin bedded; forms grayish-red slope; regional studies suggest deposition in shallow waters of a restricted marine embayment; not measured.

Section 2.--Hansen Creek

[Section begins 2.3 miles (3.7 km) up Hansen Creek from mouth of Shootering (Shitamaring) Creek and proceeds up northeast side of canyon of Hansen Creek, in the NE 1/4 sec. 31, T. 35 S., R. 11 E. (unsurveyed), Garfield County, Utah]

	Thickness	
	Feet	Meters
Morrison Formation (part):		
Salt Wash Member (part):		
(Upper fluviolacustrine sequence, part):		
17. Sandstone, light-grayish-brown; fine grained, maximum 50 mm pebbles; planar crossbedding, horizontal laminations, and trough cross-bedding; forms grayish brown cliff. Braided stream deposit. Thickness estimated----------	40.0	12.19
(Middle fluviolacustrine sequence):		
16. Mudstone, siltstone, and sandstone; moderate to dark reddish brown and some light grayish green, sandstones are light gray; laminated to very thin bedded; contains vertical or nearly vertical smooth sided burrows 10-25 mm in diameter; slabby, horizontally ribbed cliff; a fluvial (meandering stream) channel sandstone bed 12 ft (3.7 m) thick replaces the top part of the unit to the east. Nearshore lacustrine, lacustrine, mudflat, and some overbank---------	30.0	9.13

Section 2.--Hanson Creek--continued

Morrison Formation (part)--continued

Salt Wash Member (part)--continued

	Thickness	
	Feet	Meters
15. Sandstone, light gray weathers grayish brown; fine grained, maximum 15 mm; planar crossbedding, horizontal laminations, and trough crossbedding; forms grayish brown cliff. Braided stream deposit----------	21.0	6.40
(Lower fluviolacustrine sequence):		
14. Sandstone, light grayish brown weathers grayish brown; planar crossbedding, horizontal laminations, and trough crossbedding; grayish brown cliff. Braided stream deposit----------	10.0	3.05
13. Mudstone and siltstone, moderate to dark reddish brown, laminated to very thin bedded; red slope; overbank deposit----------	2.0	0.61
12. Sandstone, light-grayish-brown; weathers grayish brown; fine grained, maximum 15 mm; planar crossbedding, horizontal laminations, trough crossbedding; contains scattered conglomerate lenses 0-1 ft (0-0.3 m) thick; grayish cliff. Braided stream deposit----------	10.0	3.05

Section 2.--Hansen Creek--continued

Morrison Formation (part)--continued

Salt Wash Member (part)--continued

		Thickness	
		Feet	Meters
11.	Mudstone and siltstone; same as unit 13----------	3.0	0.91
10.	Sandstone, light gray weathers grayish brown; fine grained, maximum 6 mm; trough cross-bedding, and horizontal laminations; bladed barite(?) sand crystals weather out of top 1 ft (0.6 m) which also contains some burrows; grayish brown cliff. Marginal lacustrine-----	9.0	2.74
9.	Mudstone and siltstone; same as unit 13 only contains some light grayish green colors------	2.0	0.61
8.	Sandstone, light-gray; fine grained, maximum 10 mm; planar crossbedding, horizontal laminations, trough crossbedding; top 0-1 ft (0-0.6 m) locally mottled and burrowed; grayish brown cliff. Braided stream deposit----------	24.0	7.32
7.	Mudstone and siltstone, same as unit 13----------	2.0	0.61

Section 2.--Hansen Creek--continued

Morrison Formation (part)--continued

Salt Wash Member (part)--continued

	Thickness	
	Feet	Meters
6. Sandstone, light-gray to light yellowish brown weathers to grayish brown; fine grained, maximum medium grained; contains numerous burrows; horizontal laminations and low-angle trough crossbedding; grayish brown cliff. Marginal lacustrine deposit----------	12.0	3.66
5. Mudstone, siltstone, and sandstone, moderate- to dark-reddish-brown and some very light grayish-green; laminated to very thin bedded, some sandstones grayish brown and contain ripple drift crosslaminations; red slope. Overbank deposit----------	5.0	1.52

Section 2.--Hansen Creek--continued

Morrison Formation (part)--continued

Salt Wash Member (part)--continued

	Thickness	
	Feet	Meters
*4. Sandstone, yellowish gray; fine grained, maximum 10 mm; horizontal laminations, planar crossbedding, trough crossbedding; this bed locally contains several very thin beds of gray mudstone with tiny carbonized plant fragments (see appendix to section 2) although none were found where the section was measured; two adits across canyon to southwest are about 10-20 ft (3.0-6.0 m) above base of this unit but no radioactivity was found in them; several prospect pits and adits with radioactivity occur in this bed farther down Hansen Creek; blocky cliff. Braided stream deposit----------	50.0	15.24
Total Salt Wash Member measured (incomplete)----------	220.0	67.06

Section 1.--Hansen Creek--continued

Morrison Formation (part)--continued

	Thickness	
	Feet	Meters
Lower member (measured on southwest side of canyon):		
3. Mudstone, siltstone, and sandstone, interbedded; dark reddish gray, light grayish green; laminated to very thin bedded, some thin bedding; contains several thin brown limestone beds; flaggy cliff; nearshore lacustrine and mudflat----------	26.0	7.92
2. Sandstone, yellowish gray to moderate reddish brown; fine grained, maximum coarse grained; several thin streams of grit with grains up to 4 mm in diameter about 8 ft (2.4 m) above base; contains several thin beds of moderate reddish brown mudstone and siltstone; yellowish gray cliff; marginal lacustrine----------	11.5	3.51
Total Lower Member----------	37.5	11.43
Total middle fluviolacustrine sequence----------	51.0	15.54
Total lower fluviolacustrine sequence----------	166.5	50.75

Unconformity determined from regional studies. Contact here is sharp and planar.

Section 2.--Hansen Creek--continued

	Thickness	
	Feet	Meters

1. Mudstone, siltstone, and sandstone; chocolate reddish brown and some light grayish green; laminated to very thin bedded; platey cliff or slope; regional studies suggest deposition in shallow waters of a restricted marine embayment; not measured.

Appendix to Section 2.--Hansen Creek

Because the slope-forming mudstones are not well exposed, the primary gray mudstones with minute carbonized plant fragments that occur in the lower part of the Morrison could not be identified where the section was measured. Following are the stratigraphic positions and thicknesses of three of these mudstones in a partial section measured about 2 mi (1.2 km) downstream and on the southwest side of Hansen Creek, about one-half mile (1 km) up from the mouth of Shootering Canyon (Shitamaring Creek). Scattered uranium prospect pits occur in the lower sandstone bed of the Salt Wash Member (unit 4 of section 2) in Hansen Creek Canyon above Shootering Canyon. They all appear related to primary gray mudstones such as those listed below.

3* Mudstone, grayish green; laminated to very thin bedded; contains tiny black carbonized plant fragments; bed is 1-3 in. (2.5-7.5 cm) thick and occurs 34 ft (10.4 m) above the base of the Salt Wash Member.

2* Mudstone, grayish green; laminated to very thin bedded; contains tiny black carbonized plant fragments; bed is 2 in. (5.0 cm) thick and occurs 26.5 ft (8.1 m) above the base of the Salt Wash Member.

1* Mudstone, light grayish green; laminated to very thin bedded; contains tiny black carbonized plant fragments; bed is 6 in (15 cm) thick and occurs 5.5 ft (1.7 m) below the top of the lower member.

Section 3.--Shootering Canyon

[Measured on west side of canyon of Shootering (Shitamaring) Creek in the NW 1/4 SW 1/4 SE 1/4, NE 1/4 SE 1/4 SW 1/4 and N 1/2 SW 1/4 sec. 16, T. 35 S., R. 11 E., Garfield County, Utah. Lowermost beds measured on east side of canyon where exposures are better.]

	Thickness	
	Feet	Meters
Morrison Formation (part):		
Brushy Basin Member (part):		
36. Mudstone, dark-reddish-brown and light-greenish-gray; banded; laminated to thin bedded; forms slope. Probably nearshore lacustrine and mudflat. Not measured.		
Salt Wash Member:		
(Upper fluviolacustrine sequence):		
35. Sandstone, very light gray; fine grained, maximum 10 mm pebbles; bedding not apparent; a white or partly covered slope; possibly marginal lacustrine deposit----------	13.0	3.96
34. Conglomerate, grayish brown; estimated mean size about 1-6 mm, maximum 75 mm; horizontal bedding and trough crossbedding; brown cliff. Probably a braided stream deposit----------	30.0	9.14

Section 3.--Shootering Canyon--continued

Morrison Formation (part)--continued

Salt Wash Member--continued

	Thickness	
	Feet	Meters
33. Mudstone and siltstone, moderate to dark reddish brown and grayish purple, some light grayish green; includes several thin, very light gray sandstone beds; bedding not apparent; partly covered slope; overbank(?) deposit----------	39.0	11.89
32. Sandstone, light-gray weathers grayish brown; fine grained, maximum 8 mm; bedding not apparent; appears mottled and burrowed; slabby ledge; marginal lacustrine(?) deposit-	5.0	1.52
31. Mudstone and siltstone; moderate to dark reddish brown and some light grayish green; includes several thin sandstone beds; bedding not apparent; partly covered slope; overbank(?) deposit----------	12.0	3.66

Section 3.--Shootering Canyon--continued

Morrison Formation (part)--continued

Salt Wash Member--continued

	Thickness	
	Feet	Meters
30. Sandstone, light-gray, light-grayish brown-weathering; fine grained, maximum 15 mm; planar crossbedding, horizontal laminations, trough crossbedding; about 29 ft (8.8 m) above base is 2-ft (0.6 m)-thick red mudstone and siltstone lens, another red mudstone and siltstone wedge 3 ft (1 m) thick is present 15ft (4.6 m) (4.6 m) above the base; forms cliff. Braided stream deposit----------	66.0	20.12
29. Mudstone, siltstone, and sandstone, moderate-to dark-reddish-brown and some light-grayish-green, laminated to very thin bedded; contains grayish purple septarian limestone nodules and cylinders up to 15 cm in diameter near top; forms red slope. Overbank deposit----------	9.0	2.74

Section 3.--Shootering Canyon--continued

Morrison Formation (part)--continued

Salt Wash Member--continued

	Thickness	
	Feet	Meters
28. Sandstone, grayish brown weathers dark brown at the base and grades upward to gray, light yellowish gray or light gray at the top; fine to coarse grained, maximum 25 mm in lower part, coarse grained in upper part; lower 18 ft (5.49 m): fine to coarse grained, maximum 25 mm; planar crossbedding, horizontal laminations, trough crossbedding; upper 14 ft (4.27 m): fine grained, maximum coarse grained; mostly horizontally laminated; locally mottled; rounded cliff; lower part braided stream deposit; upper part probably marginal lacustrine deposit-----	32.0	9.75
27. Mudstone, siltstone, and sandstone; moderate to dark reddish brown and some light grayish green; laminated to very thin bedded; red slope; overbank deposit----------	5.0	1.52

Section 3.--Shootering Canyon--continued

Salt Wash Member--continued

Salt Wash Member--continued

	Thickness Feet	Meters
26. Sandstone, light gray; weathers gray to grayish brown; fine to medium grained, maximum 25 mm although pebble size diminishes upward to 4 mm near top; planar crossbedding, horizontal laminations, trough crossbedding; gray mud-chips locally at base; conglomerate lenses in lower 30ft (9.14 m), pebbly zones above that; high cliff; braided stream deposit----------	74.0	22.56
(Middle fluviolacustrine sequence):		
25. Mudstone, siltstone, and sandstone; moderate to dark reddish brown and some light grayish green; laminated to very thin bedded; burrows in upper half are 6-25 mm in diameter and 5-10 cm deep; 8 ft (2.44 m) above base there is a 3 ft (1 m) thick, light-gray very fine grained sandstone bed that contains ripple drift crosslaminations at the base, climbing ripples in the middle, and irregular small-scale crossbedding at the top; unit is a good marker for correlation purposes in the southeastern part of the Henry basin; red slope; nearshore lacustrine, mudflat, and probably some overbank deposit----------	21.0	6.40

Section 3.--Shootering Canyon--continued

Morrison Formation (part)--continued

Salt Wash Member--continued

	Thickness	
	Feet	Meters
24. Sandstone, light gray; weathers gray to brown; fine to medium grained, maximum 20 mm, pebbles increase in abundance upwards; planar crossbedding, horizontal laminations, trough crossbedding; locally pinches out on point to southwest but appears again about 1,000 ft (300 m) farther southwest; gray cliff; braided stream deposit----------	16.0	4.88
(Lower fluviolacustrine sequence):		
23. Mudstone, siltstone, and sandstone; same as unit 27; top 1.5 ft (0.46 m) consists of laminated dark reddish brown and grayish purple mudstone----------	4.0	1.22
22. Sandstone, light gray; weathers gray; fine grained, maximum medium grained; planar crossbedding, horizontal laminations, trough crossbedding; gray cliff; braided stream deposit----------	12.0	3.66

Section 3.--Shootering Canyon--continued

Morrison Formation (part)--continued

Salt Wash Member--continued

	Thickness	
	Feet	Meters
21. Mudstone, siltstone, and sandstone; same as unit 27; a lens that pinches out about 300 ft (90 m) north and south of here--------	2.0	0.61
20. Sandstone, light-gray; weathers grayish brown; fine grained, maximum 10 mm; planar crossbedding, horizontal laminations, trough crossbedding; cliff; braided stream deposit----------	9.0	2.74
19. Mudstone, siltstone, and sandstone; same as unit 27----------	4.0	1.22
18. Sandstone, light-gray, weathers grayish brown; fine to medium grained, maximum 10 mm; planar crossbedded, horizontal laminations, trough crossbedded; cliff; braided stream deposit---	22.0	6.71
17. Sandstone, siltstone, and mudstone, light grayish green, light gray, and moderate to dark reddish brown; sandstone is very fine grained; laminated to very thin bedded; red slope; overbank deposit----------	1.0	0.30

Section 3.--Shootering Canyon--continued

Morrison Formation (part)--continued

Salt Wash Member--continued

	Thickness	
	Feet	Meters
16. Sandstone, light-gray; weathers grayish brown; fine to medium grained, maximum 5 mm; planar crossbedding, horizontal laminations; smooth sided burrows 5-10 mm in diameter locally present at top; gray cliff; marginal lacustrine deposit----------	7.5	2.29
15. Sandstone, light-gray; fine grained, maximum medium grained; bedding not apparent; mottled; contains several small barite(?) roses; includes scarce smooth sided burrows about 6 mm in diameter; cliff or slope; marginal lacustrine deposit----------	5.5	1.68
14. Sandstone, light-gray, weathers grayish brown; fine to medium grained, maximum 6 mm; planar crossbedding, horizontal laminations, trough crossbedding; rounded cliff; braided stream deposit----------	16.0	4.88
13. Mudstone, siltstone, and sandstone, same as unit 17----------	1.5	0.46

Section 3.--Shootering Canyon

Morrison Formation (part)--continued

Salt Wash Member--continued

	Thickness Feet	Meters
12. Sandstone, light-gray, weathers grayish brown; fine grained, maximum medium grained, planar crossbedded, horizontal laminations, trough crossbedding; mudchip conglomerate locally present at base; locally in middle contains small burrows 4 mm in diameter in nonbedded unit, top 1-2 ft (0.3-0.6 m) mottled and contains scarce burrow-like structures; unit pinches out northwestward in this area; cliff; braided stream deposit------	21.0	6.40
*11B. Mudstone, very light grayish green; laminated to very thin bedded; contains tiny carbonized plant fragments; includes some very light gray, laminated to very thin bedded sandstone; slope; offshore lacustrine deposit----------	2.0	0.61
11A. Mudstone, light-gray; weathers grayish brown, fine to medium grained, maximum 3 mm; planar crossbedding, horizontal laminations, trough crossbedding; contains several thin light-gray mudstone lenses similar to unit 11B up to 2 ft (0.6 m) thick; radioactive uranium mines in this bed; blocky cliff; braided stream deposit-	29.0	8.84

Section 3.--Shootering Canyon

Morrison Formation (part)--continued

Salt Wash Member--continued

	Thickness	
	Feet	Meters
10. Sandstone, light-gray, weathers grayish brown; fine to medium grained, maximum 10 mm; laminations, planar crossbedding, trough crossbedding; red and(or) gray mudchips at base and locally higher; farther northwest the distinction between this bed and the overlying unit 11A is less apparent and perhaps the two units should be considered as one; brown cliff; braided stream deposit------	8.0	2.44
Total Salt Wash Member----------	466.5	142.19

Section 3.--Shootering Canyon

Morrison Formation (part)--continued

	Thickness	
	Feet	Meters
Lower member:		
9. Siltstone and mudstone, light grayish green; laminated to very thin bedded; contains several thin pink to grayish pink limestone lenses or pods; forms notch; nearshore lacustrine mudflat, and possibly overbank----	3.0	0.91
8. Sandstone, light gray; weathers brown; laminated to ripple crosslaminated and small-scale cross-bedded; includes about 20 percent light grayish green mudstone in thin splits; slabby ledges; marginal lacustrine, possibly overbank--------	3.0	0.91
7. Siltstone and mudstone, moderate to dark reddish brown and light grayish green; laminated to very thin bedded; contains a purple bentonite bed 50 mm thick in middle; flaggy cliff; nearshore lacustrine and mudflat----------	8.0	2.44
6. Sandstone, light gray; weathers brown; fine grained, maximum medium grained, laminated to ripple crosslaminated; slight ledge; marginal lacustrine----------	1.0	0.30

Section 3.--Shootering Canyon

Morrison Formation (part)--continued

Lower member--continued

	Thickness	
	Feet	Meters
5. Siltstone and mudstone, moderate to dark reddish brown; laminated to very thin bedded; forms notch; nearshore lacustrine and mudflat----------	2.5	0.76
4. Sandstone, light grayish green, some yellow, some black near base; very fine to fine grained; maximum 3 mm locally at base and in middle; slightly irregular laminated and very thin bedded and low angle small-scale cross-bedded, top 15 cm (6 in.) has some ripple crosslaminations and horizontal laminations; slabby cliff; marginal lacustrine----------	4.5	1.37
3. Siltstone and mudstone, moderate to dark reddish brown; laminated to very thin bedded; several siltstone and scarce very fine grained sandstone beds have medium to coarse grains; 25-50 mm (10-20 in.) deep sandstone-filled mud-cracks at base; dark red flaggy cliff; nearshore lacustrine and mudflat-------	9.0	2.74

Section 3.--Shootering Canyon--continued

Morrison Formation (part)--continued

Lower member--continued

	Thickness Feet	Thickness Meters
2. Sandstone, light grayish green; weathers grayish brown; fine grained, maximum 3 mm in basal and middle parts, top locally has granules up to 6 mm in diameter; laminated to very thin bedded; locally contains "humped" structures in which the bedding is horizontal at the base and grades up to concave downward in the middle of the unit, grading up to horizontal bedded at the top; smooth cliff or flaggy ledge; marginal lacustrine bars; unit is the basal Morrison marker bed; this and underlying units measured on east side of canyon----------	12.0	3.96
Total lower member----------	44.0	13.41
Total upper fluviolacustrine sequence----------	285.0	86.87
Total middle fluviolacustrine sequence----------	37.0	11.28
Total lower fluviolacustrine sequence----------	188.5	57.45
Total all three fluviolacustrine sequences----------	510.5	155.60

Unconformity, determined from regional studies; contact here is sharp and planar; truncation of Summerville beds can be seen farther down Shootering Canyon.

Section 3.--Shootering Canyon--continued

	Thickness	
	Feet	Meters
Summerville Formation (part):		
1. Siltstone and mudstone, moderate to dark reddish brown; laminated to very thin bedded and ripple cross laminated; 15 ft (4.57 m) below top is a 15 cm thick bed of purple bentonite; top 1 ft (0.3 m) is light grayish green siltstone and mudstone; flaggy and slabby cliff; regional studies suggest deposition in shallow waters of a restricted marine embayment; thickness shown is height of exposure here but basal and middle parts are not exposed----------	33.0+	10.06+

Section 4.--Del Monte mines

[Measured on south side of ridge above cattle tank, in the NW 1/4 SW 1/4 sec. 12, T. 35 S., R. 11 E., Garfield County, Utah.]

Morrison Formation (part):

Salt Wash Member (part):

	Thickness	
	Feet	Meters
(Upper fluviolacustrine sequence, part):		
17. Sandstone, light-gray, fine to very coarse grained, maximum 50 mm diameter pebbles; planar crossbedding, horizontal laminations, trough crossbedding; scattered conglomerate lenses in lower 12 ft (3.66 m); cliff; top of bed concealed by Quaternary gravels and probably eroded; braided stream deposit----------	30.0	9.14
(Middle fluviolacustrine sequence):		
16. Mudstone, siltstone, and sandstone; moderate to dark reddish brown and some light gray; laminated to very thin bedded; partly covered red slope; probably nearshore lacustrine, mudflat, and partly overbank----------	18.0	5.49
15. Sandstone, light-gray; fine grained, maximum 15 mm pebbles; planar crossbedding, horizontal laminations, trough crossbedding; cliff; braided stream deposit----------	20.0	6.10

Section 4.--Del Monte mines--continued

Morrison Formation (part)--continued

Salt Wash Member (part)--continued

	Thickness	
	Feet	Meters
(Lower fluviolacustrine sequence):		
14. Mudstone, siltstone, and sandstone; moderate to dark reddish brown and some light gray; laminated to very thin bedded; red slope; probably overbank deposit----------	9.0	2.74
13. Sandstone, grayish red-brown; fine to medium grained, maximum 10 mm pebbles; horizontal laminations, planar crossbedding, trough cross-bedding; cliff; braided stream deposit----------	9.0	2.74
12. Sandstone, light-gray and brown, fine grained, maximum very coarse grained; laminated to very thin bedded; includes about 10 percent moderate reddish brown to light grayish green mudstone; burrows in top 2 ft (0.6 m); partly covered slope; overbank and possibly near-shore lacustrine----------	7.0	2.13
11. Sandstone, light-gray weathers grayish brown; fine to medium grained, maximum 10 mm pebbles; trough crossbedding, horizontal laminations; burrows in lower part; cliff; marginal lacustrine----------	31.0	9.45

Section 4.--Del Monte mines--continued

Morrison Formation (part)--continued

Salt Wash Member (part)--continued

		Thickness	
		Feet	Meters
10*	Sandstone, yellowish-brown-gray; fine grained, maximum 6 mm pebbles; horizontal laminations, planar crossbedding, trough crossbedding; gray mudstone containing tiny carbonized plant fragments and interbedded sandstone form top 1 foot (0.3 m) of unit; grades westward into interbedded sandstone and gray mudstone which contains tiny carbonized plant fragments; local radioactivity; only two adits in this unit but about 0.5 mile (1 km) north this is the main ore horizon; ledges and slopes; braided stream deposit---	7.0	2.13
9.	Mudstone, siltstone, and sandstone; light grayish green; laminated to very thin bedded; 1 ft (0.3 m) above base is 0-2 ft (0-0.6 m) thick sandstone bed that is ripple crosslaminated and horizontally laminated; flaggy slope; overbank deposit----------	6.0	1.83
8.	Sandstone, yellowish gray; fine grained, maximum 10 mm pebbles; horizontal laminations, planar crossbedding, trough crossbedding; appears to pinch out to northeast; cliff; braided stream(?) deposit----------	6.0	1.83

Section 4.--Del Monte mines--continued

Morrison Formation (part)--continued

Salt Wash Member (part)--continued

		Thickness	
		Feet	Meters
7*	Mudstone, siltstone, and sandstone; light grayish green; laminated to very thin bedded; contains tiny carbonized plant fragments; includes about 1 percent red mudstone and siltstone; flaggy slope; offshore lacustrine deposit----------	3.0	0.91
6.	Sandstone, very light gray weathers yellowish gray; fine to medium grained, maximum 10 mm pebbles; horizontal laminations, planar crossbedding, trough crossbedding; contains scattered mudchips and, locally, carbonized plant fragments; local radioactivity; most of the adits in this area are in this bed; cliff; braided stream deposit----------	24.0	7.32
5.	Mudstone, siltstone, and sandstone; moderate to dark reddish brown and some light grayish green; laminated to thin bedded; flaggy slope; overbank deposit----------	10.0	3.05

Section 4.--Del Monte mines--continued

Morrison Formation (part)--continued

Salt Wash Member (part)--continued

	Thickness	
	Feet	Meters
4. Sandstone, yellowish gray; fine grained, maximum medium grained; planar crossbedding, horizontal laminations, trough crossbedding; contains mudchips at several horizons in the middle; a shallow prospect adit is beside the road but no radioactivity is present here; about 0.5 mile (1 km) north several radioactivity anomalies 2-3 times background are in this bed; cliff; braided stream deposit----------	36.0	10.97
Total Salt Wash Member measured (incomplete)---------	216.0	65.84

Section 4.--Del Monte mines--continued

Morrison Formation (part)--continued

	Thickness	
	Feet	Meters
Lower member:		
3* Sandstone, siltstone, and mudstone; moderate to dark reddish brown and light grayish green; laminated to very thin bedded; uppermost 3 ft (1 m) is gray mudstone containing minute carbonized plant fragments and a local calcareous mudstone or thin limestone bed at the top; partly covered slope; nearshore lacustrine. Mudflat, and probably some overbank---------	30.0	9.14
2. Sandstone, light gray; fine grained, maximum very coarse grained; laminated to very thin bedded and ripple crosslaminated; platey ledge; marginal lacustrine; the basal Morrison marker bed----------	2.0	0.61
Total lower member----------	32.0	9.75

Section 4.--Del Monte mines--continued

Morrison Formation (part)--continued

Lower member--continued

	Thickness	
	Feet	Meters
Unconformity, determined from regional studies, contact here is sharp and planar; local truncation of beds in underlying Summerville Formation can be seen in the vicinity.		
Total middle fluviolacustrine sequence----------	38.0	11.58
Total lower fluviolacustrine sequence----------	180.0	54.86

Summerville Formation (part):

1. Mudstone and siltstone; moderate to dark reddish brown and some light grayish green; laminated to very thin bedded; slope; regional studies suggest deposition in shallow waters of a restricted marine embayment; not measured.

Section 5.--Woodruff Hole

[About 1/2 mile (800 m) northeast of Woodruff Spring, in the NW 1/4 NE 1/4 sec. 8, T. 34 S., R. 12 E., Garfield County, Utah.]

	Thickness	
	Feet	Meters
Morrison Formation (part):		
Brushy Basin Member (part):		
30. Mudstone, grayish red to purplish red-gray; laminated to thin bedded; partly covered slope; probably nearshore lacustrine and mudflat; not measured.		
Salt Wash Member:		
(Upper fluviolacustrine sequence):		
29. Sandstone very light yellowish gray; fine to medium grained, maximum 15 mm pebbles mainly in lower 6 ft (2 m) although some are found higher; planar crossbedded, horizontally laminated, trough crossbedded; cliff in gully but partly covered slope elsewhere; braided stream deposit----------	36.0	10.97

Section 5.--Woodruff Hole--continued

Morrison Formation (part)--continued

Salt Wash Member (part)--continued

	Thickness	
	Feet	Meters
28. Mudstone, moderate to dark reddish brown and some light grayish green laminated to very thin bedded; contains grayish pink limestone concretions; slope; overbank deposit----------	6.0	1.83
27. Conglomerate, brown; median about 8 mm, maximum about 35 mm; planar crossbedded and trough crossbedded; about 16 ft (5 m) above base grades upward into pebbly sandstone that is light yellowish brown to light yellowish gray, fine to medium grained with maximum to 15 mm pebbles, and is planar crossbedded, horizontally laminated, and trough crossbedded; slabby cliff at base to slope at top; braided stream deposit----------	28.0	8.53
26. Siltstone and mudstone, grayish green; very thin to thin bedded; blocky cliff; overbank deposit----------	2.0	0.61

Section 5.--Woodruff Hole--continued

Morrison Formation (part)--continued

Salt Wash Member (part)--continued

	Thickness	
	Feet	Meters
25. Sandstone, yellowish gray; fine grained, maximum coarse grained; planar crossbedded, horizontal laminations, trough crossbedded; about 500 ft (150 m) southwest is 0-3 ft (0-1 m) red to grayish green mudstone lens or wedge at 33 ft (10 m) above base; 48 ft (14.63 m) above base is fairly persistent parting plane with 0-6 in. (0-15 cm) thick grayish green mudstone and scattered mud-chips; blocky cliff; braided stream deposit--	68.0	20.73

Section 5.--Woodruff Hole--continued

Morrison Formation (part)--continued

Salt Wash Member (part)--continued

	Thickness	
	Feet	Meters
24. Sandstone, very light gray; fine to medium grained, maximum 25 mm pebbles; planar crossbedded, horizontal laminations, trough crossbedding; about 20 ft (6 m) above base is large petrified log about 4 ft (1.2 m) in diameter and at least 45 ft (13.7 m) long that only locally has high radioactivity; larger pebbles at approximately same horizon as the log; contains scattered mudchips; some climbing ripples at top; top picked at color change, more than normal amount of mudchips at base of overlying sandstone bed, and persistent scoured surface (up to 10 ft or 3 m deep scours) at base of overlying bed; white cliff; braided stream deposit----------	47.0	14.33

Section 5.--Woodruff Hole--continued

Morrison Formation (part)--continued

Salt Wash Member (part)--continued

	Thickness Feet	Meters
(Middle fluviolacustrine sequence):		
23. Mudstone and siltstone, moderate to dark reddish brown, some grayish green; laminated to very thin bedded; 5 ft (1.5 m) above base is 2 ft (0.6 m) thick sandstone bed that is brown, fine grained, and very thin to thin bedded, forming a slight ledge; contains pink to light gray limestone nodules; includes scarce burrows that are about 10 mm in diameter and vertical; slope; nearshore lacustrine and mudflat----------	10.0	3.05
22. Sandstone, light yellowish brown to very light gray and yellowish brown; fine to medium grained, maximum 25 mm pebbles; planar cross-bedding, horizontal laminations, trough cross-bedding; contains scarce bone fragments and locally abundant carbonized wood fragments or small coalified logs; some radioactivity in lower part, and one adit (mostly in underlying beds) extends up into the lower part of this bed; cliff; braided stream deposit----------	13.0	3.96

Section 5.--Woodruff Hole--continued

Morrison Formation (part)--continued

Salt Wash Member (part)--continued

		Thickness	
		Feet	Meters
	(Lower fluviolacustrine sequence):		
21*	Mudstone, grayish green; laminated to very thin bedded; contains tiny carbonized plant fragments; locally contains light gray limestone nodules but the mudstone generally is not calcareous or is only slightly calcareous; locally scoured out by overlying sandstone bed; gray notch or slope; offshore lacustrine deposit----------	3.0	0.91
20.	Sandstone, yellowish brown; fine grained, maximum coarse grained; horizontal laminations, planar crossbedding, trough crossbedding; contains scattered mudchips and scattered carbonized plant fragments; includes a log that is partly coalified and partly petrified; low radioactivity, most of the adits in the area are in this bed, especially at or near the top; cliff, braided stream deposit----------	20.0	6.10

Section 5.--Woodruff Hole--continued

Morrison Formation (part)--continued

Salt Wash Member (part)--continued

		Thickness	
		Feet	Meters
19*	Mudstone and siltstone, grayish green, some moderate to dark reddish brown in lower 5 ft (1.5 m); laminated to very thin bedded; 6 ft (2 m) above base is 2 ft (0.6 m) thick sandstone bed that is light grayish green, fine grained, and ripple crosslaminated; gray mudstone above the sandstone bed is not calcareous and contains tiny carbonized plant fragments; mudstone below the sandstone bed is calcareous; slope; offshore lacustrine at top to near-shore lacustrine at bottom----------	11.5	3.51
18.	Sandstone, white; fine grained, maximum medium grained; very thin to thin bedded; burrowed, especially in lower part; white cliff or slope; marginal lacustrine----------	9.0	2.74

Section 5.--Woodruff Hole--continued

Morrison Formation (part)--continued

Salt Wash Member (part)--continued

	Thickness	
	Feet	Meters
17. Mudstone and siltstone, moderate to dark reddish brown, top 50-75 mm is grayish green; laminated to very thin bedded; 2 ft (0.6 m) above base is 1 ft (0.3 m) thick sandstone bed that is gray, very fine grained, and laminated to very thin bedded or ripple crosslaminated; slope, overbank deposit-------	16.0	4.88
16. Sandstone, light gray, fine grained, maximum 8 mm pebbles; horizontal laminations, scarce crossbedding; moderately burrowed although well burrowed in upper 15 cm; cliff; marginal lacustrine----------	7.0	2.13
15. Mudstone and siltstone moderate to dark reddish brown; laminated to very thin bedded; slope; overbank deposit----------	5.5	1.68

Section 5.--Woodruff Hole--continued

Morrison Formation (part)--continued

Salt Wash Member (part)--continued

	Thickness	
	Feet	Meters
14. Sandstone, very light gray, weathers grayish brown; fine to medium grained, maximum 25 mm pebbles; horizontal laminations, planar crossbedding, trough crossbedding, top 1 ft (0.3 m) ripple crosslaminated; cliff; braided stream deposit----------	42.5	12.95
13. Mudstone and siltstone; moderate to dark reddish brown, top 5 cm grayish green; laminated to very thin bedded; includes about 5 percent light gray, very fine grained, sandstone in thin beds that are ripple crosslaminated; slope; overbank deposit----------	6.0	1.83
12. Sandstone, grayish brown; fine to medium grained, maximum 15 mm pebbles; horizontal laminations, planar crossbedding, trough crossbedding; cliff; braided stream deposit--	8.0	2.44

Section 5.--Woodruff Hole--continued

Morrison Formation (part)--continued

Salt Wash Member (part)--continued

		Thickness	
		Feet	Meters
11.	Mudstone and siltstone, moderate to dark reddish brown; finely laminated to very thin bedded; 12 ft (3.7 m) above base is 2 ft (0.6 m) thick sandstone bed that is light gray, fine grained, and ripple crosslaminated, forming a slight ledge; overbank and possibly nearshore lacustrine----------	15.5	4.72
10.	Sandstone, yellowish brown; fine grained, maximum medium grained; horizontal laminations; cliff; marginal lacustrine----------	6.0	1.83
9*	Mudstone and siltstone, grayish green; laminated to very thin bedded; contains tiny carbonized plant fragments; slope; offshore lacustrine deposit----------	3.0	0.91
8.	Sandstone, light yellowish gray; fine grained, maximum 15 mm pebbles; horizontal laminations, planar crossbedding, trough crossbedding; top 15 cm is burrowed, locally below that are some ripple crosslaminations; contains some carbonized plant material; locally radioactive, adit in cliff about 300 ft (100 m) to south; cliff; braided stream deposit----------	18.0	5.49

Section 5.--Woodruff Hole--continued

Morrison Formation (part)--continued

Salt Wash Member (part)--continued

	Thickness	
	Feet	Meters
Total Salt Wash Member----------	381.0	116.13
Lower member:		
7* Sandstone, light yellowish gray; fine grained; maximum medium grained; very thin to thin bedded; includes 5-10 percent light grayish green mudstone; top 2-3 ft (0.6-1 m) moderate to dark reddish brown mudstone capped by about 15 cm of grayish green mudstone that contains tiny carbonized plant fragments; slabby cliff at base to notch above; marginal lacustrine to offshore lacustrine----------	6.5	1.98
6. Mudstone and siltstone, light grayish green; laminated to very thin bedded; about 20 percent consists of thin beds of light yellowish gray sandstone; flaggy slope; nearshore lacustrine and mudflat----------	12.0	3.66
5. Sandstone, light yellowish gray; fine grained, maximum medium grained; thin to thick bedded; ledgy cliff; marginal lacustrine or overbank deposit----------	6.0	1.83

Section 5.--Woodruff Hole--continued

Morrison Formation (part)--continued

Lower member--continued

	Thickness	
	Feet	Meters
4. Mudstone and siltstone; moderate to dark reddish brown, includes some light grayish green; 5 ft (1.5 m) above base is 1 ft (0.3 m) thick bed of light gray, very fine grained, very thin bedded sandstone forming a slight ledge; 14 ft (4.3 m) above base is 1 ft (0.3 m) thick discontinuous bed of gray limestone containing irregular blebs or nodules of authigenic chert that is very colorful: red, orange, and gray; this bed is locally radioactive at about 2-3 times background (0.011 percent uranium, delayed neutron); 24 ft (7.3 m) above base is 12 ft (3.7 m) thick zone of light yellowish gray sandstone that is very fine grained and very thin bedded, includes some dark reddish brown mudstone in middle; 40 ft (12.2 m) above base is 2 ft (0.6 m) thick bed of light yellowish gray, very fine grained, very thin bedded sandstone that forms a slight ledge or slope; slope or ledgy slope; nearshore to marginal lacustrine deposit----------	62.0	18.90

Section 5.--Woodruff Hole--continued

Morrison Formation (part)--continued

Lower member--continued

	Thickness	
	Feet	Meters
3. Sandstone, light gray, some is moderate reddish brown to grayish purple; fine to coarse grained, maximum 4 mm granules; slightly irregular laminated to very thin bedded; includes about 10 percent grayish green mudstone; platey ledge; marginal lacustrine-------	5.5	1.68
Total lower member----------	92.0	28.04
Total upper fluviolacustrine sequence----------	187.0	57.00
Total middle fluviolacustrine sequence----------	23.0	7.01
Total lower fluviolacustrine sequence----------	263.0	80.16
Total all three fluviolacustrine sequences----------	473.0	144.17

Unconformity, determined from regional studies; contact is sharp and planar, truncation of upper 2 ft (0.6 m) of underlying formation is visible here.

Section 5.--Woodruff Hole--continued

Summerville Formation:

	Thickness	
	Feet	Meters
2. Mudstone and siltstone, moderate to dark reddish brown, some is light grayish green; laminated to very thin bedded and ripple crosslaminated; regional studies suggest deposition in shallow waters of a restricted marine embayment----------	122.0	37.19

Unconformity, determined from regional studies, contact here is sharp and nearly planar with about 15-30 cm of local relief in broad swales.

Entrada Sandstone (part):

1. Sandstone, reddish orange; very fine grained, maximum fine grained; very thin bedded; top 5 ft (1.5 m) bleached to white with color boundary cutting cross bedding; steep slope; sabkhah deposit; not measured.

Section 6.--Trachyte Ranch

[Units 1-5 measured on south side of Trachyte Creek in the SE 1/4 NE 1/4 sec. 6; units 6-16 and 20-23 measured on north side Trachyte Creek in the NW 1/4 NE 1/4 sec. 6; units 17-19 measured on south side of Straight Creek in the C-S 1/2 NW 1/4 sec. 6; and units 24-29 measured on the west side of a small tributary to Trachyte Creek in the C-W 1/2 SW 1/4 sec. 6, T. 33 S., R. 12 E., Garfield County, Utah.]

	Thickness	
	Feet	Meters
Morrison Formation (part):		
Brushy Basin Member (part):		
29. Mudstone, grayish red-brown; bedding not discernable; partly covered slope; probably overbank, nearshore lacustrine and mudflat; not measured.		
Salt Wash Member:		
(Upper fluviolacustrine sequence):		
28. Sandstone, light gray, weathers light grayish brown; fine to medium grained, maximum 25 mm pebbles; planar crossbedded, horizontal laminations, trough crossbedded; 30 ft (9 m) above base is wedge edge of thin red mudstone and siltstone unit that thickens southward; cliff; braided stream deposit----------	45.0	13.72

Section 6.--Trachyte Ranch--continued

Morrison Formation (part)--continued

Salt Wash Member (part)--continued

	Thickness	
	Feet	Meters
27. Mudstone, siltstone, and sandstone; moderate to dark reddish brown and some light grayish brown to light grayish green; laminated to very thin bedded; slope; overbank deposit----------	10.0	3.05
26. Sandstone, light brownish gray, weathers grayish brown; fine to medium grained, maximum 25 mm pebbles; planar cross-bedded, horizontal laminations, trough crossbedded; brown cliff; braided stream deposit----------	20.0	6.10
25. Mudstone, siltstone, and sandstone; same as unit 27----------	12.0	3.66
24. Sandstone, light grayish brown, weathers brown; fine to medium grained, maximum 35 mm pebbles; planar crossbedded, horizontal laminations, trough crossbedded; cliff; braided stream deposit----------	39.0	11.89
23. Mudstone, siltstone, and sandstone; same as unit 27----------	30.0	9.14

Section 6.--Trachyte Ranch--continued

Morrison Formation (part)--continued

Salt Wash Member--continued

	Thickness	
	Feet	Meters
22. Sandstone, light-gray; fine grained, maximum coarse grained; gently inclined laminations and wide but shallow trough crossbedding abundant in lower half, trough crossbedding common in upper half with sets thinning upward to small-scale crossbedding and ripple crosslaminations at top; lateral accretion shown by channeled base which has shifted laterally to the east several times; cliff; meandering stream deposit----------	20.0	6.10
(Middle fluviolacustrine sequence):		
21. Mudstone, siltstone, and sandstone; same as unit 27----------	6.0	1.83

Section 6.--Trachyte Ranch--continued

Morrison Formation (part)--continued

Salt Wash Member--continued

		Thickness	
		Feet	Meters
20	Sandstone, light-gray; fine grained, maximum 15 mm pebbles; planar crossbedded, horizontal laminations, trough crossbedded; lower approximately 12 ft (3.7 m) horizontally laminated and tends to form a distinct unit by itself; contains scattered petrified logs 6 in to 2.5 ft (0.15-0.76 m) in diameter and bones up to 2 ft (0.61 m) long; scattered mudchips in lower part; locally radioactive, many adits in lower 10 ft (3.0 m) which locally contains some carbonized plant fragments; cliff; lower part marginal lacustrine(?), upper part braided stream deposit----------	26.0	7.92

Section 6.--Trachyte Ranch--continued

Morrison Formation (part)--continued

Salt Wash Member--continued

		Thickness	
		Feet	Meters
	(Lower fluviolacustrine sequence):		
19*	Mudstone, light to dark grayish green; laminated to very thin bedded; contains tiny carbonized plant fragments; includes about 30 percent yellowish gray sandstone in thin beds that are very fine grained laminated to very thin bedded; locally contorted; top locally has some shallow sandstone-filled desiccation cracks; thickens to 11 ft (3.35 m) by Farmers Knob 1/2 mile (1 km) to east; slope or notch; offshore lacustrine deposit----------	4.0	1.22

Section 6.--Trachyte Ranch--continued

Morrison Formation (part)--continued

Salt Wash Member--continued

	Thickness	
	Feet	Meters
18. Sandstone, light gray, locally has small brown spots; fine grained, maximum 15 mm pebbles; finely laminated, includes some trough and planar crossbedding; contains scattered mudchips in places and several petrified logs up to 1 ft (0.3 m) in diameter; locally radioactive; most of the adits in this subdistrict are in this bed; contains scattered and locally concentrated carbonized plant fragments that may or may not be radioactive; grayish brown cliff; braided stream deposit and possibly some marginal lacustrine----------	20.0	6.10
17. Mudstone, siltstone, and sandstone; same as unit 27----------	17	5.18

Section 6.--Trachyte Ranch--continued

Morrison Formation (part)--continued

Salt Wash Member--continued

	Thickness	
	Feet	Meters
16. Sandstone, light-gray, weathers light gray to light grayish brown; fine grained, maximum 10 mm pebbles; horizontal laminations, planar crossbedded, trough crossbedded; 23 ft (7.01 m) above base is 2 ft (0.6 m) thick red mudstone bed that pinches out south of here; rare radioactivity; on west side of Farmers Knob an adit in this bed follows a slightly mineralized petrified log; cliff; braided stream deposit---	29.0	8.84
15. Mudstone, siltstone, and sandstone, same as unit 27----------	13.0	3.96
14. Sandstone, light-gray, weathers light grayish brown; fine grained, maximum 6 mm granules; mainly horizontally laminated although contains some low angle crossbedding; locally burrowed; cliff; marginal lacustrine----------	25.0	7.62
13. Mudstone, siltstone, and sandstone, same as unit 27----------	12.0	3.66

Section 6.--Trachyte Ranch--continued

Morrison Formation (part)--continued

Salt Wash Member--continued

	Thickness	
	Feet	Meters
12. Sandstone, light-gray, weathers light-gray to light grayish brown; fine to medium grained, maximum 25 mm pebbles; horizontal laminations, planar crossbedded, trough crossbedded; contains scattered mudchips; 14 ft (4.27 m) above base contains a 2-3 ft (0.6-1 m) thick bed of dark reddish brown mudstone that pinches out to the northeast; 20 ft (6.1 m) above base contains a 1 ft (0.3 m) thick bed of dark reddish brown and light grayish green mudstone that pinches out to the southwest; cliff; braided stream deposit, mudstone beds are overbank deposits----------	25.0	7.62
11. Mudstone, siltstone, and sandstone, same as unit 27----------	9.0	2.74
10. Sandstone, light-gray, weathers grayish brown; fine grained, maximum coarse grained; horizontal laminations, planar crossbedded, trough cross-bedded; mudchip conglomerate up to 2 ft (0.6 m) thick at base; cliff; braided stream deposit-----	24.0	7.32

Section 6.--Trachyte Ranch--continued

Morrison Formation (part)--continued

Salt Wash Member--continued

	Thickness	
	Feet	Meters
9. Mudstone, siltstone, and sandstone; same as unit 27----------	8.5	2.59
8. Sandstone, light-gray, weathers grayish brown; fine grained, maximum 5 mm granules; horizontal laminations rare, planar crossbedded, trough crossbedded; locally contains mudchips at base; tracing on outcrop indicates the bed is a series of broad and shallow channels; cliff; braided stream deposit----------	6.0	1.83
Total Salt Wash Member----------	407.5	124.21
Lower member:		
7. Mudstone, siltstone, and sandstone; light yellowish gray, light grayish green, and moderate to dark reddish brown; laminated to very thin bedded; 9 ft (2.74 m) above base is 2 ft (0.6 m) thick light gray sandstone ledge that is ripple crosslaminated; slabby cliff or slope; nearshore lacustrine----------	15.0	4.57

Section 6.--Trachyte Ranch--continued

Morrison Formation (part)--continued

Lower Member--continued

	Thickness	
	Feet	Meters
6. Sandstone, light gray speckled with yellowish orange spots; fine grained, maximum medium grained; laminated to very thin bedded, scarce planar crossbedding; 3 ft (1 m) above base is a thin (4-6 in. or 10-15 cm) grayish green mudstone split; blocky cliff or slope; marginal lacustrine----------	8.0	2.44
5. Interbedded sandstone, siltstone, mudstone, and limestone; light grayish green to light-gray; laminated to very thin bedded and some thin bedded; contains about a dozen thin beds or lenses of gray to pinkish gray limestone; 13 ft (3.96 m) above base is a 0-3 in. (0-7.5 cm) thick granular limestone bed that contains small blebs of red chert; smooth shelled ostracodes found about 6 in. (15 cm) below top; horizontally ribbed cliff, or slope; offshore lacustrine deposit----------	18.0	5.49

Section 6.--Trachyte Ranch--continued

Morrison Formation (part)--continued

Lower member--continued

	Thickness	
	Feet	Meters
4. Sandstone, light-gray, weathers light grayish brown; fine grained, maximum coarse grained laminated to thin bedded; contains some moderate to dark reddish brown and light grayish green mudstone in middle; about 1,000 ft (300 m) northwest found a dinosaur track 6 ft (1.8 m) above base; slabby cliff or slope; marginal lacustrine, possibly overbank deposit--	18.5	5.64
3. Interbedded sandstone, siltstone, and mudstone; light grayish green, mudstone medium gray where fresh; finely laminated to very thin bedded; contains some sandstone-filled desiccation cracks in places; also contains tiny carbonized plant fragments and irregular brownish-black blebs that may be a kerogenous substance; palynomorphs obtained 2.5 ft (0.76 m) above the base and identified by R. H. Tschudy (written commun., 1977) included the alga Botryococcus sp.; slabby slope or cliff; offshore lacustrine deposit----------	7.5	2.29

Section 6.--Trachyte Ranch--continued

Morrison Formation (part)--continued

Lower member--continued

	Thickness	
	Feet	Meters
2. Sandstone, light greenish gray; fine grained, maximum 4 mm granules; slightly irregular laminated to very thin bedding; slight ledge; marginal lacustrine deposit----------	0.5	0.15
Total lower member----------	67.5	20.57
Total upper fluviolacustrine sequence----------	176.0	53.64
Total middle fluviolacustrine sequence----------	32.0	9.75
Total lower fluviolacustrine sequence----------	260.0	79.25
Total all three fluviolacustrine sequences----------	468.0	142.65

Unconformity, determined from regional studies, contact here is sharp and planar.

Summerville Formation (part)

1. Siltstone and mudstone, moderate to dark reddish brown and some light grayish green; laminated to very thin bedded and some ripple cross-laminations; flaggy cliff or slope; regional studies suggest deposition in shallow waters of a restricted marine embayment; not measured.

Section 7.--Little Egypt

[Measured in cliffs above Little Egypt; units 1-7 measured on north side of unnamed gulley in the SE 1/4 NW 1/4 sec. 30; units 8 and higher measured west up same gulley in the S 1/2 SW 1/4 NW 1/4 and N 1/2 NW 1/4 SW 1/4 sec. 30, T. 31, S., R. 12 E., Garfield County, Utah.]

	Thickness	
	Feet	Meters
Morrison Formation (part):		
Brushy Basin Member (part):		
27. Mudstone and siltstone, moderate to dark reddish brown; bedding not apparent; partly covered slope; probably nearshore lacustrine and mudflat; not measured.		
26. Sandstone, brown; fine grained, maximum medium grained; laminated to ripple crosslaminated; contains vertical burrows about 6 mm in diameter and 5-10 cm deep; slight ledge; probably marginal lacustrine----------	1.0	0.3
25. Mudstone and siltstone, moderate to dark reddish brown and some light grayish green; laminated to very thin bedded; contains some thin brown ledges of sandstone; also contains some 1-2 mm diameter horizontal burrows; partly covered slope; nearshore lacustrine or overbank deposits----------	6.0	1.83

Section 7.--Little Egypt--continued

Morrison Formation (part):

	Thickness Feet	Meters
Salt Wash Member:		
(Upper fluviolacustrine sequence):		
24. Sandstone, light gray, weathers grayish red-brown; fine grained, maximum 6 mm pebbles; horizontal laminations, planar crossbedded; trough crossbedded; slight ledge; because it is concealed by talus and soil in many places, this bed may be included in the Brushy Basin Member for mapping purposes and the contact placed at the top of unit 22; braided stream deposit----------	12.0	3.66
23. Mudstone and siltstone, moderate to dark reddish brown and some light grayish green; laminated to very thin bedded; red slope; probably overbank deposit----------	14.0	4.27
22. Sandstone, light-gray; fine grained; maximum 25 mm pebbles; bedding proportions vary from predominantly horizontally laminated in one place to predominantly trough and planar crossbedded in other places; cliff; probably mixed braided stream and marginal lacustrine deposits----------	10.0	3.05

Section 7.--Little Egypt--continued

Morrison Formation (part)--continued

Salt Wash Member--continued

	Thickness	
	Feet	Meters
21. Mudstone and siltstone, same as unit 23---------	2.0	0.61
20. Sandstone, light-gray, weathers light grayish brown; fine grained, maximum 10 mm pebbles; planar crossbedded, horizontal laminated, trough crossbedded; cliff; braided stream deposit----------	49.0	14.94
19. Mudstone and siltstone, same as unit 23 only locally all light gray to light grayish green----------	3.0	0.91
18. Sandstone, light-gray, weathers light grayish brown; fine grained, maximum 20 mm pebbles; planar crossbedded, horizontal laminations, trough crossbedded; contains some scarce ripple crosslaminations at top; also includes some scattered mudchips; cliff; braided stream deposit----------	21.5	6.55
(Middle fluviolacustrine sequence):		
17. Mudstone and siltstone, same as unit 23----------	22.0	6.71

Section 7--Little Egypt--continued

Morrison Formation (part)--continued

Salt Wash Member--continued

	Thickness	
	Feet	Meters
16. Sandstone, light-gray, weathers light grayish brown; fine to medium grained; planar cross-bedded, horizontal laminations, trough cross-bedded; locally contains carbonized plant fragments and scarce petrified logs; locally radioactive, about 500 ft (150 m) south contains a tabular and 2 ft (0.6m) thick C-shaped uranium roll deposit in middle of the bed; cliff; braided stream deposit----------	19.0	5.79

Section 7--Little Egypt--continued

Morrison Formation (part)--continued

Salt Wash Member--continued

		Thickness	
		Feet	Meters
	(Lower fluviolacustrine sequence):		
15*	Siltstone and mudstone, light grayish green with yellowish-brown staining; laminated to very thin bedded; mudstone contains scarce tiny carbonized plant fragments; contains vertical burrows about 4-6 mm in diameter and 3-5 cm long; unit cut out locally to south unit 16; slope or notch; offshore lacustrine deposit----------	2.5	0.76

About 100 ft (30 m) north of the line of section this unit is overlain by an 8-ft (2.4-m) braided stream sandstone bed which is overlain by 2 ft (0.6 m) of interbedded very fine grained sandstone and gray mudstone that contains tiny carbonized plant fragments. Several adits are present to the north where the mudstone locally has anomalous radioactivity (2-3 times background), and an irregular and discontinuous tabular uranium deposit is present in the upper part of the sandstone bed. These beds are cut out southward at the line of section by the overlying unit 16 and farther south all of unit 15 is cut out.

Section 7--Little Egypt--continued

Morrison Formation (part)--continued

Salt Wash Member--continued

	Thickness	
	Feet	Meters
14. Sandstone, light-gray, weathers brown; fine to medium grained, maximum very coarse grained; horizontal laminations, planar crossbedded, trough crossbedded; locally contains climbing ripple and ripple crosslaminations; farther northeast upper 12 ft (3.7 m) is largely horizontally laminated and contains abundant burrows 3-10 mm in diameter and 5-10 cm long, most of which are vertical; cliff; mostly braided stream deposit, upper part to northeast may be marginal lacustrine--	33.0	10.06
13. Mudstone and siltstone, same as unit 23 only locally contains desiccation cracks and burrows----------	3.5	1.07

Section 7--Little Egypt--continued

Morrison Formation (part)--continued

Salt Wash Member--continued

		Thickness	
		Feet	Meters
12.	Sandstone, light-gray, weathers brown; fine grained, maximum medium grained; horizontal laminations, planar crossbedded, trough crossbedded; locally contains ripple cross-laminations and burrows in top 1 ft (0.3 m); pinches out to north; cliff; braided stream deposit----------	8.0	2.44
11.	Mudstone and siltstone, same as unit 23---------	21.0	6.40
10.	Sandstone, light-gray, weathers light gray to light grayish brown; fine to medium grained, maximum 10 mm pebbles; planar crossbedded, horizontal laminations, trough crossbedded; top 5 ft (1.5 m) laminated to very thin bedded and ripple crosslaminated; locally contains scattered mudchips in lower half of bed; cliff; braided stream deposit----------	19.0	5.79
9.	Mudstone and siltstone, same as unit 23 only has grayish purple mottling in places and contains small limestone nodules----------	4.0	1.22

Section-7--Little-Egypt--continued

Morrison Formation (part)--continued

Salt Wash Member--continued

	Thickness	
	Feet	Meters
8. Sandstone, light-gray, weathers brown; fine to medium grained, maximum 25 mm pebbles; horizontal laminations, planar crossbedded, trough crossbedded; scarce mudchips in lower two-thirds of unit; top 6 ft (1.8 m) laminated to very thin bedded and ripple crosslaminated, also contains burrows; big brown cliff; braided stream deposit----------	42.0	12.80
7. Sandstone, light-gray, weathers brown; fine grained, maximum medium grained; very thin to thin bedded, locally includes some trough crossbedding; flaggy cliff; overbank deposit--	2.0	0.61
6. Sandstone, light-gray, weathers light brown; very fine to fine grained, maximum medium grained; very thin bedded and ripple crosslaminated; includes about 50 percent mudstone and siltstone that is moderate to dark reddish brown to light grayish green and laminated to very thin bedded; red notch or cliff, locally a slope; overbank deposit----------	9.0	2.74

Section 7--Little-Egypt--continued

Morrison Formation (part)--continued

Salt Wash Member--continued

	Thickness	
	Feet	Meters
5. Sandstone, light yellowish brown, weathers grayish brown; fine grained, maximum 25 mm pebbles; predominantly trough crossbedded with ripple crosslaminations in middle and at top; appears to be two separate sandstone beds, each containing a fining-upwards sequence of grain size and bedding set thickness; slabby cliff; meandering stream deposit----------	10.0	3.05
Total Salt Wash Member----------	306.5	93.42

Section 7--Little-Egypt--continued

Morrison Formation (part)--continued

Salt Wash Member--continued

	Thickness	
	Feet	Meters
5. Sandstone, light yellowish brown, weathers grayish brown; fine grained, maximum 25 mm pebbles; predominantly trough crossbedded with ripple crosslaminations in middle and at top; appears to be two separate sandstone beds, each containing a fining-upwards sequence of grain size and bedding set thickness; slabby cliff; meandering stream deposit----------	10.0	3.05
Total Salt Wash Member----------	306.5	93.42

Section 7--Little Egypt--continued

Morrison Formation (part)--continued

	Thickness	
	Feet	Meters

Lower member:

4. Interbedded sandstone, siltstone, mudstone, and limestone; lower 10 ft (3.0 m); grayish purple to moderate or dark reddish brown, laminated to thin bedded, nearshore lacustrine; 10-60 ft (3.0-18.3 m) above base; light grayish green, laminated to very thin bedded, contains most of the limestone beds in the unit; 30 and 31 ft (9.1 and 9.4 m) above base are two thin limestone beds that contain small blebs of authigenic red chert, 37 ft (11.3 m) above base is 23 ft (7.0 m) thick zone that includes several sandstone lenses up to 6 ft (2 m) thick that are yellowish gray weathering brown, fine grained, maximum 4 mm granules, very thin bedded and some crossbedding; beds are considered offshore lacustrine, sandstone lenses are lacustrine bars; top 5 ft (1.5 m) consists of moderate to dark reddish brown mudstone and scarce thin pink limestone beds, laminated to very thin bedded, nearshore lacustrine, mudflat, and probably some overbank---------- 65.0 19.81

Section 7--Little Egypt--continued

Morrison Formation (part)--continued

Lower member--continued

	Thickness	
	Feet	Meters
3. Sandstone, light grayish green; very fine grained at base grading to fine grained in middle and upper parts, maximum very coarse grained; laminated to very thin bedded, some ripple crosslaminated; contains about 20 percent moderate to dark reddish brown and light grayish green siltstone and mudstone; slabby cliff and ledges at base to slope at top; marginal lacustrine deposits----------	14.0	4.27
Total lower member----------	79.0	24.08
Total upper fluviolacustrine sequence----------	111.5	33.99
Total middle fluviolacustrine sequence----------	41.0	12.5
Total lower fluviolacustrine sequence----------	233.0	72.02
Total all three fluviolacustrine sequences---------	385.5	117.50

Unconformity, determined from regional studies; contact is sharp and planar; slight angular beveling of underlying strata is apparent in this area; a sketch illustrating this truncation 1.7 miles (2.74 km) north of here is in Hunt, Averitt, and Miller, 1953, p. 73, fig. 17.

Section --Little Egypt--continued

	Thickness	
	Feet	Meters

Summerville Formation:

2. Siltstone and mudstone, moderate to dark reddish brown and some light grayish green; laminated to very thin bedded with some ripple crosslaminations; chocolate red flaggy cliff or slope; regional studies suggest deposition in shallow waters of a restricted marine embayment---------- 138.0 42.06

Unconformity, determined from regional studies, contact is sharp and planar.

Entrada Sandstone (part):

1. Sandstone, moderate reddish brown; very fine grained maximum fine grained; slightly irregular very thin bedded; top 2 ft (0.6 m) bleached to very light gray and color boundary cuts across the bedding; blocky cliff and smooth slopes; sabkhah deposits; not measured.

Section 8.--Crescent Creek

[Measured on the northwest side of a ridge just southeast of a bend in Crescent Creek in the NE 1/4 NE 1/4 NE 1/4 sec. 34 and NW 1/4 NW 1/4 NW 1/4 sec. 35, T. 31 S., R. 11 E., Garfield County, Utah.]

Morrison Formation (part):

Salt Wash Member (part):

	Thickness	
	Feet	Meters
(Upper fluviolacustrine sequence, part):		
22. Sandstone, light-gray to light yellowish gray; fine to coarse grained, maximum 50 mm pebbles; planar crossbedded, horizontal laminations, trough crossbedded; contains conglomerate lenses and beds; blocky cliff; braided stream deposit; not measured but about 30 ft (9.1 m) thick.		
(Middle fluviolacustrine sequence):		
21. Mudstone and siltstone, moderate to dark reddish brown; laminated to very thin bedded; poorly exposed slope; probably nearshore lacustrine and overbank deposit----------	18.0	5.49
20. Sandstone, light-gray; fine grained, maximum 15 mm pebbles; planar crossbedded, horizontal laminations, trough crossbedded; contains thin conglomerate lenses and stringers; rounded cliff; braided stream deposit----------	21.0	6.40

Section 8--Crescent Creek--continued

Morrison Formation (part)--continued

Salt Wash Member (part)--continued	Thickness	
	Feet	Meters
19. Mudstone and siltstone, moderate to dark reddish brown and some light grayish green; laminated to thin bedded; partly covered slope; overbank deposit----------	10.0	3.05
18. Sandstone, light-gray, weathers reddish brown owing to wash from overlying unit; fine grained, maximum medium grained; horizontal laminations, planar crossbedded, trough crossbedded; slabby cliff; braided stream deposit----------	10.0	3.05
17. Mudstone, siltstone, and sandstone; moderate to dark reddish brown; laminated to very thin bedded and some ripple crosslaminations in sandstone beds; partly covered slope; overbank deposits----------	4.0	1.22
16. Sandstone, light-gray; fine grained, maximum 6 mm pebbles; horizontal laminations, planar crossbedded, trough crossbedded; blocky cliff; braided stream deposit----------	9.0	2.74

Section 8--Crescent Creek--continued

Morrison Formation (part)--continued

Salt Wash Member (part)--continued

		Thickness	
		Feet	Meters
15.	Mudstone, siltstone, and sandstone, same as unit 17	17.0	5.18
14.	Sandstone, light-gray; fine grained, maximum medium grained; predominantly horizontally laminated, scarce trough crossbedding in lower half; slabby ledges; marginal lacustrine deposit	11.0	3.35
13.	Mudstone, siltstone, and sandstone; same as unit 17	5.0	1.52
12.	Sandstone, light-gray; fine grained, maximum very coarse grained; horizontal laminations, planar crossbedded, trough crossbedded; top 1-3 ft (0.3-1 m) burrowed; rounded cliff; braided stream deposit	16.0	4.88
11.	Sandstone and mudstone, light grayish brown; sandstone fine grained, maximum medium grained; laminated to thin bedded; slabby slope; overbank deposit	5.0	1.51

Section 8—Crescent Creek--continued

Morrison Formation (part)--continued

Salt Wash Member (part)--continued

	Thickness	
	Feet	Meters
10. Sandstone, light-gray; fine to medium grained, maximum 25 mm pebbles; lower 45 ft (13.7 m): predominantely horizontally laminated with many burrows near top; upper 12 ft (3.7 m): horizontally laminated, planar crossbedded, trough crossbedded, top 2.5 ft (0.76 m) laminated; rounded cliff; lower part marginal lacustrine deposit, upper part braided stream deposit----------	57.0	17.37
9. Sandstone, grayish brown; very fine to fine grained, maximum medium grained; very thin to thin bedded; overbank deposit----------	3.0	0.91
8. Sandstone, grayish brown; fine to medium grained, maximum 50 mm pebbles; horizontal laminations scarce, planar crossbedded, trough crossbedded; cliff; braided stream deposit----------	20.0	6.10

Section 8--Crescent Creek--continued

Morrison Formation (part)--continued

Salt Wash Member (part)--continued

	Thickness	
	Feet	Meters
7. Mudstone and siltstone, moderate to dark reddish brown and grayish purple; laminated to very thin bedded; red notch; overbank deposit----------	2.5	0.76
6. Sandstone, yellowish brown; very fine to very coarse grained, maximum 10 mm pebbles; predominantly trough crossbedded, grades up to irregular laminated to very thin bedded or ripple crosslaminated at top; coarser material at base grading upward to very fine grained sandstone at top; interfingers with overbank deposits about 50 ft (15 m) north, this is a good example of interfingering of the Salt Wash Member and lower member; cliff; meandering stream deposit----------	7.5	2.29
Total Salt Wash Member (incomplete)----------	216.0	65.84

Section 8--Crescent Creek--continued

Morrison Formation (part)--continued

	Thickness	
	Feet	Meters
Lower member:		
5. Sandstone and mudstone; sandstone: yellowish gray, very fine to medium grained, maximum 8 mm pebbles; very thin to thin bedded; lenticular and in beds; mudstone: light grayish green; calcareous; laminated to very thin bedded; offshore lacustrine deposits, lenticular sandstones probably are lacustrine bars and possibly distributary channels----------	25.0	7.62
4. Mudstone and siltstone, light grayish green; calcareous, some of the beds may best be called marlstones; contains light gray limestone nodules and very thin beds; also contains sandstone beds 1-2 ft (0.3-0.6 m) thick that are yellowish gray, very fine grained, and very thin to thin bedded or ripple crosslaminated, occurring at 11, 30, and 45 ft (3.4, 9.1, and 13.7 m) above base; steep slope; offshore lacustrine deposit-------	51.0	15.54

Section 8—Crescent Creek—continued

Morrison Formation (part)--continued

Salt Wash Member (part)--continued

Lower member--continued

	Thickness	
	Feet	Meters
3. Sandstone, light-gray; fine to medium grained, maximum 8 mm pebbles; mainly trough cross-bedded, top 15 cm ripple crosslaminated; has channel form up to 5 ft (1.5 m) in greatest thickness; slight ledge; origin uncertain, probably meander or distributary channel deposit, may be a lacustrine bar------	3.0	0.91
2. Sandstone, light-gray; fine grained, maximum very coarse grained; slightly irregular laminated to very thin bedded; cliff; marginal lacustrine deposit----------	10.0	3.05
Total lower member----------	89.0	27.13
Total middle fluviolacustrine sequence----------	39.0	11.89
Total lower fluviolacustrine sequence----------	266.0	81.08

Unconformity, determined from regional studies, contact here is sharp and planar.

Section 8—Crescent Creek—continued

	Thickness	
	Feet	Meters

Summerville Formation:

1. Mudstone and siltstone, moderate to dark reddish brown and some light grayish green; laminated to very thin bedded and some ripple crosslaminations; chocolate red slope; regional studies suggest deposition in shallow waters of a restricted marine embayment; not measured.

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