

SECTION 1

Reads Bottom to top-exposed in Creek bed at south end of West Mule Creek Anticline, Sec. 11, T 39N R 61W NE 1/4

- 1. Muddy SS-slightly crossbedded, thinly laminated, poorly consolidated sandy siltstone-carbonaceous, contains occ. stringers of iron-stained pebbles, varies in color from yellow-orange to dark yellow brown. Sample 1-1 8' exposed (Dark streaks are oil stain) 8
 - 2. Gypsiferous bentonitic shale-sandy-grades upward into sdy. shale moderate reddish brown=about 2' thick- covered interval-est. 10' thick 10
20
 - 3. Covered- 10' 20
 - 4. Lowest Mowry exposed-typical-Blk. plty, brittle-slightly softer than usual Sample 1-2 (15') 35
 - 5. Becoming better exposed-blk, papery, very jarositic, extremely fissile sample 1-3 (20') 45
 - 6. 1st Bentonite-20' above (5)- (underlying Mowry 3' is hard, blocky, no discernable bedding features) Sample 1-4, Bentonite is .9' thick, yellowish gray at bottom, grades upward into bentonitic shale, not siliceous, about 1' thick, Bentonite sample 1-5, weathered, no sandy basal zone (sample primarily from base SFD) 46
 - 7. Mowry, typical, poorly exposed, 12' 58
 - 8. 2nd Bentonite, .7' thick, very pale orange, underlying 6" of mowry are blocky and brittle, sample 1-6, Bentonite sample 1-7(SFB) 59
 - 9. Mowry, typical, extremely fissile, 7' 66
 - 10. Zone of concretions about 4" thick, scattered, seams and discontinuous, silty layer, packed with fish scales, sample 1-8, These appear to be lumps on a rather persistent thin silty bed about 1/2" thick, sample 1-9 (ore)
 - 11. Revision, 4' below siltstone (10) is a bentonite bed .5', same color as bentonite #2. (SFB) sample 1-1-, grades upward into brown shale, about 1' thick
- NOTE:
2' above this bentonite, found concretion, sample 1-11
- 12. Mowry, typical, .6' thick, above siltstone layer 67
 - 13. Thin bentonite, bright orangish yellow, .2' (SFB) sample 1-12 67
 - 14. Typical Mowry, 8' 75
 - 15. Concretionary layer, resembles those in Belle Fouche, About 2' in diam about .4' thick, weather reddish purple, appear scattered in next f' of interval sample 1-13 80

16. Bentonite layer, approx. .5', yellow-orange, poorly exposed, may be clay spur, sample 1-14, Shale sample from 3' below, 1-15

80½

17. Shale, mostly covered, contains large scattered ironstone concretions, 24' thick, sample 1-16

18. Bentonite, 3' thick (?) Brown bed, rusty brown, alligator on surface sample (SFB) 1-17

Photo 1-1, concretion (15) W. Mule Creek Section

SECTION 2

Amsden Creek, WGF winter elk refuge, Sec 36 T57N R87 SW¼ Sheridan Co.
Reads bottom to top.

1. Covered slope, estimate 50-75' shale? 75
2. Siltstone, thin-bedded, blocky, lt. brownish gray, weathers very lt. gray 2.5 feet thick, samples 2-1 and 2-2. Fish scales are randomly oriented. Evidence of rapid deposition (?) 77½
3. Bentonite, .5' thick, grayish orange, sample 2-3, No silicified bottom 78
4. Shale-very thin bedded, fissile, 6' thick, silty, Sample 2-4, Brownish black, some thin laminations in crossbedding 84
5. Siltstone, very thinbedded, finely laminated and crossbedded, 3', brownish grey with very pale orange bands, weathers lt. grey, sample 2-5 87
6. 5' thin fissile shale, dark olive grey to greyish brown, very thin-bedded, sample 2-6 92
7. Siltstone, very thinly laminated, .9', as 5. sample 2-7 grades into overlying unit through 1' zone 93
8. Shale, like #6, 7' thick 100
9. 6' siltstone, like #5, sample 2-8 106
10. Bentonite, 1.8' thick, yellowish grey, very silty, grades upward into blk shale thru .5' transition zone, sample 2-9 from base 108
108½
11. .8' dark brownish grey soft, thinbedded shale with bentonite interlayers 109
12. Pale yellowish brown siltstone, 1.1', thin bedded slightly crossbedded, resembles #5 110½
13. Bentonite, poorly exposed, appears about .2' thick, Greyish orange sample 2-10 111
14. Bentonite is overlain by black, very blocky shale, thickness unknown sample 2-11.
15. 100' covered interval apparently blk. shale and siltstones as below sample at top 2-12 211
16. Bentonite? Clayey soil (clay spur?) about 3' thick? 214
17. Sandstone, med. grey to dark grey, small crossbeds, poorly exposed, sample 2-13, est. 10', probably shale interbeds

NOTE:

There appears to be a thin sandstone bed about 5' below bentonite #16, (Mowry shale above SS is typical)

18. 30' covered shale slope, overlain by dense, silty lt. grey, fine grained SS irreg. bedded. SS on top sh ss also est. 30' thick with interbedded shales

SECTION 3

Reads bottom to top, measured up south slope of hill 1/2 mile south of middlefork, Crazy Woman Creek, T99N R83W Sec 36 NW1/4, Johnson Co.

1. Black shale, Shell Crk? below Mowry, est. 75' partially covered interval, fissile, v. dark grey, soft, not silty, weathers greyish, brown, much Fe-stain
Sample 3-1
2. Bentonite, greyish, yellow, corn-meally, popcorn on surface, poorly exposed, est. 2' thick sample 3-2
3. Shale, as #1, 12'
4. Bentonite, .3', salmon-yellow, not sampled
5. Shale, as #1, 7'
6. Bentonite, .7' thick, greyish-yellow, blocky, sample 3-3
7. Shale, as #1, 15' thick, sample 3-4 from upper 1' of this horizon
8. Shale, becoming siliceous and platy, 5' thick (3-5) 5
9. Bentonite, reddish-orange, .5' thick, (3-6) 5 1/2
10. Shale, siliceous, platy, contains bentonitic zone 1' from bottom, (3-7) 10 1/2
11. Bentonite, 1.4' yellowish-grey to reddish orange (3-8) 11
12. Typical Mowry, dar, greyish, brown, weathers lt. grey, very platy, thinly laminated, fish scales, etc. sample 3-9 8' Bottom 3' are less resistant 19
13. Bentonite, 1.4' thick, greyish-yellow, corn-meally, sample 3-10 20 1/2
14. Shale, same as #12, alternated between 2-3' zones of very thin bedded fissile shale and thicker bedded finely laminated beds. sample 3-11 at 25' Unit is 27' thick 47 1/2
15. Bentonite, 1.4' thick, lt. olive brown, poorly exposed, sample 3-12 49
16. Mowry shale, very thin bedded and fissile, less resistant than lower unit. Sample 3-13 at 25'. Unit is 48' thick sample 3-14 at 45' 97
17. Bentonite-.9' thick, light salmon pink, poorly exposed, sample 3-15 98
18. Shale, as below (16), 13' 111
19. Bentonite, Lt. reddish brown, .5', poorly exposed, sample 3-16
20. Shale as below (#16), 9' thick 120
21. Bentonite, .7' thick greyish orange, sample 3-17 121
22. Shale, as below (#16), 5' sample 3-18, fish scales are exceedingly large, found one plate with shell? impressions. 126

23. .1' bentonite, yellow-grey, not sampled	
24. Shale, 2.5' typical, as below (22) not sampled	128½
	129
25. Bentonite, .3' thick, yellowish orange, not sampled	
26. Mowry, 26' thick bottom 5 resistant, upper part less so, becomes thinner bedded and more fissile toward top. Sampled at 20', (3-19)	145
27. Mowry, 3.5' more resistant unit, otherwise resembles 26 (3-20)	148½
28. Bentonite, 1.4' thick, orangish-brown (3-21)	150
29. Shale, very blocky and resistant, choc. brown, weathers cream (3-22) 6' thick	156
30. Bentonite, 1.8' thick, greyish yellow, (3-23)	158
31. Mowry, as (29), 16', no sample	174
32. Bentonite, see sketch, sample 3-24, 1' thick	
32-39 not described.	180
40. Mowry, 38', poorly exposed, (3-25) from 5' of top, appears typical, but less siliceous	218
41. Bentonite, .7' greyish yellow, (3-26)	219
42. Typical Mowry, 8', (3-27)	227
43. Bentonite, 4.2', popcorn surface, greyish-olive to green, (3-28) SFB	231
44. Shale, black blocky, very siliceous, poorly exposed because of slope wash, about 1' thick (3-29)	232
45. Bentonite, 7.4', alligator surface, lower part olive, upper part yellowish grey, 2 samples 3-30 from base and 3-31 from near top	239
46. Shale, very blocky, very brittle, highly fractured, 2' thick (3-32)	241
47. Bentonite, .5'. pramosj-brown, poorly exposed, 3-33	242
48. Shale, Mowry, 13' thick, grades into overlying Belle Fourche type shale 3-34 at 2', 3-35 at 10', 3-36 at 20' in soft shale	255


NOTE:

Estimate this section underlain by apx. 100' Belle Fourche shale (shell crk?) soft, fissile, dark brown, ironstone concretions, many bentonites, under this is a 10' buff sandstone, then more shale

SECTION 4

Measured interval on side of hill, Sec 35 T47N R83W Johnson Co. reads bottom to top.

1. Shell Creek Shale?, Bell fourche type, ironstone concretions, etc. very dark grey, fissile to blocky, soft, non-resistant, sample 4-1 taken from about 25' above Muddy SS interval 50' approx.
2. Bentonite (aprx. 25' above 1) greyish-yellow, corn-meally, popcorn surface, poorly exposed, appears about 4' thick, 4-2
3. Shale, as #1, 45' thick, no sample
4. Bentonite, 1.8', greyish orange, orange stained, flakey, alligator-hide surface, 4-3
5. Shale, 50', soft, poorly exposed, very bentonitic, med. grey, weathers brownish. Grades upward into Mowry shale, No ironstone concretions, but contains occasional large sandy appearing contorted concretions in upper 5', -see sample 4-4. Sample of shale, 4-5 Concretion has extreme cone-in-cone structure and resembles one found at Section 3, which must have been in place
6. Mowry shale, typical, thinbedded, fissile, resistant, med. grey, very large fish scales, thinlly laminated, 4-6, 10' thick 10
7. Bentonite, 3', greyish-yellow, cornmeally, poorly exposed 4-7, SFB 13
8. Shale, as #6, 1' 14
9. Bentonite, yellowish-orange, 1.4' thick, sample 4-8 SFB 15½
10. Mowry sh. 24', sample 4-9 at 15', Bentonitic sh. at 12' 40
11. Bentonite, 2', yellow-grey, sample 4-10 42
12. Shale, as below (#10), 1' 43
13. Bentonite, .8', orange-grey, sample 4-11 44
14. Shale, weathers to very small chips, less resistant, 23', sample 4-12 at 15' 67
15. Bentonite, .8', yellow-orange, cornmeally, sample 4-13 68
16. Shale as #14, becoming more resistant at top 11' 79
17. Bentonite, 1.2', greyish orange, sample 4-14 80
18. Shale, appears very silty, quite resistant 1' 81
19. Bentonite, .2'. orangish, not sampled
20. Bentonitic shale, soft and non-resistant, brown, 1' 82

21. Siltstone, very resistant, resembles #18, sample 4-15, 3' thick
22. Bentonite, .6', greyish yellow, flaky, sample 4-16
23. Siltstone, resembles #21, becomes salier towards top, 13', sample 4-17 from 10' Sample 4-18 from 12', found sample 4-19, shells, at this spot, Not in place, but must have come from this interval or immediately overlying one.
24. Bentonite, sample 4-20, greyish yellow, 1.6' thick
25. Shale, typical Mowry, 6'
26. Bentonite, 1.3' thick, yellowish orange, sample 4-21
27. Siltstone, very blocky and massive, grey-brown, resistant, weathers white sample 4-22, 4' thick
28. Bentonite Bed, .4', not sampled, reddish orange
29. Thinbedded Mowry, 3' thick
30. Massive bedded siltstone, like #27, 8' thick
31. Bentonite, reddish-orange, .6', sample 4-23
32. Siltstone, like #27, 22' thick, sample 4-24, a variety of impressions in this interval, see also sample 4-25.
33. Non-resistant brownish bentonitic shale interval, 4', sample 4-26, Contains a large concretionary? or crossbedded lens structure about 8' by 3' thick, bedding goes through, sample 4-27 
34. Shale, 25', resistant, white weathering, sample 4-28
35. Bentonite, .2', reddish-orange, not sampled
36. Shale as below, #34, 1.5', not sampled
37. Bentonite, yellow-grey; sample 4-29, 1' thick
38. Shale, as below (#34), 6', sample 4-30
39. Bentonite, 3', sample 4-31, May be thicker at expense of Unit 38?
40. Shale, typical mowry, sample 4-32, 6' thick, with thin brownish bentonitic streak in middle
41. 12' covered bentonitic interval, soil has well developed popcorn texture, but no bentonite could be dug up.
42. Shale, (Mowry?), 24' thick, non-siliceous, brownish-grey, Sample 4-33, some irregular siltstone zones in middle
43. Sandstone, 2' thick, med. grey, silty, carbonaceous, sample 4-34
44. Shale, as #42, sample 4-35, 13', alternating thin siltstone and shale layers

45. Bentonite, Sample 4-36, 4' thick, yellowish green, sample 4-36 from base, 4-37 from near top

46. Overlying interval consists of soft shales, thin siltstone beds about every 10-15 feet or so, iron-stone concretions and occasional bentonites, Est. at least 100' before next sandstone, Bentonite sample 4-38 from 4-5' thick bed, approx. 50' above unit #45.

SECTION 5

Sec 26, T43N, R83W, Johnson Co.

1. Bentonite, lowest Mowry bed exposed in Cr. bank, lt. blue, .5' thick, sample 5-1 ½
2. Typical Mowry shale, 1.5', sample 5-2 2
3. Bentonite, .5', yellow-grey, sample 5-3 2½
4. Shale, 2.6', sample 5-4 5
5. Bentonite, .7', sample 5-5 6
6. Shale, not sampled, as #4, 1.8' 8
7. Bentonite, yellow, sample 5-6, .8' 9
8. Mowry, very thin bedded, sample 5-7 at 10'. sample 5-8 at 25', total thickness of unit is 27' 36
9. Bentonite, poorly exposed, orange, est. .8', sample 5-9 37
10. Shale, 28', typical, sample 5-10 at 25' 65
11. Bentonite, sample 5-11, poorly exposed est. 1' 66
12. Shale, 7' thick, as #10, not sampled 73
13. Bentonite, 1', orange, sample 5-12 74
14. Covered interval, 7', appears to be less resistant, thin bedded Mowry 81
15. Mowry sh., 12', platy, resistant, sample 5-13 93
16. Bentonite, 2.2', orange, poorly exposed, apparently low swelling, sample 5-14SFB 95
17. Mowry sh., 21', sample 5-15 from 1' above bentonite unit #16. Rest of unit is less massive, less resistant, sample 5-16 at 15' 116
18. Bentonite, sample 5-17, poorly exposed, .5', orangish-red 116½
19. Mowry sh., 7', not sampled 124
20. Bentonite, greyish, .3', not sampled
21. Mowry sh. 2.4', not sampled 126
22. Bentonite, salmon, .2', not sampled
23. Mowry, 5' thick, sample 5-18 131
24. Bentonite, greenish, 3.6', sample 5-19 SFB 134

- | | |
|---|------------|
| 25. Shale, .7', highly silicified and blocky, sample 5-20 | 135 |
| 26. Bentonite, 1.6', yellowish-orange, sample 5-21 | 137 |
| 27. Shale, 1.6', blocky and resistant, sample 5-22 | 139 |
| 28. Bentonite, yellow-brown, .2', not sampled | |
| 29. Shale, bottom 5' resistant, rest, less so. | 144
150 |

Approaching transition zone to Belle fourche. Samples taken every 5'. The 1st is 5-23, then 24, then 25, total thickness is 23'

30. Bentonite, poorly exposed, est. .5', sample 5-26, yellowish-grey to orange.
31. Shale, softer, sample at 5'-5-27
sample at 10' 5-28
sample at 30' 5-29
Interval is 35' thick, capped by bentonite bed being mined by Black Hills Bentonite Co., sample 5-30

SECTION 6

Sec 32 T39N R85W Natronia Co.

1. Bentonite, est. 2-3', yellow-grey, cornmeally, popcorn surface, sample 6-1
2. Shale, 24', Belle fourche type, sample 6-2
3. Bentonite, yellowish-grey, sample 6-3, .8'
4. Shale, 2.5' thick, as #1, not sampled
5. Bentonite, 1.2', brown upper $\frac{1}{2}$, yellow-grey lower, sample 6-4
6. Shale, 4.5' as #1, not sampled, Interval contains several large cone-in-cone type concretions similiar to those of lower Mowry in previous sections sample 6-5
7. Bentonite, .6', sample 6-6
8. Shale, as #1, 3.5', no sample
9. Bentonite, .5' orangish, sample 6-7, also includes silicified siltstone sample immediately underlying bentonite.
10. Shale, 16', sample from 10', sample 6-8, same as #1
- 3
11. Bentonite, sample 6-9, .6' thick, cream yellow
12. Shale, as #1, 2.5' no sample
13. Bentonite, reddish-orange, .6', no sample
14. Shale, as #1, 5' thick, sample 6-10
15. Bentonite, orange- yellow, .4', no sample
16. Shale, somewhat siliceous, mowry appearing, chippy, sample 6-11, 3.2'
17. Bentonite, .5', yellow-orange, sample 6-12
18. Transition zone through to Good Mowry, samples taken every 5 feet.
6-12 at 5'
6-13 at 10'
6-14 at 15'
6-15 at 20'

NOTE:

One small 2' by 1 $\frac{1}{2}$ ' cone-in-cone concretion found at 15'
total thickness of interval from bentonite #17 is 34'

19. Bentonite, 1.4', yellow-orange at top, blue grey at bottom sample 6-16. Has pronounced siliceous base

34

37

38

20. Mowry shale, as below, 1.3' thick, no sample	39
21. Bentonite, .3', blue-grey, no sample	
22. Mowry, sh, thin, black, platy, typical, 14', sample 6-17 at 10'	53
23. Bentonite, .8', med. blue-grey, sample 6-18	54
24. Shale, 8', as below, no sample	62
25. Bentonite, 2.6', yellow, cornmeally, sample 6-19	65
26. Mowry, sample 6-20 at 10', 21' total thickness of unit	84
27. Bentonite, .6', yellow, sample 6-21	
28. Shale, as below, 7' thick, no sample	92
29. Bentonite, sample 6-22, 1.8'	94
30. Shale, as below, 6' thick, sample 6-23	100
31. Bentonite, .2', yellow-orange, no sample	
32. Mowry, as below, becoming blocky near top, 13', sample 6-24 from near top	113
33. Mowry, less resistant near bottom, more resistant near top, sample at 15' is 6-25, sample from 30' is 6-26, Total thickness of unit is 33'	143
34. Bentonite, yellow-orange, 1' thick, sample 6-27	144
35. Mowry sh. blocky and brittle, 7', no sample	157
36. Bentonite, 1.4', yellow-orange, sample 6-28	158
37. Mowry, 15', typical, sample 6-30 from near top	173
38. Bentonite, 2.4', poorly exposed orange-yellow, sample 6-31	175
39. Mowry, 3', upper 1/2 very blocky, not sampled	178
40. Bentonite, .7', not sampled, orange	179
41. Mowry, very thin and papery, 1.4' thick, not sampled	180
42. Bentonitic shale, 1.6' thick, brown and soft, not sampled	182
43. Mowry, 17' thick, contains 2 thin bentonitic intervals, sample 6-31 at 15'	199
44. Bentonite, .4' thick, orange, not sampled	
45. Mowry, 8', blocky and highly silicified, sample 6-32	207
46. Bentonite, poorly exposed, about 4.5', sample 6-33	212
47. Porcellanite bed, .6', sample 6-34, may correlate with radiolarian chert of other locality Upper surface often covered with small tracks, sample 6-35 from top	212

48. Deeply weathered, reddish brown, non-siliceous shale, sample 6-36 --end of sector

sample 6-37-a thin bed from the bentonite unit 46, not found at measured section, but located on road a short ways down dip. Occurs in middle of bed.

NOTE: Mowry is overlain by 25' shale, 3' bentonite bed, 75' shale, and massive reddish-brown sandstone about 35' thick.

SECTION 7

SW of Lander on US 287 Sw1/4 of Sec 24, T32N, R99W

1. SS, tan, crossbedded, est. 30', moderately resistant, 7-1
2. Covered interval, apparently soft, non-resistant shale, about 85' thick, 7-2 from near top
3. Calcareous concretionary zone, concretions are bedded, upper lens-like, off-white in color, about 4' thick and 8' wide 7-3
4. Covered interval, appears to be soft, black shale about 45' thick, sample from near top 7-4
5. Mowry shale, lowest exposed from very near contact sample 7-5, 7' thick 7
6. Bentonite, greyish-yellow, poorly exposed est. .7', 7-6 8
7. Mowry, typical, total 18' thick, sample at 15' 7-7 26
8. Bentonite, abt. 1' thick, 7-8 27
9. Mowry, 35' poorly exposed interval, probably contains some bentonite beds that were missed 62
10. Mowry, better exposed, apparently more resistant, abt. 24' thick, brownish and chippy sample 7-9 86
11. Soft, bentonitic shale, deeply weathered, Brownish in color, could not obtain good sample, 8' 94
12. Typical Mowry, sample 7-10, at 3', sample 7-11 from 20' interval is 26' thick 120
13. Covered interval, 55', no sample, appears to be typical Mowry shale 175
14. Siltstone bed, .7', sample 7-12 176
15. Typical thin platy Mowry, sample 7-13 at 15' 191
16. Bentonite, appears abt. 2' thick, grey-yellow, 7-14 193
17. Mowry, sample 7-15 at 10', sample 7-16 at 20', sample 7-17 at 30' from 5' thick zone much softer and more brown than usual. Sample 7-18 from 35', typical Mowry again, total thickness is 39' 232
18. Bentonite, green, est. 2' thick, 7-19 234
19. Mowry sh. typical 3.5', no sample 238
20. Bentonite, yellow orange, est. .8', 7-20 239
21. 15' siliceous Mowry interval, 7-21 254
22. Bentonite, 2.5', 7-22 256
23. Mowry sh. 12', 7-23 268
24. Frontier shale, on up, 7-24

25. Mowry, weathers white, 8' thick, sample 8-28 from bottom where it is thin bedded and fissile, sample 8-29 is from the top where it is blocky 204
26. Bentonite, 1.3', yellow-grey 8-30 205
27. Mowry sh. as 25, 12' thick, 8-31 from near top 217
28. Bentonite, 1.9', cornmeally, popcorn surface, yellow-grey, 8-32 219
29. Massive, dark brown siliceous siltstone, 1.8', very sandy, has desiccation cracks on upper surface, 8-33 221
30. Typical Mowry shale, 3' thick, 8-34 224
31. Massive Siltstone, as 29, 1.8', 8-35 226
32. Typical Mowry, 8' thick, 8-36, sample 8-37 is from a line-like silt bed in the lower part of this unit 23⁴
33. Siltstone, as 29, 2' thick, 8-38 236
34. Shale interval, 35' thick, somewhat resistant, bottom 5', sample 8-39 at 3', sample 8-40 at 20' 241
35. SS. with Shale inter beds, est. 50' thick

SECTION 8

Reads bottom to top NW1/4 Sec 18, T6N, R2E, Fremont co.

1. Bentonite, olive-brown, poorly exposed, est. abt. .8', 8-1
2. Shale, soft, dark brownish-grey, very fissile, sample at 5' is sample 8-2, Thickness of unit is 20', Sample 8-3 is from 19' from silicified "floor" beneath bentonite bed
3. Bentonite, 1.6', greyish-yellow popcorn surface, 8-4 SFB
4. Siltstone, blocky, bottom relatively soft, brown-grey, contains fish scales, sample 8-5 at 2' above bentonite no. 3, 10' total thickness 10
5. Bentonite, 1.3', yellowish-grey, 8-6 SFB 11
6. Siltstone, as 4, 7' thick, sample 8-7 18
7. Bentonite, 1.5' thick, grey-yellow, sample 8-8 20
8. Siltstone, as 4, Sample 8-9 at 10', 8-10 at 20', total thickness is 23', Seems loaded with radiolarians near top, many very small bentonite beds in upper 5' 43
9. More typical grey weathering Mowry, sample 8-11 from 2' above base, total thickness of unit is 33', Middle 10' are softer and contain numerous very thin bentonites Sample 8-12 from 18', top is more resistant and typical mowry sample 8-13 76
10. Bentonite, poorly exposed, est. .9', grey-yellow 8-14 77
11. Mowry shale, 4' very thinly laminated and papery, with thin bentonite films in between, 8-15 81
12. Bentonite, 1.1', yellowish orange, 8-16 82
13. Interval, 12', consists of Mowry shale as in 11, and about 4 thin bentonite beds spaced throughout, Beds are yellow-orange and about .2', not sampled 94
14. Mowry, typical, platy, brittle, 8-17 at 4', Unit is 21' thick, 8-18 at 18' 115
15. Shale, non-siliceous, 24', somewhat silty in lower part. Sample 8-19 at 2', sample 8-20 at 15', sample 8-21 at 23', in silicified zone below bentonite 139
16. Bentonite, 1.1', tough, waxey yellow, 8-22 140
17. Mowry, silty, 2', not sampled 142
18. Bentonite, cornmeally, popcorn surface, yellowish brown, appears very impure, No luck trying to dig out better samples. 8-23, Est. 2.5' thick. 145
19. Bentonitic shale, poorly exposed, abt. 2' thick 147
20. SS, 3' thick, dense, brittle, buff-weathering 8-24 150
21. Mowry, Less resistant than usual, very flakey, sample 8-25 at 5', sample 26 at 25', total thickness of unit is 37' 187
22. 3' thick bentonitic zone, with .2' thick grey yellow bent. at base, not sampled, typical shale, except soft 190
23. Bentonite, deeply weathered. Est. .8' thick, 8-27 191
24. Bentonitic zone, 5' thick popcorn crust, very slick, seems to be brwnish waxey, shale no sample 196

SECTION 9

Reads bottom to top, NE1/4 Sec 16, T43N, R99W, North of Thermopolis along Big Horn River

1. Uppermost Muddy SS, thin bedded, crossbedded, orange-buff with med. grey mottles, abt. 4' thick, contains much carbonaceous material, 9-1 Underlain by approx. 50' soft black shale, not sampled
 2. Soft, block, dark, grey to black shale, 9-2 at 75', 9-3 at 150', Total thickness of this unit is 165'
 3. Mowry shale, has gradational contact with [2] below, through about 5' of transition zone. Sample 9-4 at 5', Shale is typical, except somewhat brwnsh. and softer, interval is 8' 8
 4. Bentonite, yellowgrey, .4', 9-5
 5. Mowry sh., typical, 11', 9-6 at 8' 19
 6. Bentonite, yellow-grey, .4', 9-7 20
 7. Mowry shale, 9', typical, 9-8 29
 8. bentonite, 2.2', bottom 1/2 is lt. grey, top is cream, 9-9 SFB 31
 9. Mowry, typical, small bentonite bed .1' thick at 1' above base, 9-10 at 15', This interval is relatively soft and non-siliceous, 20' thick 51
 10. Siltstone dark grey with brownish streaks, blocky, soft, relatively iron-resistant. May be sandy in parts Sample 9-11 at base. Interval is 49' thick sample 9-12 at 25', sample 9-13 at top, which is somewhat more resistant. Poorly exposed 100
- NOTE:
Missed a bentonite at 27', sample 9-15 .6' thick
11. Bentonite, sample 9-14, .4' thick
 12. Mowry, typical, somewhat softer than normal. Bottom 5' is blocky and silty, sample 9-15 at 15', thin (.2') bentonite at 10', not sampled. Unit is 25' thick, poorly exposed 125
 13. Mowry, typical, resistant, weathers white in contrast to intervals 10 and 12, which weather buff, Sample 9-16 from near base of unit--14' thick 139
 14. Mowry, silty, massive, blocky-bed, 1.6' thick, may be secondarily silicified, 9-17 141
 15. Bentonite, grey-yellow, .8', overlain by .2' of soft Mowry, overlain by 1.3' of bentonite, grey-yellow. Bottom bentonite sampled as sample 9-18, top one is 9-19, SFB 143
 16. Mowry, dense, brittle, as (14), may be secondary silification, 1' thick 9-20 144
 17. Bentonite, very impure, yellow-brown, .9' thick, 9-21, overlain by 1' of soft black shale 145
148
 18. 2' of hard, brittle mowry, overlain by 2' soft, brown, bentonitic shale, sample of hard zone is 9-22 148
150
 19. Mowry, typical, 8', 9-23 158
 20. Soft, non consolidated black shale, bentonitic-appearing, 5' thick, 9-24, 163
 21. Resistant, typical Mowry, 1.5', not sampled 165

22. Soft, non-resistant shale, as (20), not sampled, poorly exposed, 15' 180
23. Sandstone, dark grey, very hard and resistant, has all sorts of burrows through it. 182
Upper surface has desiccation-like cracks noted at locality 8. 2.2' thick, Sample 9-25.
Note very abrupt contact with shale as shown on small chip in bag.
24. Mowry, very typical, sample 9-26 from base, sample 9-27 from 25', Sample 9-28
at 40'. At 47', there is an .8' blocky siltstone bed, sample 9-29. Sample 9-30 is at 50', At 61'
there is a siltstone bed 1.4'
thick, sample 9-31. Interval is 71' thick and moderately well-exposed. 253
Sample 9-32 is from near top.
25. Bentonite, olive green, 4.9' thick, sample 9-33 from base, sample 9-34 from middle 258
and sample 9-35 from top. Has Alligator-hide surface texture.
26. 1.2' thick zone of interbedded thin bentonite films and soft grey siltstone, not sampled 259
27. 15' of Mowry-type grey hard siltstone, becoming less resistant at top of gradually
changing into buff-weathering siltstones. Sample 9-36 at base, fish scales present.
9-37 at 15', near contact 274
28. 24' of soft, non, resistnat, buff weathering med. grey blocky siltstone, with
interbedded med. grey soft shale beds, 9-38 taken 5' above (9-37)
29. SS, buff, resistant, thinly laminated, gentle crossbeds, some tracks and burrows, abt
20' thick, 9-39

PHOTO 7 (color) shows concretion below bentonite(equiv= 25) at cliff. Note distortion
around conc:. Also note knobby weathering of mudstone. Number 8 shows the bedding

Sample 9-40 from base of bentonite bed 25 at cliff

Sample 9-41 from interval 3' below sample 9-40

Sample 9-42 from concretion at base of 9-40- see picture.

SECTION 10

1 mile west of Ten Sleep, on US 16, SE1/4 of Sec 23, T47N, R89W

1. Shale, soft, dark grey, very fissile, slightly silky, 10-1
2. Bentonite, .9', greyish-yellow, 10-2
3. Shale, as (1), 4' thick, not sampled
4. Bentonite, 1.1' thick, lt. tan or cream colored, 10-3
5. Shale zone, 5' thick, soft at bottom resembling (1), hard and brittle at top resembling unit (6)
6. Mowry Shale, 11' thick, sample 10-4, somewhat softer than usual, becoming harder at top, greyish-brown in color 11
7. Bentonite, 3.6' greyish yellow at base, yellowish-brown near top. Overlain by 1' soft brown bentonitic shale. 10-5 from base of bent. 10-6 from near top 15
8. Mowry shale, 12.5' thick, typical, resembles (6), except hardest at base, softer upwards 10-7 from 2' 27
9. Bentonite, .4', greyish yellow, 10-8
10. Mowry shale, 10' thick, as (8), not sampled 37
11. Bentonite, 1.6' thick, rusty brown, 10-9 39
12. Shale, 28' thick, soft, grey brown, non-resistant, weathers very chippy - sample 10-10 from 15' above base 67
13. Mowry sh. 12' thick, typical white-weathering plates, much fish scales, 10-11 79
14. Mowry, 35', softer than usual, has 2' bentonite at 1' from base and 1.1' thick siltstone bed at 15'. Probably others, but covered. Sample 10-12 at 20', weathers dark 114
15. Mowry, 10.5' thick, harder, more resistant and massive bedded. May be very silty weathers white, sample 10-13 at 9' 125
16. Bentonite, yellow-orange, .7' thick, 10-14 126
17. Mowry, as (15), 16' thick sample 10-15 at 15' 142
18. Mowry, softer than underlying unit, less massive tends to be platy rather than blocky sample 10-16 at 5', Unit is 23' thick 165
19. Mowry, siltier, blocky and resistant, sample, 10-17. Unit is 7' thick and the sample was taken from the middle 172
20. Bentonite, brownish-orange, 1.6' thick, 10-18 174
21. Mowry, as unit (19), 12' thick, becoming very blocky and massive near middle 10-19 at 8' 186
22. Bentonite, 3.5' thick, greyish yellow, buff at top, 10-20 near base of bed, 10-21 near top 190
23. Mowry, poorly exposed, appears to be thinbedded, whit weathering Mowry, with thin interbedded bentonites and occasional siltstone beds, sample 10-22 at 35', sample 10-23 at 60', Interval is 82' thick 272

24. Sandstone, buff-weathering, lt. grey on fresh surface, 6', wavy bedded at bottom, even bedded (.2-.4') near top, no ripple marks, numerous burrows, mostly horizontal, sample 10-14, contains occasional very thin interlamination of Mowry shale 278
25. Mowry shale, typical, 4.5' thick, 10-15 292
26. Bentonite, 2.6' thick, creamy-yellow, 10-26 295
27. Mowry shale, 9', typical appearance, not sampled 304
overlain by 1' of soft black bentonitic shale, badly weathered 305
overlain by 1.2' of silty, very hard platy Mowry 306
28. Bentonite, 1.6' thick, light green in color, 10-27 308
29. Mowry shale, typical, 10-28 from 10', 10-29 from 30', Unit is 35' thick 343
30. Bentonite, 1.5' thick, greyish yellow, greenish near top, red-brown at bottom, 10-30 344
31. Bentonitic sandy shale, 7' thick, deeply weathered, brownish, no sample 351
32. Sandstone bed, .4' thick, resistant, weathers buff, lt. grey on fresh, 10-31
33. Shale, dark grey, weathers reddish brown, blocky, slightly resistant, 36' thick, contains 3 thin (.2') siltstone beds at 15', 20' and 25', sample 10-31 at 20' 387
34. Sandstone, .8' thick, highly distorted and chewed up inside, probably by organisms, Lt. grey, sample 10-32, seems laterally persistent 388
35. Shale, resembles unit (33), 34' thick, contains occasional very thin ironstone concretions that appear almost as a thin bed, sample 10-33. Sample of shale at 25' is sample 10-34 422
36. Bentonite, 5.5' thick, dark olive green, sample 10-35 427
37. Mowry shale, typical, white weathering, sample 10-36, Becomes increasingly sandy toward top, 22' thick, grades into buff sandstone, samples at 5' intervals, 10-37 at 5', 38 at 10', 39 at 15' and 40 at 20'. 437
38. Sandstone, 40' thick, Lt. grey, buff weathering, transitional into 37 below, becomes massive, even bedded at top, overlain by soft med. grey, non-siliceous brown-weathering shale.

REMEASURE OF TENSLEEP SECTION--Dip 47°

[Started at change in sh. from soft dk. grey to siliceous, white-weathering sh.]

1. Sh., siliceous, 24'
2. Bent, .1'0'
3. Sh., siliceous, 8.0'
4. Bent, .5'
5. Sh, siliceous, 45.0'
6. Bent, 1.0', first exposed in road
7. Sh, siliceous, 10.0'
8. Bent, .5'
9. Sh, siliceous, 6.0'
10. Bent, .5'
11. Silty, siliceous sh., 49.0'
12. Bent, 2.0'
13. Sh, siliceous, 10'
14. Bent, 3.0'
15. Sh, siliceous, but less resistant, 50'
16. Sandstone, 3.0'
17. Sh, soft, dk. grey, 31.0'
18. Bent, 1.0'
19. Soft, dk grey sh, 3.0'
20. Bent, .5'
21. Soft, dk, belle-fourche type sh., 25'
22. S.S., 1.0'
23. Sh, soft, belle-fourche type, 25'
24. Sh, siliceous, silty in base, may be about 24'
25. thin-bedded flags, siltstones, increasingly sandy toward top, 28'
26. S.S., thin bedded aprx. 25'

SECTION 11

Near Hyattville, Sec 32, T49N, R90W, measured bottom to top.

1. Lowermost Mowry exposed, near valley bottom, presumably underlain by non-resistant shale, sample 11-1 at base, 15' thick 15
2. Bentonite, est. about 1' thick, dark yellow-grey, sample 11-2 16
3. Mowry, typical at base (sample 11-3), becoming silty upward, (sample 11-4 at 15'), From about 15' on to about 20' is soft, black shale, sample 11-5. Upper 4' is hard and resistant and silty (sample 11-6). Unit is 24' thick 40
4. Bentonite, poorly exposed, less than 1' thick, reddish orange, 11-7 41
5. Shale, soft, brownish, fissile, may be bentonitic, 7' thick, sample 11-8 48
6. Mowry, silty, resistant, typical, 2.5' thick, sample 11-9 50.5
7. Shale, soft, as (5), not sampled, 2.2' thick 53
8. Mowry, very chippy, 6' thick, not sampled 59
9. Bentonite, greyish-yellow, poorly exposed, est. 1'-2' thick, sample 11-10 60
10. Shale, soft, non-resistant, chippy, med. grey, sample 11-11 at 12', Interval is 24' thick, Becomes soft and silty near top 84
11. Sandstone, 3.4' thick, bottom 1/2 is wavy-bedded, top evenly bedded, abt .6' to .2' thick, sample 11-12 from middle 87
12. Sandstone is overlain by .2' soft black shalen then .8' yellow-orange bentonite, sample of bentonite is sample 11-13 88
13. Shale, typical white, weathering Mowry, 1' thick 89
14. Bentonite, light yellow-green, about. 3' thick, poorly exposed, sample 11-14 92
15. Soft black, bentonitic shale, with thin bentonite interlayers, 4' thick, no sample 96
16. Siliceous mowry shale, 5' thick, typical, sample 11-15
17. Shale, 16' thick, soft, brownish-grey, sample 11-16. Upper 1' is hard and siliceous from overlying bent. Hard shale sample is 11-17 112
18. Bentonite, yellow-grey, bottom few inches, sandy, Sample 11-18. Sample from top is 11-19. Bed is 6' thick 118
19. Siltstone, 1.5' thick, dk. grey with lt. grey contorted laminae, 11-20 120
20. Mowry shale, 6' thick, typical, sample 11-21 126
21. Bentonite, poorly exposed, est. 1'-2' thick, sample 11-22 127
22. Mowry sh. as (20), becomes softer and siltier to top, 6' thick, sample 11-23 at base, grades into overlying shale. 133
23. Soft dark grey shale, sample 11-24, 60' thick capped by thin sandstone

SECTION 12

Magcobar properties, Greyball, Sec 17, T53N, R92W, measured bottom to top.

1. Thermopolis shale, dk. grey, soft, weathers tan, sample 12-1, About 25' exposed below, 13' to top, wample 12-2 at top.

2. Mowry shale, 5' thick, dark grey, weathers silver, hard and resistant, fish scales common, sample 12-3 5

3. Bentonite, 3.3' thick, grey-yellow, sample 12-4 at base, 12-5 near top 8

4. Mowry sh., typical, .5' thick, not sampled 9

5. Bentonite, .4' thick, grey-yellow, sample 12-6

6. Mowry shale, typical, 2.9' thick, sample 12-7 12

7. Bentonite, .8' thick, yellow, has .1' thick brwon clay band at abt. .2' above base sample 12-8 13

8. Mowry shale, 13' thick, typical at bottom, (sample 12-9), becoming soft and papery at about 5-10', with silicified top. sample 12-10 of soft interval 26

9. Bentonite, abt. 3' thick, top not exposed, lt. yellow-green, popcorn surface, cornmeal texture, sample 12-11 SFB 29

10. Mowry Shale, somewhat softer than usual, sample 12-12, interval is 7' thick, contains remains of occasional sandy, non-calcareous lens or concretions, abt. 5' in diameter by 1' thick, sample 12-13 36

11. Bentonite, poorly exposed, est. .4' thic, yellow-brown, sample 12-14

12. Shale interval, soft and platy at bottom, middle is extremely soft, fissile and waxey. Weathering cornmeally, and tip is hard and blocky, Typical silty-phase Mowry. samples taken at intervals as indicated. Unit is 51' thick
12-15 at 5'; 12-16 at 10', very soft; 12-17 at 15', very soft; 12-18 at 35', very soft; 12-19 at 37', very hard and blocky; and 12-20 at 50', very hard and blocky. 87

13. Bentonite, sample 12-21 at base, 12-22 at top. Bed is 2.7' thick, grey-yellow, blocky, weathers popcorn 90

14. Mowry shale, moderately resistant, 1.8' thick, sample 12-23 92

15. Bentonite, greenish-yellow, flakey, abt. 1' thick, sample 12-24 93

16. Shale, very soft, about 5' thick, not sampled 98

17. Bentonite, 1' thick, yellow, cornmeally, sample 12-25 99

18. Shale, very soft, as (16) and (12), poorly exposed, sample 12-26 at 25', sample 12-27 at 50', Sample 12-28 at 75', at 87' a bright yellow, 1.4' thick bentonite, sample 12-29 25' approx. to base of SS. 186

SUPPLEMENTAL SECTION—measured along road 1/2 mile east, down-dip

samples at 5' intervals or less through top of section. Starts with arbitrary zero. Correlate with previous section, with bentonite (18)

	Sample 12-30 at 0 feet
	" 12-31 at 5 feet
+	" 12-32 at 10 feet
=	" 12-33 at 15 feet
=	" 12-34 at 20 feet
>	" 12-35 at 25 feet
	" 12-36 at 30 feet
<	" 12-37 at 35 feet
	" 12-38 at 40 feet
*	" 12-39 at 45 feet
o	" 12-39A at 50 feet

+ Sample 12-32 is bentonite, bright yellow, 2.2' thick, correlates with bentonite (18) of previous section

= Massive, blocky mowry shale between these two bentonites about 12-15' thick

> Bentonite, bright yellow, top at 25', 1.3' thick

< Mowry, becoming very silty, these beds are interbedded with more typical black shales

* almost a sandstone

o massive grey sandstone, bed about 8' thick

At 53',

1. Lt. yellow-green bentonite, apx. 2.0' thick, sample 12-40
2. Overlain by 3.5', typical Mowry shale, sample 12-41
3. Overlain by 1.0' of bentonitic, waxey shale, yellow-brown
4. Overlain by a 16' interval of alternating impure brownish, waxey bentonite beds and thin soft shale beds, interval was not sampled
5. Overlain by resistant, flaggy, siltstone unit, 1.6' thick, upper bedding surfaces of some flags are covered with tracks, (sample 12-42)
6. Overlain by 5.5' of typical mowry shale, sample 12-43
7. Overlain by apx. .4' poorly exposed grey-ish-yellow bentonite, sample 12-44
8. Overlain by typical mowry shale, 6' thick, sample 12-45
9. Overlain by .6' yellow-orange cornmeally bentonite, sample 12-46
10. Overlain by covered interval, seems to be brownish, sandy shale, very soft, not sampled, 4' thick
11. Overlain by extremely hard, dense, dark grey sandy siltstone, 5' thick, sample 12-47
12. Overlain by bentonite, 2.5' thick, cornmeally, greenish-yellow, sample 12-48
13. Overlain by 7' covered interval, no sample
14. Overlain by 9' of mowry shale, silty, seems typical sample 12-49
15. Shale interval sampled at 5' intervals. Bottom 8' is siliceous, rest is less so, becomes sandy near top:

12-50 at 5'

12-51 at 10'

12-52 at 15'

12-53 at 20'

12-54 at 25'

12-55 at 30'

12-56 at 35'

12-57 at 40'

230

235

24

24

24

26

26

26

26

27

27

27

27

27

28

28

29

30

34

This unit is a dark greenish-brown bentonite, poorly exposed. Est. at about 2'+, Top of hill, top of section, appears overlain by about 25' of soft, dk brown shale, then 20' of buff sandy shale, capped by commercial bed, sample 12-58

SECTION 13

South of Lovell, SW1/4 of Sec 24, T54N, R95W

1. Lowermost Mowry exposed, underlain by covered slope about 25-35' thick, probably developed on soft, very dark bentonitic shale, Mowry seems typical, sample 13-1, 3' 3
2. Bentonite, poorly exposed, est. abt. 1' thick, lt. grey, sample 13-2 4
3. Mowry shale, somewhat softer than (1), sample 13-3 at 10', interval is 32' thick, covered with bentonite wash at top 36
4. Bentonite, 4' thick, yellow-brown at base, dark olive near top, seems sandy, sample 13-4 at base, 13-5 at top 40
5. Soft, dark brown bentonitic shale interval, deeply weathered, sample 13-6 at 5', Unit is 24' thick 64
6. Mowry, appears typical, sample 13-7 at 2', Hard zone is about 4' thick, becomes softer upwards. Sample 13-8 at 10', Unit is 24' thick 88
7. Bentonite, .8' thick, upper 1/2 is yellow grey, bottom 1/2 is rusty brown, has silicified floor, sample 13-9 89
8. Soft, dark brown deeply weathered shale, sample 13-10 at 15', interval is 28' thick, sample 13-11 comes from silicified floor at top of interval 117
9. Bentonite, .9' thick, consists of cornmeally bright yellow bentonite, Two beds separated by .2' thick bentonitic brown shale, sample 13-12 118
10. Covered interval, 35' thick, presumably soft shale like that of unit (8) 153
11. Mowry shale, typical, sample 13-13 at base, Sample 13-14 at 20', Unit is 29' 182
12. Bentonite, sample 13-15, Bright yellow, 1.1' thick 183
13. Mowry shale, 10' thick, hard, blocky, thinly laminated, some beds have an extreme number of fish scales, see sample, sample 13-16 193
14. Bentonite, 1.5' thick, greyish-yellow, sample 13-17 195
15. Mowry, very hard and blocky, becoming fissile and less resistant near top, Sample 13-18 at 10', Sample 13-19 at 18', Interval is 20.5' thick, The brown shale chips in the sample come from 18' also, where they are interbedded with the siltstone 215
16. Sandstone, light grey, dense, hard and blocky, contains very irregular laminae 2.7' thick, much very small scale crossbedding present. sample 13-20 218
17. Bentonite, 1.5' thick, dark olive green, popcorn surface, sample 13-21 220
18. Siltstone, 3.9' thick, very thinly laminated and brittle, interbedded with soft shale, sample 13-22, lt. grey color 224
19. Bentonite, 1' thick, light greenish grey, very silty, sample 13-23 225
20. Siltstone, as (18), samples are marked and included in bags with samples 13-22, sample 13-24, 3' thick 228

- | | |
|--|-----|
| 21. Bentonite, .8' thick, dark olive green, sample 13-25 | 229 |
| 22. Zone, 6.0' of interbedded thin bentonites, soft black shale, and occasional siliceous shales, sample 13-26 | 235 |
| 23. S.S., 4' thick, lt. grey, mottled, very contorted bedded, sample 13-27, (included with 13-26) | 239 |
| 24. Shale, soft, dark brown, crumbly, 4' thick, sample 13-28 | 243 |
| 25. S.S., 2' thick, as (23), has thin glistenstein zone at top, sample 13-29 | 245 |
| 26. Shale, white-weathering silty mowry, hard and resistant, sample 13-30, in with 13-29 | 250 |
| 27. Extremely hard, dense, siliceous siltstone, .6' thick, dark grey, sample 13-31 | 251 |
| 28. Bentonite, poorly exposed, yellowish-brown, est. thickness is 2.5', sample 13-32 | 253 |
| 29. 15' covered slope, apparently siliceous mowry, sample 13-33, picked up from float | 268 |
| 30. Siltstone, lt. grey, 2' thick, top of Mowry, sample 13-34 (in with 13-33) | 270 |
| 31. Shale, soft, dark grey, est. 100' thick to massive buff ss., shale sample 13-35 | |

SECTION 14

East of Cowley, Sec 31, T58N, R95W

1. Shale underlying mowry, soft, black, quite fissile, thickness unknown, forms valley, sample 14-1- 7' below next unit
2. Bentonite, .7' thick, dark olive green loaded with biotite, sample 14-2
3. Shale, 3' thick, as (1), not sampled
4. Bentonite, thickness not known, est. abt. 1' thick, yellow-Orange, sample 14-3
5. Shale, as (1), upper few feet becoming harder and more resistant. Sample 14-4 at 25', Sample 14-5 at 35', Unit is 36' thick
6. Bentonite, 5-7' thick, grey, weathers yellow-grey, sample 14-6 at base, sample 14-7 near top
7. Shale, as (1), somewhat more resistant, 7', no sample
8. Bentonite, .6' thick, yellow-orange, loaded with calcite needles, sample 14-8
In places this is a bed of solid calcite, must be aragonite, Sample 14-9
9. Shale, blocky, tough, dark grey, finely laminated and silty, sample 14-10 at 10',
Unit is 25' thick, Top 5' is very blocky and siliceous, sample 14-11 25
10. Bentonite, 1.5' thick, bright yellow and cornmeally, sample 14-12 26
11. Shale, as (9), seems to be typical Mowry, 5.5' thick sample 14-13. Upper 2' is
siltstone, borders on sandstone 32
12. Bentonite, .5' thick, bright yellow, Sample 14-14 33
13. Shale, 2.7' thick, soft and bentonitic at bottom, harder at top, no sample 36
14. Bentonite, .4' thick, bright yellow, resembles unit (12), sample 14-15 37
15. Sandstone, 8.5', silty in bottom, less so at top, Upper part consists of massive, 1'
beds, very dense and hard, weathers buff, med. grey on fresh, sample 14-16 46
16. Bentonite, 2.2' thick, bright greenish-yellow, sample 14-17 48
17. Shale, soft, silty, med. grey, fish scales, sample 14-18, changes upward to hard
siltstone, 8' thick 56
18. Bentonite, .6' thick, bright yellow, cornmeally, sample 14-19 57
19. Partially covered slope, apparently very soft, dark grey, very silty to sandy shale,
with occasional more resistant sandstone or siltstone beds. Sample 14-20 at 20',
Sample 14-21 at 40'. Interval is 45' thick, more resistant toward top, Upper 5' are gradational
into normal Mowry 102
20. Siliceous Mowry, sample 14-22 at 5', sample 14-23 at 20', Interval is 24' thick 126
21. Sandstone, 2.5' thick, light grey, weathers rusty brown, wavy bedded, fine laminae, sam=
ple 14-24 129
22. Siltstone, greyish-brown, less resistant than unit (19), contains fish scales, sample
14-25 at 5', Interval is 15' thick 144

23. Bentonite, poorly exposed, dusky yellow green, quite gypsiferous. Thickness not known, perhaps 3 or more feet thick, badly weathered most places, sample 14-26 147
24. Partially covered interval, 23' thick, apparently consists of buff-weathering med. grey siltstone, becoming sandier near top. Sample 14-27 at 15', Consists of thin siltstone or ss flags separated by very thin waxy bentonite beds 170
25. Bentonite, badly swelled, appears about 2' thick, lt. green to yellow-orange, very gypsiferous, sample 14-28 172
26. Covered interval, apparently soft shale, 4' thick 176
27. Bentonite, poorly exposed, approx. 3' thick or so, disky yellow, sample 14-29 179
28. Mowry shale, very typical, sample 14-30 at 5', grades upward in about 10-12' to soft dark grey buff-weathering shale containing occasional buff or lt. grey s.s., abt. 2' thick, and occasional bentonites sample 14-31 at 25' 190

SECTION 15

Southwest of Cody, Sec 21, T52N R102W, measured bottom to top

1. Lowest Shale exposed, dark, grey-brown, weathers buff, very silty, not hard nor resistant, poorly exposed, sample 15-1 at base, 7' thick
2. Sandstone, med. grey, weathers rusty brown, contains fish scales, resistant, 3' thick, sample 15-2 3
3. Shale, Mowry, buff-weathering, Brownish-grey, resistant, sample 15-3 at 5', sample 15-4 at 25', Sample 15-5 at 45', sample 15-6 at 70', sample 15-7 at 110' (top becoming sandier), Interval is 124' thick 127
4. Bentonite, poorly exposed, appears less than 1' thick, dark olive green, sample 15-8 128
5. 5' covered interval. apparently soft bentonitic shale 133
6. Mowry shale, extremely fissile and papery, hard and resistant, sample 15-9 at 5', Interval is 14' thick 147
7. Bentonite, poorly exposed, appears about .4' thick, dusky yellow, sample 15-10
8. 4' covered interval, apparently bentonitic shale 151
9. Mowry shale, as unit (6), 7' thick, sample 15-11 158
10. Bentonite, extremely hard and tough, dark yellow-grey, est. about 2-3' thick popcorn surface, sample 15-12 160
11. 3' covered interval, probably bentonitic shale 163
12. Mowry shale, like unit (6), sample 15-13 at 5', interval is 11' thick 174
13. Bentonite, sample 15-14, Unit is .9' thick, yellow-orange, cornmeally, (secured a better sample from down-dip, also numbered 15-14A) 175
14. Resistant Mowry shale, 2.2' thick, silty-like (6), sample 15-15 177
15. Soft black shale, 2.4' thick, sample 15-16 180
16. Silty resistant Mowry, 4' thick, sample 15-17 184
17. Shale, 4.5' thick, soft black, fissile, sample 15-18
18. Bentonite, poorly exposed, about 1' thick, greyish-yellow, sample 15-19
19. Shale, soft, black, fissile, having several sandy zones a few feet thick, and occasional bentonite-rich zones. 65' thick. Sample 15-20 at 5'. At 45' there is a popcorn, yellow bentonite, .8' thick, sample 15-21. Underneath is a silicified zone about 3' thick with rare fish scales, sample 15-22. Sample 15-23 at 60', note small sand.
20. Siltstone, 5' thick, contains rare fish scales, grey, contorted bedding, sample 15-24. Contains a .4' bentonite, sample included with 15-24.
21. Bentonite, 2.4' thick, dark yellow-brown, sample 15-25
22. Shale, soft, weathers very light grey and popcorny, sample 15-26, 22' thick
23. Sandstone, 3' thick top of section, sample 15-27, rare fish scales

SECTION 16

Section north of Dubois, Sec. 11, T42N, R107W, measured bottom to top

1. uppermost Muddy sandstone, about 2' thick, dense, lt. grey, weathers buff, contains large-scale ripples which trend N50° E with the steep dip on NW side, sample 16-1. The s.s. contains all sorts of burrows, etc.
2. Soft black shale, .5' thick, not sampled
3. Bentonite, .8' thick, grey-yellow, sample 16-2
4. Soft black, blocky, shale, sample 16-3 at 5', Unit is 12' thick
5. Bentonite, Sample 16-4, at base, Unit is 6' thick Basal 2' are grey-yellow, then .2' shale stringers, then approx. 4' of med. grey bentonite, sample 16-5
6. Shale, like unit (4), 16' thick, no sample
7. Bentonite, 3.0' thick, bottom 1.5' very light grey, sample 16-6, overlain by .4' soft black shale, overlain by 1' of light grey bentonite, sample 16-7
8. Shale, soft, fissile, weathers brownish-black, very flakey, sample 16-8 at 10', unit is 14' thick
9. Bentonite, .5' thick, cream-colored, sample 16-9
10. Shale, as (8), becoming somewhat more blocky near top, sample 16-10 at 20', unit is 32' thick
11. Bentonite, 3.0' thick, olive green, sample 16-11, most of sample comes from lt. grey basal zone
12. Shale is like (8), with occasional grey weathering bands about 4-5' thick, sample 16-12 from one band at 30', interval is 36' thick
13. Bentonites, Med. grey, 1.2' thick, sample 16-13
14. Shale, 4', as unit (8), not sampled
15. Bentonite, lt. grey, .8' thick, Sample 16-14
16. Shale, as unit (8), 3' thick, no sample
17. Bentonite, 2' thick, med. grey, sample 16-15
18. Shale, as unit (8), 56' thick sample 16-16 at 40'
19. Bentonite, poorly exposed, approx. 2' thick, lt. grey, sample 16-17
20. Mowry-type silty shale, 4' thick, no fish scales, sample 16-18
21. Bentonite, 1' thick, cream-colored, sample 16-19

22. Shale, like unit #8, contained several thin bentonites, not sampled, and a few ironstone concretions, sample 16-20 at 55', contains rare fish scales

NOTE:

Missed a 2.4' thick yellow bentonite at 35', sample 16-21, Unit is 70' thick, transitional into unit 23

23. Shale, fissile, more resistant than underlying shale, brownish-grey, blocky, with fish scales, sample 16-22, Sample 16-22 at 5', Unit is 11' thick

24. Bentonite, .4' thick, lt. orange, sample 16-23

25. Shale, like unit #23, 7' thick, no sample

26. Bentonite, sample 16-24, pale green at base, yellow-orange at top, 4' thick, sample 16-25 from top

27. 47' poorly exposed interval, at bottom and top is platy grey brown shale similar to unit #23, no sample

28. Bentonite, Sample 16-26, light olive, 4.4', sample 16-27 from top

29. Mowry shale, 17', weathers papery, brown-grey, weathers light grey, becomes blocky near top, sample 16-28 includes paper from middle of unit and block from top

30. Bentonite, 3.5' thick, blocky and silty, sample 16-29

31. Mowry shale, 4. thick, blocky and silty, sample 16-30

32. Bentonite, .6' thick, lt grey, sample 16-31

33. Mowry, typical, silty, 16' thick, sample 16-32 at 8'

34. Bentonite, 1.2' thick, yellow-grey to bright orange, sample 16-33

35. Mowry, typical, 15' thick, sample 16-34 at 10'

36. Bentonite,, sample 16-35, greyish yellow, .8' thick

37. Mowry, very hard and blocky, weathers white, 7. thick, sample 16-36.

38. Bentonite, .8' thick, yellow-grey, sample 16-37

39. Soft at bottom, becoming hard toward top, 15' sample 16-38, fault

this unit is approximately 225' below massive frontier ss. section continues on hill to south

SECTION 17

1/2 mile north of 16, Sec. 11, T42N, R107 W

1. Mowry shale, very blocky and hard, poorly exposed, thickness not known, sample 17-1
2. Bentonite, .4' thick, lt. olive green, sample 17-2
3. Mowry, 16.5', blocky, brwn-blck, less hard than unit #1, sample 17-3
4. Bentonite, .4' thick, lt. olive green, sample 17-4
5. Mowry, as unit #3, not sampled, 8' thick
6. Bentonite, lt. yellow-green, .7' thick, sample 17-5
7. Mowry, hard blocky, dark brown, sample 17-6 at 3', Unit is 16' thick
8. Bentonite, .6' thick, grey-yellow, sample 17-7
9. Mowry, blocky, hard, poorly exposed, 22' thick, sample 17-8 at 10', at 14. is a lith olive green bentonite, .4' thick, sample 17-9
10. Bentonite, 6.5' thick, greyish yellow, sample 17-10, from bottom, 17-11 from top
11. Mowry, 13.0' thick, blocky, and hard, sample 17-12 at 8'
12. Bentonite, greyish-yellow, .8' thick, sample 17-13
13. Mowry, 4.5' thick, hard and blocky, no sample
14. Bentonite, 1.0' thick, lt. yellow-green sample 17-14
15. Mowry shale, dk. brown, extremely silty, sample 17-15 contains one thin bed of flattened oyster shells, found at 3', Unit is 5.5' thick
16. Bentonite, 1.3' thick, greyish-yellow, sample 17-16
17. Mowry, dk. brown, blocky, silty, sample 17-17 at 6', unit is 12' thick
18. Bentonite, .7' thick, greyish-yellow at bottom, lt. grey at top sample 17-18
19. Mowry, sample 17-19 at 2.0', sample 17-20 at 12.0', dk. grey, thin bedded and less silty than units below, unit is approx. 15.0' thick, grades upward into overlying unit #20
20. Soft dark brown silty shale, blocky and non-resistant, sample 17-21 at 1.0' Becomes increasingly softer and more bentonitic up to 8.0' where there is a .2' lt. grey dirty bentonite, Thickness of unit is 8'. Sample 17-22 at 7.0'
21. Mowry shale, thin, flaky, brittle, dk. grey, thinly laminated, sample 17-23 at 10', Middle of unit is soft, then top is increasingly resistant, Grades into overlying unit #22. sample 17-24 at 25', sample 17-25 at 35', sample 17-26 at 50' unit is 54' thick

22. Mowry, thin, brittle, platy, weathers white, med. grey-brown on fresh, typical sample 17-27 at 1.0', Unit is 15' thick, sample 17-28 at 12.
23. Siltstone, very soft and sandy, appears to have highly contorted bedding, very blocky, sample 17-29 at 4.0', contains a few grey resistant silt stone beds at 15.0', becomes thin bedded and alternates with thin waxy bentonites in upper 15'. Also becomes darker and much platier, seems to be completely gradational sequence, Sample 17-30 at 25', Interval is 38'
24. Bentonite, 1.4' thick, lt. yellow-grey, sample 17-31
25. Mowry, silty, 5.4' thick, thinly laminated, with thin bentonite interlayers, hard and resistant, sample 17-32
26. Bentonite, 2.0' thick, very impure, especially near top, med. grey in color sample 17-33 from base
27. Interval containing 3 ss. beds, each about 3-5' thick, separated by soft brownish shale beds, s.s. are lt. tan, buff weathering, and contain thin contorted laminae of dark brown, Sample 17-34 is from bottom s.s. at 1.0', sample 17-35 is from shale Below top s.s, at 15; Unit is 21' thick.
28. Mowry shale, platy, med. grey, very fissile, typical, sample 17-36 at 5'. 17-37 at 19', unit is 21' thick, siltier and blockier near top
29. Bentonite, 1.8' thick, bright yellow, sample 17-38
30. Siltstone, dark grey, buff weathering, highly silicified, 2.0' thick, sample 17-39
31. Bentonite, 1.6' thick, bright yellow, sample 17-40
32. S.S., very lt. grey, buff weathering, laminated and contorted, 4' thick sample 17-41
33. Bentonite, 5' thick, very impure and sandy with numerous s.s beds in it. lt. grey, sample 17-42
34. 17' interval of interbedded soft, lt. grey s.s. with thin contorted laminae, interbedded with soft dk brown fissile shale, no samples
35. Shale, soft, very fissile, dk. brown, weathers dark grey, sample 17-43 at 8', Unit is 63' thick, with occasional thin ss beds, becoming more numerous near top.
36. S.s., med. to coarse grained, highly x-bedded, massive, est. 25-50' thick, lt. grey, weathers buff, sample 17-44

SECTION 18

Winkleman Dome, Sec 19, T2N, R1W, poorly exposed

1. S.s. uppermost Muddy S.S., abt. 3' thick, clean, buff, x-bedded, sample 18-1
2. 20' covered interval, probably soft shales, with Mowry in upper part
3. Mowry, hard, typical, 5'+ exposed, sample 18-2
4. Bentonite, yellow brown, .4' thick, sample 18-3
5. Mowry, as below, 10' thick, sample 18-4 at 5'
6. Bentonite, .6' thick, dusky yellow-orange, sample 18-6
7. Mowry, massive but whathers platey, sample 18-6 at 3', Unit is 7.0' thick
8. Bentonite, dusky yellow-green, poorly exposed, est. abt. 1.5' thick, sample 18-7
9. 5' of poorly exposed interval, apparently bentonitic shale.
10. Siltstone, light grey, weathers buff, est. 2' thick, sample 18-8
11. 8' covered interval, apparently bentonitic shale
12. Bentonite, est. .8' thick, rusty red-orange, sample 18-9
13. 2' poorly exposed soft bentonitic shales
14. Mowry, typical white-weathering chips, sample 18-10, at 2', interval is 9' thick
15. Shale, soft, greyish, brown, chippy, very fissile, sample 18-11 at 3', 18-12 at 15', 18-13 at 25', 18-14 at 35', unit is 38' thick, note increase in siliceousness toward top, top 10-15' is typical mowry.
16. Bentonite, poorly exposed, dk. olive, est. 2-2.5' thick, sample 18-15
17. Shale, soft in bottom, becoming increasingly hard upward. Sample 18-16 at 15'. Unit is 27' thick.
18. Bentonite, poorly exposed, est. 4.0' thick, sample 18-17 from base, appears dusky yellow green
19. Mowry, massive, poorly exposed, est. 2.0' thick, med. grey, has worm burrows.
20. 6.0' covered interval, occupied in part by sandy, yellowish bentonite, no sample
21. Mowry shale, typical, sample 18-19 at 5.0', sample 18-20 at 30', Unit is 34' thick
22. Bentonite, poorly exposed, dusky yellow-orange, 5' thick sample 18-21 from base
23. Porcellanite, 3.5' thick, in 3 beds, black, very hard, sample 18-22
24. Bentonite, 4' thick, sample 18-23
25. Porcellanite, 1.0' thick, as unite #24, sample 18-24

26. Siltstone, 18' thick, thinbedded, flaggy, lt. grey, buff weathering, with many burrow, sample 18-25
27. S.S., dk. grey, silty, resistant, buff-weathering, abt. 1.0' thick, sample 18-26
28. Shale and siltstone, interbedded siltstone layers like unit #27, abt. 1' thick at about 5' intervals in resistant dark brown mottly shale, sample 18-27 at 15', This interval is poorly exposed, at 55' there is a 1' thick porcellanite (?) bed, lt. grey in color, sample 18-28. Also appears to be a bentonite immediately beneath, but not exposed
29. Shale, 10', med. grey, papery, veined, sample 18-29 grades upward into 65' interval of soft brown fissile shale, sample 18-30. Overlain by a clean, buff-colored 3' s.s.bed, sample 18-31, then more shale.

SECTION 19

5 miles east of Sand Draw, Wyo., Sec 15, T33 R94, measured bottom to top

1. Belle-fourche type shale, dk. grey, blocky, soft and non-resistant, with ironstone concretions abt. .6' x 2', discoid, sample 19-1, is of blocky shale, 19-2 (same sack) is fragment of ironstone concretion. Abt. 25' below #2.

2. Soft, non-resistant shale, less blocky, more fissile than unit #1. Est 15' below #3. sample 19-3

3. Bentonite, 11' thick (eleven feet!) greenish-yellow, popcorn, very pure appearing sample 19-4 at base, 19-5 at 5' and 19-6 at top. Biggest bent. I've ever seen. the top .8' is blue, the rest greenish to yellow.

4. Mowry, chippy, dk. grey, base silicified for about .2-.4', Unit is 1.3ft. thick

5. Siltstone, 1.2' thick, med. grey, with lt. grey contorted laminae, massive, resistant, sample 19-8

6. Mowry, chippy, very thin bedded, resembles #4, sample 19-9, Unit is 1.8' thick

7. Siltstone, 1.4' thick, massive, much disturbed bedding, weathers lt. grey, sample 19-10

8. Shale, 35.5' thick, very well exposed, less resistant, very fissile, with .2-.4' thick hard siltstone beds about every 5' or so, forms a valley. Sample 9-11 at 3' 9-12 at 15', and 9-13 at 34'

9. Mowry, very siliceous, and hard, weathers white, consists of alternating beds of massive claystone abt .6' thick up to 1.0' thick, separated by thinner zones of papery-shale. Sample 19-14 at 3', sample 19-15 at 15', Unit is 17' thick.

10. Bentonite, 5' thick, dusky cream at bottom, becoming greyish near top, well exposed, alligator hide surface, sample 19-16 near base, 19-17 at 3.0'

11. Mowry shale, as unit #9, perhaps paltrier, 7' thick sample 19-18 at 4'

12. Bentonite, 4.5' thick, med. grey, sample 19-19 at base, 19-20 near top

13. Mowry shale, 13.0' thick, very hard, as below, more massive toward top, sample 19-21 at 7'

14. .8' thick zone of soft, black, papery shale, sample 19-22

15. Mowry, very hard and resistant, as units below, 4' thick, sample 19-23 at 2'

16. Bentonite, 3' thick, very impure with many small siltstone stringers, color varies from med. brwn to lt. yellow, sample 19-24

17. Mowry, as below, 2' thick, not sampled

18. Bentonite, 6.5' thick, dusky brown, becoming yellowish near top, sample 19-25 at base, 19-26 near top

19. Mowry, 5' thick, blocky as below, not sampled

20. Bentonite, 2.5' thick, greyish yellow, sample 19-27

21. Mowry, .6' thick, very brittle, lt. buff, sample 19-28
22. Bentonite, 2.2' thick, greyish yellow, sample 19-29
23. Mowry, 14' thick, white, platy, may be bleached, sample 19-30 at 10'
24. Bent., sample 19-31, .8' thick, dusky rose
25. Mowry, 7' thick, platy, weathers white, highly weathered, no sample
26. Bent. .6' thick, dusky yellow, sample 19-32
27. Mowry, 5' thick, platy, hard, lt. buff, deeply weathered, sample 19-33
28. Bent., impure, 6' thick, poorly exposed, brownish, sample 19-34 at 3'
29. Mowry, platy, 2.5' thick, no sample
30. Bent. dusky yellow, rusty weathering, .8' thick, sample 19-35
31. Mowry, 1.5' thick, not sampled
32. Bent., 2' thick, dusky yellow, sample 19-36
33. Mowry, .5' thick, as below, not sampled
34. Bent. , 1'5' thick, grey-brown, sample 19-37
35. 13' interval, interbedded thin Mowry beds and soft, bentonitic shale, not sampled
36. Mowry, 14' hard, resistant, typical, sample 19-38 at 7'
37. Bentonite, abt.1' thick, poorly exposed, could not sample, overlain by abt. 1' of soft dark shale, no sample
38. Mowry, tough and hard, as below, sample 19-39 at 2'
39. Mowry, hard and platy, 23' thick, sample 19-40 at 10', sample 19-41 at 20', Somewhere in this interval is the clam-bed. Sample from float included with sample 19-41
40. Bentonite, .4' thick, brownish-yellow, underlain by a .6' zone of soft dk grey shale, bentonite sample, 19-42
41. Mowry, exactly as below, 21' thick, sample 19-43 near top note fabric in some pieces
42. Bent., .5' thick grey, weathered orange, sample 19-44
43. Mowry, 5' thick, very hard, more massive than usual, contains clam bed at 4', sample 19-45, (two sank)
44. Bent., 1' thick, lt. rose, sample 19-46
45. Mowry, 12' thick, very hard and massive, sample 19-47 contains clam-beds
46. Bent., poorly exposed, est. 1' thick, no sample
47. Mowry, 4' thick, massive, as unti #45, not sampled

48. Covered interval, not exposed, pbblly bentonite, 3' thick
49. Badly disturbed interval, appears folded or slumped, Mostly Mowry, Thickness of total interval est. at 20' fossil found in float, sample 19-48
50. Mowry, thinbedded, platy, poorly exposed, 15' thick, no sample
51. Bent. 2' thick, lt. grey, weathers orange, sample 19-49
52. Mowry, typical, 3' thick, no sample
53. Bent. lt. orange, .6' thick, sample 19-50
- B
54. Mowry, typical, 5' thick, sample 19-51
55. Bentonite, grey-yellow, 3' thick, sample 19-52
56. Mowry, typical appearing but poorly expose, 10', no sample
57. Bent. 3' thick, popcorny, lt. grey, weathers yellow, orange, sample 19-53
58. 20' covered interval, appears to be soft, dk. brown shale, no sample
59. Mowry, less massive, more platy than underlying Mowry, 16' thick, sample 19-54 at 8'
60. Bent. , blue-grey, poorly exposed, est. 4' thick, sample 19-55
61. Mowry, resembles unit #59, 10' thick, no sample
62. Bent. yellow orange, est 1.5' thick, sample 19-56
63. Mowry, very platy, weathers grey rather than white, sample 19-57 at 15'
64. 30' covered interval, appears to be a soft, dk, grey shale, very fissile, sample 19-58 from abt. 20'
65. Mowry, typical but badly weathred, about 3' exposed, sample 19-59
66. Bent., 2.5' thick, grey yellow sample 19-60(in with sample 19-59)
67. 30' covered interval, probably soft dk grey shale as in previous interval, no samples
68. Mowry, 15' thick, typical, platy, sample 1961 from 7'
69. Covered interval est. 50' thick, probably lower part Mowry at least in part. Overlain (and probably consists) of dk grey, very soft, non-resistant shale with bentonite beds, est. at 150+ feet thick, capped with 5' of s.s.

SECTION 20

In Gas Hills, NE of Lucky Mc Uranium Mine
Sec 15, T33N, R90W

1. Soft, papery, black shale, partially exposed, contains numerous ironstone concretions abt 1' x 2½', Sample 20-1 of shale 25' below unit #2, abt. 75-100' above main Thermopolis ss., included in sample is piece of ironstone from concretion
2. Resistant siltstone bed, med. grey, weathers buff, 3' thick, contains scattered casts of small organisms, mainly shells, sample 20-2
3. Siltstone, 7' thick, bottom 4' non-resistant, upper 3' more so. Lt. grey to tan, weathers buff, sample 20-3
4. Bent., poorly exposed, est. 1-1½' thick, lt. grey, weathers rusty, sample 20-4
5. 35' black, papery shale, like unit #1, with ironstone conc. sample 20-5 at 30' w/ conc. frag.
6. Bent., .8' thick, lt. grey, sample 20-6
7. Shale, as below, 17', not sampled
8. Bent, poorly exposed, est. 2-2½' thick, med. grey, much biotite, sample 20-7
9. Shale, resembles unit #1, up to about 30' or so then gradually becomes siltier, dk. greyish brown and rich in fish scales, sample 20-8 at 45', from 50' to 65' is a very poorly exposed bentonitic shale zone, seemingly composed of tin orangish bentonites and soft dark brown shale chips, sample 20-9 is a composite from several spots in this interval
10. Mowry shale, 14' thick, thinbedded, fissile, dk. grey, sample 20-10 at 7' becomes harder toward top
11. Bent, 1.4' thick, salmon colored, sample 20-11
12. Shale, like unit #9, poorly exposed, sample 20-12 at 35', interval from 40' to 75' completely covered
13. Mowry, white, weathering, hard, platey, sample 20-13 at 5' Unit is 8' thick
14. Bent, yellow, flakey, 1.5' thick, sample 20-14
15. Mowry, as unit #12 except contains several rather massive beds abt. .3' thick sample 20-15
16. Bent, .7' thick, flakey, yellow-orange, sample 20-16
17. Mowry, .5' thick, very hard and blocky, no sample
18. Bentonite, 1' thick, dk yellow, flakey, sample 20-17
19. Mowry, 15' thick, same as unit #12, sample 20-18 at 10'
20. Shale, 3.0' thick, soft, brownish-grey, sample 20-19 has .2' thick dirty bentonite in center, (sample in sack with shale)
21. Mowry, 9' thick, as unit #12, sample 20-20 at 5'
22. Bent, 3' thick, yellow, weathers orange, sample 20-21

23. Mowry, poorly exposed down dip slope, est. abt. 6' thick, sample 20-22 at 5'

24. Bentonite, poorly exposed, yellow, est. 5-6' thick, sample 20-23

SECTION 21

Supplemental sec. in roadcut NE of Kerr Mc Mine

1. Bent, .3' thick, yellowish, 21-1
 2. Mowry, silty, thin-bedded 2', 21-2
 3. Bentonite, .9' with .2' thick shale stringer near top, 21-3
 4. Mowry, 6.6', 21-4 at 3'
 5. Bent, yellowish grey, .5', 21-5
 6. Mowry, 3.6', sample at 2', 21-6
 7. Bent, .4', lt. grey, weathers orange, 21-7
 8. Mowry, 3' thick, 21-8 at 2'
 9. Bent, .3' buffcolored, 21-9
 10. Mowry, 2.7', with several thin bentonite partings, 21-10
 11. Bent, 1.1' greenish yellow, 21-11
 12. Mowry, .7', not sampled
 13. Bent, .5', with thin shale stringer near top, 21-12
 14. Mowry; 6.2' with several thin bentonite stringers, 21-23 at 3'
 15. Bent, grayish-yellow, .7', 21-14
 16. Mowry, 4.7', 21-15 at 2'
 17. Bent, .9', lt. grey, 21-16
 18. Mowry, 6.2', 21-17 at 3'
 19. Bent, yellowish-green, 1.3', 21-18
 20. Mowry 6.6', with several bentonite stringers, 21-19 at 3'
 21. Bentonite, 1.3', yellow orange, 21-20
- End of outcrop estimate 20-25' of Mowry overlying

Section 25

On middle fork of Chugwater Creek, near Iron Mtn, Albany Co.
Sec 25, T19N, R71W

1. Belle-fourche type shale, no bottom, sample 25-1 at 5' below (2), silty in part
2. Bent, 1.2', lt tan, 25-2
3. Belle fourrche type shale, 115' thick, sample 25-3 at 20', here it becomes somewhat more brittle and contains fish scales, sample 25-4 at 50' (note: .3' bent. at 45'), Sample 25-5 at 100', Unit is 115' thick Top 20' is full of ironstone conc.
4. Bent, 3.0' thick, greenish-yellow sample 25-6
5. Shale, soft, Mowry, 4' thick med. grey (w/ .2' thick bentonite at 2.5') shale sample 25-7
6. Bent, .4' yellow=orange, sample 25-8
7. Shale silty, mowry type, sample 25-9 at 1', sample 25-10 at 5', unit is 7'
8. Bent, 3' thick greenish yellow, brown near bottom, sample 25-11
9. Typical white-weathering hard chippy Mowry, sample 25-12 at 5', At 10' there is a 4' bentonitic zone that is soft (sample 25-13). At 17' becomes much harder than anything underlying, Sample 25-14 at 20', has occassional very thin porcellanitic bands, sample 25-15 at 30', sample 25-16 at 45', (next 10' are relatively soft, with one .2' bentonite at 50'), sample 25-17 at 51'. Unit is 57' thick
10. Bentonite, poorly exposed, est. 1' thick, yellow-orange, sample 25-18
11. Covered interval, 10' thick, probably soft shale
12. Bentonite, poorly exposed, est. 2' thick, sample 25-19
13. Poorly exposed interval, 27' thick, appears to be shale, non-resistant, with occassional very large lens-like silty concretions, sample 25-20. At 10' is an extremely poorly exposed bentonite, no smple
14. Clean white s.s., at 15' thick, very massive sample 25-21

SECTION 26

North of Rawlins Sec 3, T23N, R88W

1. Lowest Mowry exposed, sample 26-1 at 1', Unit is 41' thick, poorly exposed
26-2 at 34', 26-3 at 40'
2. Covered interval 17'
3. Sample 26-4 at 1' 26-5 at 11', Bentonite at 18', no sample to be had, seems fairly thick, 26-6 at 23', bentonite at 31', can't be dug out, 26-7 at 33', Bent. .2' thick (26-8) at 38', this interval seems to contain several thin bentonites. 26-9 at 45', 26-10 at 62', 26-11 at 71', Whole unit is 72' thick
4. Bentonite 1.5' thick, sample 26-12
5. Siltstone, tan, 2.5', 26-13
6. Shale, unit is 10.5', 26-14 at 4', 26-15 at 10'
7. Less resistant than unit 6. Unit is 48' thick, 26-16 at 19', 26-17 at 34' Concretions scattered from 34' up to top of this unit
8. Bent, .8', 26-18
9. Shale, also contains concretions, unit is 44' thick, similar to unit 17. 26-19 at 10', Bent. .6' thick at 19' (sample 28-20), sample 26-21 at 35', interval from 19' to ___ no concretions
10. Siltstone, 1', 26-22
11. Shale, unit is 26' thick similar to unit 9
12. Siltstone, 1', 26-23
13. Shale, siliceous, 2.5', 26-24
14. Bentonite, .4', at 3' is sample 26-25
15. Siliceous shale, 2', 26-26
16. Bentonite, 1', 26-27
17. Shale, siliceous, grades upward (at 5') into non-siliceous shale, 26-28 at 2' 26-29 at 12', Unit is 75' thick all similar to sample 26-29
18. Sandstone, massive, 12', 26-30

SECTION 27

East of Rawlings in roadcut, Sec 24, T21N, R87W

1. Lowest Mowry exposed, 5', 27-1
2. Bent. 1.5', 27-2
3. Mowry 1; , no sample
4. Bent. .4' 27-3
5. Mowry, 11', 27-4 at 7'
6. Bent., 2.5', 27-5
7. Shale, 1',
8. Bent. .6', 27-6
9. Shale, 4', 27-7
10. Bent. .4', 27-8
11. Sh. 15', 27-9 at 5'
12. Bent, .5' 27-10
13. Sh. 10' 27-11
- 14, Bent, .2', 27-12
15. Sh. 32', 27-13 at 10', 27-14 at 20', 27-15 at 30'
16. Bent. .5' 27-16
17. Sh. 6', 27-17
18. Bent 1' 27-18
19. Sh. 28' 27-19 at 10', 27-20 at 20'
20. Bent. 2' 27-21
21. Shale and thin bent. 7'
22. Hard and soft Mowry 21', 27-22 at 15'
23. Bent 2.5', 27-23
24. Sh. 21', 27-24 at 10', 27-25 at 20'
25. Bent. 4', 27-26
26. Sh. 3', 27-27

Top of Mowry overlain unconformably by Qal, Time 8:50 p.m.!

SECTION 28

Aspen frontier in S. fork Piney Creek, T29N, R115W, Sec15

covered with Bear River picked at top of Ridge-forming tan quartzite bed abt. 10' thick
1. Covered interval, abt. 30' thick, seems to be brittle blk shale

2. Dk. grey mottled fine grained s.s., hard and resistant with Fe-stain, 7' thick

3. Black, siliceous shale, very splintery, 118' thick, sample 28-1 at 10', top poorly exposed but appears to be much softer

4. Silty zone of alternating 1-2' siltstone beds and soft black shale, poorly exposed, interval is 34' thick, sample 28-2 of siltstone near base of unit

5. Resistant, massive siltstone bed, 13' thick, with softer zone in middle abt. 3' thick, forms ridge much Mg stain, weathers buff. sample 28-3 at top

6. Covered interval across stream valley, probably soft shales, 150' thick

7. S.S., med. grey, 1½ feet thick, massive, speckled, sample 28-4

8. Blocky, dk. grey shale, 20' not sampled has silicified zone 1' thick at top

9. Bentonite, 1' thick, sample 28-5, greenish-yellow

10. Porcellanite (?) lt. grey green, sample 28-6 abt. 1' thick

11. Black brittle shale, 55' thick, with several more resistant ledges in it. and one 1' ss at 20' sample 28-7 at 25', Has 2' silicified zone at top

12. Bent, poorly exposed, est. 2', yellow-green 28-8

13. Siltstone, lt. grey, thin bedded, not resistant, 5'

14. Poorly exposed interval, probably soft black shale, 16'

15. Resistant siltstone, thin bedded, med. grey, no sample, turns to resistant black shale near top, 31' thick

16. Bent, 1' thick, yellow-green, 28-9

17. Shale 18', poorly exposed, seems to be chippy, black shale

18. Porcellanite, mottled white and dk. grey, 10' thick 28-10

19. Blk. Shale, chippy, poorly exposed, 26' thick, no sample. siliceous zone at top

20. Bent, 1' thick, yellow-green, 28-11

21. Sh., blk, brittle, 28-12 at 25', 28-13 at 70', Unit is 95' thick, 28-14 at 1' thick silicified zone at top

22. Bent, 28-15 1' thick, greenish-brown

23. Poorly exposed interval, appears to consist of dk. brittle shale with occasional dk. grey siltstone beds, 172' thick

ASPEN/FRONTIER CONTACT?

24. S.S. buff colored, massive bedded, with worm trails, etc. 28-16 from base, Top is tuffaceous? lt. grey 28-17, Unit is 34' thick

25. Sh. dk. grey, brittle, sample 28-18 at 10', Unit is 15' thick, Has 1' silicified zone at top
26. Bent, 1' thick yellow-brown, 28-19
27. Sh, black, blocky, brittle, 28-20 at 25', Unit is 38' thick
28. Porcellanite, lt. grey, speckled, bedded with thin laminae visible as color changes, 28-21 Unit is 25' thick
29. Shale, buff to lt. grey, ashey? at bottom, 28-22 at 5', becomes more shale-like at top, 28-23 is at 10', Unit is 42' thick'
30. Porcellanite, 1' thick, lt. grey, sample 28-24
31. Covered interval, probably shale, 110' thick
32. Porcellanite?, 5' thick, speckled white and black, 28-25
33. Shale, 30'+, top not exposed, top of section, 28-26 at 10'

SECTION 29

Measured in gorge of Ventre River, Section starts about 25' above med. grey fine-grained ss. assigned to the Bear River, Sec 15, T42N, R113W

1. Soft, silty, med. grey varigated sh. with numerous thin bentonites, about 10' exposed, 29-1
2. Bentonite, lt. grey, 2' thick with thin sh. parting at top, huge biotite flakes, 29-2
3. 15' soft black shale, 29-1 (one)
4. Bent, 1' thick, 29-3
5. 25' soft black shale,
6. Bent, .6' thick
- B
7. Poorly exposed interval, presumably soft black sh. 59' thick
8. S.S., lt. grey, biotitic, friable, med to fine grained, thin bedded, 29-4 at base, Unit is 12' thick, finely x-bedded throughout, more resistant at top
9. Poorly exposed interval, 12' thick, probably soft blk sh.
10. Typical brittle Mowry, 6' thick, 29-5
11. Bent, 1' thick yellow-green 29-6
12. Shale; like unit #10, 17' thick 29-7 at 12'
13. Bent, 1' thick 29-8
14. Sh. 3', not sampled
15. SS, 4' thick, massive lt. grey, may be an ash, 29-9
16. Extremely hard Mowry sh, 4' thick 29-10
17. Normal Mowry shale, sample from base in with 29-10, Unit is 14' thick
18. Bentonite, 1' thick, yellow-green, 29-11
18. Sh. as below, sample at 18' 29-12, Unit is 24' thick
20. Bentonite, 3.5' thick yellow, has .4' sh. stringer near base, 29-13
21. Thick shale interval contains a few very thin bentonites, could not sample because of steepness of slope, 29-14 at 85', Unit is 107'
22. Bent, dk. green 1' thick, 29-15
23. Typical Mowry, 29-16 at 25', Unit is 48' thick, with 3' brittle zone at top
24. Bentonite, 1' thick, yellow-green, 29-20
25. Blocky hard mowry, 4' thick no sample

26. Bent, 4' thck, yellowish 29-17

27. Typical platy mowry, 29-18 at 15', softer and less resistant near top, 42'

Basal frontier, interbedded buff-weathering thin ss. and shales, becoming massive s.s. at 40', sample 29-19 at base

NOTE:

Sample of Bear River below Aspen, sample 29-22

SECTION 30

Type section of Albino formation, Bill Hall's thesis area-Montana

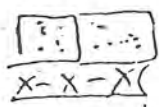
What location?

1. Muddy ss, buff, x-bedded, med to fine grained, some shannels, not measured
2. Silty mudstone, 72' thick, dusky yellow, weathers badlandy and bright yellow Rather soft, sample 30-1 top 10' become dark olive and bentonitic appearing with popcorn weathering, sample 30-2
3. S.s. dusky green, fine grained, dense and resistnat, 1' thick 30-3

NOTE:

this s.s. increases rapidly in thickness to the west, becoming abt. 15' at the the west end of the outcrop, Becomes more yellowish and much softer, also coarser grained Seems to be incorporating underlying yellow zone.

4. Dk. grey to purplish blocky siltstone, weathers badlandy, with occassional beds of hard concretions (.5' max) samples of both are 30-4, weathers in varigated violet greenish and gray colors, Unit is 32' thick
5. Silicified ash? bed, dk, olive, very hard and brittle, weathers re-orange, sample 30-5, Unit is .8' thick
6. Interval of blocky siltstones, weathers badlandy, varigated lt. greens and lt. maroons, fresh material is blocky, brnsh-gray with occassional greenish, biotite-rich bands (bentonite?) sample of both lithologies is in bag 00-6, at 20'
7. Lithic tuff or ash, resembles unit #5, .4' thick 30-7
8. Siltstone, blocky, yellow, 9' thick, 30-8
9. Black Siltstone, blocky, 2' thick, with red specks, 30-9
10. Interval of blocky siltstone, much like such intervals below. Mostly varigated lt. grey, buff, and lt. greens with some red stain from above, 30-10 from 10' below top of unit. Unit is 135' thick
11. Lithic tuff? 6' thick, lt. grey with red specks, Interval with ferns, 30-11
12. Hard, blocky, blk mudstone 1' thick, sample 30-12
13. Lithic tuff, 2' thick, lt. grey, blocky, contains ferns, 30-13
14. Pink sandy siltstone, 4' thick, 30-14
15. Buff siltstone, sample 30-15, 17' thick
16. Lithic tuff, red, 2" thick, discontinuous, 30-16



buff silicified s.s. with plant frag. 31-1

Bent ? med. grey, chippy 1/2', 31-2

60' slope with pale green chips and occasional bright green chips, 31-3

cream colored volcanic ash, 31-4
perhaps 5-10'

lt. grey porcellanite with fish scales and carbonaceous material
31-5, abt. 35-40'

volcanic ash ?, 31-6, 2-3'

20' not exposed

green porcellanite, 31-7, 4'

15' not exposed

bright green porc. 31-8

50' covered
31-9 found in float

100' covered

dk. siltstone ledge, 31-10

Dk. block gy. shale, 31-13 25'

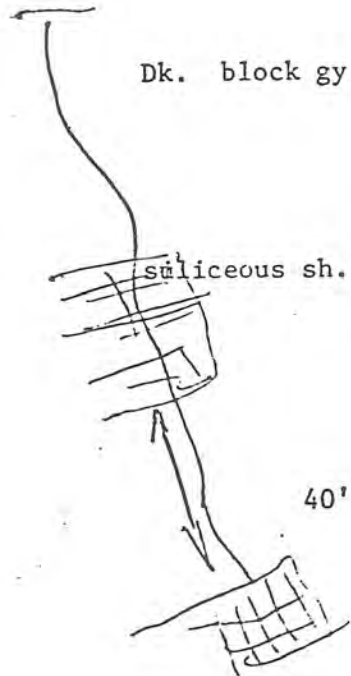
200' steep slope, buff shale and
soft s.s., 31-11

siliceous sh. lt. grey, 31-14, 5'

Brittle dk. grey siliceous
siltstone, 5', 31-12

40'

Buff, soft, shale, 31-15



SECTION 31

South of Casper on highway, Sec 6, T32N R80W

1. Muddy s.s., 4' thick, thinbedded brown, weathers tan, 31-1
2. Belle-fourche type sh, with fe-stone concretions in upper $\frac{1}{2}$, (to concr. zone = 17') interval is 24' thick, 31-2 near top
3. Bent, very silty, med. grey, 1.5' thick SFB 31-3
4. Sh, as #2, 5' thick, contains small bentonite, not sampled has hardened floor beneath bentonite
5. Bentonite, lt. grey, 2.5' thick, 31-4, contains occasional fe-stone lenses in bed
6. Sh, 12' thick, chippy, blk, harder than #2 but not as hard as normal Mowry, 31-5
7. Ben. greenish, .8' thick 31-6
8. Sh, 1.5' thick slightly siliceous with fish scales and some teeth(?) platey, resistant 31-7
9. Bent, lt. grey, .6', 31-8
10. Sh, as unit #8, 2.5' thick, no sample
11. Bent, lt. grey .4' thick, 31-9
12. Mowry, 7.5', contains several soft bentonitic streaks, 31-10 at 5'
13. Bent, greenish, 31-11, unit is 1.5' thick
14. Mowry as below, 2.0'
15. Bent, med. grey 1' thick 31-12
16. Interval 3.0' of siltstone, bentonite, and shale ^{has some} ~~has some~~ poor cone-in-cone, x-bedding, etc. note fine lamination in bentonite, 31-13
17. Shale interval, 15' thick, at abt. 5' there is a zone of concretion-like bodies that resemble s.s. lens They are composed of amber fibrous material and have the gassey smell, 31-14, sale sample at 12' is 31-15
18. Bentonite, 2' thick, 31-16
19. Shale, typical Mowry, 14' thick 31-17 at 10'
20. Bent, med. grey, 2' thick, 31-18
21. Mowry, typical, 12' thick 31-19 from near middle
22. Bent, med. grey, 1' thick 31-20
23. Mowry 16.0' thick blocky, resistant, 31-21 from near middle
24. Bent, med. grey, 1' thick 31-22
25. Sha., typical mowry, 31-23 at 15', Unit is 27' thick

26. Bentonite, yellowish, 2.4' thick, 31-24
27. Mowry, shale, very hard, massive-bedded (check for radiolarians) 31-25 at 8', Unit is 11' thick
28. Bentonite, .6' thick, yellow grey, sample 31-26
29. Mowry shale, as below, becoming silty near top, Unit is 8' thick ,31-27
30. Bentonite, 2.5' thick, yellowish, 31-28
31. Interval, 10', poorly exposed because of stream, probably shale like unit 29
32. Bent, yellow, 1' thick, 31-29
33. Sh, typical mowry, 25' thick, 31-30 at 10', top of unit is soft, belle-fourche like, (about 8' of so)
34. Bent., yellow, 3. thick, sample SFB, 31-31
35. Typical, Belle Fourche, with fe-stone cone, approx. 20' to next bent. 31-32 at 10'

SECTION 32

East of Medicine Bow, N. of Highway 30
Sec. 19, T22N, R77W

1. Upper Thermop. shale, dk grey, chippy, silty, with silty fe-stone concretions and siltstone beds, has thin lignite at 15', abt. 18' exposed, 32-1 at 5'
2. Silty fe-concretion zone, abt 3' thick, with .2' bentonite near middle, N.S.
3. 10' covered interval, probably shales as below, grading upward into unit #4'
4. Soft, silty Mowry, med. grown-grey, thin platey, with fish scales, 32-2 at 1' unit is 24' thick, Mollusk impression with 32-2, 32-3 at 10', 32-4 at 20'
5. Bentonite, 1.2' thick, weathered yel-brown, 32-5
6. 13' covered interval, probably soft mowry, as below
7. hard mowry sh, thicker bedded, weathers silver-white, 32-6 at 1' unit is 2' thick
8. Bentonite, 1.5' thick, yellowish, 32-7
9. Hard Mowry, 3.0' thick, N.S.
10. Bentonite, 1' thick, yellowish, 32-8
11. Hard Mowry, 32-9, at 5', Unit is abt. 7' thick
12. Mowry shale, somewhat softer than below, very platey, much Jarosite, a few thin bentonites near base, sample 32-10 at 10', becomes harder near top, (upper 5' or so), Unit is 21' thick
13. Bentonite, 1' thck, yellowish, 32-11
14. Mowry shale, typical (hard), sample at 10' is 32-12, unit is 20' thck, with .3' bentonite, 2' from top, sample 32-50 at 5' from top, also plant.
15. Bentonite, .8' thick weathered yellow, sample 32-13
16. Berry massive hard silty Mowry, with some x-bedding, 32-14, 2.0' thick
17. Bent, 3' thick, yellow, poorly exposed, 32-15
18. Mowry shale, 22' thick, silty, somewhat less resistant, 32-16 at 10' (soft)
19. Bent, .7' thick, lt. yellow-grey, 32-17
20. Soft Mowry, 10' thick, has .3' bent. at 2', 32-18 at 5'
21. Bentonite, 3' thick, (clay spur?) 32-19
22. Hard Mowry, bottom 5' very hard and blocky, becoming hard and platey toward top, Unit is 8' thick, 32-20 at 3', Interfingers with unit #23 laterally
23. Bentonite, varies in thickness from 3' to ϕ ', where absent, is replaced by silty mudstone, only slightly sliceous, varies rapidly from 3' to ϕ in abt. 20' 32-21

24. Siliceous, platy mowry, 2.0' thick, sample 32-22

25. Typical Belle Fourche, has abrupt contact with unit #24, sample 32-23

SECTION 33

N83°E at 10°, S. of Douglas, Sec. 23, T31N R72W

1. Lowest Mowry exposed, typical, platey, abt. 3' thick, 33-1
2. Bentonite, 1.2' thick, yellow 33-2
3. Mowry, typical, seems silty, 9' thick, 33-3 at 3'
4. Bent, .8' thick, brown 33-4
5. Shale, soft, fissile, grey-brown, silty, 1.5' thick N.S.
6. Bent, .4' thick, brn, orange, sample 33-5
7. Sh. soft, as below 5' exposed 33-6
8. Covered interval, probably soft shales, as unit #7, 18' thick
9. Mowry, typical, chippy, 7' thick 33-7
10. Bent, .8' thick, yellow, 33-8
11. Mowry, typical 4' thick, N.S.
12. Bent, .4', yellow-orange
13. Mowry, 6.5' thick, soft, with bentonitic stringers 33-9
14. Bent, orange, .3'
15. Mowry 4' lt grey platey more siliceous than unit #13 33-10
16. Bentonite, orange, .4'
17. Mowry, typical, platey, 11', resembles unit 315 has .3' bentonite at 3'
18. Bent, poorly exposed, est. 1' or less, yellow, 33-11
19. Mowry, hard brittle, poorly exposed, contains several thin bentonites, 7' thick 33-12 at 3'
20. Bent, or bentonitic zone, poorly exposed, appears grey and abt. 1' or less thick thickness included with unit 21
21. Poorly exposed interval, 3' thick, probably non-siliceous shale,
22. Mowry, 1.5' thick, chippy brittle
23. Bentonite, abt. .2' thick, yellow-grey
24. Mowry, typical, platey, etc. hard and resistant, Oysters (33-x) found in bottom 2' of this unit 33-13 at 5', A .2' bentonite at 6'. Several very thin bent. beds in the interval. Shale sample 33-14 at 20', Unit is 32' thick

25. Bentonite, .7', orange, 33-15
26. Mowry shale, typical, brittle, thin-bedded with occasional tin bentonites
This unit contains a large sandy red-orange concretion (3' x 5' x 4' exposed) in
the lower 8' at this location. Sample of concretion, 33-16, sample of shale at 10'
is 33-17, Unit is 21' thick
27. Bentonite, yellow, .5', (under this ^{is a} zone about 2', containing 2-.2' bentonites
separated by a siliceous sh)
28. Mowry, siliceous, blocky, 2',
29. Bent, yellow-brown .8' thick, 33-19
30. Mowry, 3' thick, blocky, etc,
31. Bentonite, .4', yellow 33-20
32. Mowry sh. typical, except that it contains at this location a small (2' wide x
.5' thick) cone-in-cone concretion at 4', 33-21, shale sample is 33-22, Unit is 17'
33. Bentonite, yellow-grey, 2' thick, 33-23
34. Mowry sh. .6'
35. Bent, lt. yellow, 1' thick, 33-24
36. Mowry sh. Brittle, typical, w/ .2' bentonite at 2', 33-25 at 10', Unit is 12'
37. Bentonite, poorly exposed, at .5', sample 33-26
38. Mowry, resistant, resembles underlying units, abt 3' thick, 33-27
39. Mowry, soft, non-silty, no concretions of any type, Unit is 13' thick, 33-28
40. Clay Spur?, Bentonite, 3.5-4.0' thick, 33-29 at base, yellow green
41. Typical Belle fourche shale, 33-30 at 10'

SECTION 34

South of Dave Johnson Power Plant
in old irrigation ditch Sec ____, T ____, R ____,

1. Lowest Mowry exposed, 12.5' thick, typical, hard, brittle, 34-1 at 5'
2. Bentonite, 2', yellow-brwn, 34-2 SFB
3. Mowry, typical, hard papery, contains a few very thin bentonites, one at 1.5' below top, 34-3 at 7. Unit is 13' thick
4. Bentonite, 1' thik, yellow-orange, 34-4
5. Mowry sh, thin papery, as unit #3, except for top 1', which is silty and more massive bedded (not silicified) Unit is 7' thick, sample 34-5 at 6½'
6. Bent, 2.5' thick, olive green, sample 34-6
7. Sh, very blocky and hard .5' thick
8. Bent, orange 1.3', 34-7
8. Mowry, thin and papery, moderately resistant, 34-8 at 10', Unit is 14'
10. Bent, .8', olive-green 34-9
11. Mowry shale, like unit #9, 10', has persistent bed, .1' thick 2' from top, that is composed of organic (fish) remains, 34-10=
12. Bent, 1', yellow-grey, 34-11
13. Mowry, typical, somewhat harder than underlying units, and more platy, 34-12 at 10', 34-13 at 20', Unit is 34' thick, one thin bentonite at 30'
14. Clay Spur(?) bentonite, badly puffed and popcorny, lt. grey-green, Unit is 5' thick, 34-14 SFB
15. Mowry shale, papery like unit #13, 2' thick
16. Belle fourche, typical with fe-concretions, .4 bentonite at 7', 34-15 at 5'

BLACK HILLS SECTION

see Master's Thesis for location 0

1. Lowest Mowry exposed, covered interval below, typical very platy, lt. grey dark grey on fresh, sample BH1 at base, thin bentonite streak at 8', N.S. BH2 at 10', BH3 at 19' at top of unit
2. Bent, yellowish-orange, .5' BH4
3. Mowry shale, typical 1',
4. Bentonite, .4', light grey, BH5, overlain by 1' typical Mowry, then .2' yellow bentonite then more Mowry
5. Mowry shale, 4.5', hard, platy, typical, BH6 at 3'
6. Bentonite, 1.2', yellowish-orange, Bh7
7. Mowry, very hard and resistant, has beds abt $\frac{1}{2}$ " thick weathers yellow-white, Bh8 at 5', Unit is 9' thick
8. Bent, 1', greenish yellow, BH9, (thickens laterally to about 2' may be due to squeezing or may have miscorrelated up section about 5') Bh10
9. Mowry, 1.5', typical
10. Bentonite, yellow-orange, 2.4', BH11 from base
11. Mowry, typical, very thin bedded, sample BH12 at 5', Unit is 14' thick, somewhat softer near the top
12. Bentonite, BH13 1.2', yellow-orange SFB
13. Mowry 11', top 2' are soft, rest typical, Bh14 at 8'
14. Bentonite, 1.2', yellow-orange, Bh15
15. Mowry, platy, resistant, typical, BH16 at 26', Upper part somewhat less resistant than usula, very chippy, Bh17 at 21', Est. 10'-15' more mowry of this type can't find clay spur exposed here
16. Clay spur bentonite taken from nearby pit, est. 4.2' thick, BH18