APPENDIX A

Core Description
KGS # 1 NPS
SE SE SE SEC 31, T18S R8E
(ridge west of ranch hands house)
Chase County, Kansas

Threemile Limestone (6'+) - Limestone, white to light gray, medium texture, irregular bedding, irregular fracture, fossiliferous. Chert. Contact below sharp.

Speiser Shale (14.8') - Mudstone, calcareous, varicolored (lower 5' maroon, upper 3' gray green, tan at top), very fine silt to silty texture, irregular bedding, irregular fracture, no fossils observed.

Funston Limestone (24.2') - Lower limestone (3.8'): Limestone, very light gray, medium grained grading to fine grained near top, massive bedded to thinly bedded at top, irregular fracture, fossiliferous (algal coated grains to 5 cm). Small iron stained (limonite) filled inclusions. Mudstone layer (0.9' thick) is 0.4' below top, calcareous, laminated, grades to limestone below. Contacts above and below sharp. Middle mudstone (6.3'): Mudstone, slightly calcareous in lower part to calcareous above, black (lower 1.5') grades to dark gray above, very fine silty to clay texture, lower 0.3' angular bedding with pale green mudstone clasts, indistinct bedding above, irregular fracture, no fossils observed. Very soft. Upper limestone (14.1'): Limestones and interbedded mudstones: *limestone (2.6')*, light gray, medium grained, irregular and angular bedding, irregular fracture, fossiliferous (coated grains, skeletal fragments), with interbedded thin mudstone layers, contacts above and below sharp; *mudstone (1.7')*, gray and interbedded gray/tan near base and top, silty texture, thinly bedded, bedded fracture, no fossils observed, middle portion soft; *limestone (1.6')*, argillaceous, very light gray to very light tan, medium bedded, medium texture, irregular fracture, fossiliferous, limonite filled vugs (1-2 mm) throughout, contact below sharp, above somewhat gradational; *mudstone (1.6')*, calcareous, tan and gray, fine silty texture, thin bedded, bedded fracture, no fossils observed; *limestone (6.6')*, lower 2' massive limestone, upper 4.6' interbedded limestone and mudstone (mudstone layers approximately 60%), limestone is light gray, medium to fine grained, massive below to thin bedded above, irregular fracture, chert nodules in lower 2' to 4 cm), mudstone layers dark gray in lower 0.7', light gray green and thinly bedded in upper limestone. Mudstone partings in upper part are numerous and sometimes thick (1cm). Contact below gradational, above sharp.

Blue Rapids Shale (21.6') - Mudstone, calcareous (some zones very calcareous), varicolored (dark gray and tan in lower part, gray green and light green in upper part), very fine silt texture, very thinly bedded, bedded fracture, no fossils observed. Upper 1' yellow gray color. Some zones are very soft, especially the upper 3'.

Crouse Limestone (14.4') - Lower limestone (2.5'): Limestone, argillaceous, basal 1.5' very light gray (mottled gray), upper part gray to dark gray, fine grained with abundant skeletal fragments, irregular bedding, irregular fracture, fossiliferous (skeletal fragments to 30 mm). Iron stained mudstone or limonite clasts (rounded) in lower part, most abundant in basal 0.4'. Upper part very argillaceous, with coated skeletal grains; vertical fracture with weathered and iron stained face. Contacts below sharp, above somewhat gradational. Middle mudstone (9.5'): Mudstone, calcareous, dark gray, very fine silty texture, thin bedded, bedding fracture, lower 1' very fossiliferous, no fossils observed above. Thin, wispy, white calcareous layers throughout. Upper 0.6' tan with mottled gray color. Upper limestone (2.4'): Limestone, argillaceous, very light gray, fine grained, irregular bedding and fracture, fossiliferous (brachipods). Iron stained mudstone clasts (or vug fills) and skeletal grains throughout. Large vugs (1-4 cm) filled with quartz crystals. Contacts below sharp, above gradational.

Easly Creek Shale (12.6') - Mudstone, calcareous, varicolored (gray green, maroon, pale green), clay to very fine silt texture, thinly bedded, bedded fracture, no fossils observed. Upper 1' with abundant (25%) siliceous nodules to 15mm.

Middleburg Limestone (6.3') - Lower limestone (3.4'): Limestone, argillaceous, gray, mottled light gray, very coarse grained (skeletal grains to 4cm) (wackestone), irregular bedding, bedding fracture, very fossiliferous (crinoids, brachiopods, algal encrusted fragments). Contact below and above sharp. Middle shale (1.6'): Shale, black, fissile, bedding fracture, no fossils. Gray green mudstone at top (0.3' thick). Upper limestone (1.3'): Limestone, argillaceous, light gray, fine grained, thinly bedded, fractures (desiccation cracks?) filled with pale green mudstone increase upwards (appears pedagenic), also vertical fractures cut and distort bedding planes, no fossils observed. Contacts above and below sharp.

Hooser Shale (4.9') - Mudstone, calcareous, varicolored red (lower 1'), medium gray green (middle 3.4'), dark gray (upper 0.5'), thinly bedded, irregular fracture, no fossils observed.

Eiss Limestone (14.1') - Lower limestone (3.3'): limestone, argillaceous (shaly limestone), dark gray, course grained, thin bedded, bedding fractures, very fossiliferous (crinoids, fusulinids, brachiopods, gastropods, bivalves). Skeletal grains to 15 mm. Contact fairly sharp below, gradational above. Middle mudstone (7.4'): mudstone, calcareous, gray to dark gray, lower 1.3' looks like limestone below but with higher mudstone content, fossiliferous; argillaceous limestone (0.7') in middle, similar to lower limestone; upper 5.4' dark gray mudstone to light gray near upper contact, no fossils. Upper limestone (3.4'): limestone, very light gray, medium grained, massive bedding, irregular fracture, skeletal grains. Large vugs throughout filled with calcite in upper part, gypsum in the middle, and pale green mudstone in lower part. Lower part may be brecciated. Contact below fairly sharp (mudstone below grades into limestone), above very sharp.

Stearns Shale (11.8') - Mudstone, calcareous, varicolored maroon and pale green to medium gray green, very fine silt to clay texture above, very thin bedded, irregular fracture below to bedding fracture in upper part, no fossils observed. Boxwork limestone 0.8' thick (128.3' to 129.1' log depth) has chicken wire fractures filled with pale green mudstone, contacts gradational. Thin (0.3') boxwork limestone at 126.1' (log depth). Limestone 0.7' thick (122.9' to 123.6' log depth) is light gray and fine grained with fairly sharp contacts. Upper 3.2' is medium gray-green calcareous claystone, soft (wetting and drying has caused swelling and desiccation fractures).

Morrill Limestone (3.6') - Limestone, white to light gray, lower 1.9' fine grained, upper 1.5' medium grained, massive bedded above, lower 1.9' interbedded with very thin (< 1mm) mudstone lamina, irregular fracture, skeletal grains, small vugs in upper part. Contact below is sharp and erosional, above gradational. Mudstone layer 0.15' thick at 132.0' (log depth).

Florena Shale (10.6') - Mudstone, gray (lower 1' medium dark gray), lower 2.5 feet calcareous, silty to very fine silt texture grading upward, very thin bedded, irregular fracture, brachiopods (chonetids common) in lower 1'. Gypsum: thin wispy lenses in lower 1'; large (to 7 cm) anhydrite nodules and satin spar fracture fills (to 1 cm thick) that cut across bedding in middle 4' (138' to143' log depth).

Cottonwood Limestone (5.3') - Limestone, light gray with white skeletal grains (grainstone), texture grades upward from medium to course, massive bedded, irregular fracture, very fossiliferous (invertebrate skeletal fragments), large (to 5 mm in long direction) fusulinids abundant, especially in upper part. Vug 0.2' above basal contact is associated with vertical fracture that extends into mudstone below. Contact below gradational, above missing (incomplete core recovery).

Eskridge Shale (9.0') - Mudstone, calcareous, gray-green, silty texture, very thinly bedded, irregular fracture, fish debris, small brachiopods. Interbedded with very thin (less than 1mm) white calcareous layers. Anhydrite filled fractures (angular to near vertical) cross and distort bedding, anhydrite becomes nodular in places.

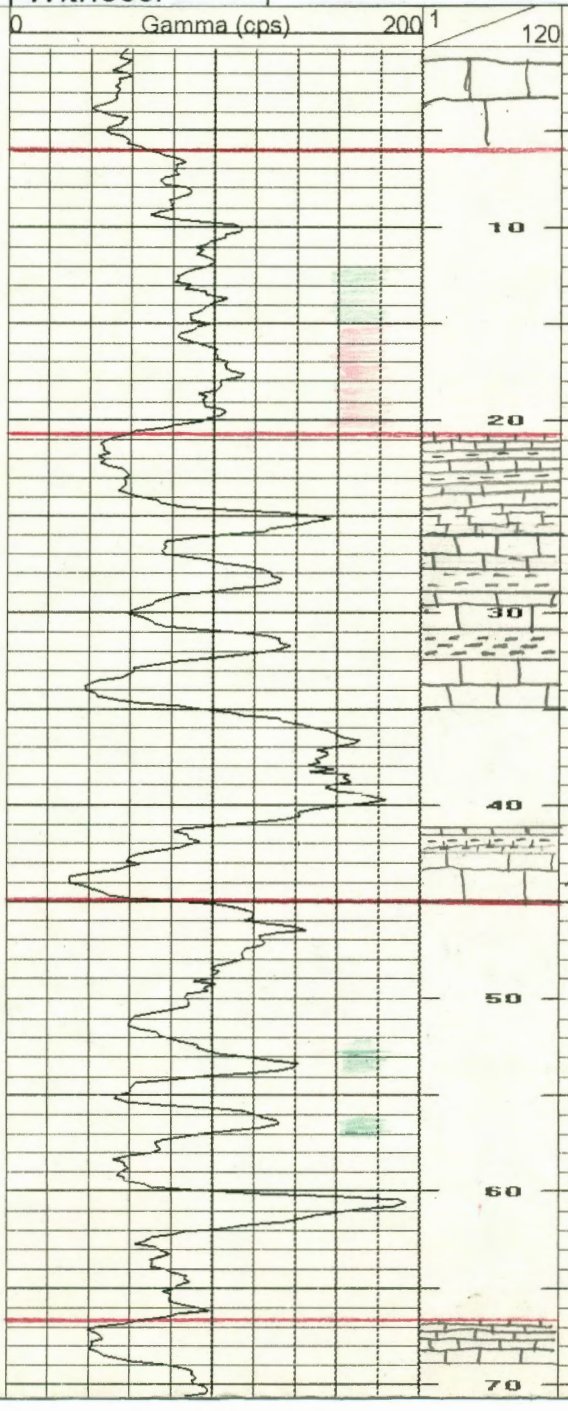
Date: Thursday, October 09, 2003 Time: 12:35 File: C:\Documents and Settings\joe anderson\My Documents\logs\eagle log

COMPANY:	KGS
Location:	SE SE SE Sec. 31 T18S, R8E
Well	#1 NPS
Date	10-9-2003
BH Fluid	WATER
Casing	NONE
File Name	TPMP#1NPS_GAMUP1 (slet)
Depth Driller	159' 3'
Depth Logger	159'
Logged by:	ANDERSON
Witness:	SAWIN

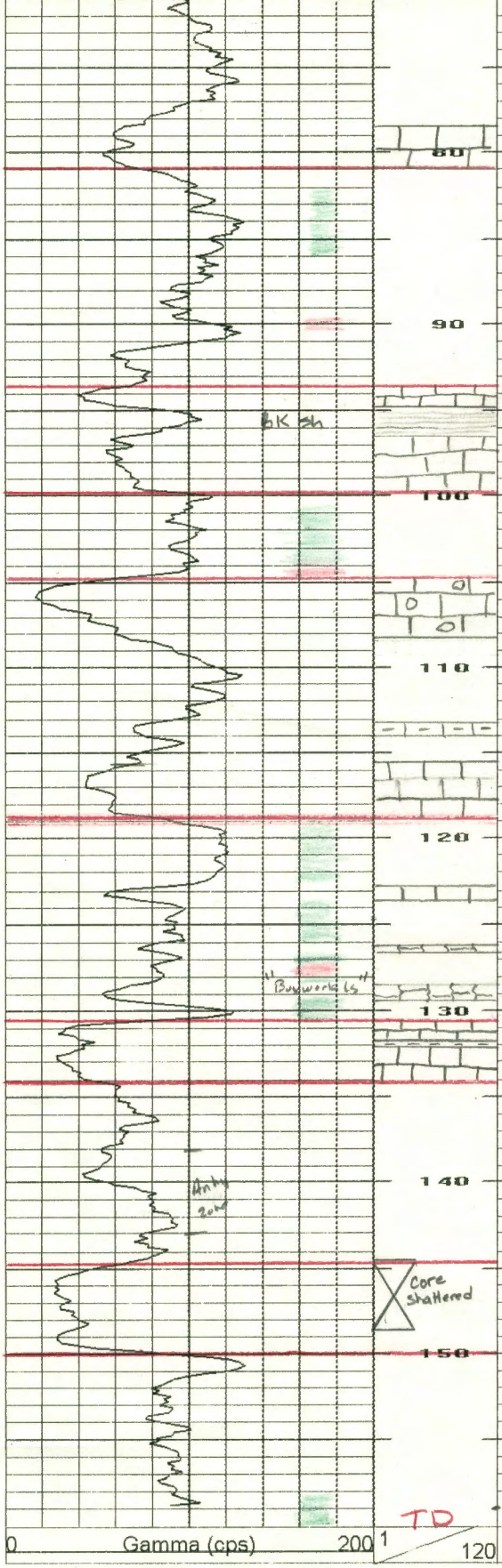
OTHER SERVICES

V.S. 1" = 10'

GL 1357.8



LOG DEPTH	Thickness	CORE (driller) DEPTH
Threemile	6' +	
6.0		6.0
Speiser	14.8	
20.8		21.9
	6.6	
Funston	1.6	
	1.6	24.2
32.3	1.7	
34.9	2.6	
	6.3	
0.1		
1.0		
2.4	3.8	43.2
45.0		45.4
Blue Rapids	21.6	
66.6		67.0
69.0	2.4	69.4



Crouse 9.5 14.4

1276.8 — 78.5 — 81.0 — 78.5 — 81.0

2.5

Easly Creek 12.6

1264.2 — 93.6 — 94.9 — 96.5 Middleburg — 93.8 — 95.1 — 96.7

1.3 1.6 3.4 6.3

1257.9 — 99.9 — 100.1

Hooser 4.9'

1253.0 — 104.8 — 105.1

3.4

108.2 — 108.5

Eiss 14.1

7.4

115.6 — 115.9

3.3

1238.9 — 118.9 — 119.2

Sterns 11.8

1227.3 — 130.5 Morrill — 131.6

3.6

1223.7 — 134.1 — 135.2

Florena 10.6

1213.1 — 144.7 — Lost X

Cottonwood 5.3'

1207.8 — 150.0 — 150.3

Eskridge 9.0'+

159.0 — 159.3

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