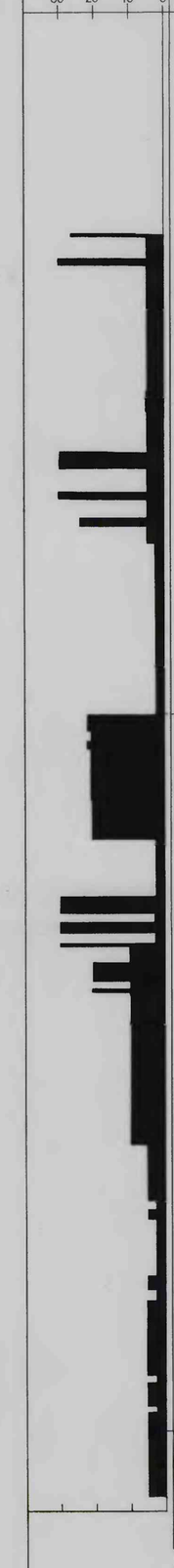
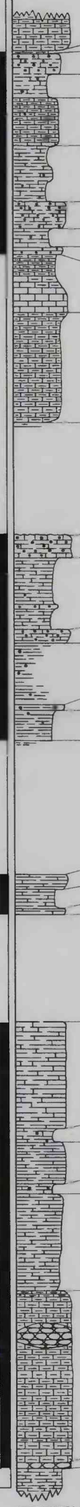


Bed No.	Thickness (in.)	Description	Reaction to dil. HCl	Sample No.	P_2O_5 (percent)	e U (percent)	V_2O_5 (percent)
67		Limestone, siliceous, grayish-black; weathers to light-gray tinkly plates; massive ledge-maker. Thin lenses of black chert	Strong	None			
66	2.0	Chert, calcareous, black; weathers grayish black. Bed is lenticular	- do -	- do -			
65	5.5	Mudstone, calcareous, grayish-black; weathers medium gray	- do -	- do -			
64	1.5	Chert, black; weathers grayish black	Not tested	- do -			
63	20.0	Limestone, argillaceous, grayish-black; weathers light gray	Strong	- do -			
62	8.0	Chert, calcareous, grayish-black, weathers grayish black. 1 inch of nodular, calcareous phosphate rock at base. Sample from phosphate rock at base	- do -	53APa154	26.3[1]	0.018	0.04[1]
61	7.0	Mudstone similar to bed 59	- do -	53APa152	5	.005	
60	1.5	Phosphate rock, calcareous, grayish-black; weathers medium gray. Bed is lenticular	- do -	53APa153	30	.017	
59	8.0	Mudstone, calcareous, phosphatic, soft, fissile, grayish-black; weathers grayish black	- do -	53APa152	5	.005	
58	17.0	Limestone, argillaceous, phosphatic, grayish-black; weathers light gray. 2 inches of cherty limestone at top	- do -	53APa151	5	.003	
57	19.0	Mudstone similar to bed 49	- do -	53APa146	5	.005	
56	7.5	Limestone, grayish-black; phosphatic at base. Siliceous concretions 5 by 14 inches at top	- do -	53APa150	5.2[2]	.004	
55	14.0	Mudstone similar to bed 49	- do -	53APa146	5	.005	
54	5.0	Phosphate rock, calcareous, grayish-black; weathers medium gray with characteristic phosphate bloom. Secondary purple fluorite	- do -	53APa149	30	.010	
53	8.5	Mudstone similar to bed 49	- do -	53APa146	5	.005	
52	2.0	Phosphate rock, calcareous, siliceous, grayish-black; weathers medium dark gray	- do -	53APa148	30	.017	
51	7.0	Mudstone similar to bed 49	- do -	53APa146	5	.005	
50	3.0	Phosphate rock, calcareous, grayish-black; weathers medium gray with a characteristic phosphate bloom. Secondary purple fluorite	- do -	53APa147	23.8[1]	.009	.10[1]
49	6.0	Mudstone, calcareous, phosphatic, soft, fissile, grayish-black; weathers grayish black	- do -	53APa146	5	.005	
48	58.0	Limestone, grayish-black; weathers grayish yellow; massive ledge-maker	- do -	53APa145	<5	.002	
47	5.5	Phosphate rock similar to bed 45; pisolites and nodules on upper surface	- do -	53APa144	21.5[2]	.008	
46	4.0	Phosphate rock similar to bed 44	- do -	53APa143	20.8[2]	.008	
45	2.5	Phosphate rock, argillaceous, calcareous, oolitic, grayish-black; weathers light gray with characteristic phosphate bloom	- do -	53APa144	21.5[2]	.008	
44	17.0	Phosphate rock, argillaceous, calcareous, fissile, soft, grayish-black. Several 1/6- to 3/4-inch nonfissile lenses	- do -	53APa143	20.8[2]	.008	
43	14.0	Phosphate rock, calcareous, grayish-black; weathers light gray with characteristic phosphate bloom. Pisolites and nodules	- do -	53APa142	20.5[2]	.008	
42	11.0	Limestone, medium-gray, weathers grayish yellow. Oolites at top	- do -	53APa141	<5	.003	
41	9.0	Mudstone similar to bed 37	- do -	53APa140	<5	.005	
40	5.5	Phosphate rock; argillaceous, calcareous, grayish-black. Alternating thick and thin beds. Secondary purple fluorite	- do -	53APa139	30	.010	
39	2.5	Mudstone similar to bed 37	- do -	53APa140	<5	.005	
38	4.0	Phosphate rock, calcareous, grayish-black; weathers light gray with a characteristic phosphate bloom	- do -	53APa139	30	.010	
37	4.0	Mudstone, calcareous, soft, fissile, grayish-black; weathers grayish black	- do -	53APa140	<5	.005	
36	1.0	Phosphate rock, calcareous, pisolitic, grayish-black; weathers light gray with a characteristic phosphate bloom. Bed is lenticular	- do -	53APa139	30	.010	
35	5.0	Mudstone similar to bed 33	Mod.	53APa137	10	.004	
34	7.0	Phosphate rock, calcareous, oolitic and pisolitic, grayish-black; weathers light gray with characteristic phosphate bloom. Breaks into platy fragments	Strong	53APa138	20.5[1]	.012	.10[1]
33	3.0	Mudstone similar to bed 31 but only slightly calcareous	Weak	53APa137	10	.004	
32	.75	Phosphate rock, calcareous, oolitic, grayish-black; weathers light gray with a characteristic phosphate bloom. Bed is lenticular	Strong	53APa138	20.5[1]	.012	.10[1]
31	17.5	Mudstone, phosphatic, calcareous, fissile, grayish-black; weathers medium gray	- do -	53APa137	10	.004	
30	28.5	Mudstone, thickly laminated, medium-gray; weathers to medium light-gray platy fragments. Phosphatic near top. Calcareous concretions 10 by 24 inches	Weak	53APa136	10	.003	
29	5.0	Limestone, argillaceous, medium-gray; weathers light gray. Phosphatic near top	Strong	53APa136	10	.003	
28	19.0	Mudstone, calcareous, phosphatic, grayish-black; weathers medium gray. Fissile at base	Moderate	53APa135	5	.003	
27	3.0	Limestone, siliceous, grayish-black; weathers light gray. Oolites on top	Strong	53APa133	<5	.001	
26	3.5	Mudstone, similar to bed 24	Weak	53APa134	5	.002	
25	19.0	Limestone, grayish-black; weathers to blocky light-gray fragments. ½-inch layer of oolites at top. Black siliceous limestone concretions 9 by 18 inches, 10 inches below top	Strong	53APa133	<5	.001	
24	4.5	Mudstone, phosphatic, grayish-black; weathers medium gray. Fissile at base	Weak	53APa134	5	.002	
23	3.5	Limestone, medium-gray; weathers light gray. A few phosphate oolites on top. Bed is lenticular. 1 inch of chert at base	Strong	53APa133	<5	.001	
22	26.5	Mudstone similar to bed 18. 2½-inch lens of black calcareous chert, 7 inches above base	Moderate	53APa131	5	.002	
21	1.75	Limestone similar to bed 19. Oolites on top. Discoidal concretions as much as 6 by 18 inches in diameter composed of limestone occur along this horizon	Strong	53APa132	<5	.001	
20	8.5	Mudstone similar to bed 18	Mod.	53APa131	5	.002	
19	1.5	Limestone, argillaceous, grayish-black; weathers light gray	Strong	53APa132	<5	.001	
18	6.25	Mudstone, calcareous, phosphatic, grayish-black; weathers grayish black	Mod.	53APa131	5	.002	
				53APa130 (top 23 inches)	5	.003	
17		Limestone, argillaceous, siliceous, massive, grayish-black; weathers light gray. 2½ inches of phosphate rock 9 inches below top. 2 inches of chert 18 inches below top. Sample from top 23 inches	Strong				

SECTION 1B

SECTION 1A



Bed No.	Thickness (in.)	Description	Reaction to dil. HCl	Sample No.	P_2O_5 (percent)	e U (percent)
96		Limestone, argillaceous, grayish-black; weathers to light-gray platy fragments stained with limonite	Strong	---	---	---
95	1.0	Mudstone, calcareous, fissile, grayish-black; weathers medium gray	- do -	---	---	---
94	7.0	Phosphate rock, calcareous, argillaceous, oolitic, grayish-black; weathers to medium-gray shaly fragments with characteristic phosphate bloom	- do -	53APa180	30	0.011
93	8.0	Mudstone, calcareous, phosphatic, soft, thinly laminated, grayish-black	Moderate	53APa179	5	.005
92	16.0	Limestone, argillaceous, phosphatic, grayish-black; weathers to light gray, tinkly, shaly fragments	Strong	53APa179	5	.005
91	18.5	Mudstone, calcareous, phosphatic, grayish-black; weathers medium gray; thinly laminated at top and bottom, thickly laminated in middle	Moderate	53APa179	5	.005
90	9.5	Phosphate rock, argillaceous, calcareous, grayish-black; weathers with characteristic phosphate bloom. Pisolites and nodules. Secondary purple fluorite. Top contact undulant	- do -	53APa178	30	.012
89	7.0	Mudstone, calcareous, phosphatic, thinly laminated, grayish-black; weathers medium gray	Strong	53APa179	5	.005
88	2.0	Phosphate rock, argillaceous, calcareous, grayish-black; weathers medium gray with characteristic phosphate bloom. Oolites and nodules	- do -	53APa177	30	.021
87	19.0	Limestone, argillaceous, thinly laminated at top, thickly laminated at base, grayish-black; weathers to light-gray tinkly plates	- do -	53APa176	0	.001
86	36.0	Limestone, argillaceous; similar to bed 87	- do -	53APa176	0	.001
85	38±	Poorly exposed. Appears to be limestone as in bed 86	---	---	---	---
84	7.5	Phosphate rock, calcareous, grayish-black; oolites at base grading to nodules at top. Weathers with characteristic phosphate bloom. Top contact undulant	Strong	53APa175	30	.015
83	24.0	Mudstone, calcareous, thinly laminated, grayish-black; weathers medium gray. 1½ inches of phosphate rock 7 inches above base	- do -	53APa174	5	.005
82	4.5	Phosphate rock, calcareous, argillaceous, oolitic, grayish-black	- do -	53APa173	22.1[2]	.013
81	20.0	Mudstone, phosphatic, grayish-black; poorly exposed	Not tested	53APa172	10	.006
80	2.0	Mudstone, phosphatic, thickly laminated, grayish-black	None	53APa172	10	.006
79	12.0	Mudstone, phosphatic, fissile, soft, grayish-black	Weak	53APa172	10	.006
	44±	Not exposed				
78	5.0	Mudstone, calcareous, siliceous, thickly laminated, medium-gray; weathers medium gray	Mod.	53APa171	<5	.001
77	6.0	Mudstone, calcareous, soft, thinly laminated, grayish-black	- do -	53APa171	<5	.001
76	2.0	Mudstone similar to bed 78	- do -	53APa171	<5	.001
	36	Not exposed				
75	35.5	Mudstone, calcareous, siliceous, thickly laminated, grayish-black; weathers light gray	- do -	53APa170	<5	.001
74	5.0	Mudstone, calcareous, phosphatic, platy, grayish-black; weathers medium gray	- do -	53APa169	5	.003
73	14.5	Mudstone, calcareous, siliceous, thickly laminated; weathers to light-gray shaly fragments	- do -	53APa170	<5	.001
72	3.5	Mudstone, calcareous, thinly laminated. Oolites in center	- do -	53APa169	5	.003
71	32.0	Mudstone, calcareous, siliceous, platy, grayish-black; weathers light gray	Strong	53APa168	<5	.002
70	57.5	Limestone, argillaceous, dark-gray; weathers light gray. Siliceous concretions as much as 20 by 36 inches in diameter along this horizon	- do -	53APa168	<5	.002
69	2.0	Chert, argillaceous, grayish-black; weathers to grayish-black blocky fragments	Weak	53APa167	<5	a
68	-	Mudstone, calcareous, siliceous, thickly laminated, grayish-black; weathers to light-gray shaly fragments	Moderate	-	-	-

SECTION 2

EXPLANATION

- Mudstone
- Calcareous mudstone
- Limestone
- Argillaceous limestone
- Bedded chert
- Chert nodules, concretions, and lenses
- Limestone nodules, concretions, and lenses
- Phosphate rock
- Argillaceous phosphate rock

10 8 6 4 2 0
Vertical scale (in feet)

[1] Analyses for P_2O_5 and V_2O_5 by Maryse Delevaux, Wendell Tucker, and Esma Campbell, U. S. Geological Survey

[2] Analyses for P_2O_5 and V_2O_5 by Audrey Smith, U. S. Geological Survey

All others, J. J. Matzko, U. S. Geological Survey

Analysis of equivalent uranium by Julius Goode, U. S. Geological Survey

P_2O_5 results by Matzko are approximate, based on a semi-quantitative field test (Shapiro, Leonard, 1952)

COLUMNAR SECTIONS OF PHOSPHATIC ZONE OF THE LISBURNE GROUP, TIGLUKPUK CREEK AREA

484088 O - 59 (In pocket)