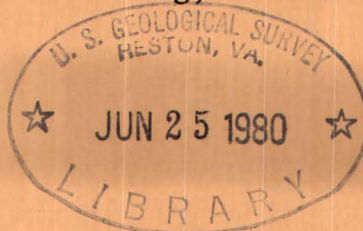


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Stratigraphic Sections of the Phosphoria Formation in Utah, 1949-1951

By T. M. Cheney, R. A. Smart, R. G. Waring, and M. A. Warner



This material contains information affecting
the national defense of the United States
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Title 18, U.S.C., Secs. 793 and 794, the
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Trace Elements Investigations Report 360

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

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Geology and Mineralogy

This document consists of 46 pages.
Series A

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STRATIGRAPHIC SECTIONS OF THE PHOSPHORIA FORMATION
IN UTAH, 1949-1951*

By

T. M. Cheney, R. A. Smart,
R. G. Waring, and M. A. Warner

July 1953

Trace Elements Investigations Report 360

This preliminary report is distributed without editorial and technical review for conformity with official standards and nomenclature. It is not for public inspection or quotation.

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*This report concerns work done partly on behalf of the Division of Raw Materials of the U. S. Atomic Energy Commission.

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STRATIGRAPHIC SECTIONS OF THE PHOSPHORIA FORMATION IN UTAH, 1949-1951

by T. M. Cheney, R. A. Smart, R. G. Waring, and M. A. Warner

INTRODUCTION

As part of a comprehensive investigation of the phosphate deposits of the western field begun in 1947, the U. S. Geological Survey has measured and sampled the full thickness of the Permian Phosphoria formation and its partial correlative, the Park City formation, at many localities in Utah(fig.1) and other western states. Although these data will not be fully analyzed for several years, segments of the data, accompanied by little or no interpretation, are published as preliminary reports as they are assembled. This report, which contains abstracts of the sections measured in northeastern Utah in 1949, 1950, and 1951, is one of this series and the second report of data gathered in Utah. The field and laboratory procedures adopted in these investigations are described rather fully in a previous report (McKelvey and others, 1953a).

A large number of people have taken part in this investigation. The program of which this work is a part was organized by V. E. McKelvey and the field program was supervised by R. W. Swanson. R. P. Sheldon assisted in the location and selection of sample localities and F. J. Anderson, McKelvey, Sheldon, and H. W. Peirce participated in the description of strata and the collection of samples referred to in this report. T. K. Rigby assisted in the preparation of trenches and the crushing and splitting of samples in the field. The laboratory preparation of samples for chemical analysis was done in Denver, Colo., under the direction of W. P. Huleatt.

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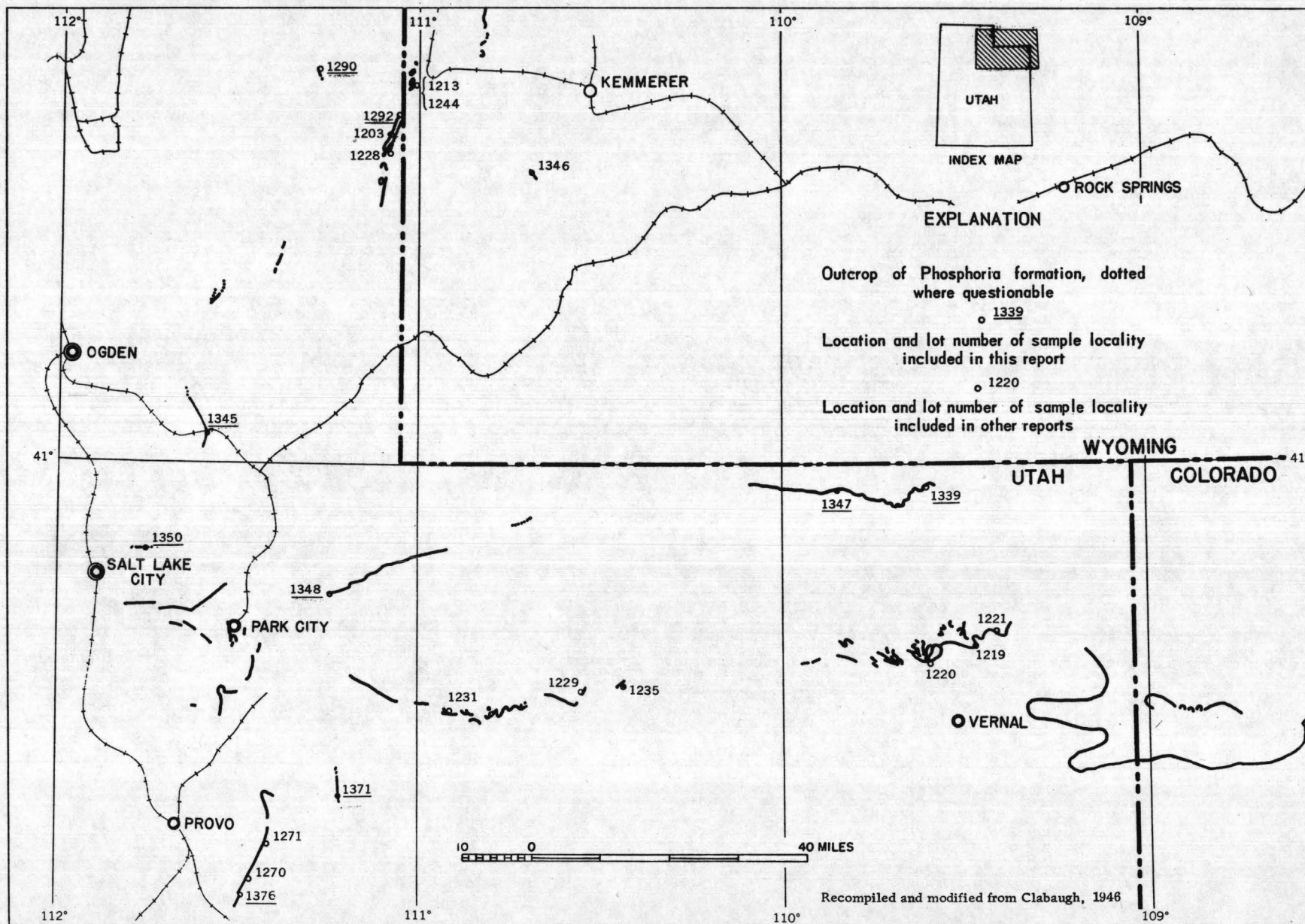


Figure 1.—Outcrops of the Phosphoria and Park City formations in Utah and localities sampled

The P_2O_5 and acid-insoluble analyses were made in part in the Trace Elements Section laboratory of the Geological Survey in Denver, Colo., under the direction of L. F. Rader, by chemists M. Appling, J. Dufour, N. Jammer, H. Miskowiec, N. Morris, and M. Stevens and in part for the Survey by the U. S. Bureau of Mines at the Northwest Electrodevelopment Laboratory, Albany, Oreg., under the direction of S. M. Shelton and M. L. Wright. The Al_2O_3 , Fe_2O_3 , and loss-on-ignition analyses were made in the Washington Trace Elements Section laboratory under the direction of J. C. Rabbitt, by H. Alberty, T. Farley, F. S. Grimaldi, C. Hoy, and M. Landers. The radiometric analyses were made in the Denver laboratory by S. P. Furman and J. N. Rosholt and in the Washington laboratory by F. J. Flanagan and J. J. Warr, Jr., and the chemical uranium analyses were made in this laboratory by M. Appling, G. W. Boyes, J. Dufour, N. Jammer, H. Miskowiec, N. Morris, W. Mountjoy, M. Stevens, and J. S. Wahlberg and in the Washington laboratory by A. L. White.

Compilation of the data has been largely by K. S. Bergman under the supervision of R. W. Swanson. Organization of the tabular data has been by Anita Wise.

Acknowledgments

Special thanks are due J. Steele Williams and A. A. Baker who have given much advice and many suggestions in the field. The cost of these investigations has been borne partly by the Division of Raw Materials of the Atomic Energy Commission. This support is gratefully acknowledged.

It is a pleasure to acknowledge the fine cooperation extended to the field parties by the local residents and property owners who furnished information and services and gave access to property. Special thanks are due the American Smelting and Refining Company for permission to sample the open pit mine under their lease.

STRATIGRAPHY OF THE PHOSPHORIA AND PARK CITY FORMATIONS IN UTAH

The stratigraphy of the Permian Phosphoria formation in the Crawford Mountains of northeastern Utah, near the Idaho-Wyoming corner, is very similar to that in the adjacent states and described in companion reports (McKelvey and others 1953a and b). It consists of the phosphatic shale member, about 210 feet thick, and the Rex chert member, for which this is the type locality, about 220 feet thick. The upper shale member, present in the adjacent region to the north, is not well defined in this area. Here, as well as to the north, the Phosphoria formation overlies the Pennsylvanian Wells formation, the upper part of which consists chiefly of cherty gray limestone with some thin phosphatic layers. The Phosphoria is overlain by the Triassic Dinwoody formation, consisting of limestone, calcareous siltstone, and sandstone. A generalized section of the Phosphoria formation at Brazer Canyon is shown in figure 2.

Farther south, along both the north and south flanks of the Uinta Range and in the general area of the Wasatch Range, the Park City formation is the partial stratigraphic equivalent of the Phosphoria formation. At Park City, its type locality, it is about 590 feet thick and consists of a lower limestone member, which may be stratigraphically equivalent to

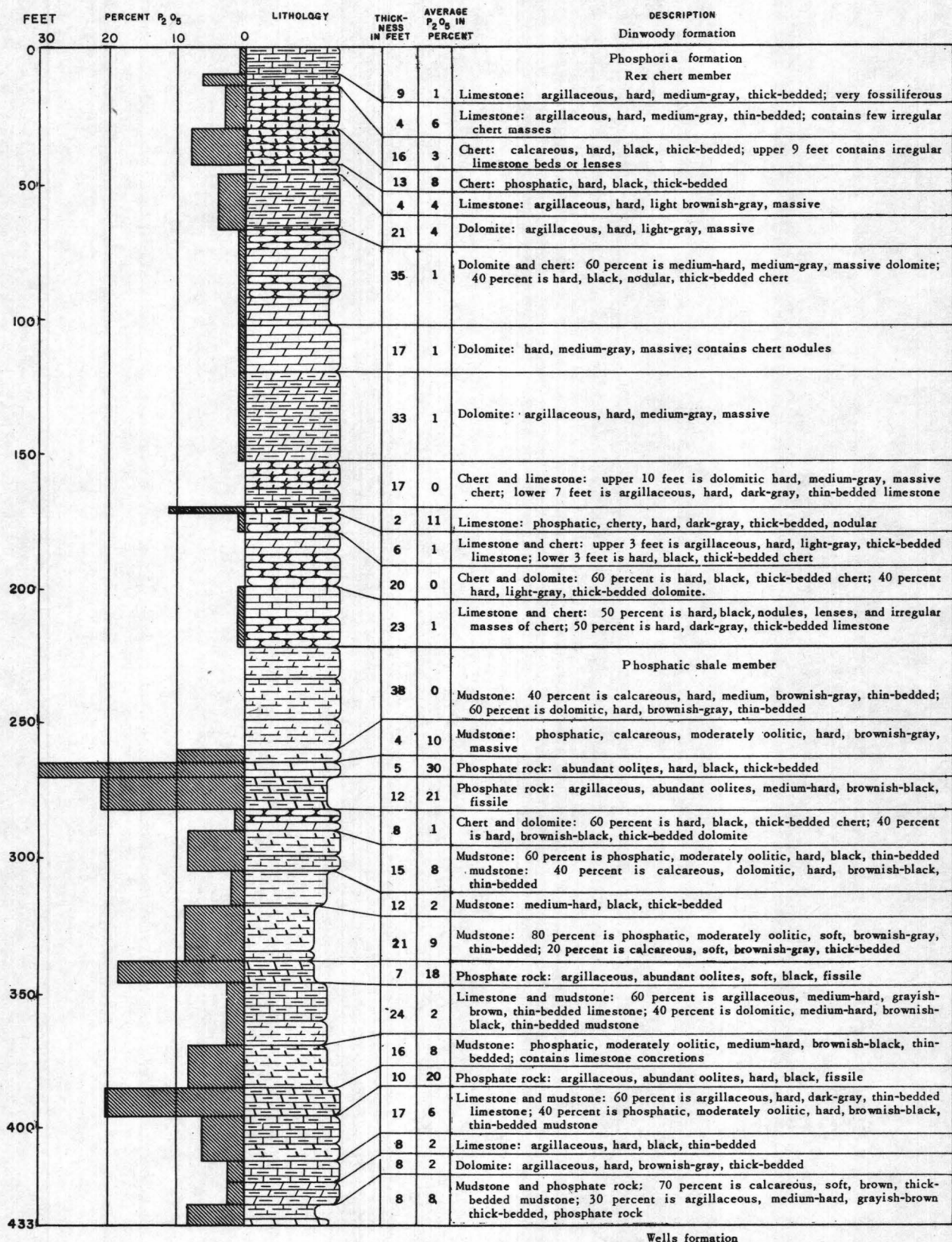


Figure 2—Generalized section of the Phosphoria formation at Brazer Canyon, Utah, lot no. 1203

the upper part of the Wells formation in southeastern Idaho; a middle shale member (phosphatic but containing no high-grade phosphate beds) probably equivalent in major part to the phosphatic shale of Idaho; and an upper limestone member, equivalent to the Rex chert member to the north. Eastward the lower limestone member thins out and the phosphatic shale and upper limestone members thin, are more clastic, and finally tongue out into nonmarine redbeds in eastern Utah and western Colorado. Westward the formation thickens markedly, attaining a thickness of several thousand feet, and contains a greater proportion of chemical precipitates.

More detailed correlations of the strata within Utah as well as between Utah and adjacent states will be discussed in subsequent publication.

STRATIGRAPHIC SECTIONS

Analytical data and abstracts of stratigraphic sections measured at nine localities follow. Their locations as well as the locations of sections previously reported (Smith and others, 1953) are shown in figure 2.

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Clabaugh, P. S., 1946, Permian phosphate deposits of Montana, Idaho, Wyoming, and Utah: U. S. Geol. Survey, Strategic Minerals Inv. Prelim. Map 3-198.

McKelvey, V. E., Davidson, D. F., O'Malley, F. W., and Smith, L. E., 1953a, Stratigraphic sections of the Phosphoria formation in Idaho, 1947-48, Part I: U. S. Geol. Survey Circ. 208.

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Smith, L. E., Hosford, G. F., Sears, R. S., Sprouse, D. P., and Stewart, M. D., 1953, Stratigraphic sections of the Phosphoria formation in Utah, 1947-48: U. S. Geol. Survey Circ. 211.

Laketown Canyon, Utah, lot 1290

Phosphatic shale member of Phosphoria formation sampled in bulldozer trench, sec. 32, T. 13 N., R. 6 E., Rich County, Utah, on an early Tertiary surface exhumed by erosion of the covering Wasatch formation. Phosphoria extensively leached by pre-Wasatch erosion. Beds strike N. 10° E. and dip 65° W. Section measured by R. P. Sheldon, F. J. Anderson, and R. G. Waring and sampled by Waring in July 1949. Samples analyzed for P_2O_5 and acid insoluble by U. S. Bureau of Mines laboratory, Albany, Oreg., and for other constituents by Trace Elements Section laboratory, Washington, D. C.

Samples analyzed for eU and chem. U by the U. S. Geological Survey laboratory, Geochemistry and Petrology Branch.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)					Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)	Uranium content (percent)		Thickness x percent eU (cumulative)
				P ₂ O ₅	Al ₂ O ₃	Fe ₂ O ₃	Loss on ignition	Acid insoluble			eU	Chem. U	
Rex chert member of Phosphoria formation—basal bed only													
R- 1	Chert -----	3793- RPS	0.8	1.2	--	--	--	90.7	0.8	--	0.001	--	--
Phosphatic shale member of Phosphoria formation													
P-58	Mudstone, phosphatic -----	3792- RPS	0.3	11.0	--	--	--	63.3	0.3	3.30	0.002	--	0.001
P-57	Mudstone -----	3791- RPS	2.6	1.6	--	--	--	75.8	2.9	7.46	.002	--	.006
P-56	Mudstone -----	5190- RPS	1.0	5.8	--	--	--	64.0	3.9	13.26	.003	--	.009
P-55	Phosphate rock -----	3789- RPS	1.0	35.8	0.99	0.71	2.18	4.0	4.9	49.06	.007	.007	.016
P-54	Mudstone and argillaceous phosphate rock -----	3787- RPS	1.5	9.0	8.2	3.95	4.26	59.5	6.4	62.56	.003	.002	.020
P-53	Phosphate rock -----	3877- FJA	1.0	31.0	3.1	1.93	4.10	11.7	7.4	93.56	.007	.007	.027
P-52	Mudstone, phosphatic -----	3876- FJA	.9	15.6	7.0	3.08	4.80	42.9	8.3	107.60	.006	.005	.033
P-51	Phosphate rock -----	3875- FJA	1.9	33.5	1.2	.43	3.62	7.4	10.2	171.25	.008	.010	.048
P-50	Phosphate rock -----	3874- FJA	.5	36.3	1.3	.43	3.14	3.5	10.7	189.40	.011	.013	.053
P-49	Phosphate rock -----	3873- FJA	1.4	31.4	2.1	.92	3.74	12.7	12.1	233.36	.010	.010	.067
P-48	Phosphate rock -----	3872- FJA	1.3	36.5	.92	.63	3.24	2.2	13.4	280.81	.010	.012	.080
P-47	Phosphate rock -----	3871- FJA	1.2	35.2	1.3	.37	3.78	4.7	14.6	323.05	.011	.013	.094
P-46	Phosphate rock, argillaceous -----	3870- FJA	.7	27.5	4.3	1.27	4.20	20.7	15.3	342.30	.006	.006	.098
P-45	Phosphate rock, argillaceous -----	3869- FJA	.6	25.6	3.6	.67	5.80	22.0	15.9	357.66	.005	.006	.101
P-44	Mudstone and phosphate rock -----	3868- FJA	.9	21.5	6.0	2.08	6.24	27.2	16.8	377.01	.007	.006	.107
P-43	Phosphate rock, argillaceous -----	3867- FJA	.9	16.4	6.6	2.60	7.02	37.1	17.7	391.77	.007	.006	.113
P-42	Phosphate rock, argillaceous -----	3866- FJA	1.0	24.2	4.5	1.91	6.36	22.7	18.7	415.97	.008	.007	.121
P-41	Phosphate rock -----	3865- FJA	.8	29.8	2.6	1.56	6.84	8.3	19.5	439.81	.009	.010	.129
P-40	Phosphate rock -----	3864- FJA	.7	30.4	2.7	.71	5.18	11.3	20.2	461.09	.011	.011	.136
P-39	Phosphate rock, argillaceous -----	3863- FJA	1.5	22.3	5.2	4.00	4.44	28.5	21.7	494.54	.008	.007	.148
P-38	Phosphate rock, argillaceous -----	3862- FJA	2.0	21.9	5.5	2.14	4.34	32.2	23.7	538.34	.007	.007	.162
P-37	Phosphate rock, argillaceous -----	3861- FJA	1.0	24.9	4.8	1.20	4.34	25.5	24.7	563.24	.009	.010	.171
P-36	Phosphate rock, argillaceous -----	3860- FJA	2.2	19.2	6.1	3.15	4.40	36.9	26.9	605.48	.005	.005	.182
P-35	Mudstone, phosphatic -----	3859- FJA	1.5	11.5	--	--	--	53.8	28.4	622.73	.004	--	.188
P-34	Mudstone, phosphatic -----	3858- FJA	1.8	13.5	--	--	--	51.8	30.2	647.03	.004	--	.196
P-33	Mudstone -----	3857- FJA	2.5	1.3	--	--	--	83.7	32.7	650.28	.001	--	.198

Laketown Canyon—Continued

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)					Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)	Uranium content (percent)		Thickness x percent eU (cumulative)
				P ₂ O ₅	Al ₂ O ₃	Fe ₂ O ₃	Loss on ignition	Acid insoluble			eU	Chem. U	
P-32	Mudstone, phosphatic-----	3856- FJA	1.1	11.3	--	--	--	54.4	33.8	662.71	0.003	--	0.201
P-31	Phosphate rock -----	3855- FJA	1.2	33.2	--	--	--	8.3	35.0	702.55	.005	0.006	.207
P-30	Mudstone-----	3854- FJA	1.6	6.9	--	--	--	66.1	36.6	713.59	.003	--	.212
P-29	Mudstone-----	3853- FJA	3.5	2.5	--	--	--	80.0	40.1	722.34	.002	--	.219
P-28	Phosphate rock, argillaceous -----	3852- FJA	1.7	27.3	--	--	--	18.3	41.8	768.75	.006	.005	.229
P-27	Mudstone-----	3851- FJA	1.8	5.3	--	--	--	69.9	43.6	778.29	.002	--	.233
P-26	Phosphate rock -----	3772- RPS	.85	27.7	--	--	--	15.0	44.45	801.84	.010	.008	.241
P-25	Mudstone -----	---	?	--	--	--	--	--	--	--	--	--	--
P-24	Mudstone, phosphatic -----	3771- RPS	1.5	10.5	--	--	--	54.6	45.95	*15.75	.006	.005	*.009
P-23	Phosphate rock -----	3770- RPS	1.0	29.5	--	--	--	13.7	46.95	45.25	.011	.010	.020
P-22	Phosphate rock, argillaceous -----	3769- RPS	1.6	19.1	--	--	--	32.8	48.55	75.81	.008	.007	.033
P-21	Mudstone, phosphatic -----	3768- RPS	2.0	9.7	--	--	--	58.0	50.55	95.21	.003	--	.039
P-20	Phosphate rock, argillaceous -----	3767- RPS	2.0	23.1	--	--	--	30.7	52.55	141.41	.005	.004	.049
P-19	Phosphate rock -----	3788- RPS	1.6	28.3	--	--	--	16.0	54.15	186.69	.005	.005	.057
P-18	Phosphate rock, argillaceous -----	3766- RPS	.9	19.8	--	--	--	38.6	55.05	204.51	.004	--	.060
P-17	Mudstone-----	3765- RPS	1.6	3.8	--	--	--	76.4	56.65	210.59	.002	--	.064
P-16	Mudstone-----	3764- RPS	4.0	1.1	--	--	--	81.5	60.65	214.99	.002	--	.072
P-15	Phosphate rock -----	3763- RPS	1.0	34.5	--	--	--	6.8	61.65	249.49	.008	.007	.080
P-14	Mudstone-----	3786- RPS	5.0	4.1	--	--	--	71.6	66.65	269.99	.003	--	.095
P-13	Mudstone-----	3785- RPS	5.0	3.7	--	--	--	69.7	71.65	288.49	.003	--	.110
P-12	Mudstone-----	3784- RPS	4.5	6.7	--	--	--	62.2	76.15	318.64	.003	--	.123
P-11	Phosphate rock and mudstone-----	3783- RPS	.5	23.9	6.2	2.52	4.04	28.0	76.65	330.59	.005	.004	.126
P-10	Mudstone, phosphatic -----	3774- RPS	.8	17.3	6.9	2.76	3.68	44.0	77.45	344.43	.004	--	.129
P-9	Phosphate rock, argillaceous -----	3773- RPS	.7	17.6	6.2	2.43	4.30	41.4	78.15	356.75	.004	--	.132
P-8	Phosphate rock and mudstone -----	3832-RGW	2.3	19.1	6.7	2.37	4.18	39.1	80.45	400.68	.005	.005	.143
P-7	Phosphate rock, argillaceous -----	3831-RGW	1.7	22.7	5.1	1.58	5.46	28.2	82.15	439.27	.005	.005	.152
P-6	Mudstone-----	3830-RGW	.6	7.5	12.	7.15	6.58	53.9	82.75	443.77	.004	--	.154
P-5	Phosphate rock, argillaceous -----	3829-RGW	1.5	18.5	6.9	3.88	5.58	34.4	84.25	471.52	.005	.005	.162
P-4	Phosphate rock, argillaceous -----	3828-RGW	1.0	23.1	4.9	3.61	4.90	25.4	85.25	494.62	.011	.008	.172
P-3	Phosphate rock, argillaceous -----	3827-RGW	2.4	27.6	4.4	1.54	5.08	16.2	87.65	560.86	.008	.007	.192
P-2	Phosphate rock and mudstone -----	3826-RGW	1.2	19.1	6.2	3.83	4.80	35.0	88.85	583.78	.008	.007	.201
P-1	Phosphate rock, argillaceous -----	3825-RGW	1.5	18.7	6.2	6.30	4.80	35.0	**90.35	**611.83	.007	.006	**212
Wells formation—upper part only													
Cw-1	Mudstone-----	3824-RGW	1.3	2.2	--	--	--	83.0	1.3	2.86	0.002	--	0.003
Cw-2	Sandstone, cherty -----	3823-RGW	1.2	2.0	--	--	--	86.2	2.5	5.26	.001	--	.004
Cw-3	Sandstone, cherty -----	3822-RGW	2.7	1.3	--	--	--	86.2	5.2	8.77	.0005	--	.005
Cw-4	Sandstone, cherty -----	3821-RGW	1.4	1.3	--	--	--	84.9	6.6	10.59	.0005	--	.006

* Cumulative data incomplete because of missing information. Cumulatives start from zero after interruption.

** Note incompleteness of cumulative data.

North Crawford, Utah, lot 1292

Phosphoria formation sampled in bulldozer trench in North Crawford Mountains, sec. 32, T. 12 N., R. 8 E., Rich County, Utah, on the west limb of the Crawford syncline. Section measured by V. E. McKelvey, R. G. Waring, M. A. Warner, and R. A. Smart and sampled by Waring, Warner, and Smart in July 1949. Samples analyzed for P_2O_5 and acid insoluble by U. S. Bureau of Mines laboratory, Albany, Oreg., and for other constituents by Trace Elements Section laboratory, Washington, D. C.

Samples analyzed for eU and chem. U by the U. S. Geological Survey laboratory, Geochemistry and Petrology Branch.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)					Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)	Uranium content (percent)		Thickness x percent eU (cumulative)
				P ₂ O ₅	Al ₂ O ₃	Fe ₂ O ₃	Loss on ignition	Acid insoluble			eU	Chem. U	
Phosphatic shale member of Phosphoria formation													
P-104	Mudstone, carbonatic-----	3843-MAW	5.7	0.6	--	--	--	57.2	5.7	3.42	0.0005	--	0.003
P-103	Mudstone, carbonatic-----	3842-MAW	5.9	.6	--	--	--	52.7	11.6	6.96	.0005	--	.006
P-102	Mudstone, carbonatic-----	3933-VEM	2.8	.7	--	--	--	63.0	14.4	8.92	.002	--	.011
P-101	Phosphate rock, argillaceous-----	3932-VEM	1.4	17.1	--	--	--	35.7	15.8	32.86	.004	--	.017
P-100	Carbonate rock, argillaceous, and argillaceous phosphate rock-----	3931-VEM	1.5	9.1	--	--	--	32.0	17.3	46.51	.002	--	.020
P- 99	Mudstone, phosphatic-----	3930-VEM	.9	8.3	--	--	--	51.3	18.2	53.98	.003	--	.023
P- 98	Phosphate rock -----	3929-VEM	1.8	32.3	0.74	0.67	5.86	3.7	20.0	112.12	.008	0.008	.037
P- 97	Phosphate rock -----	3928-VEM	1.4	32.8	.49	.43	6.44	2.0	21.4	158.04	.012	.012	.054
P- 96	Phosphate rock, argillaceous, and phosphatic mudstone -----	3927-VEM	.5	19.9	3.9	1.21	7.40	29.8	21.9	167.99	.004	--	.056
P- 95	Phosphate rock -----	3926-VEM	1.2	30.3	.49	.50	9.04	2.4	23.1	204.35	.013	.013	.072
P- 94	Phosphate rock, phosphatic mudstone, and carbonatic phosphate rock -----	3925-VEM	.9	27.3	2.5	1.20	5.92	15.1	24.0	228.92	.018	.017	.088
P- 93	Phosphate rock -----	3924-VEM	1.7	29.4	1.4	.38	6.78	9.3	25.7	278.90	.012	.012	.108
P- 92	Phosphate rock -----	3923-VEM	.9	27.7	2.7	.82	4.80	19.7	26.6	312.14	.009	.010	.119
P- 91	Phosphate rock, argillaceous -----	3922-VEM	1.3	19.0	3.4	1.27	9.26	27.0	27.9	331.14	.006	.007	.125
P- 90	Mudstone, carbonatic-----	3921-VEM	2.8	2.6	6.1	1.94	19.40	47.3	30.7	338.42	.003	--	.133
P- 89	Phosphate rock -----	3841-MAW	2.0	25.6	3.3	1.00	4.34	23.4	32.7	389.62	.003	--	.139
P- 88	Phosphate rock -----	3840-MAW	.9	27.2	2.1	3.63	4.38	18.7	33.6	414.10	.003	--	.142
P- 87	Phosphate rock, argillaceous-----	3839-MAW	1.8	22.0	4.2	1.82	3.58	32.7	35.4	453.70	.003	--	.147
P- 86	Mudstone, phosphatic-----	3838-MAW	.5	9.5	6.2	2.45	8.50	52.8	35.9	458.45	.003	--	.149
P- 85	Phosphate rock -----	3837-MAW	1.1	27.7	1.7	1.60	6.00	13.7	37.0	488.92	.004	--	.153
P- 84	Carbonate rock -----	3836-MAW	1.2	.7	--	--	--	12.3	38.2	489.76	.0005	--	.154
P- 83	Mudstone, cherty -----	3835-MAW	1.2	.9	--	--	--	81.1	39.4	490.84	.001	--	.155
P- 82	Phosphate rock, argillaceous, carbonatic -----	3834-MAW	1.4	17.3	--	--	--	19.1	40.8	515.06	.002	--	.158
P- 81	Mudstone, carbonatic -----	3833-MAW	3.0	2.3	--	--	--	44.0	43.8	521.96	.001	--	.181
P- 80	Mudstone, carbonatic -----	3986-RGW	1.9	4.0	--	--	--	55.3	45.7	529.56	.004	--	.168
P- 79	Mudstone -----	3985-RGW	.5	2.3	--	--	--	75.5	46.2	530.71	.003	--	.170
P- 78	Mudstone and phosphate rock -----	3984-RGW	.7	14.9	--	--	--	38.3	46.9	541.14	.008	.006	.176
P- 77	Carbonate rock, argillaceous-----	3983-RGW	.6	.5	--	--	--	22.3	47.5	541.44	.001	--	.176

North Crawford—Continued

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)					Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)	Uranium content (percent)		Thickness x percent eU (cumulative)
				P ₂ O ₅	Al ₂ O ₃	Fe ₂ O ₃	Loss on ignition	Acid insoluble			eU	Chem. U	
P-76	Mudstone, phosphatic, carbonatic-----	3982-RGW	0.5	10.3	--	--	--	36.3	48.0	546.59	0.003	--	0.178
P-75	Mudstone, carbonatic-----	3981-RGW	1.8	1.7	--	--	--	52.3	49.8	549.65	.002	--	.181
P-74	Phosphate rock, argillaceous-----	3980-RGW	1.1	25.6	--	--	--	16.3	50.9	577.81	.007	0.005	.189
P-73	Carbonate rock, argillaceous, phosphatic-----	3979-RGW	1.6	8.5	--	--	--	24.5	52.5	591.41	.0005	--	.190
P-72	Carbonate rock-----	3940-VEM	3.2	.4	--	--	--	6.3	55.7	592.69	.001	--	.193
P-71	Mudstone, carbonatic-----	3939-VEM	.3	5.2	--	--	--	56.2	56.0	594.25	.004	--	.194
P-70	Mudstone-----	3938-VEM	.3	.4	--	--	--	78.9	56.3	594.37	.003	--	.195
P-69	Mudstone-----	3937-VEM	.5	.2	--	--	--	71.5	56.8	594.47	.003	--	.197
P-68	Mudstone-----	3936-VEM	.8	.2	--	--	--	75.3	57.6	594.63	.004	--	.200
P-67	Mudstone-----	3935-VEM	1.0	5.7	--	--	--	65.1	58.6	600.33	.003	--	.203
P-66	Mudstone, carbonatic-----	3934-VEM	2.2	1.1	--	--	--	52.8	60.8	602.75	.002	--	.207
P-65	Mudstone, phosphatic-----	3848- RAS	.6	11.4	--	--	--	53.3	61.4	609.59	.003	--	.209
P-64	Mudstone-----	3847- RAS	1.2	.9	--	--	--	77.3	62.6	610.67	.002	--	.211
P-63	Mudstone, carbonatic-----	3846- RAS	1.9	.7	--	--	--	59.8	64.5	612.00	.002	--	.215
P-62	Mudstone, phosphatic-----	3845- RAS	.6	10.8	--	--	--	50.2	65.1	618.48	.003	--	.217
P-61	Mudstone, phosphatic-----	3844- RAS	1.4	11.7	--	--	--	48.2	66.5	634.86	.003	.002	.221
P-60	Mudstone, phosphatic-----	3900- RAS	1.8	10.1	--	--	--	50.2	68.3	653.04	.003	--	.227
P-59	Carbonate rock-----	3899- RAS	.8	2.9	--	--	--	9.5	69.1	655.36	.001	--	.227
P-58	Phosphate rock, argillaceous, carbonatic-----	3898- RAS	2.5	14.7	--	--	--	28.3	71.6	692.11	.004	--	.237
P-57	Mudstone, carbonatic-----	3897- RAS	1.6	5.1	--	--	--	47.5	73.2	700.27	.002	--	.241
P-56	Phosphate rock, argillaceous-----	3896- RAS	1.0	19.7	--	--	--	33.0	74.2	719.97	.004	--	.245
P-55	Carbonate rock-----	3895- RAS	.6	2.8	--	--	--	8.5	74.8	721.65	.001	--	.245
P-54	Phosphate rock, argillaceous, carbonatic-----	3894- RAS	.8	14.1	--	--	--	22.7	75.6	732.93	.005	.005	.249
P-53	Mudstone, phosphatic, carbonatic-----	3893- RAS	1.8	10.4	--	--	--	35.8	77.4	751.65	.002	--	.253
P-52	Mudstone, phosphatic and argillaceous limestone-----	3892- RAS	1.7	9.4	--	--	--	49.0	79.1	767.63	.003	--	.258
P-51	Phosphate rock, argillaceous-----	3891- RAS	2.7	18.3	--	--	--	31.2	81.8	817.04	.003	--	.266
P-50	Phosphate rock, argillaceous-----	3890- RAS	1.4	20.6	--	--	--	20.9	83.2	845.88	.003	--	.270
P-49	Phosphate rock, argillaceous and mudstone-----	3889- RAS	1.1	21.8	--	--	--	29.7	84.3	869.86	.003	--	.274
P-48	Phosphate rock-----	3888- RAS	1.2	33.1	--	--	--	9.3	85.5	909.58	.007	--	.282
P-47	Phosphate rock, argillaceous-----	3978-RGW	1.0	23.7	--	--	--	29.0	86.5	933.28	.002	--	.284
P-46	Mudstone, phosphatic-----	3977-RGW	.8	14.3	--	--	--	38.3	87.3	944.72	.003	--	.286
P-45	Carbonate rock-----	3976-RGW	1.3	3.1	--	--	--	18.8	88.6	948.75	.0005	--	.287
P-44	Mudstone-----	3975-RGW	3.3	6.9	--	--	--	51.3	91.9	971.52	.003	--	.297

P-43	Mudstone, carbonatic-----	3974-RGW	4.7	1.6	--	--	--	48.3	96.6	979.04	.001	--	.302
P-42	Carbonate rock, argillaceous-----	3973-RGW	1.3	2.2	--	--	--	37.3	97.9	981.90	.001	--	.303
P-41	Mudstone, cherty-----	3972-RGW	1.4	5.1	--	--	--	64.7	99.3	989.04	.002	--	.306
P-40	Carbonate rock, argillaceous-----	3971-RGW	1.1	1.6	--	--	--	31.3	100.4	990.80	.002	--	.308
P-39	Mudstone, carbonatic and limestone-----	3970-RGW	.9	.7	--	--	--	21.3	101.3	991.43	.002	--	.310
P-38	Mudstone, carbonatic-----	3969-RGW	1.1	2.9	--	--	--	58.1	102.4	994.62	.001	--	.311
P-37	Chert-----	3968-RGW	.7	3.4	--	--	--	70.3	103.1	997.00	.002	--	.312
P-36	Carbonate rock, argillaceous-----	3967-RGW	2.0	.8	--	--	--	22.8	105.1	998.60	.0005	--	.313
P-35	Chert and calcareous chert-----	3966-RGW	.6	2.6	--	--	--	77.7	105.7	1,000.16	.0005	--	.313
P-34	Chert-----	3965-RGW	.7	3.1	--	--	--	78.0	106.4	1,002.33	.0005	--	.314
P-33	Mudstone-----	3964-RGW	1.1	4.7	--	--	--	67.3	107.5	1,007.50	.002	--	.316
P-32	Carbonate rock, argillaceous-----	3963-RGW	2.0	1.5	--	--	--	31.7	109.5	1,010.50	.0005	--	.317
P-31	Mudstone-----	3962-RGW	.9	4.5	--	--	--	68.3	110.4	1,014.55	.001	--	.318
P-30	Mudstone, phosphatic-----	3961-RGW	.6	9.9	--	--	--	56.4	111.0	1,020.49	.002	--	.319
P-29	Mudstone, phosphatic-----	3960-RGW	1.1	11.6	--	--	--	53.5	112.1	1,033.25	.002	--	.322
P-28	Phosphate rock and mudstone-----	3887- RAS	1.1	11.9	--	--	--	52.8	113.2	1,046.34	.002	.002	.324
P-27	Mudstone, carbonatic-----	3886- RAS	1.0	1.2	--	--	--	47.3	114.2	1,047.54	.0005	--	.324
P-26	Phosphate rock, argillaceous-----	3885- RAS	.6	20.5	--	--	--	37.8	114.8	1,059.84	.004	--	.327
P-25	Mudstone and phosphate rock-----	3884- RAS	.5	18.0	--	--	--	39.7	115.3	1,068.84	.007	.007	.330
P-24	Phosphate rock, argillaceous-----	3883- RAS	.5	22.3	--	--	--	28.5	115.8	1,079.99	.006	.006	.333
--	Carbonate rock lens-----	3882- RAS	(.7)	.8	--	--	--	14.7	--	--	.0005	--	--
P-23	Carbonate rock, argillaceous-----	3881- RAS	1.8	1.4	--	--	--	28.5	117.6	1,082.51	.001	--	.335
P-22	Mudstone, phosphatic-----	3880- RAS	.6	14.1	--	--	--	48.1	118.2	1,090.97	.006	.006	.338
P-21	Mudstone, phosphatic-----	3879- RAS	1.4	14.1	--	--	--	52.1	119.6	1,110.71	.006	.006	.347
P-20	Mudstone, phosphatic-----	3878- RAS	.7	13.2	--	--	--	52.1	120.3	1,119.95	.004	--	.350
P-19	Mudstone, carbonatic-----	3794- RAS	1.4	1.5	--	--	--	52.7	121.7	1,122.05	.002	--	.352
P-18	Phosphate rock, argillaceous-----	3795- RAS	1.9	27.2	2.4	1.20	3.38	22.0	123.6	1,173.73	.010	.010	.372
P-17	Phosphate rock, argillaceous-----	3796- RAS	2.5	24.8	--	--	--	27.9	126.1	1,235.73	.005	.006	.384
P-16	Phosphate rock, argillaceous-----	3797- RAS	1.2	25.1	2.3	.42	3.26	27.8	127.3	1,265.85	.006	.007	.391
P-15	Phosphate rock, argillaceous-----	3798- RAS	1.7	28.9	1.8	.46	3.20	18.7	129.0	1,314.98	.006	.007	.401
P-14	Phosphate rock, argillaceous-----	3799- RAS	1.9	19.1	--	--	--	35.7	130.9	1,351.27	.004	--	.409
P-13	Limestone, argillaceous-----	3959-RGW	1.2	4.8	1.2	.26	25.18	30.1	132.1	1,357.03	.001	--	.410
P-12	Mudstone and argillaceous phosphate rock -	3958-RGW	.9	19.7	3.6	.77	5.64	35.6	133.0	1,374.76	.004	--	.414
P-11	Mudstone-----	3957-RGW	.8	7.4	--	--	--	57.0	133.8	1,380.68	.003	--	.416
P-10	Carbonate rock, argillaceous-----	3956-RGW	.7	7.2	--	--	--	37.7	134.5	1,385.72	.002	--	.418
P- 9	Chert, mudstone and phosphatic mudstone -	3955-RGW	.8	8.1	--	--	--	58.2	135.3	1,392.20	.001	--	.418
P- 8	Phosphate rock, argillaceous-----	3954-RGW	.6	15.7	--	--	--	36.3	135.9	1,401.62	.001	--	.419
P- 7	Carbonate rock-----	3953-RGW	1.2	1.1	--	--	--	16.7	137.1	1,402.94	.001	--	.420
P- 6	Carbonate rock, argillaceous-----	3952-RGW	1.2	3.4	--	--	--	28.0	138.3	1,407.02	.001	--	.421
P- 5	Mudstone, carbonatic and cherty carbonate rock-----	3951-RGW	1.4	3.7	--	--	--	44.2	139.7	1,412.20	.001	--	.423
P- 4	Carbonate rock, argillaceous-----	3951-RGW	1.1	2.1	--	--	--	20.3	140.8	1,414.51	.001	--	.424

North Crawford—Continued

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)					Cumulative thickness (feet)	Thickness x percent P_2O_5 (cumulative)	Uranium content (percent)		Thickness x percent eU (cumulative)
				P_2O_5	Al_2O_3	Fe_2O_3	Loss on ignition	Acid insoluble			eU	Chem. U	
P- 3	Carbonate rock and chert -----	3949-RGW	1.6	2.6	--	--	--	36.8	142.4	1,418.67	0.0005	--	0.425
--	Carbonate rock lens -----	--	(.5)	--	--	--	--	--	--	--	--	--	--
P- 2	Limestone, argillaceous and phosphate rock -----	3948-RGW	2.4	13.8	--	--	--	28.5	144.8	1,451.79	.001	--	.427
P- 1	Phosphate rock, argillaceous, carbonatic -----	3947-RGW	.3	18.4	--	--	--	22.3	145.1	1,457.31	.002	--	.428

Wells formation—top beds only

Cw-1	Mudstone, carbonatic -----	3946-RGW	2.2	2.1	--	--	--	49.0	2.2	--	.001	--	--
Cw-2	Carbonate rock, argillaceous -----	3945-RGW	1.2	2.8	--	--	--	36.7	3.4	--	.001	--	--
Cw-3	Carbonate rock, argillaceous -----	3944-RGW	1.0	3.1	--	--	--	40.7	4.4	--	.001	--	--
Cw-4	Carbonate rock, argillaceous -----	3943-RGW	2.2	--	--	--	--	--	6.6	--	--	--	--
Cw-5	Carbonate rock -----	3942-RGW	2.2	--	--	--	--	--	8.8	--	--	--	--
Cw-6	Carbonate rock, argillaceous -----	3941-RGW	1.2	--	--	--	--	--	10.0	--	--	--	--

RESTRICTED

RESTRICTED

Devils Slide, Utah, lot 1345

Park City formation measured and phosphatic beds sampled in bulldozer trench and natural outcrop 4 miles east of Morgan in Weber Canyon, sec. 26(?), T. 4 N., R. 3 E., Morgan County, Utah. The section is on the east limb of an anticline. Beds strike N. 40° E. and dip 20° E. Section measured by M. A. Warner, T. M. Cheney, R. G. Waring, and R. A. Smart and sampled by T. K. Rigby, Smart, and Warner in June 1951. Samples analyzed by U. S. Bureau of Mines Laboratory, Albany, Oreg.

Samples analyzed for eU and chem. U by the U. S. Geological Survey laboratory, Geochemistry and Petrology Branch.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)		Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)	Uranium content (percent)		Thickness x percent eU (cumulative)
				P ₂ O ₅	Acid insoluble			eU	Chem. U	
Woodside shale—basal bed only										
Tw-1	Sandstone	--	--	--	--	--	--	--	--	--
Upper member of Park City formation										
U-17	Carbonate rock-----	--	4.0	--	--	4.0	--	--	--	--
U-16	Covered interval-----	--	78.0	--	--	82.0	--	--	--	--
U-15	Carbonate rock-----	--	7.0	--	--	89.0	--	--	--	--
U-14	Carbonate rock-----	--	4.7	--	--	93.7	--	--	--	--
U-13	Covered interval-----	--	25.6	--	--	119.3	--	--	--	--
U-12	Carbonate rock, sandy-----	--	15.1	--	--	134.4	--	--	--	--
U-11	Chert-----	--	3.5	--	--	137.9	--	--	--	--
U-10	Carbonate rock, sandy and chert-----	--	5.8	--	--	143.7	--	--	--	--
U-9	Sandstone, carbonatic-----	--	6.1	--	--	149.8	--	--	--	--
U-8	Carbonate rock, cherty-----	--	9.6	--	--	159.4	--	--	--	--
U-7	Carbonate rock, cherty-----	--	8.2	--	--	167.6	--	--	--	--
U-6	Covered interval-----	--	17.4	--	--	185.0	--	--	--	--
U-5	Sandstone-----	--	19.8	--	--	204.8	--	--	--	--
U-4	Carbonate rock; fgs. col. nos. 12487 and 12488 ¹ -----	--	28.0	--	--	232.8	--	--	--	--
U-3	Covered interval-----	--	6.0	--	--	238.8	--	--	--	--
U-2	Chert-----	--	2.0	--	--	240.8	--	--	--	--
U-1	Carbonate rock, cherty-----	--	1.2	--	--	242.0	--	--	--	--
Phosphatic shale member of Park City formation (?)										
P-139	Mudstone, carbonatic-----	--	7.2	--	--	7.2	--	--	--	--
P-138	Mudstone, phosphatic-----	6182-RGW	3.2	10.8	53.8	10.4	34.56	.002	--	.006
P-137	Mudstone, carbonatic-----	6181-RGW	1.3	2.75	47.6	11.7	38.14	.002	--	.009
P-136	Mudstone-----	6180-RGW	1.4	3.65	73.6	13.1	43.24	.001	--	.010
P-135	Mudstone-----	6179-RGW	.9	3.70	66.0	14.0	46.58	.003	--	.013
P-134	Mudstone, phosphatic-----	6178-RGW	1.8	13.9	38.0	15.8	71.60	.001	--	.015

¹ Fossil collection made by J. E. Smedley, Paleontology and Stratigraphy Branch, U. S. Geological Survey.

Devils Slide—Continued

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)		Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)	Uranium content (percent)		Thickness x percent eU (cumulative)
				P ₂ O ₅	Acid insoluble			eU	Chem. U	
P-133	Mudstone, phosphatic -----	6177- RGW	2.2	10.8	46.5	18.0	95.36	0.001	--	0.017
P-132	Mudstone, phosphatic -----	6176- RGW	1.2	13.8	44.6	19.2	111.92	.001	--	.018
P-131	Mudstone, carbonatic -----	6175- RGW	1.9	4.05	40.5	21.1	119.61	.001	--	.020
P-130	Mudstone -----	6174- RGW	1.7	4.15	79.0	22.8	126.66	.001	--	.022
P-129	Mudstone -----	6173- RGW	1.7	4.10	78.3	24.5	133.64	.002	--	.025
P-128	Mudstone -----	6172- RGW	1.4	7.00	60.6	25.9	143.44	.003	--	.030
P-127	Mudstone -----	6171- RAS	2.4	3.95	65.8	28.3	152.92	.001	--	.032
P-126	Mudstone -----	6170- RAS	4.3	2.65	71.6	32.6	164.31	.001	--	.036
P-125	Mudstone, phosphatic -----	6169- RAS	1.9	13.5	49.8	34.5	189.96	.001	--	.038
P-124	Mudstone -----	6168- RAS	2.5	2.45	79.5	37.0	196.08	.000	--	.038
P-123	Phosphate rock, argillaceous -----	6167- RAS	1.5	19.9	41.3	38.5	225.94	.002	--	.041
P-122	Carbonate rock, argillaceous -----	6166- RAS	1.1	1.10	29.6	39.6	227.14	.000	--	.041
P-121	Mudstone -----	6165- RAS	3.1	6.05	73.1	42.7	245.90	.002	--	.047
P-120	Mudstone, carbonatic -----	6164- RAS	.7	1.10	45.7	43.4	246.67	.000	--	.047
P-119	Mudstone, phosphatic -----	6163- RAS	1.3	10.6	61.6	44.7	260.45	.002	--	.050
P-118	Mudstone, carbonatic -----	6162- RAS	2.2	1.90	55.3	46.9	264.63	.001	--	.052
P-117	Mudstone, phosphatic -----	6161- RAS	1.1	10.1	59.8	48.0	275.74	.002	--	.054
P-116	Carbonate rock -----	6160- RAS	1.0	1.30	15.2	49.0	277.04	.001	--	.055
P-115	Mudstone, phosphatic -----	6159- RAS	2.4	10.2	63.0	51.4	301.52	.002	--	.060
P-114	Carbonate rock, argillaceous -----	6158- TMC	1.5	1.25	32.4	52.9	303.40	.001	--	.062
P-113	Mudstone, phosphatic -----	6157- TMC	1.8	11.4	56.8	54.7	323.92	.002	--	.065
P-112	Mudstone, carbonatic -----	6156- TMC	.7	4.90	53.6	55.4	327.34	.003	--	.067
P-111	Carbonate rock -----	6155- TMC	.8	1.55	18.5	56.2	328.58	.000	--	.067
P-110	Mudstone -----	6154- TMC	1.2	4.97	68.7	57.4	334.55	.001	--	.068
P-109	Phosphate rock, argillaceous, phosphatic mudstone, mudstone and phosphate rock-----	6153- TMC	.9	19.4	29.5	58.3	352.01	.003	--	.071
P-108	Mudstone, carbonatic, phosphate rock and mudstone -----	6152- TMC	1.4	7.20	51.5	59.7	362.09	.001	--	.073
P-107	Mudstone, calcareous -----	6151- TMC	3.4	2.45	43.7	63.1	370.42	.001	--	.076
P-106	Mudstone, calcareous, phosphatic -----	6150- TMC	1.8	6.05	64.4	64.9	381.31	.002	--	.080
P-105	Phosphate rock, argillaceous and phosphatic mudstone -----	6149- TMC	1.8	23.5	28.2	66.7	423.61	.002	--	.083
P-104	Carbonate rock, argillaceous -----	6148- TMC	2.1	.50	25.0	68.8	424.66	.001	--	.085
P-103	Phosphate rock and phosphatic mudstone -----	6147- TMC	.8	17.4	32.4	69.6	438.58	.003	--	.088
P-102	Mudstone and calcareous mudstone -----	6146- TMC	1.7	3.30	40.2	71.3	444.19	.001	--	.089
P-101	Phosphate rock, argillaceous -----	6145- TMC	.5	18.8	25.3	71.8	453.59	.004	--	.091
P-100	Mudstone, carbonatic and phosphatic mudstone -----	6144- TMC	1.0	4.80	56.2	72.8	458.39	.001	--	.092

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P- 99	Phosphate rock, argillaceous, carbonatic	6143-TMC	.9	15.0	23.2	73.7	471.89	.004	--	.096
P- 98	Phosphate rock	6142-TMC	.9	23.4	21.5	74.6	492.95	.004	--	.100
P- 97	Mudstone, phosphatic, mudstone, and argillaceous carbonate rock	6141-TMC	2.0	2.70	17.4	76.6	498.35	.000	--	.100
P- 96	Phosphate rock, argillaceous	6140-TMC	1.0	22.4	28.2	77.6	520.75	.005	0.003	.105
P- 95	Mudstone, phosphatic, phosphate rock, and mudstone	6139-TMC	.4	15.0	45.0	78.0	526.75	.004	--	.106
P- 94	Phosphate rock, argillaceous	6138-TMC	1.0	22.1	31.3	79.0	548.85	.004	--	.110
P- 93	Carbonate rock, argillaceous	6137-TMC	2.6	.45	33.7	81.6	550.02	.001	--	.113
P- 92	Carbonate rock, argillaceous	6136-TMC	.5	2.15	35.5	82.1	551.09	.000	--	.113
P- 91	Phosphate rock, argillaceous	6135-TMC	.9	25.8	27.2	83.0	574.31	.003	--	.116
P- 90	Mudstone	6134-TMC	2.3	.75	86.8	85.3	576.04	.003	--	.122
P- 89	Mudstone	6133-TMC	.4	1.05	85.8	85.7	576.46	.003	--	.124
P- 88	Mudstone	6130-TMC	.6	.75	81.8	86.3	576.91	.001	--	.124
P- 87	Mudstone	6129-TMC	1.8	1.15	83.7	88.1	578.98	.001	--	.126
P- 86	Mudstone and phosphate rock	6128-TMC	.6	13.4	52.4	88.7	587.02	.003	--	.128
P- 85	Phosphate rock and mudstone	6127-TMC	.4	20.8	35.6	89.1	595.34	.003	--	.129
P- 84	Phosphate rock, argillaceous	6126-TMC	.6	22.8	26.4	89.7	609.02	.004	--	.131
P- 83	Mudstone, phosphatic	6125-TMC	.9	17.5	46.0	90.6	624.77	.002	--	.133
P- 82	Mudstone	6124-TMC	.7	6.20	75.2	91.3	629.11	.002	--	.135
P- 81	Brecciated zone (possible fault zone)	--	4.2	--	--	95.5	--	--	--	--
P- 80	Siltstone, calcareous	--	1.9	--	--	97.4	--	--	--	--
P- 79	Carbonate rock; fos. col. no. 12485	--	3.0	--	--	100.4	--	--	--	--
P- 78	Sandstone, carbonatic	--	22.8	--	--	123.2	--	--	--	--
P- 77	Breccia (possible fault zone)	--	28.2	--	--	151.4	--	--	--	--
P- 76	Sandstone, carbonatic	--	3.7	--	--	155.1	--	--	--	--
P- 75	Mudstone	--	1.0	--	--	156.1	--	--	--	--
P- 74	Mudstone, phosphatic	6132-MAW	.7	10.0	53.1	156.8	--	.002	--	--
P- 73	Mudstone, carbonatic	6131-MAW	2.9	4.65	40.1	159.7	--	.001	--	--
P- 72	Mudstone	--	2.3	--	--	162.0	--	--	--	--
P- 71	Mudstone	--	4.1	--	--	166.1	--	--	--	--
P- 70	Mudstone	--	3.4	--	--	169.5	--	--	--	--
P- 69	Mudstone	--	3.4	--	--	172.9	--	--	--	--
P- 68	Mudstone and chert	--	2.9	--	--	175.8	--	--	--	--
P- 67	Mudstone	--	3.4	--	--	179.2	--	--	--	--
P- 66	Mudstone	--	3.2	--	--	182.4	--	--	--	--
P- 65	Mudstone, carbonatic	6123-MAW	3.2	2.25	58.1	185.6	*7.20	.002	--	*.006
P- 64	Mudstone, carbonatic	6122-MAW	2.7	2.00	52.2	188.3	12.60	.000	--	.006
P- 63	Mudstone, carbonatic	6121-MAW	.5	8.85	46.9	188.8	17.02	.002	--	.007
P- 62	Mudstone, carbonatic	6120-MAW	1.5	3.45	52.1	190.3	22.20	.001	--	.009
P- 61	Mudstone, carbonatic	6119-MAW	2.3	5.70	50.8	192.6	35.31	.002	--	.014
P- 60	Mudstone, carbonatic	6118-MAW	2.5	4.70	38.2	195.1	47.06	.001	--	.016

* Cumulative data incomplete because of missing information. Cumulatives start from zero after interruption.

Devils Slide—Continued

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)		Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)	Uranium content (percent)		Thickness x percent eU (cumulative)
				P ₂ O ₅	Acid insoluble			eU	Chem. U	
P-59	Mudstone, carbonatic -----	6117-MAW	1.5	3.50	42.2	196.6	52.31	0.001	--	0.018
P-58	Mudstone, carbonatic -----	6116-MAW	1.5	1.75	40.2	198.1	54.94	.001	--	.019
P-57	Mudstone, carbonatic -----	6115-MAW	1.4	4.00	45.7	199.5	60.54	.001	--	.020
P-56	Phosphate rock, carbonatic, argillaceous -----	6114-MAW	.35	17.2	22.6	199.85	66.56	.003	--	.021
P-55	Mudstone -----	--	2.7	--	--	202.55	--	--	--	--
P-54	Mudstone -----	--	3.0	--	--	205.55	--	--	--	--
P-53	Mudstone -----	--	3.6	--	--	209.15	--	--	--	--
P-52	Mudstone, cherty and mudstone -----	--	1.3	--	--	210.45	--	--	--	--
P-51	Mudstone, cherty -----	--	1.4	--	--	211.85	--	--	--	--
P-50	Mudstone, cherty -----	--	2.8	--	--	214.65	--	--	--	--
P-49	Mudstone -----	--	1.9	--	--	216.55	--	--	--	--
P-48	Mudstone, cherty -----	--	.9	--	--	217.45	--	--	--	--
P-47	Mudstone -----	--	2.3	--	--	219.75	--	--	--	--
P-46	Mudstone -----	--	.9	--	--	220.65	--	--	--	--
P-45	Mudstone, carbonatic -----	6113-MAW	.8	1.30	54.8	221.45	*1.04	.001	--	*.001
P-44	Mudstone, carbonatic -----	6112-MAW	3.0	.04	47.4	224.45	1.16	.000	--	.001
P-43	Mudstone -----	6111-MAW	.9	1.35	83.7	225.35	2.38	.003	--	.004
P-42	Mudstone -----	6110-MAW	1.8	3.15	78.5	227.15	8.04	.003	--	.009
P-41	Mudstone -----	6109-MAW	1.3	4.90	73.2	228.45	14.42	.003	--	.013
P-40	Mudstone, carbonatic -----	6108-MAW	2.2	1.15	55.0	230.65	16.94	.001	--	.015
P-39	Mudstone, carbonatic -----	6107-MAW	5.5	.40	59.3	236.15	19.14	.001	--	.020
P-38	Mudstone, carbonatic -----	6106-MAW	3.7	.50	63.6	239.85	21.00	.001	--	.024
P-37	Carbonate rock -----	6105-MAW	1.1	.55	7.3	240.95	21.60	.001	--	.025
P-36	Mudstone -----	6104-MAW	1.6	1.25	72.5	242.55	23.60	.002	--	.028
P-35	Mudstone -----	6103-MAW	1.5	6.60	66.5	244.05	33.50	.003	--	.033
P-34	Mudstone -----	6102-MAW	2.6	.70	81.6	246.65	35.32	.002	--	.038
P-33	Mudstone -----	6101-MAW	2.9	1.20	82.8	249.55	38.80	.001	--	.041
P-32	Mudstone -----	6100-MAW	3.1	6.60	67.2	252.65	59.26	.003	--	.050
P-31	Mudstone, carbonatic -----	6099-MAW	3.2	4.85	55.4	255.85	74.78	.002	--	.057
P-30	Mudstone, carbonatic -----	6098-MAW	1.1	2.25	65.2	256.95	77.26	.002	--	.059
P-29	Mudstone -----	6097-MAW	1.2	3.30	74.7	258.15	81.22	.002	--	.061
P-28	Limestone; fos. col. no. 12484 -----	6096-MAW	4.1	.70	16.5	262.25	84.08	.001	--	.066
P-27	Limestone, argillaceous; fos. col. no. 12484 -----	6095-MAW	1.9	.80	27.3	264.15	85.60	.001	--	.067
P-26	Mudstone, carbonatic -----	6094-MAW	2.0	5.45	54.3	266.15	96.51	.002	--	.071
P-25	Mudstone, carbonatic -----	6093-MAW	1.4	5.35	46.9	267.55	104.00	.003	--	.076
P-24	Carbonate rock and phosphate rock -----	6092-MAW	1.0	8.00	12.8	268.55	112.00	.001	--	.077

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P-23	Mudstone and phosphatic mudstone -----	6091-MAW	.7	11.2	43.1	269.25	119.84	.003	--	.079
P-22	Carbonate rock, phosphatic -----	6090-MAW	.9	14.2	10.6	270.15	132.62	.003	--	.081
P-21	Phosphate rock, argillaceous -----	6089-MAW	1.0	16.3	32.9	271.15	148.92	.005	.003	.086
P-20	Mudstone, carbonatic -----	6088-MAW	1.8	4.70	52.1	272.95	157.38	.002	--	.090
P-19	Mudstone, phosphatic -----	6087-MAW	2.3	14.7	37.4	275.25	191.18	.004	--	.099
P-18	Carbonate rock, phosphatic, argillaceous ---	6086-MAW	.9	9.25	23.4	276.15	199.51	.002	--	.101
P-17	Mudstone, carbonatic, phosphatic -----	6085-MAW	1.9	8.10	40.8	278.05	214.90	.001	--	.103
P-16	Mudstone, phosphatic -----	6084-MAW	2.1	13.5	47.2	280.15	243.25	.003	--	.109
P-15	Phosphate rock, carbonatic, argillaceous ---	6083-MAW	.8	14.6	24.7	280.95	254.93	.003	--	.112
P-14	Carbonate rock -----	6082-MAW	1.0	2.60	7.7	281.95	257.53	.001	--	.113
P-13	Phosphate rock, carbonatic, argillaceous ---	6081-MAW	1.2	18.1	22.6	283.15	279.25	.003	--	.116
P-12	Carbonate rock, phosphatic, argillaceous ---	6080-MAW	.9	10.4	23.5	284.05	288.61	.005	.003	.121
P-11	Brecciated mudstone containing much calcite and chert -----	--	2.2	--	--	286.25	--	--	--	--
P-10	Carbonate rock, argillaceous; fos. col. no. 12483 -----	6079-MAW	2.0	1.35	33.3	288.25	*2.70	.000	--	*.000
P- 9	Mudstone, carbonatic -----	6078-MAW	1.4	2.15	58.9	289.65	5.71	.000	--	.000
P- 8	Mudstone, phosphatic -----	6077-MAW	1.0	10.5	57.9	290.65	16.21	.004	--	.004
P- 7	Carbonate rock, argillaceous -----	6076-MAW	1.2	3.95	26.7	291.85	20.95	.006	.003	.011
P- 6	Carbonate rock; fos. col. no. 12482 -----	6075-MAW	.7	4.75	14.5	292.55	24.28	.004	--	.014
P- 5	Carbonate rock; fos. col. no. 12482 -----	6074-MAW	1.2	7.50	12.5	293.75	**33.28	.008	.008	** .024
P- 4	Mudstone -----	--	1.4	--	--	295.15	--	--	--	--
P- 3	Mudstone, carbonatic -----	--	2.3	--	--	297.45	--	--	--	--
P- 2	Carbonate rock, argillaceous -----	--	3.9	--	--	301.35	--	--	--	--
P- 1	Mudstone, phosphatic, and argillaceous phosphate rock -----	6185- RAS	1.7	11.6	45.9	303.05	--	.002	--	--

Lower member of Park City formation (?)

L-41	Mudstone, carbonatic -----	--	3.3	--	--	3.3	--	--	--	--
L-40	Clay containing fragments of cherty carbonate rock -----	--	11.0	--	--	14.3	--	--	--	--
L-39	Carbonate rock -----	--	3.5	--	--	17.8	--	--	--	--
L-38	Mudstone -----	--	1.9	--	--	19.7	--	--	--	--
L-37	Mudstone -----	--	.7	--	--	20.4	--	--	--	--
L-36	Mudstone -----	--	2.2	--	--	22.6	--	--	--	--
L-35	Mudstone -----	--	1.5	--	--	24.1	--	--	--	--
L-34	Mudstone -----	--	1.9	--	--	26.0	--	--	--	--
L-33	Mudstone -----	--	1.6	--	--	27.6	--	--	--	--
L-32	Mudstone -----	--	2.8	--	--	30.4	--	--	--	--
L-31	Mudstone, phosphatic -----	6184- RAS	.8	15.9	42.3	31.2	--	.002	--	--
L-30	Quartzite, argillaceous -----	--	1.8	--	--	33.0	--	--	--	--
L-29	Carbonate rock, cherty -----	--	2.0	--	--	35.0	--	--	--	--

* Cumulative data incomplete because of missing information. Cumulatives start from zero after interruption.

** Note incompleteness of cumulative data.

Devils Slide—Continued

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)		Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative) ⁵	Uranium content (percent)		Thickness x percent eU (cumulative)
				P ₂ O ₅	Acid insoluble			eU	Chem. U	
L-28	Carbonate rock, cherty -----	--	3.6	--	--	38.6	--	--	--	--
L-27	Carbonate rock -----	--	2.5	--	--	41.1	--	--	--	--
L-26	Mudstone, carbonatic -----	--	2.9	--	--	44.0	--	--	--	--
L-25	Mudstone and phosphate rock -----	6183- RAS	(1.1)	16.4	47.5	--	--	0.003	--	--
L-24	Mudstone, carbonatic -----	--	(2.2)	--	--	--	--	--	--	--
L-23	Mudstone, carbonatic; fos. col. no. 12481 -----	--	(2.3)	--	--	--	--	--	--	--
L-22	Mudstone -----	--	(.8)	--	--	--	--	--	--	--
L-21	Mudstone, carbonatic -----	--	(1.7)	--	--	--	--	--	--	--
L-20	Mudstone; fos. col. no. 12480 -----	--	(.8)	--	--	--	--	--	--	--
L-19	Mudstone, carbonatic, chert, and mudstone -----	--	(.6)	--	--	--	--	--	--	--
L-18	Carbonate rock -----	--	(2.9)	--	--	--	--	--	--	--
L-17	Mudstone, carbonatic; fos. col. no. 12479 -----	--	(.9)	--	--	--	--	--	--	--
L-16	Mudstone -----	--	(.8)	--	--	--	--	--	--	--
L-15	Mudstone -----	--	(3.9)	--	--	--	--	--	--	--
L-14	Mudstone, carbonatic -----	--	(2.3)	--	--	--	--	--	--	--
L-13	Mudstone, carbonatic; fos. col. no. 12478 -----	--	(2.5)	--	--	--	--	--	--	--
L-12	Carbonate rock -----	--	(2.4)	--	--	--	--	--	--	--
L-11	Mudstone -----	--	(.9)	--	--	--	--	--	--	--
L-10	Carbonate rock, argillaceous -----	--	(3.3)	--	--	--	--	--	--	--
	Section possibly faulted, remainder measured on north side of canyon. Bed L-25 correlated with beds L-6, 7, and 8; beds L-10 through L-24 represent upper part of L-5. Beds below L-6 poorly exposed and not described in detail.									
L- 9	Mudstone -----	--	(.7)	--	--	--	--	--	--	--
L- 8	Mudstone, phosphatic -----	6188-RGW	1.2	14.4	44.3	45.2	--	.004	--	--
L- 7	Mudstone -----	6187-RGW	.5	6.10	68.3	45.7	--	.003	--	--
L- 6	Carbonate rock, argillaceous -----	6186-RGW	.7	4.15	33.4	46.4	--	.002	--	--
L- 5	Mudstone -----	--	65.0	--	--	111.4	--	--	--	--
L- 4	Mudstone -----	--	77.0	--	--	188.4	--	--	--	--
L- 3	Carbonate rock, chert, and cherty carbonate rock -----	--	27.0	--	--	215.4	--	--	--	--
L- 2	Covered -----	--	97.0	--	--	312.4	--	--	--	--

L-1	Sandstone-----	--	164.0	--	--	--	476.4	--	--	--	--
Weber formation—top bed only (?)											
Cw-1	Sandstone-----	--	--	--	--	--	--	--	--	--	--

Lot 1345

II - Utah - 13

Franson Canyon (Pinon Canyon), Utah, lot 1347

Park City formation measured and sampled at natural exposure on the north flank of the Uinta Mountains axis in Franson Canyon, sec. 14, T. 1 S., R. 6 E., Summit County, Utah. Beds strike N. 80° E. and dip 30° N. Section measured and sampled by T. M. Cheney, R. A. Smart, M. A. Warner, and R. G. Waring in June 1951. Samples analyzed by Trace Elements Section laboratory, Denver, Colo.

Samples analyzed for eU and chem. U by the U. S. Geological Survey laboratory, Geochemistry and Petrology Branch.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)		Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative) ⁵	Uranium content (percent)		Thickness x percent eU (cumulative)
				P ₂ O ₅	Acid insoluble			eU	Chem. U	
Upper member of Park City formation—top not exposed										
	Woodside-Park City contact covered; approximate thickness of covered interval	--	15.0	--	--	15.0	--	--	--	--
U-70	Carbonate rock; fos. col. no. 12500 ¹ -----	--	2.8	--	--	17.8	--	--	--	--
U-69	Carbonate rock, argillaceous; fos. col. no. 12500-----	--	3.2	--	--	21.0	--	--	--	--
U-68	Carbonate rock; fos. col. no. 12500-----	--	3.1	--	--	24.1	--	--	--	--
U-67	Carbonate rock; fos. col. no. 12500-----	--	3.2	--	--	27.3	--	--	--	--
U-66	Carbonate rock, argillaceous; fos. col. no. 12500-----	--	2.7	--	--	30.0	--	--	--	--
U-65	Carbonate rock; fos. col. no. 12500-----	--	1.9	--	--	31.9	--	--	--	--
U-64	Siltstone, carbonatic; fos. col. no. 12500----	--	2.5	--	--	34.4	--	--	--	--
U-63	Siltstone, carbonatic; fos. col. no. 12500----	--	1.7	--	--	36.1	--	--	--	--
U-62	Siltstone, carbonatic-----	--	1.2	--	--	37.3	--	--	--	--
U-61	Siltstone, carbonatic-----	--	2.9	--	--	40.2	--	--	--	--
U-60	Siltstone, carbonatic-----	--	1.9	--	--	42.1	--	--	--	--
U-59	Siltstone, carbonatic; fos. col. no. 12499----	--	2.1	--	--	44.2	--	--	--	--
U-58	Carbonate rock-----	--	2.0	--	--	46.2	--	--	--	--
U-57	Carbonate rock, silty-----	6320- RAS	.4	6.9	31.3	46.6	--	0.001	--	--
U-56	Sandstone, carbonatic-----	--	4.7	--	--	51.3	--	--	--	--
U-55	Carbonate rock-----	--	2.8	--	--	54.1	--	--	--	--
U-54	Carbonate rock-----	--	4.4	--	--	58.5	--	--	--	--
U-53	Mudstone, carbonatic-----	--	1.3	--	--	59.8	--	--	--	--
U-52	Mudstone, carbonatic-----	--	1.8	--	--	61.6	--	--	--	--
U-51	Mudstone, carbonatic-----	--	1.2	--	--	62.8	--	--	--	--
U-50	Carbonate rock, argillaceous-----	--	3.1	--	--	65.9	--	--	--	--
U-49	Siltstone-----	--	7.2	--	--	73.1	--	--	--	--
U-48	Siltstone, carbonatic-----	--	12.4	--	--	85.5	--	--	--	--
U-47	Carbonate rock, argillaceous-----	--	1.2	--	--	86.7	--	--	--	--
U-46	Mudstone, carbonatic-----	--	.7	--	--	87.4	--	--	--	--

Lot 1347

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U-45	Carbonate rock, argillaceous -----	--	8.1	--	--	95.5	--	--	--	--
U-44	Siltstone -----	--	3.9	--	--	99.4	--	--	--	--
U-43	Sandstone, carbonatic -----	--	2.2	--	--	101.6	--	--	--	--
U-42	Sandstone -----	--	8.7	--	--	110.3	--	--	--	--
U-41	Sandstone, carbonatic -----	--	12.9	--	--	123.2	--	--	--	--
U-40	Siltstone, carbonatic -----	--	5.3	--	--	128.5	--	--	--	--
U-39	Mudstone, carbonatic -----	6319-MAW	2.2	0.60	64.7	130.7	--	0.001	--	--
U-38	Carbonate rock, argillaceous -----	6318-MAW	1.5	6.00	30.9	132.2	--	.001	--	--
U-37	Carbonate rock, sandy, and argillaceous carbonate rock -----	--	3.4	--	--	135.6	--	--	--	--
U-36	Carbonate rock, argillaceous -----	--	5.6	--	--	141.2	--	--	--	--
U-35	Carbonate rock; fos. col. no. 12498 -----	--	3.0	--	--	144.2	--	--	--	--
U-34	Sandstone; fos. col. no. 12498 -----	--	2.3	--	--	146.5	--	--	--	--
U-33	Sandstone, carbonatic; fos. col. no. 12498 -----	--	2.0	--	--	148.5	--	--	--	--
U-32	Chert and carbonatic sandstone; fos. col. no. 12498 -----	--	1.9	--	--	150.4	--	--	--	--
U-31	Chert -----	--	1.9	--	--	152.3	--	--	--	--
U-30	Siltstone -----	--	1.7	--	--	154.0	--	--	--	--
U-29	Siltstone, cherty -----	--	1.9	--	--	155.9	--	--	--	--
U-28	Siltstone, carbonatic -----	--	1.5	--	--	157.4	--	--	--	--
U-27	Siltstone; fos. col. no. 12497 -----	--	3.9	--	--	161.3	--	--	--	--
U-26	Siltstone, carbonatic -----	--	1.5	--	--	162.8	--	--	--	--
U-25	Carbonate rock, argillaceous; fos. col. no. 12496 -----	--	1.9	--	--	164.7	--	--	--	--
U-24	Sandstone, carbonatic -----	--	1.0	--	--	165.7	--	--	--	--
U-23	Carbonate rock -----	--	.5	--	--	166.2	--	--	--	--
U-22	Chert and cherty carbonate rock -----	--	1.0	--	--	167.2	--	--	--	--
U-21	Chert -----	--	1.0	--	--	168.2	--	--	--	--
U-20	Sandstone, carbonatic -----	--	1.8	--	--	170.0	--	--	--	--
U-19	Chert -----	--	1.8	--	--	171.8	--	--	--	--
U-18	Chert -----	--	2.3	--	--	174.1	--	--	--	--
U-17	Carbonate rock, sandy -----	--	4.0	--	--	178.1	--	--	--	--
U-16	Carbonate rock -----	--	3.6	--	--	181.7	--	--	--	--
U-15	Chert -----	--	3.7	--	--	185.4	--	--	--	--
U-14	Chert and carbonate rock -----	--	3.8	--	--	189.2	--	--	--	--
U-13	Carbonate rock, cherty -----	--	5.4	--	--	194.6	--	--	--	--
U-12	Chert -----	--	1.2	--	--	195.8	--	--	--	--
U-11	Carbonate rock, sandy -----	--	5.2	--	--	201.0	--	--	--	--
U-10	Siltstone, carbonatic; fos. col. no. 12495 -----	--	5.3	--	--	206.3	--	--	--	--
U-9	Siltstone, carbonatic; fos. col. no. 12495 -----	--	4.3	--	--	210.6	--	--	--	--
U-8	Siltstone, carbonatic; fos. col. no. 12495 -----	--	4.7	--	--	215.3	--	--	--	--

1 Fossil collection made by J. E. Smedley, Paleontology and Stratigraphy Branch, U. S. Geological Survey.

Franson Canyon—Continued

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)		Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)	Uranium content (percent)		Thickness x percent eU (cumulative)
				P ₂ O ₅	Acid insoluble			eU	Chem. U	
U- 7	Siltstone, carbonatic; fos. col. no. 12494 ----	--	1.4	--	--	216.7	--	--	--	--
U- 6	Siltstone, carbonatic; fos. col. no. 12494 ----	--	1.1	--	--	217.8	--	--	--	--
U- 5	Siltstone; fos. col. no. 12494 -----	--	1.1	--	--	218.9	--	--	--	--
U- 4	Covered interval; fos. col. no. 12494-----	--	7.6	--	--	226.5	--	--	--	--
U- 3	Carbonate rock; fos. col. no. 12494 -----	--	2.5	--	--	229.0	--	--	--	--
U- 2	Carbonate rock, argillaceous; fos. col. no. 12493-----	--	12.9	--	--	241.9	--	--	--	--
U- 1	Limestone, argillaceous -----	--	1.7	--	--	243.6	--	--	--	--
Phosphatic shale member of Park City formation (?)										
P-50	Siltstone, carbonatic -----	--	2.3	--	--	2.3	--	--	--	--
P-49	Mudstone, carbonatic; fos. col. no. 12492 ---	--	.5	--	--	2.8	--	--	--	--
P-48	Carbonate rock, cherty -----	--	1.1	--	--	3.9	--	--	--	--
P-47	Carbonate rock, phosphatic; fos. col. no. 12492 -----	6317- RAS	1.0	7.85	8.7	4.9	7.85	0.001	--	0.001
P-46	Carbonate rock, argillaceous -----	6316- RAS	1.1	2.80	39.3	6.0	10.93	.002	--	.003
P-45	Carbonate rock; fos. col. no. 12491 -----	6315- RAS	.3	7.20	12.1	6.3	13.09	.001	--	.004
P-44	Siltstone, cherty, carbonatic -----	6314- RAS	2.6	2.15	47.8	8.9	18.68	.001	--	.006
P-43	Mudstone, carbonatic -----	6313- RAS	.4	4.30	45.9	9.3	20.40	.002	--	.007
P-42	Siltstone, cherty, carbonatic -----	--	1.3	--	--	10.6	--	--	--	--
P-41	Carbonate rock -----	--	1.5	--	--	12.1	--	--	--	--
P-40	Carbonate rock, cherty -----	--	5.4	--	--	17.5	--	--	--	--
P-39	Mudstone, phosphatic, carbonatic -----	6312- RAS	1.1	12.6	39.2	18.6	13.86	.000	--	.000
P-38	Carbonate rock, argillaceous -----	6311- RAS	1.5	2.95	33.6	20.1	18.28	.001	--	.002
P-37	Mudstone, carbonatic, phosphatic -----	6310- RAS	.8	9.80	47.5	20.9	26.12	.003	--	.004
P-36	Mudstone, carbonatic -----	6309- RAS	1.0	2.65	68.8	21.9	28.78	.001	--	.005
P-35	Carbonate rock -----	--	3.4	--	--	25.3	--	--	--	--
P-34	Carbonate rock -----	--	2.9	--	--	28.2	--	--	--	--
P-33	Carbonate rock -----	--	2.3	--	--	30.5	--	--	--	--
P-32	Carbonate rock -----	--	1.1	--	--	31.6	--	--	--	--
P-31	Carbonate rock -----	--	1.7	--	--	33.3	--	--	--	--
P-30	Mudstone, cherty -----	--	1.8	--	--	35.1	--	--	--	--
P-29	Carbonate rock -----	--	1.3	--	--	36.4	--	--	--	--
P-28	Siltstone -----	--	1.7	--	--	38.1	--	--	--	--
P-27	Siltstone, carbonatic and chert-----	--	4.2	--	--	42.3	--	--	--	--
P-26	Siltstone, carbonatic and chert-----	--	1.8	--	--	44.1	--	--	--	--

P-25	Chert -----	--	1.8	--	--	45.9	--	--	--	--
P-24	Siltstone and chert -----	--	8.4	--	--	54.3	--	--	--	--
P-23	Mudstone -----	6308-TMC	.4	2.55	78.0	54.7	1.02	.001	--	.000
P-22	Carbonate rock, argillaceous -----	6307-TMC	1.0	.95	26.1	55.7	1.97	.001	--	.001
P-21	Carbonate rock, argillaceous -----	6306-TMC	1.9	3.25	38.7	57.6	8.14	.002	--	.005
P-20	Carbonate rock, argillaceous -----	6305-TMC	.8	1.40	26.7	58.4	9.26	.000	--	.005
P-19	Mudstone, carbonatic -----	6304-TMC	4.9	2.75	45.8	63.3	22.74	.002	--	.015
P-18	Siltstone, carbonatic -----	6303-TMC	2.0	1.70	51.3	65.3	26.14	.001	--	.017
P-17	Siltstone, carbonatic -----	6302-RGW	2.2	2.05	60.7	67.5	30.65	.001	--	.019
P-16	Siltstone, carbonatic -----	6301-RGW	1.5	5.30	42.2	69.0	38.60	.003	--	.024
P-15	Carbonate rock -----	6300-RGW	1.9	.90	17.9	70.9	40.31	.001	--	.026
P-14	Siltstone, carbonatic -----	6299-RGW	4.3	3.65	66.8	75.2	56.01	.003	--	.038
P-13	Siltstone -----	6298-RGW	1.5	4.25	70.9	76.7	62.38	.003	--	.043
P-12	Sandstone, carbonatic -----	6297-RGW	1.5	.40	46.4	78.2	62.98	.001	--	.044
P-11	Siltstone, carbonatic -----	6296-RGW	3.8	5.75	56.1	82.0	84.83	.002	--	.052
P-10	Siltstone, carbonatic -----	6295-RGW	2.2	6.90	50.9	84.2	100.01	.002	--	.056
P-9	Siltstone, carbonatic, phosphatic -----	6294-RGW	1.7	10.1	45.7	85.9	117.18	.003	--	.062
P-8	Siltstone, carbonatic, phosphatic -----	6293-RGW	1.9	8.45	41.8	87.8	133.24	.003	--	.067
P-7	Carbonate rock, argillaceous, phosphatic --	6292-RGW	2.7	9.75	30.0	90.5	159.56	.002	--	.073
P-6	Phosphate rock, argillaceous, carbonatic --	6291-RGW	1.8	17.0	31.4	92.3	190.16	.005	.004	.082
P-5	Carbonate rock -----	6290-RGW	1.8	2.65	10.6	94.1	194.93	.001	--	.084
P-4	Carbonate rock, argillaceous, phosphatic --	6289-RGW	1.6	9.15	36.5	95.7	209.57	.004	--	.090
P-3	Siltstone and argillaceous phosphate rock --	6288-RGW	1.2	16.2	18.9	96.9	229.01	.004	--	.095
P-2	Phosphate rock, carbonatic -----	6287-RGW	.6	24.5	18.3	97.5	243.71	.006	.004	.098
P-1	Phosphate rock; fos. col. no. 12490 -----	6286-RGW	.5	29.5	16.6	98.0	258.46	.005	.003	.101

Lower member of Park City formation (?)

L-5	Sandstone, calcareous; fos. col. no. 12490 --	--	11.9	--	--	11.9	--	--	--	--
L-4	Sandstone -----	--	8.5	--	--	20.4	--	--	--	--
L-3	Chert and calcareous sandstone -----	--	1.2	--	--	21.6	--	--	--	--
L-2	Sandstone; fos. col. no. 12489 -----	--	10.0	--	--	31.6	--	--	--	--
L-1	Sandstone, calcaroues -----	--	13.0	--	--	44.6	--	--	--	--

Horseshoe Canyon, Utah, lot 1339

Park City formation measured and sampled in hand trenches and at natural exposure in Horseshoe Canyon on the north side of the Green River, sec. 36, T. 3 N., R. 20 E., Dagbatt County, Utah. Beds strike S. 50° E. and dip 15° N. Section measured and sampled by R. G. Waring, R. A. Smart, H. W. Peirce, and T. M. Cheney in September 1950. Samples analyzed by U. S. Bureau of Mines laboratory, Albany, Ore.

Samples analyzed for eU and chem. U by the U. S. Geological Survey laboratory, Geochemistry and Petrology Branch.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)		Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative) ⁵	Uranium content (percent)		Thickness x percent eU (cumulative)
				P ₂ O ₅	Acid insoluble			eU	Chem. U	
Upper member of Park City formation—top not exposed										
U-30	Carbonate rock; fos. col. no. 12287 ¹ -----	--	4.0	--	--	4.0	--	--	--	--
U-29	Carbonate rock; fos. col. no. 12287 -----	--	3.6	--	--	7.6	--	--	--	--
U-28	Carbonate rock, argillaceous -----	--	2.6	--	--	10.2	--	--	--	--
U-27	Carbonate rock-----	--	15.0	--	--	25.2	--	--	--	--
U-26	Carbonate rock; fos. col. no. 12286-----	--	25.	--	--	50.2	--	--	--	--
U-25	Carbonate rock; fos. col. no. 12286 -----	--	4.1	--	--	54.3	--	--	--	--
U-24	Carbonate rock; fos. col. no. 12286 -----	--	7.3	--	--	61.6	--	--	--	--
U-23	Carbonate rock-----	--	6.3	--	--	67.9	--	--	--	--
U-22	Carbonate rock, argillaceous -----	--	9.0	--	--	76.9	--	--	--	--
U-21	Carbonate rock-----	--	4.2	--	--	81.1	--	--	--	--
U-20	Carbonate rock-----	--	4.2	--	--	85.3	--	--	--	--
U-19	Covered interval; dominantly carbonate rock float -----	--	26.	--	--	111.3	--	--	--	--
U-18	Gypsum -----	--	1.0	--	--	112.3	--	--	--	--
U-17	Mudstone, carbonatic, gypsiferous-----	--	1.8	--	--	114.1	--	--	--	--
U-16	Sandstone, carbonatic -----	5305-RGW	3.6	0.2	68.8	117.7	0.72	0.002	--	0.007
U-15	Sandstone, carbonatic -----	5304-RGW	1.9	.2	68.0	119.6	1.10	.003	--	.013
U-14	Sandstone -----	5303-RGW	2.9	.2	74.5	122.5	1.68	.003	--	.022
U-13	Sandstone -----	5302-RGW	2.1	.2	73.6	124.6	2.10	.002	--	.026
U-12	Sandstone-----	5301-RGW	3.1	.4	70.7	127.7	3.34	.003	--	.035
U-11	Sandstone, carbonatic -----	--	4.0	--	--	131.7	--	--	--	--
U-10	Carbonate rock, sandy; fos. col. no. 12285--	5300-RGW	3.3	1.1	41.3	135.0	--	.002	--	--
U-9	Carbonate rock, sandy; fos. col. no. 12285--	5299-RGW	2.9	1.0	42.9	137.9	--	.001	--	--
U-8	Sandstone, carbonatic; fos. col. no. 12285 --	--	12.0	--	--	149.9	--	--	--	--
U-7	Carbonate rock; fos. col. no. 12284 -----	--	3.2	--	--	153.1	--	--	--	--
U-6	Mudstone, cherty-----	--	4.7	--	--	157.8	--	--	--	--
U-5	Carbonate rock-----	--	5.2	--	--	163.0	--	--	--	--
U-4	Gypsum -----	--	.3	--	--	163.3	--	--	--	--
U-3	Mudstone -----	--	.5	--	--	163.8	--	--	--	--
U-2	Carbonate rock-----	--	4.0	--	--	167.8	--	--	--	--
U-1	Carbonate rock; fos. col. no. 12283 -----	--	7.6	--	--	175.4	--	--	--	--

Phosphatic shale member of Park City formation

P-28	Carbonate rock, phosphatic, argillaceous; fos. col. no. 12282-----	5298-RGW	1.5	8.4	24.4	1.5	12.60	0.004	--	0.006
P-27	Carbonate rock, phosphatic, argillaceous; fos. col. no. 12281-----	5297-RGW	1.3	9.1	25.8	2.8	24.43	.003	--	.010
P-26	Mudstone, carbonatic; fos. col. no. 12280---	5296-RGW	1.9	8.1	36.8	4.7	39.82	.003	--	.016
P-25	Carbonate rock and chert; fos. col. no. 12279-----	5295-RGW	3.0	2.7	58.0	7.7	47.92	.002	--	.022
P-24	Phosphate rock, argillaceous and dolomite; fos. col. no. 12278-----	5294-RGW	1.4	16.0	30.2	9.1	70.32	.003	--	.026
P-23	Phosphate rock, argillaceous, carbonatic; fos. col. no. 12277-----	5293-RGW	1.2	14.3	25.3	10.3	87.48	.002	--	.028
P-22	Carbonate rock; fos. col. no. 12276-----	5292-HWP	.7	6.8	10.9	11.0	92.24	.002	--	.030
P-21	Mudstone, phosphatic, carbonatic; fos. col. no. 12275-----	5291-HWP	2.2	10.2	36.2	13.2	114.68	.002	--	.034
P-20	Mudstone, carbonatic; fos. col. no. 12274---	5290-HWP	2.0	6.8	43.9	15.2	128.28	.002	--	.032
P-19	Mudstone, carbonatic-----	5289-RAS	3.1	6.8	50.7	18.3	149.36	.002	--	.044
P-18	Mudstone, phosphatic-----	5288-RAS	2.0	11.1	44.0	20.3	171.56	.002	--	.048
P-17	Mudstone, carbonatic-----	5287-RAS	1.1	6.3	52.3	21.4	178.49	.002	--	.050
P-16	Phosphate rock, argillaceous-----	5286-RAS	1.5	20.1	30.8	22.9	208.64	.003	--	.055
P-15	Phosphate rock, carbonatic; fos. col. no. 12273-----	5285-RAS	.9	18.0	10.8	23.8	224.84	.004	--	.058
P-14	Phosphate rock, argillaceous; fos. col. no. 12273-----	5284-RAS	.5	22.4	15.3	24.3	236.04	.005	0.004	.061
P-13	Mudstone, phosphatic, carbonatic-----	5283-RAS	1.6	8.7	36.8	25.9	249.96	.002	--	.064
P-12	Mudstone, carbonatic-----	5282-RAS	1.8	4.6	40.3	27.7	258.24	.002	--	.068
P-11	Mudstone, phosphatic, carbonatic-----	5281-RAS	1.2	8.7	35.8	28.9	268.68	.003	--	.071
P-10	Carbonate rock, phosphatic-----	5280-RAS	1.4	13.0	10.4	30.3	286.88	.002	--	.074
P-9	Phosphate rock, argillaceous-----	5279-RAS	1.5	24.6	26.0	31.8	323.78	.004	--	.080
P-8	Phosphate rock, argillaceous-----	5278-RAS	1.9	20.1	18.8	33.7	361.97	.004	--	.088
P-7	Mudstone, carbonatic-----	5277-RAS	1.1	5.6	39.8	34.8	368.13	.003	--	.091
P-6	Phosphate rock, argillaceous-----	5276-RAS	.6	19.8	30.2	35.4	380.01	.003	--	.093
P-5	Mudstone, phosphatic-----	5275-RAS	1.7	7.8	53.6	37.1	393.27	.004	--	.100
P-4	Phosphate rock, argillaceous-----	5274-RAS	1.4	23.8	16.8	38.5	426.59	.005	.004	.107
P-3	Phosphate rock-----	5273-RAS	3.6	26.7	11.4	42.1	522.71	.006	.006	.128
P-2	Phosphate rock, argillaceous-----	5272-RAS	1.1	16.0	36.6	43.2	540.31	.004	.004	.133
P-1	Mudstone, phosphatic, carbonatic-----	5271-RAS	.5	7.9	43.7	43.7	544.26	.014	.012	.140

Lower member of Park City formation

L-27	Sandstone, carbonatic; fos. col. no. 12272-----	--	3.3	--	--	3.3	--	--	--	--
L-26	Carbonate rock, silty-----	--	1.5	--	--	4.8	--	--	--	--

¹ Fossil collection made by J. E. Smedley, Paleontology and Stratigraphy Branch, U. S. Geological Survey.

Horseshoe Canyon—Continued

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)		Cumulative thickness (feet)	Thickness x percent P_2O_5 (cumulative)	Uranium content (percent)		Thickness x percent eU (cumulative)
				P_2O_5	Acid insoluble			eU	Chem. U	
L-25	Sandstone, carbonatic-----	--	1.4	--	--	6.2	--	--	--	--
L-24	Carbonate rock, quartzitic; fos. col. no. 12271-----	--	4.3	--	--	10.5	--	--	--	--
L-23	Sandstone, carbonatic-----	--	20.6	--	--	31.1	--	--	--	--
L-22	Covered interval-----	--	4.	--	--	35.1	--	--	--	--
L-21	Sandstone, carbonatic-----	--	10.8	--	--	45.9	--	--	--	--
L-20	Sandstone, carbonatic-----	--	5.3	--	--	51.2	--	--	--	--
L-19	Carbonate rock and carbonatic mudstone-----	--	.8	--	--	52.0	--	--	--	--
L-18	Carbonate rock-----	--	1.3	--	--	53.3	--	--	--	--
L-17	Sandstone, carbonatic-----	--	1.2	--	--	54.5	--	--	--	--
L-16	Sandstone, carbonatic-----	--	16.8	--	--	71.3	--	--	--	--
L-15	Carbonate rock, sandy-----	--	6.3	--	--	77.6	--	--	--	--
L-14	Carbonate rock-----	--	.4	--	--	78.0	--	--	--	--
L-13	Siltstone, carbonatic-----	--	1.1	--	--	79.1	--	--	--	--
L-12	Carbonate rock-----	--	.3	--	--	79.4	--	--	--	--
L-11	Carbonate rock; fos. col. no. 12270-----	--	2.2	--	--	81.6	--	--	--	--
L-10	Sandstone, carbonatic-----	--	3.5	--	--	85.1	--	--	--	--
L-9	Carbonate rock, sandy-----	--	3.2	--	--	88.3	--	--	--	--
L-8	Carbonate rock, sandy-----	--	8.2	--	--	96.5	--	--	--	--
L-7	Carbonate rock, quartzitic-----	--	2.8	--	--	99.3	--	--	--	--
L-6	Sandstone and carbonate rock-----	--	.9	--	--	100.2	--	--	--	--
L-5	Carbonate rock, sandy-----	--	1.0	--	--	101.2	--	--	--	--
L-4	Sandstone, carbonatic-----	--	.5	--	--	101.7	--	--	--	--
L-3	Carbonate rock, sandy-----	--	4.3	--	--	106.0	--	--	--	--
L-2	Sandstone, carbonatic-----	--	1.4	--	--	107.4	--	--	--	--
L-1	Carbonate rock, sandy-----	--	1.2	--	--	108.6	--	--	--	--
Weber formation—top bed only										
Cw-1	Sandstone, carbonatic-----	--	6.0	--	--	6.0	--	--	--	--

Fort Douglas, Utah, lot 1350

Part of Park City formation measured and sampled in outcrop and bulldozer trench near Fort Douglas, E $\frac{1}{2}$ NE $\frac{1}{4}$ sec. 17, T. 1 N., R. 2 E., Salt Lake County, Utah. Beds strike N. 73° E. and dip 68° S. Section measured and sampled by M. A. Warner, R. A. Smart, and T. M. Cheney. Samples analyzed by Trace Elements Section laboratory, Denver, Colo.

Samples analyzed for eU and chem. U by the U. S. Geological Survey laboratory, Geochemistry and Petrology Branch.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)		Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative) ⁵	Uranium content (percent)		Thickness x percent eU (cumulative)
				P ₂ O ₅	Acid insoluble			eU	Chem. U	
Phosphatic shale member of Park City formation (?)										
P-242	Siltstone -----	--	4.6	--	--	4.6	--	--	--	--
P-241	Siltstone -----	--	4.3	--	--	8.9	--	--	--	--
P-240	Mudstone -----	--	7.5	--	--	16.4	--	--	--	--
P-239	Mudstone -----	--	7.2	--	--	23.6	--	--	--	--
P-238	Chert -----	--	2.8	--	--	26.4	--	--	--	--
P-237	Mudstone, cherty -----	--	1.8	--	--	28.2	--	--	--	--
P-236	Mudstone, cherty -----	--	1.5	--	--	29.7	--	--	--	--
P-235	Chert, argillaceous -----	--	1.5	--	--	31.2	--	--	--	--
P-234	Siltstone -----	--	2.7	--	--	33.9	--	--	--	--
P-233	Chert, argillaceous -----	--	1.5	--	--	35.2	--	--	--	--
P-232	Chert, argillaceous -----	--	13.1	--	--	48.5	--	--	--	--
P-231	Shear zone; brecciated siltstone -----	--	4.5	--	--	53.0	--	--	--	--
P-230	Siltstone -----	--	4.1	--	--	57.1	--	--	--	--
P-229	Mudstone -----	6406-MAW	4.1	6.50	64.2	61.2	26.65	0.003	--	0.012
P-228	Carbonate rock -----	6405-MAW	1.0	1.70	6.90	62.2	28.35	.001	--	.013
P-227	Phosphate rock, argillaceous -----	6404-MAW	.6	20.9	30.0	62.8	40.89	.002	--	.015
P-226	Siltstone, carbonatic -----	--	.9	--	--	63.7	--	--	--	--
P-225	Mudstone, cherty -----	--	8.3	--	--	72.0	--	--	--	--
P-224	Mudstone -----	--	3.4	--	--	75.4	--	--	--	--
P-223	Siltstone -----	--	1.9	--	--	77.3	--	--	--	--
P-222	Siltstone -----	--	2.6	--	--	79.9	--	--	--	--
P-221	Mudstone -----	--	2.0	--	--	81.9	--	--	--	--
P-220	Siltstone -----	--	2.5	--	--	84.4	--	--	--	--
P-219	Chert -----	--	2.5	--	--	86.9	--	--	--	--
P-218	Mudstone -----	--	4.9	--	--	91.8	--	--	--	--
P-217	Mudstone, cherty -----	--	1.6	--	--	93.4	--	--	--	--
P-216	Mudstone -----	--	2.4	--	--	95.8	--	--	--	--
P-215	Mudstone -----	--	1.4	--	--	97.2	--	--	--	--
P-214	Mudstone -----	--	1.0	--	--	98.2	--	--	--	--
P-213	Mudstone, phosphatic -----	6403-MAW	.5	17.3	44.9	98.7	8.65	.002	--	.001
P-212	Mudstone -----	6402-MAW	1.3	1.20	86.9	100.0	10.21	.001	--	.002
P-211	Mudstone and phosphate rock -----	6401-MAW	1.0	15.5	51.7	101.0	25.71	.003	--	.005

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Fort Douglas—Continued

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)		Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)	Uranium content (percent)		Thickness x percent eU (cumulative)
				P ₂ O ₅	Acid insoluble			eU	Chem. U	
P-210	Carbonate rock, silty -----	6400-MAW	1.1	0.95	35.3	102.1	26.76	0.001	--	0.006
P-209	Mudstone, carbonatic -----	6399-MAW	1.0	2.15	68.5	103.1	28.90	.001	--	.007
P-208	Mudstone, carbonatic -----	6398-MAW	.8	1.95	73.9	103.9	30.46	.002	--	.009
P-207	Mudstone, phosphatic -----	6397-MAW	.5	9.35	63.9	104.4	35.14	.001	--	.010
P-206	Mudstone -----	--	3.8	--	--	108.2	--	--	--	--
P-205	Phosphate rock, argillaceous -----	6396-MAW	14.0	17.4	38.8	122.2	--	.002	--	--
P-204	Mudstone, phosphatic -----	--	.9	--	--	123.1	--	--	--	--
P-203	Siltstone, carbonatic -----	--	.8	--	--	123.9	--	--	--	--
P-202	Mudstone, siliceous -----	--	.6	--	--	124.5	--	--	--	--
P-201	Mudstone -----	--	.9	--	--	125.4	--	--	--	--
P-200	Mudstone, phosphatic -----	6407-MAW	.3	9.50	64.6	125.7	--	.002	--	--
P-199	Siltstone, carbonatic -----	--	2.4	--	--	128.1	--	--	--	--
P-198	Carbonate rock, argillaceous; fos. col. no. 12528 ¹ -----	--	7.9	--	--	136.0	--	--	--	--
P-197	Carbonate rock, argillaceous -----	--	18.7	--	--	154.7	--	--	--	--
P-196	Carbonate rock and carbonatic sandstone --	--	9.2	--	--	163.9	--	--	--	--
P-195	Carbonate rock and carbonatic sandstone --	--	9.5	--	--	173.4	--	--	--	--
P-194	Carbonate rock -----	--	4.7	--	--	178.1	--	--	--	--
P-193	Not described -----	--	26.0	--	--	204.1	--	--	--	--
P-192	Mudstone, carbonatic -----	--	.6	--	--	204.7	--	--	--	--
P-191	Chert, mudstone, and carbonate rock -----	--	8.2	--	--	212.9	--	--	--	--
P-190	Mudstone -----	--	2.3	--	--	215.2	--	--	--	--
P-189	Mudstone -----	--	1.1	--	--	216.3	--	--	--	--
P-188	Mudstone -----	--	.9	--	--	217.2	--	--	--	--
P-187	Mudstone -----	--	3.1	--	--	220.3	--	--	--	--
P-186	Mudstone, carbonatic; fos. col. no. 12527 -----	--	1.8	--	--	222.1	--	--	--	--
P-185	Mudstone, carbonatic -----	--	3.6	--	--	225.7	--	--	--	--
P-184	Carbonate rock, argillaceous -----	--	1.0	--	--	226.7	--	--	--	--
P-183	Mudstone; fos. col. no. 12526 -----	--	1.5	--	--	228.2	--	--	--	--
P-182	Mudstone -----	--	2.9	--	--	231.1	--	--	--	--
P-181	Mudstone -----	--	1.9	--	--	233.0	--	--	--	--
P-180	Mudstone -----	--	2.6	--	--	235.6	--	--	--	--
P-179	Chert and mudstone; fos. col. no. 12525 -----	--	3.2	--	--	238.8	--	--	--	--
P-178	Chert -----	--	1.8	--	--	240.6	--	--	--	--
P-177	Mudstone, carbonatic and phosphatic mudstone -----	--	1.1	--	--	241.7	--	--	--	--
P-176	Mudstone -----	--	2.5	--	--	244.2	--	--	--	--
P-175	Mudstone -----	--	2.0	--	--	246.2	--	--	--	--
P-174	Mudstone -----	--	1.6	--	--	247.8	--	--	--	--

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P-173	Mudstone -----	--	4.2	--	--	252.0	--	--	--	--
P-172	Mudstone -----	6395-TMC	1.9	1.35	82.7	253.9	2.56	.003	--	.006
P-171	Mudstone, phosphatic -----	6394-TMC	1.9	9.90	55.8	255.8	21.38	.002	--	.010
P-170	Mudstone, carbonatic -----	6393-TMC	.8	1.85	66.3	256.6	22.86	.001	--	.010
P-169	Mudstone, carbonatic and cherty mudstone-----	6392-TMC	.8	5.85	58.0	257.4	27.54	.001	--	.011
P-168	Mudstone, carbonatic and carbonatic chert; fos. col. no. 12524-----	6391-TMC	2.6	1.90	63.6	260.0	32.48	.001	--	.014
P-167	Mudstone, carbonatic -----	6390-TMC	2.9	1.70	54.1	262.9	37.40	.001	--	.017
P-166	Mudstone, carbonatic -----	6389-TMC	1.5	1.70	52.1	264.4	39.96	.001	--	.018
P-165	Mudstone, carbonatic -----	6388-TMC	2.9	2.25	52.7	267.3	105.20	.000	--	.018
P-164	Mudstone, carbonatic -----	6387-TMC	1.6	2.50	61.0	268.9	109.20	.001	--	.020
P-163	Mudstone, carbonatic -----	6386-TMC	1.1	2.75	55.5	270.0	112.23	.000	--	.020
P-162	Mudstone, carbonatic -----	6385-TMC	1.9	2.75	48.2	271.9	117.46	.002	--	.023
P-161	Mudstone, phosphatic, carbonatic; fos. col. no. 12523-----	6384-TMC	.6	13.3	46.6	272.5	125.44	.003	--	.025
P-160	Siltstone -----	--	5.2	--	--	277.7	--	--	--	--
P-159	Siltstone -----	--	7.3	--	--	285.0	--	--	--	--
P-158	Mudstone; fos. col. no. 12522-----	--	3.8	--	--	288.8	--	--	--	--
P-157	Mudstone -----	--	4.5	--	--	293.3	--	.001	--	--
P-156	Mudstone, carbonatic -----	6383-MAW	.4	4.65	52.0	293.7	1.86	.001	--	.000
P-155	Mudstone, carbonatic -----	6382-MAW	1.4	2.50	47.5	295.1	5.36	.002	--	.003
P-154	Mudstone, phosphatic -----	6381-MAW	.3	15.5	47.9	295.4	10.01	.002	--	.004
P-153	Siltstone -----	--	10.0	--	--	305.4	--	--	--	--
P-152	Siltstone -----	--	3.3	--	--	308.7	--	--	--	--
P-151	Siltstone -----	--	5.8	--	--	314.5	--	--	--	--
P-150	Siltstone -----	--	8.0	--	--	322.5	--	--	--	--
P-149	Siltstone -----	--	2.0	--	--	324.5	--	--	--	--
P-148	Siltstone, cherty -----	--	3.8	--	--	328.3	--	--	--	--
P-147	Siltstone -----	--	2.2	--	--	330.5	--	--	--	--
P-146	Siltstone -----	--	3.2	--	--	333.7	--	--	--	--
P-145	Siltstone; fos. col. no. 12521-----	--	7.3	--	--	341.0	--	--	--	--
P-144	Siltstone -----	--	1.8	--	--	342.8	--	--	--	--
P-143	Siltstone -----	--	1.5	--	--	344.3	--	--	--	--
P-142	Mudstone, cherty -----	--	.5	--	--	344.8	--	--	--	--
P-141	Siltstone, carbonatic -----	--	1.0	--	--	345.8	--	--	--	--
P-140	Siltstone -----	--	.7	--	--	346.5	--	--	--	--
P-139	Mudstone; fos. col. no. 12520-----	6380-MAW	.8	4.70	79.5	347.3	3.76	.001	--	.001
P-138	Siltstone -----	6379-MAW	3.4	2.35	78.0	350.7	11.75	.001	--	.002
P-137	Carbonate rock, argillaceous-----	6378-MAW	5.2	1.00	45.7	355.9	16.95	.001	--	.005
P-136	Siltstone, carbonatic -----	6377-MAW	1.2	.85	64.7	357.1	17.97	.000	--	.005
P-135	Mudstone, carbonatic -----	6376-MAW	1.4	2.80	65.8	358.5	21.89	.002	--	.008

¹ Fossil collection made by Harold I. Saunders, Paleontology and Stratigraphy Branch, U. S. Geological Survey.

Fort Douglas—Continued

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)		Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)	Uranium content (percent)		Thickness x percent eU (cumulative)
				P ₂ O ₅	Acid insoluble			eU	Chem. U	
P-134	Mudstone -----	6375-MAW	1.0	2.00	73.5	359.5	23.89	0.002	--	0.010
P-133	Mudstone -----	6374-MAW	1.4	4.35	70.3	360.9	29.98	.003	--	.014
P-132	Carbonate rock, argillaceous, phosphatic -----	6373-MAW	.7	9.95	31.7	361.6	36.94	.002	--	.015
P-131	Carbonate rock, argillaceous -----	6372-MAW	1.1	6.65	44.3	362.7	44.26	.003	--	.019
P-130	Mudstone and phosphate rock -----	6371-MAW	.8	18.5	35.4	363.5	59.06	.004	--	.022
P-129	Mudstone, carbonatic -----	6370-MAW	1.2	1.65	43.0	364.7	61.04	.002	--	.024
P-128	Mudstone -----	6369-MAW	1.2	6.50	70.3	365.9	68.84	.003	--	.028
P-127	Mudstone, phosphatic -----	6368-MAW	1.3	13.9	48.1	367.2	86.91	.003	--	.032
P-126	Mudstone, phosphatic -----	6367-MAW	3.3	11.5	61.4	370.5	124.86	.003	--	.042
P-125	Mudstone, carbonatic -----	6366-MAW	2.3	7.55	54.3	372.8	142.22	.003	--	.048
P-124	Mudstone, phosphatic -----	6365-MAW	1.2	12.0	52.6	374.0	156.62	.002	--	.051
P-123	Mudstone, phosphatic; fos. col. no. 12519 -----	6364-MAW	1.5	13.2	53.0	375.5	176.42	.001	--	.052
P-122	Carbonate rock; fos. col. no. 12518 -----	6363-MAW	1.0	4.85	15.9	376.5	181.28	.001	--	.053
P-121	Phosphate rock, argillaceous, carbonatic -----	6362-MAW	2.8	18.4	33.1	379.3	232.80	.004	--	.065
P-120	Carbonate rock -----	6361-MAW	1.2	3.65	12.6	380.5	237.18	.001	--	.066
P-119	Phosphate rock, argillaceous -----	6360-MAW	2.6	21.9	25.0	383.1	294.12	.004	--	.076
P-118	Phosphate rock, argillaceous -----	6359-MAW	2.1	21.9	24.2	385.2	340.10	.004	--	.085
P-117	Mudstone -----	--	3.0	--	--	388.2	--	--	--	--
P-116	Chert and calcite -----	--	1.2	--	--	389.4	--	--	--	--
P-115	Carbonate rock -----	6358-MAW	.7	.80	18.0	390.1	0.56	.002	--	.001
P-114	Carbonate rock, argillaceous -----	6357-MAW	.6	4.55	27.6	390.7	3.29	.004	--	.004
P-113	Phosphate rock -----	6356-MAW	2.4	26.9	18.4	393.1	67.85	.004	--	.013
P-112	Phosphate rock; fos. col. no. 12514 -----	6355-MAW	.6	29.7	15.9	393.7	85.67	.008	0.005	.018
P-111	Mudstone -----	--	5.0	--	--	398.7	--	--	--	--
P-110	Mudstone -----	--	2.4	--	--	401.1	--	--	--	--
P-109	Mudstone, phosphatic -----	6354-MAW	1.3	9.85	58.1	402.4	--	.002	--	--
P-108	Siltstone -----	--	6.0	--	--	408.4	--	--	--	--
P-107	Mudstone -----	--	.9	--	--	409.3	--	--	--	--
P-106	Mudstone -----	--	1.6	--	--	410.9	--	--	--	--
P-105	Mudstone -----	--	2.9	--	--	413.8	--	--	--	--
P-104	Mudstone -----	--	2.7	--	--	416.5	--	--	--	--
P-103	Mudstone -----	--	4.6	--	--	421.1	--	--	--	--
P-102	Mudstone -----	--	2.0	--	--	423.1	--	--	--	--
P-101	Mudstone -----	--	2.1	--	--	425.2	--	--	--	--
P-100	Mudstone -----	--	2.3	--	--	427.5	--	--	--	--
P- 99	Mudstone -----	--	3.5	--	--	431.0	--	--	--	--
P- 98	Mudstone -----	--	6.6	--	--	437.6	--	--	--	--

P- 97	Mudstone, cherty-----	--	.6	--	--	438.2	--	--	--	--
P- 96	Mudstone-----	--	2.1	--	--	440.3	--	--	--	--
P- 95	Mudstone-----	--	2.9	--	--	443.2	--	--	--	--
P- 94	Siltstone-----	--	2.3	--	--	445.5	--	--	--	--
P- 93	Mudstone-----	--	1.4	--	--	446.9	--	--	--	--
P- 92	Siltstone-----	--	.7	--	--	447.6	--	--	--	--
P- 91	Mudstone, phosphatic-----	6353-MAW	.4	14.3	53.1	448.0	--	.001	--	--
P- 90	Siltstone; fos. col. no. 12513-----	--	3.5	--	--	451.5	--	--	--	--
P- 89	Chert-----	--	2.2	--	--	453.7	--	--	--	--
P- 88	Mudstone-----	6352- RAS	.5	4.05	78.6	454.2	--	.003	--	--
P- 87	Carbonate rock-----	--	.7	--	--	454.9	--	--	--	--
P- 86	Carbonate rock-----	--	1.7	--	--	456.6	--	--	--	--
P- 85	Chert-----	--	.4	--	--	457.0	--	--	--	--
P- 84	Mudstone-----	--	1.1	--	--	458.1	--	--	--	--
P- 83	Carbonate rock-----	--	3.6	--	--	461.7	--	--	--	--
P- 82	Mudstone, carbonatic-----	6350- RAS	.8	1.75	52.6	462.5	--	.000	--	--
P- 81	Chert-----	--	4.8	--	--	467.3	--	--	--	--
P- 80	Mudstone-----	--	1.2	--	--	468.5	--	--	--	--
P- 79	Chert, argillaceous-----	--	1.7	--	--	470.2	--	--	--	--
P- 78	Mudstone, calcareous-----	--	3.2	--	--	473.4	--	--	--	--
P- 77	Chert, argillaceous-----	--	6.1	--	--	479.5	--	--	--	--
P- 76	Mudstone, calcareous and chert; fos. col. no. 12512-----	--	1.6	--	--	481.1	--	--	--	--
P- 75	Mudstone, carbonatic-----	6349- RAS	1.1	4.10	63.3	482.2	--	.001	--	--
P- 74	Mudstone, carbonatic and chert-----	--	1.6	--	--	483.8	--	--	--	--
P- 73	Chert, argillaceous-----	--	1.3	--	--	485.1	--	--	--	--
P- 72	Carbonate rock, argillaceous; fos. col. no. 12511-----	6348- RAS	.8	5.35	35.3	485.9	4.28	.000	--	--
P- 71	Chert-----	6347- RAS	.8	3.95	70.8	486.7	3.16	.001	--	--
P- 70	Mudstone, carbonatic-----	--	2.3	--	--	489.0	--	--	--	--
P- 69	Mudstone, carbonatic-----	--	1.1	--	--	490.1	--	--	--	--
P- 68	Mudstone, carbonatic and chert-----	--	4.3	--	--	494.4	--	--	--	--
P- 67	Mudstone, cherty, carbonatic-----	--	1.1	--	--	495.5	--	--	--	--
P- 66	Limestone-----	--	2.4	--	--	497.9	--	--	--	--
P- 65	Mudstone, carbonatic-----	6346- RAS	.9	4.65	65.6	498.8	--	.001	--	--
P- 64	Mudstone, carbonatic and chert-----	--	1.8	--	--	500.6	--	--	--	--
P- 63	Mudstone-----	--	1.3	--	--	501.9	--	--	--	--
P- 62	Mudstone, carbonatic-----	--	1.8	--	--	503.7	--	--	--	--
P- 61	Mudstone, carbonatic, phosphatic-----	6345- RAS	.4	8.85	44.8	504.1	--	.003	--	--
P- 60	Mudstone, carbonatic and chert-----	--	1.3	--	--	505.4	--	--	--	--
P- 59	Mudstone, carbonatic-----	--	1.4	--	--	506.8	--	--	--	--
P- 58	Carbonate rock; fos. col. no. 12510-----	--	1.8	--	--	508.6	--	--	--	--
P- 57	Mudstone, carbonatic-----	6344- RAS	.5	7.25	40.9	509.1	--	.000	--	--
P- 56	Mudstone, carbonatic-----	--	1.3	--	--	510.4	--	--	--	--

RESTRICTED

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Fort Douglas—Continued

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)		Cumulative thickness (feet)	Thickness x percent P_2O_5 (cumulative)	Uranium content (percent)		Thickness x percent eU (cumulative)
				P_2O_5	Acid insoluble			eU	Chem. U	
P-55	Mudstone -----	--	3.3	--	--	513.7	--	--	--	--
P-54	Mudstone -----	--	4.2	--	--	517.9	--	--	--	--
P-53	Mudstone, carbonatic; fos. col. no. 12509 --	--	4.1	--	--	522.0	--	--	--	--
P-52	Mudstone -----	--	3.5	--	--	525.5	--	--	--	--
P-51	Mudstone -----	--	4.7	--	--	530.2	--	--	--	--
P-50	Mudstone -----	--	1.2	--	--	531.4	--	--	--	--
P-49	Mudstone, carbonatic -----	--	3.6	--	--	535.0	--	--	--	--
P-48	Carbonate rock; fos. col. no. 12508 -----	--	1.5	--	--	536.5	--	--	--	--
P-47	Mudstone, carbonatic; fos. col. no. 12507 --	--	2.9	--	--	539.4	--	--	--	--
P-46	Covered interval -----	--	11.8	--	--	551.2	--	--	--	--
P-45	Carbonate rock -----	--	1.9	--	--	553.1	--	--	--	--
P-44	Mudstone, carbonatic; fos. col. no. 12506 --	--	4.6	--	--	557.7	--	--	--	--
P-43	Carbonate rock -----	--	1.8	--	--	559.5	--	--	--	--
P-42	Carbonate rock, argillaceous; fos. col. no. 12505 -----	--	3.6	--	--	563.1	--	--	--	--
P-41	Mudstone, cherty; fos. col. no. 12505 -----	--	4.5	--	--	567.6	--	--	--	--
P-40	Mudstone, cherty; fos. col. no. 12504 -----	--	5.5	--	--	573.1	--	--	--	--
P-39	Mudstone, carbonatic -----	--	5.3	--	--	578.4	--	--	--	--
P-38	Mudstone, carbonatic -----	--	2.9	--	--	581.3	--	--	--	--
P-37	Mudstone, carbonatic -----	--	1.2	--	--	582.5	--	--	--	--
P-36	Mudstone, carbonatic; fos. col. no. 12503 --	--	2.9	--	--	585.4	--	--	--	--
P-35	Mudstone, carbonatic; fos. col. no. 12502 --	--	5.9	--	--	591.3	--	--	--	--
P-34	Mudstone -----	--	2.3	--	--	593.6	--	--	--	--
P-33	Carbonate rock, argillaceous -----	--	2.6	--	--	596.2	--	--	--	--
P-32	Carbonate rock, cherty -----	--	2.4	--	--	598.6	--	--	--	--
P-31	Carbonate rock, argillaceous -----	--	4.1	--	--	602.7	--	--	--	--
P-30	Mudstone -----	--	3.7	--	--	606.4	--	--	--	--
P-29	Mudstone -----	--	11.0	--	--	617.4	--	--	--	--
P-28	Mudstone -----	--	1.6	--	--	619.0	--	--	--	--
P-27	Mudstone -----	--	2.0	--	--	621.0	--	--	--	--
P-26	Mudstone, carbonatic -----	--	2.9	--	--	623.9	--	--	--	--
P-25	Mudstone, carbonatic -----	--	3.8	--	--	627.7	--	--	--	--
P-24	Mudstone, carbonatic -----	--	5.2	--	--	632.9	--	--	--	--
P-23	Mudstone, carbonatic -----	--	4.8	--	--	637.7	--	--	--	--
P-22	Mudstone, carbonatic -----	--	.9	--	--	638.6	--	--	--	--
P-21	Mudstone, carbonatic -----	--	5.1	--	--	643.7	--	--	--	--
P-20	Mudstone, carbonatic -----	--	2.3	--	--	646.0	--	--	--	--
P-19	Carbonate rock, argillaceous -----	6343- TMC	1.4	6.25	23.1	647.4	8.75	0.001	--	0.001
P-18	Carbonate rock, argillaceous -----	6342- TMC	1.1	7.75	24.1	648.5	17.28	.001	--	.002
P-17	Phosphate rock, carbonatic -----	6341- TMC	1.5	21.1	16.1	650.0	48.92	.002	--	.006

Lot 1350

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P-16	Carbonate rock, argillaceous -----	6340-TMC	2.7	7.60	31.2	652.7	69.44	.002	--	.011
P-15	Mudstone, carbonatic -----	--	2.6	--	--	655.3	--	--	--	--
P-14	Mudstone, carbonatic -----	--	5.3	--	--	660.6	--	--	--	--
P-13	Mudstone, carbonatic -----	--	1.3	--	--	661.9	--	--	--	--
P-12	Mudstone, carbonatic; fos. col. no. 12517 -----	--	1.1	--	--	663.0	--	--	--	--
P-11	Mudstone, carbonatic -----	--	4.6	--	--	667.6	--	--	--	--
P-10	Mudstone, carbonatic -----	--	2.2	--	--	669.8	--	--	--	--
P-9	Carbonate rock, argillaceous, phosphatic ---	6339-TMC	2.4	10.1	23.7	670.2	--	.002	--	--
P-8	Mudstone, carbonatic -----	--	2.6	--	--	672.8	--	--	--	--
P-7	Mudstone, carbonatic -----	--	2.1	--	--	674.9	--	--	--	--
P-6	Mudstone -----	--	.9	--	--	675.8	--	--	--	--
P-5	Mudstone, carbonatic -----	--	3.2	--	--	679.0	--	--	--	--
P-4	Mudstone -----	--	1.3	--	--	680.3	--	--	--	--
P-3	Mudstone, carbonatic -----	--	.7	--	--	681.0	--	--	--	--
P-2	Covered interval -----	--	.6	--	--	681.6	--	--	--	--
P-1	Phosphate rock, carbonatic -----	--	1.2	--	--	682.8	--	--	--	--

Lower member of Park City formation (?)

L-19	Carbonate rock -----	--	60.0	--	--	60.0	--	--	--	--
L-18	Carbonate rock -----	--	28.0	--	--	88.0	--	--	--	--
L-17	Sandstone -----	--	14.0	--	--	102.0	--	--	--	--
L-16	Siltstone -----	--	16.0	--	--	118.0	--	--	--	--
L-15	Siltstone -----	--	31.0	--	--	149.0	--	--	--	--
L-14	Sandstone -----	--	54.0	--	--	203.0	--	--	--	--
L-13	Sandstone -----	--	30.0	--	--	233.0	--	--	--	--
L-12	Carbonate rock -----	--	7.0	--	--	240.0	--	--	--	--
L-11	Covered interval -----	--	(?)	--	--	--	--	--	--	--
L-10	Sandstone -----	--	52.0	--	--	*52.0	--	--	--	--
L-9	Carbonate rock -----	--	1.5	--	--	53.5	--	--	--	--
L-8	Sandstone -----	--	6.5	--	--	60.0	--	--	--	--
L-7	Carbonate rock -----	--	7.0	--	--	67.0	--	--	--	--
L-6	Sandstone -----	--	18.0	--	--	85.0	--	--	--	--
L-5	Sandstone -----	--	38.0	--	--	123.0	--	--	--	--
L-4	Sandstone -----	--	60.0	--	--	183.0	--	--	--	--
L-3	Sandstone and sandy carbonate rock -----	--	30.0	--	--	213.0	--	--	--	--
L-2	Carbonate rock -----	--	25.0	--	--	238.0	--	--	--	--
L-1	Sandstone -----	--	7.0	--	--	**245.0	--	--	--	--

Weber formation

Cw-1	Sandstone -----	--	100.	--	--	100.	--	--	--	--
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* Cumulative data incomplete because of missing information. Computations start from zero after interruption.

** Note incompleteness of cumulative data.

Sols Canyon, Utah, lot 1348

Park City formation measured and sampled in outcrop and hand trench on east side of Sols Canyon, NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 2, T. 2 N., R. 18 E., Daggett County, Utah. Beds strike N. 80° E. and dip 38° N. Section measured and sampled by R. A. Smart, T. M. Cheney, and M. A. Warner in June 1951. Samples analyzed by Trace Elements Section laboratory, Denver, Colo.

Samples analyzed for eU and chem. U by the U. S. Geological Survey laboratory, Geochemistry and Petrology Branch.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)		Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative) ⁵	Uranium content (percent)		Thickness x percent eU (cumulative)
				P ₂ O ₅	Acid insoluble			eU	Chem. U	
Upper member of Park City formation—top not exposed										
U- 7	Carbonate rock, cherty -----	--	9.1	--	--	9.1	--	--	--	--
U- 6	Carbonate rock -----	--	5.4	--	--	14.5	--	--	--	--
U- 5	Covered interval -----	--	4.0	--	--	18.5	--	--	--	--
U- 4	Carbonate rock -----	--	1.8	--	--	20.3	--	--	--	--
U- 3	Covered interval -----	--	3.8	--	--	24.1	--	--	--	--
U- 2	Carbonate rock -----	--	1.6	--	--	25.7	--	--	--	--
U- 1	Covered interval -----	--	3.0	--	--	28.7	--	--	--	--
Phosphatic shale member of Park City formation										
P-47	Siltstone, carbonatic-----	--	4.0	--	--	4.0	--	--	--	--
P-46	Mudstone and chert -----	--	.5	--	--	4.5	--	--	--	--
P-45	Mudstone, carbonatic -----	--	2.5	--	--	7.0	--	--	--	--
P-44	Mudstone, carbonatic -----	--	2.5	--	--	9.5	--	--	--	--
P-43	Carbonate rock, argillaceous -----	6285-MAW	1.7	3.60	39.8	11.2	--	0.002	--	0.003
P-42	Mudstone -----	6484-MAW	.6	--	--	11.8	--	.002	--	.005
P-41	Mudstone, carbonatic -----	6283-MAW	1.7	2.10	58.7	13.5	**3.57	.001	--	.006
P-40	Mudstone, carbonatic -----	6282-MAW	1.2	7.25	44.5	14.7	12.27	.004	--	.011
P-39	Mudstone, carbonatic -----	6281-MAW	3.4	2.75	60.3	18.1	<u>21.62</u>	.001	--	.014
P-38	Weathered zone -----	--	1.1	--	--	19.2	--	--	--	--
P-37	Carbonate rock, argillaceous, phosphatic --	6280-MAW	1.6	11.7	35.6	20.8	*18.72	.002	--	*.003
P-36	Carbonate rock, phosphatic-----	6279-MAW	.8	14.2	12.7	21.6	30.08	.004	--	.006
P-35	Carbonate rock -----	6278-MAW	1.0	7.45	10.3	22.6	37.53	.002	--	.008
P-34	Mudstone, carbonatic, and phosphatic, carbonatic mudstone-----	6277-MAW	1.0	10.7	27.9	23.6	48.23	.003	--	.011
P-33	Carbonate rock, argillaceous, phosphatic --	6276-MAW	.6	9.00	27.4	24.2	53.63	.002	--	.013
P-32	Phosphate rock and phosphatic, carbonatic mudstone-----	6275-MAW	.5	15.8	32.5	24.7	61.53	.002	--	.014
P-31	Mudstone, carbonatic -----	6274-MAW	.5	7.25	43.5	25.2	65.16	.002	--	.015
P-30	Mudstone, carbonatic, and carbonatic phosphate rock-----	6273-MAW	.7	13.8	32.6	25.9	74.82	.003	--	.017
P-29	Mudstone, carbonatic -----	6272-MAW	1.2	6.80	51.0	27.1	<u>82.98</u>	.001	--	.018
P-28	Mudstone, silty -----	--	1.4	--	--	28.5	--	--	--	--

P-27	Carbonate rock -----	--	1.1	--	--	29.6	--	--	--	--
P-26	Mudstone, carbonatic -----	6271- RAS	1.2	5.45	57.0	30.8	--	.003	--	--
P-25	Mudstone, carbonatic -----	--	2.0	--	--	32.8	--	--	--	--
P-24	Mudstone, carbonatic -----	6270- RAS	1.4	4.60	59.6	34.2	--	.002	--	--
P-23	Mudstone, carbonatic -----	6269- RAS	1.7	4.85	58.0	35.9	--	.003	--	--
P-22	Brecciated zone -----	--	1.3	--	--	37.2	--	--	--	--
P-21	Mudstone, phosphatic -----	6268- RAS	.4	7.80	62.8	37.6	--	.003	--	--
P-20	Mudstone -----	6267- RAS	.8	6.80	72.4	38.4	--	.002	--	--
P-19	Carbonate rock, phosphatic, argillaceous --	6266- RAS	.7	10.9	25.6	39.1	--	.005	0.005	--
P-18	Mudstone, carbonatic -----	--	1.3	--	--	40.4	--	--	--	--
P-17	Mudstone, carbonatic -----	6265- RAS	2.2	5.05	43.7	42.6	--	.002	--	--
P-16	Mudstone -----	--	.7	--	--	43.3	--	--	--	--
P-15	Mudstone, carbonatic -----	--	2.4	--	--	45.7	--	--	--	--
P-14	Mudstone, carbonatic -----	6264- RAS	1.2	7.25	46.1	46.9	--	.003	--	--
P-13	Carbonate rock -----	--	1.8	--	--	48.7	--	--	--	--
P-12	Carbonate rock, argillaceous -----	6263- RAS	1.9	7.60	35.4	50.6	--	.002	--	--
P-11	Carbonate rock, phosphatic, argillaceous --	6262- RAS	.8	11.9	24.3	51.4	--	.005	.004	--
P-10	Carbonate rock -----	--	2.1	--	--	53.5	--	--	--	--
P-9	Carbonate rock, phosphatic -----	6261- RAS	.4	13.3	12.2	53.9	--	.006	.007	--
P-8	Mudstone, carbonatic -----	6260- RAS	.8	7.50	46.8	54.7	--	.005	.003	--
P-7	Carbonate rock, argillaceous -----	6259- RAS	.6	8.62	24.4	55.3	--	.005	.004	--
P-6	Covered interval -----	--	1.3	--	--	56.6	--	--	--	--
P-5	Carbonate rock, phosphatic, argillaceous --	6258- RAS	1.1	10.4	24.1	57.7	*11.44	.007	.006	*.008
P-4	Carbonate rock, phosphatic, argillaceous --	6257- RAS	1.2	11.3	22.0	58.9	25.00	.008	.008	.017
P-3	Carbonate rock, phosphatic -----	6256- RAS	1.7	16.4	4.2	60.6	52.88	.008	.009	.031
P-2	Mudstone, phosphatic -----	6255- RAS	1.3	13.7	36.2	61.9	70.69	.010	.011	.044
	Beds P-2 through P-7 are highly weathered and of questionable thickness and continuity.									
P-1	Carbonate rock, phosphatic -----	6254- TMC	1.3	16.8	8.2	63.2	**92.53	.011	.013	** .058

Lower member of Park City formation

L-17	Sandstone, carbonatic -----	--	17.6	--	--	17.6	--	--	--	--
L-16	Mudstone, carbonatic -----	--	3.4	--	--	21.0	--	--	--	--
L-15	Sandstone, carbonatic -----	--	6.4	--	--	27.4	--	--	--	--
L-14	Sandstone, carbonatic -----	--	15.0	--	--	42.4	--	--	--	--
L-13	Sandstone, carbonatic -----	--	10.5	--	--	52.9	--	--	--	--
L-12	Sandstone, argillaceous -----	--	3.5	--	--	56.4	--	--	--	--
L-11	Sandstone, carbonatic -----	--	10.5	--	--	66.9	--	--	--	--
L-10	Siltstone, carbonatic -----	--	2.5	--	--	69.4	--	--	--	--
L-9	Sandstone, carbonatic -----	--	8.5	--	--	77.9	--	--	--	--

* Cumulative data incomplete because of missing information. Computations start from zero after interruption.

** Note incompleteness of cumulative data.

Sols Canyon—Continued

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)		Cumulative thickness (feet)	Thickness x percent P_2O_5 (cumulative)	Uranium content (percent)		Thickness x percent eU (cumulative)
				P_2O_5	Acid insoluble			eU	Chem. U	
L- 8	Siltstone, carbonatic -----	--	5.0	--	--	82.9	--	--	--	--
L- 7	Sandstone, carbonatic -----	--	23.0	--	--	105.9	--	--	--	--
L- 6	Covered interval -----	--	3.5	--	--	109.4	--	--	--	--
L- 5	Sandstone, carbonatic -----	--	6.0	--	--	115.4	--	--	--	--
L- 4	Sandstone, carbonatic -----	--	23.0	--	--	138.4	--	--	--	--
L- 3	Covered interval -----	--	20.0	--	--	158.4	--	--	--	--
L- 2	Sandstone -----	--	25.0	--	--	183.4	--	--	--	--
L- 1	Covered interval -----	--	23.0	--	--	206.4	--	--	--	--
Weber formation—upper part only										
Cw-1	Sandstone, carbonatic -----	--	205.0	--	--	205.0	--	--	--	--

RESTRICTED

RESTRICTED
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Strawberry Valley, Utah, lot 1371

Park City formation measured and sampled in outcrop and bulldozer trenches in Willow Creek Canyon, NW $\frac{1}{4}$ sec. 14, T. 2 S., R. 12 W., Wasatch County, Utah. Beds strike N. 30° W. and are overturned toward the west; dips range from 35° W. to near vertical. Section measured and sampled by R. A. Smart, T. M. Cheney, and R. G. Waring in September 1951. Samples analyzed by U. S. Bureau of Mines laboratory, Albany, Oreg.

Samples analyzed for eU and chem. U by the U. S. Geological Survey laboratory, Geochemistry and Petrology Branch.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)		Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)	Uranium content (percent)		Thickness x percent eU (cumulative)
				P ₂ O ₅	Acid insoluble			eU	Chem. U	
Woodside formation—not measured										
Upper member of Park City formation										
U-17	Carbonate rock -----	--	75.0	--	--	75.0	--	--	--	--
U-16	Chert breccia -----	--	1.0	--	--	76.0	--	--	--	--
U-15	Carbonate rock -----	--	7.0	--	--	83.0	--	--	--	--
U-14	Covered interval -----	--	48.0	--	--	131.0	--	--	--	--
U-13	Sandstone, carbonatic -----	--	12.0	--	--	143.0	--	--	--	--
U-12	Carbonate rock -----	--	19.0	--	--	162.0	--	--	--	--
U-11	Carbonate rock and chert -----	--	10.0	--	--	172.0	--	--	--	--
U-10	Covered interval -----	--	90.0	--	--	262.0	--	--	--	--
U- 9	Sandstone, carbonatic -----	--	142.0	--	--	404.0	--	--	--	--
U- 8	Chert and carbonate rock -----	--	44.0	--	--	448.0	--	--	--	--
U- 7	Carbonate rock -----	--	41.0	--	--	489.0	--	--	--	--
U- 6	Sandstone and sandy carbonate rock -----	--	39.7	--	--	528.7	--	--	--	--
U- 5	Sandstone, carbonatic -----	--	6.3	--	--	535.0	--	--	--	--
U- 4	Chert, sandstone, and phosphatic sandstone; fos. col. no. 12625 -----	--	7.5	--	--	542.5	--	--	--	--
U- 3	Sandstone -----	--	.9	--	--	543.4	--	--	--	--
U- 2	Sandstone -----	--	.8	--	--	544.2	--	--	--	--
U- 1	Sandstone and chert -----	--	2.4	--	--	546.6	--	--	--	--
Phosphatic shale member of Park City formation (?)										
P-96	Siltstone -----	--	4.5	--	--	4.5	--	--	--	--
P-95	Siltstone -----	--	6.3	--	--	10.8	--	--	--	--
P-94	Siltstone -----	--	2.1	--	--	12.9	--	--	--	--
P-93	Siltstone -----	--	5.5	--	--	18.4	--	--	--	--
P-92	Siltstone -----	--	14.5	--	--	32.9	--	--	--	--
P-91	Siltstone -----	6618-RGW	1.2	3.3	67.5	34.1	*3.96	0.002	--	*0.002
P-90	Phosphate rock, carbonatic and mudstone --	6617-RGW	1.1	16.1	34.4	35.2	21.67	.002	--	.005
P-89	Siltstone -----	6616-RGW	2.5	2.8	66.0	37.7	28.67	.002	--	.010
P-88	Mudstone, phosphatic, carbonatic and mudstone -----	6615-RGW	1.0	4.4	62.5	38.7	33.07	.002	--	.012

* Fossil collection made by J. E. Smedley, Paleontology and Stratigraphy Branch, U. S. Geological Survey.

* Note incompleteness of cumulative data because of missing information.

Strawberry Valley—Continued

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)		Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)	Uranium content (percent)		Thickness x percent eU (cumulative)
				P ₂ O ₅	Acid insoluble			eU	Chem. U	
P-87	Siltstone and phosphate rock -----	6614-RGW	1.0	12.6	42.5	39.7	*45.67	0.002	--	*0.014
P-86	Siltstone, carbonatic-----	--	1.2	--	--	40.9	--	--	--	--
P-85	Mudstone -----	--	1.1	--	--	42.0	--	--	--	--
P-84	Chert and mudstone -----	--	.9	--	--	42.9	--	--	--	--
P-83	Mudstone -----	--	2.2	--	--	45.1	--	--	--	--
P-82	Mudstone -----	--	5.3	--	--	50.4	--	--	--	--
P-81	Mudstone -----	--	.5	--	--	50.9	--	--	--	--
P-80	Mudstone, phosphatic and phosphate rock --	6613-TMC	.5	14.4	46.2	51.4	--	.003	--	--
P-79	Mudstone, carbonatic -----	--	4.9	--	--	56.3	--	--	--	--
P-78	Mudstone, carbonatic -----	--	3.4	--	--	59.7	--	--	--	--
P-77	Siltstone -----	--	9.1	--	--	68.8	--	--	--	--
P-76	Siltstone, carbonatic -----	--	3.0	--	--	71.8	--	--	--	--
P-75	Siltstone, carbonatic -----	6612-RGW	1.2	7.2	45.7	73.0	*8.64	.002	--	*.002
P-74	Phosphate rock, argillaceous -----	6611-RGW	.4	22.5	23.9	73.4	17.64	.003	--	.004
P-73	Carbonate rock, silty, and carbonatic mudstone -----	6610-RGW	1.7	6.2	39.1	75.1	28.18	.003	--	.009
P-72	Mudstone, phosphatic -----	6609-RGW	.6	12.7	38.5	75.7	35.80	.004	--	.011
P-71	Phosphate rock -----	6608-RGW	.5	25.6	12.9	76.2	*48.60	.004	--	*.013
P-70	Siltstone, carbonatic -----	--	1.9	--	--	78.1	--	--	--	--
P-69	Carbonate rock, silty -----	6607-RGW	1.7	4.5	31.0	79.8	--	.002	--	--
P-68	Carbonate rock -----	--	.8	--	--	80.6	--	--	--	--
P-67	Siltstone, carbonatic, siltstone, and chert -	--	3.5	--	--	84.1	--	--	--	--
P-66	Mudstone, phosphatic, carbonatic -----	6606-RGW	1.1	12.3	35.8	85.2	--	.005	0.005	--
P-65	Phosphate rock and mudstone -----	6605-RGW	1.5	16.5	30.0	86.7	--	.003	--	--
P-64	Phosphate rock -----	6604-RGW	.5	26.1	12.5	87.2	--	.005	--	--
P-63	Carbonate rock -----	--	1.5	--	--	88.7	--	--	--	--
P-62	Mudstone -----	--	.5	--	--	89.2	--	--	--	--
P-61	Carbonate rock -----	--	1.5	--	--	90.7	--	--	--	--
P-60	Siltstone -----	--	.7	--	--	91.4	--	--	--	--
P-59	Siltstone, cherty -----	--	2.7	--	--	94.1	--	--	--	--
P-58	Siltstone, cherty -----	--	1.8	--	--	95.9	--	--	--	--
P-57	Mudstone and chert breccia -----	--	1.8	--	--	97.7	--	--	--	--
P-56	Siltstone, carbonatic, and carbonatic chert breccia -----	--	1.3	--	--	99.0	--	--	--	--
P-55	Chert and phosphatic mudstone -----	--	.9	--	--	99.9	--	--	--	--
P-54	Siltstone -----	--	.9	--	--	100.8	--	--	--	--
P-53	Siltstone, chert, and mudstone -----	--	1.8	--	--	102.6	--	--	--	--
P-52	Chert -----	--	1.9	--	--	104.5	--	--	--	--
P-51	Siltstone, carbonatic -----	--	1.7	--	--	106.2	--	--	--	--
P-50	Chert -----	--	1.0	--	--	107.2	--	--	--	--

P-49	Siltstone, cherty -----	--	2.5	--	--	109.7	--	--	--	--
P-48	Chert and siltstone -----	--	1.6	--	--	111.3	--	--	--	--
P-47	Phosphate rock, carbonatic and siltstone---	6603-RGW	.4	17.9	32.1	111.7	--	.005	.005	--
P-46	Siltstone -----	--	2.5	--	--	114.2	--	--	--	--
P-45	Siltstone and argillaceous, carbonatic phosphate rock -----	--	1.0	--	--	115.2	--	--	--	--
P-44	Siltstone and carbonatic phosphate rock----	--	.6	--	--	115.8	--	--	--	--
P-43	Mudstone -----	--	3.9	--	--	119.7	--	--	--	--
P-42	Mudstone -----	--	1.1	--	--	120.8	--	--	--	--
P-41	Mudstone -----	--	1.1	--	--	121.9	--	--	--	--
P-40	Mudstone -----	--	1.0	--	--	122.9	--	--	--	--
P-39	Mudstone and phosphatic mudstone -----	--	1.1	--	--	124.0	--	--	--	--
P-38	Phosphate rock, carbonatic-----	6602- RAS	.6	18.5	14.6	124.6	--	.003	--	--
P-37	Mudstone, phosphatic, carbonatic-----	6601- RAS	1.7	8.7	36.0	126.3	--	.002	--	--
P-36	Mudstone -----	--	1.8	--	--	128.1	--	--	--	--
P-35	Mudstone, carbonatic-----	--	1.5	--	--	129.6	--	--	--	--
P-34	Phosphate rock, argillaceous-----	6600- RAS	.5	23.9	17.3	130.1	*11.95	.005	.005	*.002
P-33	Carbonate rock, argillaceous-----	6599- RAS	1.6	2.4	31.0	131.7	15.79	.001	--	.004
P-32	Phosphate rock, argillaceous-----	6598- RAS	1.1	20.7	24.9	132.8	38.56	.003	--	.007
P-31	Mudstone, phosphatic-----	6597- RAS	.9	12.7	40.5	133.7	49.99	.003	--	.010
P-30	Carbonate rock, argillaceous-----	6596- RAS	1.1	4.3	36.5	134.8	54.72	.002	--	.012
P-29	Mudstone -----	--	1.5	--	--	136.3	--	--	--	--
P-28	Mudstone -----	--	2.1	--	--	138.4	--	--	--	--
P-27	Mudstone -----	--	1.5	--	--	139.9	--	--	--	--
P-26	Mudstone -----	--	2.5	--	--	142.4	--	--	--	--
P-25	Mudstone, carbonatic-----	--	.6	--	--	143.0	--	--	--	--
P-24	Mudstone -----	--	1.1	--	--	144.1	--	--	--	--
P-23	Mudstone -----	--	4.5	--	--	148.6	--	--	--	--
P-22	Mudstone, phosphatic-----	6595- RAS	.9	8.3	53.0	149.5	*7.47	.003	--	*.003
P-21	Mudstone, phosphatic-----	6594- RAS	.5	15.7	42.4	150.0	15.32	.008	.007	.007
P-20	Mudstone, carbonatic-----	6593- RAS	.8	2.8	63.3	150.8	17.56	.003	--	.009
P-19	Mudstone, phosphatic-----	6592- RAS	.5	8.3	58.5	151.3	*21.71	.002	--	*.010
P-18	Siltstone -----	--	1.2	--	--	152.5	--	--	--	--
P-17	Siltstone, carbonatic-----	--	1.0	--	--	153.5	--	--	--	--
P-16	Carbonate rock; fos. col. no. 12626-----	--	2.9	--	--	156.4	--	--	--	--
P-15	Siltstone-----	--	3.0	--	--	159.4	--	--	--	--
P-14	Siltstone-----	--	2.3	--	--	161.7	--	--	--	--
P-13	Siltstone-----	--	.7	--	--	162.4	--	--	--	--
P-12	Siltstone-----	--	.9	--	--	163.3	--	--	--	--
P-11	Siltstone-----	--	1.5	--	--	164.8	--	--	--	--
P-10	Siltstone-----	--	2.7	--	--	167.5	--	--	--	--
P- 9	Siltstone-----	--	.8	--	--	168.3	--	--	--	--

* Note incompleteness of cumulative data because of missing information.

Strawberry Valley—Continued

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)		Cumulative thickness (feet)	Thickness x percent P_2O_5 (cumulative)	Uranium content (percent)		Thickness x percent eU (cumulative)
				P_2O_5	Acid insoluble			eU	Chem. U	
P- 8	Chert, argillaceous-----	--	3.5	--	--	171.8	--	--	--	--
P- 7	Mudstone, cherty-----	--	3.4	--	--	175.2	--	--	--	--
P- 6	Mudstone, cherty-----	--	1.7	--	--	176.9	--	--	--	--
P- 5	Chert, argillaceous-----	--	2.9	--	--	179.8	--	--	--	--
P- 4	Mudstone-----	--	1.5	--	--	181.3	--	--	--	--
P- 3	Mudstone-----	6591- RAS	.7	7.3	68.1	182.0	--	0.002	--	--
P- 2	Siltstone-----	--	1.4	--	--	183.4	--	--	--	--
P- 1	Siltstone-----	--	3.3	--	--	186.7	--	--	--	--
Lower member of Park City formation (?)										
L-62	Covered interval-----	--	1.8	--	--	1.8	--	--	--	--
L-61	Sandstone-----	--	1.1	--	--	2.9	--	--	--	--
L-60	Sandstone-----	--	5.7	--	--	8.6	--	--	--	--
L-59	Sandstone-----	--	5.1	--	--	13.7	--	--	--	--
L-58	Sandstone-----	--	8.0	--	--	21.7	--	--	--	--
L-57	Covered interval-----	--	22.0	--	--	43.7	--	--	--	--
L-56	Sandstone, carbonatic-----	--	40.0	--	--	83.7	--	--	--	--
L-55	Covered interval-----	--	13.0	--	--	96.7	--	--	--	--
L-54	Sandstone, carbonatic-----	--	8.0	--	--	104.7	--	--	--	--
L-53	Sandstone, carbonatic-----	--	19.5	--	--	124.2	--	--	--	--
L-52	Covered interval-----	--	11.0	--	--	135.2	--	--	--	--
L-51	Covered interval-----	--	50.0	--	--	185.2	--	--	--	--
L-50	Carbonate rock, cherty-----	--	13.0	--	--	198.2	--	--	--	--
L-49	Covered interval-----	--	15.0	--	--	213.2	--	--	--	--
L-48	Carbonate rock-----	--	3.8	--	--	217.0	--	--	--	--
L-47	Siltstone-----	--	1.1	--	--	218.1	--	--	--	--
L-46	Carbonate rock, cherty-----	--	3.0	--	--	221.1	--	--	--	--
L-45	Covered interval-----	--	10.0	--	--	231.1	--	--	--	--
L-44	Covered interval-----	--	10.0	--	--	241.1	--	--	--	--
L-43	Covered interval-----	--	9.0	--	--	250.1	--	--	--	--
L-42	Carbonate rock-----	--	15.0	--	--	265.1	--	--	--	--
L-41	Sandstone, carbonatic-----	--	16.0	--	--	281.1	--	--	--	--
L-40	Covered interval-----	--	3.0	--	--	284.1	--	--	--	--
L-39	Carbonate rock, cherty-----	--	1.3	--	--	285.4	--	--	--	--
L-38	Carbonate rock-----	--	5.4	--	--	290.8	--	--	--	--
L-37	Siltstone, carbonatic-----	--	4.0	--	--	294.8	--	--	--	--
L-36	Chert and carbonatic siltstone-----	--	2.4	--	--	297.2	--	--	--	--

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L-35	Covered interval -----	--	12.0	--	--	309.2	--	--	--	--
L-34	Siltstone, carbonatic -----	--	1.5	--	--	310.7	--	--	--	--
L-33	Carbonate rock, sandy -----	--	1.7	--	--	312.4	--	--	--	--
L-32	Siltstone -----	--	3.4	--	--	315.8	--	--	--	--
L-31	Mudstone, carbonatic -----	--	1.7	--	--	317.5	--	--	--	--
L-30	Siltstone -----	--	2.2	--	--	319.7	--	--	--	--
L-29	Siltstone -----	--	1.9	--	--	321.6	--	--	--	--
L-28	Siltstone -----	--	1.3	--	--	322.9	--	--	--	--
L-27	Covered interval -----	--	7.0	--	--	329.9	--	--	--	--
L-26	Siltstone -----	--	.9	--	--	330.8	--	--	--	--
L-25	Siltstone -----	--	1.7	--	--	332.5	--	--	--	--
L-24	Siltstone -----	--	1.2	--	--	333.7	--	--	--	--
L-23	Siltstone -----	--	4.2	--	--	337.9	--	--	--	--
L-22	Mudstone -----	--	1.8	--	--	339.7	--	--	--	--
L-21	Siltstone -----	--	.9	--	--	340.6	--	--	--	--
L-20	Carbonate rock, sandy -----	--	2.2	--	--	342.8	--	--	--	--
L-19	Carbonate rock, sandy -----	--	4.7	--	--	347.5	--	--	--	--
L-18	Siltstone, carbonatic -----	--	.8	--	--	348.3	--	--	--	--
L-17	Sandstone, carbonatic -----	--	1.7	--	--	350.0	--	--	--	--
L-16	Siltstone, carbonatic -----	--	2.9	--	--	352.9	--	--	--	--
L-15	Carbonate rock, sandy -----	--	1.1	--	--	354.0	--	--	--	--
L-14	Carbonate rock, sandy -----	--	3.3	--	--	357.3	--	--	--	--
L-13	Carbonate rock -----	--	18.0	--	--	375.3	--	--	--	--
L-12	Carbonate rock, sandy -----	--	13.0	--	--	388.3	--	--	--	--
L-11	Sandstone -----	--	6.0	--	--	394.3	--	--	--	--
L-10	Carbonate rock -----	--	20.0	--	--	414.3	--	--	--	--
L- 9	Covered interval -----	--	70.0	--	--	484.3	--	--	--	--
L- 8	Carbonate rock -----	--	29.0	--	--	513.3	--	--	--	--
L- 7	Carbonate rock -----	--	50.0	--	--	563.3	--	--	--	--
L- 6	Covered interval -----	--	12.0	--	--	575.3	--	--	--	--
L- 5	Carbonate rock, sandy -----	--	16.0	--	--	591.3	--	--	--	--
L- 4	Carbonate rock -----	--	22.0	--	--	613.3	--	--	--	--
L- 3	Covered interval -----	--	18.0	--	--	631.3	--	--	--	--
L- 2	Carbonate rock -----	--	32.0	--	--	663.3	--	--	--	--
L- 1	Carbonate rock -----	--	20.0	--	--	683.3	--	--	--	--
Diamond Creek sandstone (?)										
D- 1	Sandstone, calcareous -----	--	(?)	--	--	--	--	--	--	--

Little Diamond Creek, Utah, lot 1376

Lower part of phosphatic shale member of Park City formation measured and sampled in old open pit mine under lease to American Smelting and Refining Company of Little Diamond Creek, S $\frac{1}{2}$ SE $\frac{1}{4}$ sec. 22, T. 8 S., R. 4 E., Utah County, Utah. Beds strike N. 20° W. and dip 30° NE. Section measured by T. M. Cheney and sampled by R. G. Waring in October 1951. Samples analyzed for P₂O₅ and acid insoluble by U. S. Bureau of Mines laboratory, Albany, Oreg., and for other constituents by Trace Elements Section laboratory, U. S. Geological Survey, Washington, D. C.

Samples analyzed for eU and chem. U by the U. S. Geological Survey laboratory, Geochemistry and Petrology Branch.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)					Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)	Uranium content (percent)		Thickness x percent eU (cumulative)
				P ₂ O ₅	Al ₂ O ₃	Fe ₂ O ₃	Loss on ignition	Acid insoluble			eU	Chem. U	
Phosphatic shale member of Park City formation—basal part only													
--	Covered interval -----	--	--	--	--	--	--	--	--	--	--	--	--
P-5	Phosphate rock -----	6798-TMC	1.7	30.1	0.98	0.74	8.20	5.4	1.7	51.17	0.002	--	0.003
P-4	Phosphate rock -----	6797-TMC	1.4	30.1	.84	.77	8.87	6.6	3.1	93.31	.001	--	.005
P-3	Phosphate rock -----	6796-TMC	1.5	27.8	1.08	.76	6.73	7.9	4.6	135.01	.003	--	.009
P-2	Phosphate rock -----	6795-TMC	1.2	26.7	.64	2.98	6.80	10.8	5.8	167.05	.005	0.003	.015
	Beds P-1 and P-2 measured 60 feet apart. The 0.5-1.5 feet of strata missing is probably similar to bed P-2.												
P-1	Dolomite -----	--	.6	--	--	--	--	--	6.4	--	--	--	--
--	Covered interval -----	--	--	--	--	--	--	--	--	--	--	--	--

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