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[Reports - Open file series]

STRATIGRAPHIC SECTIONS OF THE PHOSPHORIA FORMATION IN IDAHO

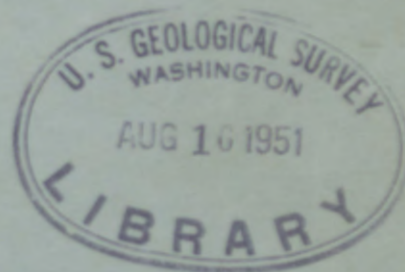
by

V. E. McKelvey, D. F. Davidson, F. W. O' Malley,
L. E. Smith, F. C. Armstrong, and R. P. Sheldon

MINERAL DEPOSITS BRANCH

Spokane, Washington

July 1951



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This ^{report}~~map~~ is preliminary and has not been edited or reviewed for conformity with U. S. Geological Survey standards and nomenclature.

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INTRODUCTION

The first of a series of reports giving detailed stratigraphic sections of the Phosphoria formation in the Western phosphate field as measured and described by the Geological Survey will be released as Circulars within the next few months. Because of the needs of industry for many of these data during the 1951 field season, and in view of the unavoidable delays attendant on publication, the tabular data to be included in these Circulars are hereby placed on open file in simple reproduction form (prepared by Ozalid from photographic negatives) and without explanatory text so that immediate use may be made of the data.

The tables include data on sections in four states: Montana, Idaho, Wyoming, and Utah; and the tables for each of these states are bound together as individual reports. The tables include name and location of section measured, brief description of geologic setting, acknowledgments for field and analytical work, abstract data on the sections (bed number, rock name, sample number, and thickness), and analytical data on the samples. The analytical data include reports on P_2O_5 and acid insoluble for all samples and additional analyses, such as Al_2O_3 , Fe_2O_3 , loss on ignition, F, and V_2O_5 , for selected samples. Spectrographic analyses for a large number of elements are included for samples from selected localities, and special analyses have been made of a few samples.

These reports are placed on open file at the offices of the Geological Survey in Washington, D. C., Spokane, Washington, Salt Lake City, Utah, and Montpelier, Idaho, and at the offices of the Idaho Bureau of Mines and Geology, Moscow, Idaho, the Montana Bureau of Mines and Geology, Butte, Montana, and the Wyoming Geological Survey, Laramie, Wyoming, and the University of Utah, Salt Lake City, Utah.

DIAMOND DRILL HOLE 8, FORT HALL MINE, IDAHO. LOT NO. 1279.

Part of phosphatic shale member of Phosphoria formation cored in diamond drill hole 8, near diamond drill hole 237 at Fort Hall Mine of J. R. Simplot Company, sec. 14, T. 4 S., R. 37 E., Bingham County, Idaho. Hole drilled in October 1948 by U. S. Bureau of Mines, A. E. Long in charge, and core measured and sampled by D. F. Davidson. Samples analyzed by U. S. Bureau of Mines Laboratory, Albany, Oregon.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)		Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)
				P ₂ O ₅	Acid insoluble		
Phosphatic shale member of Phosphoria formation—lower beds only							
P -35	Mudstone and phosphate rock	DFD-1144	2.5	16.1	40.2	2.5	40.25
P -34	Mudstone and phosphate rock	DFD-1145	0.9	15.8	41.5	3.4	54.47
P -33	Limestone, argillaceous	DFD-1146	1.6	5.2	23.2	5.0	62.79
P -32	Phosphate rock, argillaceous, calcareous	DFD-1147	0.7	15.4	33.8	5.7	73.57
P -31	Mudstone, phosphatic, calcareous	DFD-1148	1.8	9.5	51.6	7.5	90.67
P -30	Limestone	DFD-1149	0.8	2.3	10.2	8.3	92.51
P -29	Core missing	--	1.4	--	--	9.7	--
P -28	Mudstone, phosphatic	DFD-1150	0.3	13.8	40.5	10.0	4.14*
P -27	Mudstone, phosphatic	DFD-1206	3.2	13.3	49.4	13.2	46.70
P -26	Phosphate rock, calcareous, argillaceous	DFD-1207	1.5	18.4	24.4	14.7	74.30
P -25	Phosphate rock, calcareous, argillaceous	DFD-1208	1.2	14.8	25.8	15.9	92.06
P -24	Phosphate rock, calcareous	DFD-1209	1.0	22.9	19.6	16.9	114.96
P -23	Limestone, phosphatic	DFD-3336	1.2	15.6	11.6	18.1	133.68
P -22	Phosphate rock	DFD-1248	1.8	26.7	19.6	19.9	181.74
P -21	Phosphate rock, argillaceous	DFD-1249	1.6	16.2	39.1	21.5	207.66
P -20	Mudstone, phosphatic	DFD-1250	1.2	15.6	43.4	22.7	226.38
P -19	Phosphate rock, argillaceous, calcareous	DFD-1251	1.7	17.9	32.3	24.4	256.81
P -18	Phosphate rock, argillaceous	DFD-1252	0.6	25.8	21.9	25.0	272.29
P -17	Phosphate rock, argillaceous	DFD-1253	1.5	27.0	21.0	26.5	312.79
P -16	Phosphate rock, argillaceous	DFD-1254	1.8	26.3	22.8	28.3	360.13
P -15	Core missing	--	2.8	--	--	31.1	--
P -14	Mudstone, phosphatic	DFD-1255	0.5	16.6	45.6	31.6	8.30*
P -13	Mudstone, phosphatic	DFD-1256	0.6	15.7	46.5	32.2	17.72
P -12	Phosphate rock	DFD-1257	1.3	30.7	13.8	33.5	57.63
P -11	Phosphate rock, argillaceous	DFD-1258	2.8	22.2	33.1	36.3	119.79
P -10	Phosphate rock and mudstone	DFD-1259	2.0	18.5	28.1	38.3	156.79
P - 9	Phosphate rock and mudstone	DFD-1827	2.0	30.8	12.6	40.3	218.39
P - 8	Phosphate rock and mudstone	DFD-1828	1.0	24.6	20.2	41.3	242.99
P - 7	Limestone	DFD-1976	1.0	4.9	17.4	42.3	247.89

* Cumulative data incomplete due to missing information. Computations start from zero after interruption.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)		Cumulative thickness (feet)	Thickness x percent P_2O_5 (cumulative)
				P_2O_5	Acid insoluble		
P - 6	Phosphate rock	DFD-1977	1.1	28.0	15.9	43.4	278.69
P - 5	Limestone, phosphatic	DFD-1978	1.8	11.8	13.1	45.2	299.93
P - 4	Phosphate rock, argillaceous	DFD-1979	2.0	24.0	23.9	47.2	347.93
P - 3	Phosphate rock	DFD-1980	2.6	34.7	3.1	49.8	438.15
P - 2	Limestone, argillaceous, phosphatic	DFD-2170	0.5	11.8	29.4	50.3	444.05
P - 1	Limestone, argillaceous	DFD-2295	0.8	5.4	33.3	51.1	448.37**
Wells formation							
Cw- 1	Limestone, argillaceous	DFD-2296	0.2	2.5	23.0	0.2	0.50

** Note incompleteness of cumulative data.

DIAMOND DRILL HOLE 9, FORT HALL MINE, IDAHO. LOT NO. 1280.

Part of phosphatic shale member of Phosphoria formation sampled from diamond drill hole 9 near diamond drill hole 237 at Fort Hall Mine of J. R. Simplot Company, sec. 14, T. 4 S., R. 37 E., Bingham County, Idaho. Hole drilled in October 1948 by U. S. Bureau of Mines, A. E. Long in charge, and measured and sampled by D. F. Davidson. Samples analyzed by U. S. Bureau of Mines Laboratory, Albany, Oregon.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)		Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)
				P ₂ O ₅	Acid insoluble		
Phosphatic shale member of Phosphoria formation—lower beds only							
P -34	Mudstone, calcareous	DFD-2297	0.5	7.7	43.8	0.5	3.85
P -33	Mudstone, phosphatic	DFD-2298	2.0	13.5	44.0	2.5	30.85
P -32	Mudstone, phosphatic, calcareous	DFD-2299	0.6	13.7	36.5	3.1	39.07
P -31	Limestone	DFD-2300	0.7	1.9	8.0	3.8	40.40
P -30	Mudstone, phosphatic, calcareous	DFD-3035	3.4	11.5	46.2	7.2	79.50
P -29	Core missing	--	1.0	--	--	8.2	--
P -28	Limestone	DFD-2468	0.8	0.7	8.6	9.0	0.56*
P -27	Mudstone, phosphatic	DFD-2469	2.2	12.1	49.4	11.2	27.18
P -26	Phosphate rock, argillaceous	DFD-2470	1.1	16.0	39.7	12.3	44.78
P -25	Phosphate rock, calcareous, argillaceous	DFD-2471	1.0	14.6	30.6	13.3	59.38
P -24	Phosphate rock and calcareous mudstone	DFD-2472	0.9	19.3	21.7	14.2	76.75
P -23	Phosphate rock and mudstone	DFD-2473	1.0	18.2	22.9	15.2	94.95
P -22	Phosphate rock, calcareous, argillaceous	DFD-2474	1.5	17.0	23.5	16.7	120.45
P -21	Phosphate rock, calcareous	DFD-2475	1.2	24.4	16.9	17.9	149.73
P -20	Phosphate rock, argillaceous	DFD-2531	1.7	26.1	20.4	19.6	194.10
P -19	Phosphate rock, argillaceous	DFD-2532	1.6	17.2	38.6	21.2	221.62
P -18	Limestone	DFD-2533	0.9	3.2	4.5	22.1	224.50
P -17	Mudstone, phosphatic, calcareous	DFD-2534	2.9	13.4	36.5	25.0	263.36
P -16	Phosphate rock and mudstone	DFD-2535	1.6	29.1	13.1	26.6	309.92
P -15	Phosphate rock and mudstone	DFD-2536	1.9	22.7	29.6	28.5	353.05
P -14	Phosphate rock and mudstone	DFD-2537	1.3	22.6	27.3	29.8	382.43
P -13	Limestone	DFD-2538	0.5	2.6	14.5	30.3	383.73
P -12	Core missing	--	0.4	--	--	30.7	--
P -11	Mudstone, phosphatic, calcareous	DFD-2539	2.5	13.9	40.7	33.2	34.75*
P -10	Phosphate rock and mudstone	DFD-2540	2.7	27.6	19.8	35.9	109.27
P - 9	Phosphate rock and mudstone	DFD-2541	2.0	22.8	31.6	37.9	154.87
P - 8	Phosphate rock	DFD-2542	2.0	31.7	9.4	39.9	218.27
P - 7	Phosphate rock and mudstone	DFD-2543	2.2	27.6	16.3	42.1	278.99
P - 6	Limestone, argillaceous	DFD-2544	0.6	0.9	22.4	42.7	279.53
P - 5	Phosphate rock, calcareous	DFD-2545	1.6	22.0	19.0	44.3	314.73

* Cumulative data incomplete due to missing information. Computations start from zero after interruption.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)		Cumulative thickness (feet)	Thickness x percent P_2O_5 (cumulative)
				P_2O_5	Acid insoluble		
P - 4	Limestone	DFD-2546	0.8	6.4	8.6	45.1	319.85
P - 3	Core missing	--	2.9	--	--	48.1	--
P - 2	Phosphate rock	DFD-2547	1.4	27.5	11.2	49.4	35.75*
P - 1	Limestone, argillaceous	DFD-2548	1.4	0.8	36.0	50.8	36.87**

Wells formation

Cw- 3	Limestone, argillaceous	DFD-2549	0.7	2.7	21.2	0.7	1.89
Cw- 2	Core missing	--	3.0	--	--	3.7	--
Cw- 1	Limestone, argillaceous	DFD-2550	1.4	2.1	31.7	5.1	4.83*

* Cumulative data incomplete due to missing information. Computations start from zero after interruption.

** Note incompleteness of cumulative data.

CALDWELL CANYON, IDAHO. LOT NO. 1260.

Phosphatic shale member of Phosphoria formation sampled in bulldozer trench on north side of Caldwell Canyon, sec. 1, T. 8 S., R. 43 E., Caribou County, Idaho, on east limb of Slug Creek syncline. Beds strike N. 10° W. and dip 40° E. Section measured by R. A. Hoppin, D. F. Davidson, and F. W. O' Malley and sampled by R. A. Smart, R. P. Sheldon, R. G. Waring, and T. K. Rigby in August 1948. Samples analyzed by U. S. Bureau of Mines, Albany, Oregon.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)					Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)	
				P ₂ O ₅	Al ₂ O ₃	Fe ₂ O ₃	Loss on ignition	Acid insoluble			
Rex member of Phosphoria formation--basal bed only											
R- 1	Chert	WOM-1750	3.5	0.4	--	--	--	75.8	--	---	
Phosphatic shale member of Phosphoria formation ¹											
P-84	Mudstone	WOM-1749	1.1	5.2	--	--	--	57.7	1.1	5.70	
P-83	Mudstone	WOM-1748	1.2	0.7	--	--	--	70.0	2.3	6.56	
P-82	Mudstone	WOM-1747	1.4	4.9	--	--	--	59.0	3.7	13.42	
P-81	Mudstone; fos. col. no. 48-JES-189 ²	WOM-1746	2.7	0.5	--	--	--	64.4	6.4	14.77	
P-80	Mudstone, calcareous	WOM-1745	0.6	2.4	--	--	--	63.1	7.0	16.21	
P-79	Limestone, argillaceous; fos. col. no. 48-JES-188	WOM-1744	1.1	0.6	--	--	--	38.0	8.1	16.87	
P-78	Mudstone, calcareous; fos. col. no. 48-JES-187	WOM-1743	3.3	2.7	--	--	--	68.3	11.4	25.78	
P-77	Mudstone, phosphatic	WOM-1742	0.3	14.8	--	--	--	49.0	11.7	30.22	
P-76	Mudstone	WOM-1741	1.3	2.3	--	--	--	78.5	13.0	33.21	
P-75	Phosphate rock, argillaceous	WOM-1740	0.5	24.1	--	--	--	21.2	13.5	45.26	
P-74	Mudstone; fos. col. no. 48-JES-186	WOM-1780	1.9	2.5	--	--	--	69.5	15.4	50.01	
P-73	Mudstone, calcareous; fos. col. no. 48-JES-185	WOM-1779	1.3	0.2	--	--	--	52.0	16.7	50.27	
P-72	Phosphate rock	WOM-1778	1.9	32.9	--	--	--	11.3	18.6	112.78	
P-71	Phosphate rock; fos. col. no. 48-JES-184	WOM-1777	0.7	29.1	--	--	--	17.7	19.3	133.15	
P-70	Mudstone	WOM-1776	0.6	7.5	--	--	--	58.2	19.9	137.65	
P-69	Phosphate rock, calcareous	WOM-1775	0.9	24.9	--	--	--	9.5	20.8	160.06	
P-68	Phosphate rock	WOM-1774	0.8	33.3	--	--	--	5.5	21.6	186.70	
--	Limestone concretion; fos. col. no. 48-JES-183	WOM-1773	(0.9)	5.3	--	--	--	2.2	--	--	
P-67	Phosphate rock, calcareous and phosphatic calcareous mudstone; fos. col. no. 48-JES-182	WOM-1772	3.0	19.7	--	--	--	25.0	24.6	245.80	
P-66	Mudstone, phosphatic	WOM-1771	1.0	12.7	--	--	--	45.0	25.6	258.50	
P-65	Phosphate rock, argillaceous	DFD- 1790	1.3	18.0	--	--	--	37.3	26.9	281.90	
P-64	Mudstone; fos. col. no. 48-JES-181	DFD- 1789	1.3	7.6	--	--	--	63.3	28.2	291.78	

¹ The thinness of the Phosphatic shale member is probably due to faulting.

² Fossil collection by J. E. Smedley, Paleontology and Stratigraphy Branch, U. S. Geological Survey.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)					Cumulative thickness (feet)	Thickness x percent P_2O_5 (cumulative)
				P_2O_5	Al_2O_3	Fe_2O_3	Loss on ignition	Acid insoluble		
--	Limestone lens?, argillaceous	DFD- 1788	(0.9)	0.5	--	--	--	29.8	--	--
P-63	Mudstone, phosphatic, fos. col. no. 48-JES-180	DFD- 1787	3.2	8.5	--	--	--	61.7	31.40	318.98
P-62	Mudstone, phosphatic	DFD- 1786	0.7	10.6	--	--	--	59.8	32.10	326.40
P-61	Phosphate rock, argillaceous; fos. col. no. 48-JES-179	DFD- 1785	2.7	19.4	--	--	--	44.0	34.80	378.78
P-60	Mudstone, phosphatic	DFD- 1784	0.5	8.9	--	--	--	67.3	35.30	383.23
P-59	Mudstone, phosphatic; fos. col. no. 48-JES-178	DFD- 1783	0.9	8.7	--	--	--	66.3	36.20	391.06
P-58	Mudstone, phosphatic,	DFD- 1782	0.4	9.6	--	--	--	59.7	36.60	394.90
P-57	Mudstone; fos. col. no. 48-JES-177	DFD- 1781	3.6	6.4	--	--	--	70.6	40.20	417.94
P-56	Mudstone	DFD- 1760	0.8	1.6	--	--	--	83.0	41.00	419.22
P-55	Mudstone	DFD- 1759	0.5	6.4	--	--	--	74.2	41.50	422.42
P-54	Mudstone, phosphatic	DFD- 1758	1.2	9.1	--	--	--	64.0	42.70	433.34
P-53	Phosphate rock, argillaceous	DFD- 1757	0.6	17.5	--	--	--	43.2	43.30	443.84
P-52	Mudstone, phosphatic	DFD- 1756	0.8	15.4	--	--	--	45.8	44.10	456.16
P-51	Mudstone, phosphatic	DFD- 1755	0.6	9.8	--	--	--	57.8	44.70	462.04
P-50	Mudstone	DFD- 1754	0.7	6.4	--	--	--	62.5	45.40	466.52
P-49	Mudstone, phosphatic	DFD- 1753	1.0	7.9	--	--	--	64.5	46.40	474.42
P-48	Mudstone	DFD- 1752	1.1	5.1	--	--	--	74.8	47.50	480.03
P-47	Mudstone; fos. col. no. 48-JES-176	DFD- 1751	0.7	5.5	--	--	--	72.8	48.20	483.88
P-46	Phosphate rock and phosphatic mudstone	WOM-1810	0.7	24.6	--	--	--	26.0	48.90	501.10
P-45	Mudstone, phosphatic	WOM-1809	0.7	8.4	--	--	--	55.6	49.60	506.98
P-44	Mudstone	WOM-1808	0.7	5.1	--	--	--	71.1	50.30	510.55
Many of the beds from P-27 to P-43 show prominent shearing that probably represents faulting and accounts for the abnormally small thickness of the phosphatic shale member at this locality.										
P-43	Phosphate rock	WOM-1807	0.4	25.8	--	--	--	19.5	50.70	520.87
P-42	Mudstone, phosphatic	WOM-1806	0.7	13.7	--	--	--	53.1	51.40	530.46
P-41	Mudstone	WOM-1805	0.8	1.2	--	--	--	84.3	52.20	531.42
P-40	Mudstone	WOM-1804	2.2	1.6	--	--	--	83.8	54.40	534.94
P-39	Mudstone	WOM-1803	0.6	0.9	--	--	--	83.3	55.00	535.48
P-38	Mudstone, phosphatic	WOM-1802	1.5	11.1	--	--	--	60.3	56.50	552.13
P-37	Mudstone	WOM-1801	2.8?	4.7	--	--	--	73.0	59.30	565.29
P-36	Mudstone, calcareous	WOM-1800	0.7	7.3	--	--	--	58.2	60.00	570.40
P-35	Phosphate rock	WOM-1799	0.5	27.4	--	--	--	19.8	60.50	584.10
P-34	Mudstone, phosphatic	WOM-1798	1.0	9.5	--	--	--	61.3	61.50	593.60
P-33	Phosphate rock, argillaceous	WOM-1797	0.6	18.1	--	--	--	37.7	62.10	604.46
P-32	Mudstone, calcareous	WOM-1796	1.0	2.8	--	--	--	58.5	63.10	607.26
P-31	Mudstone, phosphatic	WOM-1795	0.5	11.1	--	--	--	51.9	63.60	612.81
P-30	Mudstone, phosphatic; fos. col. no. 48-JES-175?	WOM-1794	1.3	10.4	--	--	--	49.7	64.90	626.33

P-29	Mudstone	WOM-1793	0.4	3.3	--	--	--	72.2	65.30	627.65
P-28	Mudstone	WOM-1792	0.7	2.9	--	--	--	74.5	66.00	629.68
P-27	Mudstone	WOM-1791	1.9	4.9	--	--	--	66.3	67.90	638.99
P-26	Mudstone, phosphatic, calcareous	WOM-1820	1.2	10.4	--	--	--	50.6	69.10	651.47
P-25	Mudstone, phosphatic	WOM-1819	1.1	9.7	--	--	--	59.0	70.20	662.14
P-24	Mudstone, phosphatic	WOM-1818	1.2	13.2	--	--	--	47.3	71.40	677.98
P-23	Phosphate rock, argillaceous	WOM-1817	2.2	22.7	--	--	--	21.2	74.60	727.92
P-22	Phosphate rock, argillaceous	WOM-1816	1.2	15.7	--	--	--	34.1	73.80	746.76
P-21	Limestone	WOM-1815	4.5	1.2	--	--	--	5.9	79.30	752.16
P-20	Limestone; fos. col. no. 48-JES-174	WOM-1814	5.0	1.4	--	--	--	14.0	84.30	759.16
P-19	Phosphate rock, argillaceous	WOM-1813	1.4	23.2	--	--	--	29.8	85.70	791.64
P-18	Mudstone, phosphatic, calcareous	WOM-1812	1.2	11.7	--	--	--	48.7	86.90	805.68
P-17	Mudstone, phosphatic; fos. col. no. 48-JES-173	WOM-1811	0.8	10.2	--	--	--	53.4	87.70	813.84
P-16	Limestone; fos. col. no. 48-JES-172	RAH- 1826	3.7	5.6	--	--	--	12.7	91.40	834.56
P-15	Phosphate rock, argillaceous	RAH- 1825	0.6	23.7	4.1	1.52	6.92	26.8	92.00	848.78
P-14	Phosphate rock	RAH- 1824	1.8	31.6	1.3	0.73	6.98	10.0	93.80	905.66
P-13	Phosphate rock, argillaceous	RAH- 1823	1.9	26.7	3.3	1.32	6.66	20.5	95.70	956.39
P-12	Limestone, argillaceous; fos. col. no. 48-JES-171	RAH- 1822	0.8	3.4	4.5	1.50	28.58	29.7	96.50	959.11
P-11	Phosphate rock	RAH- 1821	1.2	34.2	0.67	0.46	6.52	4.3	97.70	1,000.15
P-10	Phosphate rock	RAH- 1770	1.3	29.1	2.5	1.03	8.34	12.3	99.00	1,037.98
P- 9	Phosphate rock	RAH- 1769	2.0	32.8	0.67	0.42	6.76	4.8	101.00	1,103.58
P- 8	Phosphate rock	RAH- 1768	1.5	32.0	1.5	0.71	6.88	7.0	102.50	1,151.58
P- 7	Limestone, phosphatic, argillaceous; fos. col. no. 48-JES-170	RAH- 1767	1.3	9.7	3.4	1.06	25.18	20.2	103.80	1,164.19
P- 6	Phosphate rock	RAH- 1766	1.0	26.9	2.1	0.85	10.18	10.9	104.80	1,191.09
P- 5	Limestone	RAH- 1765	1.0	4.9	2.3	0.52	35.92	7.9	105.80	1,195.99
P- 4	Phosphate rock; fos. col. no. 48-JES-169	RAH- 1764	3.3?	25.3	3.5	1.07	8.14	18.8	109.10	1,279.48
P- 3	Limestone; fos. col. no. 48-JES-168	RAH- 1763	2.5	2.3	0.46	0.50	38.42	12.4	111.60	1,285.23
P- 2	Limestone and phosphate rock; fos. col. no. 48-JES-167	RAH- 1762	0.8	19.9	1.8	2.56	15.96	14.3	112.40	1,301.15
P- 1	Phosphate rock	RAH- 1761	3.5	38.6	1.1	0.67	9.20	14.0	115.90	1,436.25

Wells formation

Cw-1	Limestone; fos. col. no. 48-JES-166	RAH- 1739	4.0	2.8	--	--	--	4.5	--	--
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MABIE CANYON, IDAHO. LOT NO. 1210.

Phosphatic shale member of Phosphoria formation sampled in bulldozer trench in Mabie Canyon, NW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 10, T. 8 S., R. 44 E., Caribou County, Idaho, on east limb of Dry Valley anticline. Section measured by R. M. Campbell, V. E. McKelvey, and R. A. Weeks and sampled by Campbell and Weeks in September and October 1947. Samples analyzed by U. S. Bureau of Mines Laboratory, Albany, Oregon.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)						Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)
				P ₂ O ₅	Al ₂ O ₃	Fe ₂ O ₃	F	Loss on ignition	Acid insoluble		
Rex member of Phosphoria formation											
R - 5	Chert	VEM-470-47	3.8	0.5	1.1	3.5	--	9.6	73.3	3.8	1.90
R - 4	Limestone, argillaceous	VEM-469-47	1.2	0.3	0.7	1.8	--	32.0	25.9	5.0	2.26
R - 3	Chert	VEM-468-47	1.7	0.6	0.79	3.8	--	6.7	78.6	6.7	3.28
R - 2	Mudstone, calcareous; fos. col. no. 47-HW-259 ¹	VEM-467-47	0.35	0.5	1.3	1.5	--	21.2	51.1	7.05	3.46
R - 1	Mudstone, calcareous and chert	VEM-466-47 ²	1.0	--	--	--	--	--	--	8.05	--
Phosphatic shale member of Phosphoria formation											
P -170	Mudstone, calcareous	VEM-465-47	0.7	5.1	4.0	1.5	0.53	13.8	60.1	0.7	3.57
P -169	Phosphate rock, argillaceous, calcareous; fos. col. no. 47-HW-258	VEM-464-47	0.6	20.1	4.0	1.3	--	12.2	26.6	1.3	15.63
P -168	Mudstone, calcareous; fos. col. no. 47-HW-257	VEM-463-47	1.9	2.9	9.9	3.0	--	9.9	69.4	3.2	21.14
P -167	Mudstone, calcareous	VEM-462-47	2.1	4.7	9.7	3.2	--	12.7	61.7	5.3	31.01
P -166	Mudstone	VEM-461-47	1.3	0.6	11.1	3.1	--	8.1	76.6	6.6	31.79
--	Limestone lens, argillaceous, in top of bed P-165	VEM-460-47	(0.0-0.5)	0.7	3.6	1.3	--	34.5	22.5	--	--
P -165	Mudstone	VEM-459-47	1.2	2.6	11.6	3.7	--	8.7	69.0	7.8	34.91
P -164	Mudstone, calcareous	VEM-458-47	2.4	0.4	7.4	2.4	--	19.8	52.5	10.2	35.87
P -163	Mudstone, calcareous	VEM-457-47	1.9	0.4	9.4	3.1	--	12.0	67.5	12.1	36.63
P -162	Mudstone, calcareous	VEM-456-47	2.4	1.3	11.0	3.6	--	11.0	66.0	14.5	39.75
P -161	Limestone; fos. col. no. 47-HW-255	VEM-455-47	0.7	0.6	2.2	0.8	--	37.7	14.0	15.2	40.17
P -160	Mudstone, calcareous; fos. col. no. 47-HW-254	VEM-454-47	1.8	4.0	10.6	3.0	--	10.7	62.4	17.0	47.37
P -159	Mudstone, calcareous; fos. col. no. 47-HW-254	VEM-453-47	1.8	1.5	9.2	2.7	--	12.7	64.8	18.8	50.07
P -158	Limestone, argillaceous, contains phosphatic nodules	VEM-452-47	0.9	6.3	1.3	3.3	--	27.5	24.3	19.7	55.73
P -157	Mudstone, calcareous	VEM-451-47	0.7	3.0	9.2	3.2	--	8.3	68.7	20.4	57.84
P -156	Phosphate rock, argillaceous, calcareous?	VEM-450-47	0.5	19.9	3.1	1.8	--	9.0	28.5	20.9	67.79
P -155	Mudstone; fos. col. no. 47-HW-253	VEM-449-47	2.4	3.1	10.7	3.1	--	8.9	69.9	23.3	75.23

P -154	Limestone, argillaceous; fos. col. no. 47-HW-252	VEM-448-47	1.1	0.2	5.7	1.8	--	25.8	42.1	24.4	75.45
P -153	Mudstone	VEM-447-47	2.4	1.9	11.7	3.6	--	8.2	72.1	26.8	80.01
P -152	Phosphate rock	VEM-446-47	0.5	37.7	0.7	0.5	--	3.2	1.8	27.3	98.86
P -151	Phosphate rock	VEM-445-47	0.5	36.7	0.8	0.4	3.90	4.4	3.5	27.8	117.21
P -150	Phosphate rock	VEM-444-47	0.7	37.1	0.8	0.5	3.72	3.5	5.0	28.5	143.18
P -149	Mudstone, calcareous; fos. col. no. 47-HW-251	VEM-443-47	1.3	4.1	8.6	2.8	0.47	11.8	60.7	29.8	148.51
P -148	Phosphate rock, argillaceous	VEM-442-47	1.1	25.5	4.4	1.9	2.35	5.4	25.1	30.9	176.56
P -147	Phosphate rock	VEM-441-47	1.0	21.8	2.4	0.9	3.17	6.1	11.5	31.9	208.36
P -146	Phosphate rock	VEM-440-47	0.8	32.7	1.8	0.7	3.27	5.8	9.8	32.7	234.52
P -145	Mudstone, phosphatic; fos. col. no. 47-HW-250	VEM-439-47	1.0	14.2	6.2	2.3	1.50	7.4	48.1	33.7	248.72
P -144	Phosphate rock	VEM-438-47	0.6	31.5	2.1	0.9	3.17	6.6	11.9	34.3	267.62
P -143	Phosphate rock and mudstone	VEM-437-47	0.8	16.8	6.4	2.4	1.45	9.1	40.5	35.1	281.06
P -142	Phosphate rock and mudstone	VEM-436-47	0.5	12.9	8.1	2.5	1.40	9.3	49.4	35.6	287.51
P -141	Mudstone, calcareous	VEM-435-47	0.3	6.8	9.8	2.4	0.66	16.5	50.6	35.9	289.55
P -140	Phosphate rock and calcareous mudstone	VEM-434-47	0.3	9.1	7.6	2.6	1.15	14.0	47.8	36.2	292.28
P -139	Phosphate rock	VEM-433-47	0.9	35.1	0.6	0.3	3.54	5.5	3.5	37.1	323.87
P -138	Phosphate rock	VEM-432-47	1.4	34.0	1.6	0.5	3.54	8.0	4.5	38.5	371.47
P -137	Phosphate rock	VEM-431-47	0.9	26.5	3.1	1.2	2.83	11.8	14.4	39.4	395.32
--	Limestone lens 0.2 foot below top of bed P-136	VEM-430-47	(0.0-0.5)	2.2	1.0	0.1	--	42.5	1.6	--	--
P -136	Phosphate rock	VEM-429-47	1.8	23.8	3.8	1.1	--	15.8	17.8	41.2	438.16
P -135	Phosphate rock	VEM-428-47	1.0	25.9	2.3	0.9	--	18.7	11.2	42.2	464.06
P -134	Phosphate rock	VEM-427-47	1.3	28.4	2.4	0.8	--	14.9	9.8	43.5	500.98
P -133	Phosphate rock and mudstone	VEM-426-47	0.4	20.9	4.8	1.7	--	18.5	22.6	43.9	509.34
P -132	Phosphate rock, argillaceous	VEM-425-47	1.2	20.9	4.9	1.6	--	15.5	25.6	45.1	534.42
P -131	Phosphate rock	VEM-424-47	0.7	26.8	2.7	1.1	--	14.8	14.0	45.8	553.18
P -130	Phosphate rock	VEM-423-47	0.7	23.9	3.8	1.2	--	15.5	18.5	46.5	569.91
P -129	Phosphate rock, argillaceous	VEM-422-47	0.9	20.1	4.9	1.6	--	17.7	25.6	47.4	588.00
P -128	Phosphate rock, argillaceous	VEM-421-47	1.0	21.2	4.2	1.6	--	16.5	24.2	48.4	609.20
P -127	Phosphate rock, argillaceous	VEM-420-47	0.8	18.5	4.9	1.7	--	17.3	30.5	49.2	624.00
P -126	Mudstone, phosphatic	VEM-419-47	1.0	9.2	7.5	2.6	--	16.3	52.4	50.2	633.20
P -125	Mudstone, phosphatic	VEM-418-47	1.3	9.0	7.6	2.7	--	17.4	51.3	51.5	644.90
P -124	Mudstone, phosphatic	VEM-417-47	1.2	13.0	7.4	2.3	--	15.8	45.0	52.7	660.50
P -123	Mudstone	VEM-416-47	1.3	6.5	9.4	3.1	--	11.7	62.5	54.0	668.95
P -122	Limestone, argillaceous; fos. col. no. 47-HW-249	VEM-415-47	2.0	0.6	4.1	1.8	--	32.7	28.4	56.0	670.15
P -121	Mudstone, phosphatic	VEM-414-47	1.7	12.4	7.6	2.5	--	16.2	44.4	57.7	691.23

¹ Fossil collection by H. Wedow, Paleontology and Stratigraphy Branch, U. S. Geological Survey.
² Sample lost.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)						Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)
				P ₂ O ₅	Al ₂ O ₃	Fe ₂ O ₃	F	Loss on ignition	Acid insoluble		
P -120	Mudstone, phosphatic	VEM-413-47	0.3	10.2	8.0	2.5	--	16.6	49.4	58.00	694.29
P -119	Phosphate rock, argillaceous	VEM-412-47	0.8	16.8	6.1	2.2	--	15.5	35.6	58.80	707.73
P -118	Mudstone, phosphatic	VEM-411-47	0.6	15.6	4.9	2.2	--	10.7	44.7	59.40	717.09
P -117	Mudstone, phosphatic	VEM-410-47	1.2	8.6	8.5	2.6	--	14.9	54.0	60.60	727.41
P -116	Mudstone	VEM-409-47	1.3	7.4	9.8	3.2	--	11.4	63.9	61.90	737.03
P -115	Mudstone, phosphatic	VEM-408-47	2.0	10.9	7.8	2.8	--	10.4	56.1	63.90	758.83
P -114	Mudstone, phosphatic	VEM-407-47	0.5	15.7	7.2	2.8	--	10.6	44.1	64.40	766.68
P -113	Mudstone, phosphatic, contains phosphatic nodules	VEM-406-47	0.8	13.6	6.1	3.0	--	4.5	56.9	65.20	777.56
P -112	Phosphate rock, argillaceous	VEM-405-47	0.8	24.3	4.0	2.5	--	5.1	30.1	66.00	797.00
P -111	Mudstone, contains phosphatic nodules	VEM-404-47	1.6	3.7	8.9	2.9	--	6.5	77.4	67.60	802.92
P -110	Mudstone, phosphatic	VEM-403-47	1.1	11.4	7.3	2.7	--	6.5	59.9	68.70	815.46
P -109	Mudstone, phosphatic	VEM-402-47	0.8	15.4	5.9	1.9	--	11.4	44.0	69.50	827.78
P -108	Mudstone, phosphatic	VEM-401-47	1.2	10.0	7.4	2.0	--	9.1	60.8	70.70	839.78
P -107	Mudstone; fos. col. no. 47-HW-248	VEM-400-47	2.6	6.9	7.9	2.7	--	7.4	69.7	73.30	857.72
P -106	Limestone; fos. col. no. 47-HW-243	VEM-399-47	1.6	0.7	1.9	0.9	--	38.1	16.1	74.90	858.84
P -105	Mudstone	VEM-398-47	0.7	5.4	8.1	2.8	--	8.4	70.8	75.60	862.62
P -104	Phosphate rock and mudstone	VEM-397-47	1.2	13.1	6.4	2.6	--	10.9	47.4	76.80	878.34
P -103	Phosphate rock, argillaceous	VEM-396-47	1.1	16.3	8.4	2.5	--	11.3	23.6	77.90	896.27
P -102	Mudstone	VEM-395-47	1.5	2.1	9.9	2.7	--	8.9	78.2	79.40	899.42
P -101	Mudstone	VEM-394-47	1.0	1.3	9.9	2.8	--	10.7	76.2	80.40	900.72
P -100	Mudstone, calcareous	VEM-393-47	1.2	2.7	8.2	2.5	--	16.4	60.7	81.60	903.96
P - 99	Mudstone, phosphatic	VEM-392-47	1.2	10.1	7.4	2.4	--	14.1	53.2	82.80	916.08
P - 98	Mudstone	VEM-391-47	0.8	3.0	9.9	2.8	--	13.9	71.5	83.60	918.48
P - 97	Mudstone	VEM-390-47	1.4	4.6	9.6	3.0	--	10.4	72.1	85.00	924.92
P - 96	Mudstone	VEM-389-47	0.9	4.6	10.7	3.2	--	8.6	75.0	85.90	929.06
P - 95	Mudstone	VEM-388-47	0.5	3.4	11.8	3.7	--	15.8	65.4	86.40	930.76
P - 94	Phosphate rock	VEM-387-47	0.3	27.9	2.5	1.4	--	8.2	16.9	86.70	939.13
P - 93	Mudstone	VEM-386-47	1.0	7.1	9.0	3.4	--	9.0	66.2	87.70	946.23
P - 92	Mudstone, calcareous, phosphatic	VEM-385-47	1.1	11.4	7.5	2.8	--	16.9	45.6	88.80	958.77
P - 91	Mudstone and phosphate rock	VEM-384-47	1.0	8.8	8.5	3.2	--	16.0	51.7	89.80	967.57
P - 90	Phosphate rock, argillaceous	VEM-383-47	0.8	19.1	4.5	1.6	--	18.0	27.8	90.60	982.85
P - 89	Mudstone	VEM-382-47	1.1	4.6	10.2	2.9	--	12.9	68.3	91.70	987.91
P - 88	Mudstone and phosphate rock; fos. col. no. 47-HW-242	VEM-381-47	1.3	12.8	8.4	3.4	--	7.8	54.4	93.00	1,004.55
P - 87	Mudstone	VEM-380-47	2.3	3.9	10.5	4.4	--	5.0	79.4	95.30	1,013.52
P - 86	Limestone, argillaceous	VEM-379-47	2.0	0.4	4.9	1.9	--	29.7	35.0	97.30	1,014.32
P - 85	Mudstone and phosphate rock	VEM-378-47	2.4	7.4	9.8	4.2	--	5.3	69.6	99.70	1,032.08
P - 84	Mudstone	VEM-377-47	0.4	1.0	7.2	5.2	--	8.1	82.0	100.10	1,032.48

P - 83	Mudstone and calcareous mudstone	VEM-376-47	2.8	0.4	6.8	2.5	--	24.2	47.4	102.90	1,033.60
P - 82	Mudstone and phosphate rock	VEM-375-47	0.5	14.7	7.9	3.3	--	5.5	50.9	103.40	1,040.95
P - 81	Mudstone and phosphate rock	VEM-374-47	2.9	9.8	9.9	4.7	--	5.3	63.9	106.30	1,069.37
P - 80	Mudstone	VEM-373-47	1.0	1.7	12.0	3.8	--	5.4	84.7	107.30	1,071.07
P - 79	Phosphate rock	VEM-372-47	1.0	32.2	2.4	2.4	--	3.3	12.0	108.30	1,103.27
P - 78	Phosphate rock and mudstone	VEM-371-47	0.7	21.4	5.4	4.9	--	5.2	33.3	109.00	1,118.25
P - 77	Mudstone	VEM-370-47	1.4	1.6	11.5	5.2	--	6.7	81.8	110.40	1,120.49
P - 76	Phosphate rock and mudstone	VEM-369-47	0.9	22.5	5.5	3.5	--	6.4	32.0	111.30	1,140.74
P - 75	Mudstone, phosphatic	VEM-368-47	0.4	9.6	10.5	3.6	--	10.0	59.6	111.70	1,144.58
P - 74	Mudstone	VEM-367-47	1.1	3.5	11.7	3.5	--	6.7	78.7	112.80	1,148.43
P - 73	Mudstone, phosphatic	VEM-366-47	0.9	14.0	8.0	3.0	--	11.8	45.9	113.70	1,161.03
P - 72	Mudstone	VEM-365-47	1.3	0.9	4.0	3.6	--	8.6	84.1	115.00	1,162.20
P - 71	Mudstone	VEM-364-47	0.8	4.8	11.0	3.5	--	8.2	74.6	115.80	1,166.04
P - 70	Phosphate rock, argillaceous	VEM-363-47	0.4	17.1	5.3	2.4	--	19.7	26.7	116.20	1,172.88
P - 69	Phosphate rock	VEM-362-47	0.7	24.3	3.3	1.4	--	17.9	14.9	116.90	1,189.89
P - 68	Mudstone, phosphatic	VEM-361-47	0.8	11.1	8.7	2.7	--	14.0	50.7	117.70	1,198.77
P - 67	Mudstone, phosphatic	VEM-360-47	1.0	13.3	7.9	2.7	--	17.2	40.7	118.70	1,212.07
P - 66	Mudstone, phosphatic	VEM-359-47	0.8	8.2	10.6	3.5	--	14.5	55.0	119.50	1,218.63
P - 65	Mudstone, phosphatic	VEM-344-47	0.4	9.1	9.6	3.3	--	25.2	36.8	119.90	1,222.27
P - 64	Mudstone, calcareous, phosphatic	VEM-343-47	1.8	10.1	7.7	2.9	--	21.5	36.7	121.70	1,240.45
P - 63	Phosphate rock, calcareous, argillaceous	VEM-342-47	1.2	13.7	5.3	2.2	--	19.2	27.6	122.90	1,256.89
P - 62	Mudstone, calcareous, phosphatic	VEM-341-47	1.6	7.9	8.0	2.7	--	18.9	40.7	124.50	1,269.53
P - 61	Mudstone, calcareous; fos. col. no. 47-HW-241	VEM-340-47	0.4	5.7	10.6	3.3	--	15.2	52.3	124.90	1,271.81
P - 60	Limestone; fos. col. no. 47-HW-240	VEM-339-47	0.5	0.3	2.0	0.8	--	40.6	11.9	125.40	1,271.96
P - 59	Limestone; fos. col. no. 47-HW-239	VEM-338-47	1.5	0.3	1.4	0.4	--	40.8	11.3	126.90	1,272.41
P - 58	Mudstone, calcareous; fos. col. no. 47-HW-238	VEM-337-47	1.1	1.8	11.9	3.4	--	13.7	65.6	128.00	1,274.39
P - 57	Limestone; fos. col. no. 47-HW-237	VEM-336-47	3.6	0.3	1.9	0.5	--	38.5	17.4	131.60	1,275.47
P - 56	Chert; fos. col. no. 47-HW-236	VEM-335-47	0.3	1.0	2.4	3.5	--	5.0	85.1	131.90	1,275.77
P - 55	Mudstone; fos. col. no. 47-HW-235	VEM-334-47	1.0	1.8	7.6	2.6	--	6.9	81.1	132.90	1,277.57
P - 54	Mudstone, calcareous	VEM-333-47	1.5	2.9	11.7	3.3	--	12.1	68.9	134.40	1,281.92
P - 53	Mudstone	VEM-332-47	1.7	1.7	11.7	3.5	--	10.0	76.6	136.10	1,284.81
P - 52	Mudstone, calcareous	VEM-331-47	1.6	4.1	9.2	2.9	--	19.0	48.6	137.70	1,291.37
P - 51	Mudstone; fos. col. no. 47-HW-234	VEM-330-47	1.2	3.7	10.3	3.1	--	9.1	72.6	138.90	1,295.81
P - 50	Mudstone	VEM-329-47	1.6	6.8	11.1	3.4	--	9.2	64.3	140.50	1,306.69
P - 49	Mudstone	VEM-328-47	1.7	1.6	11.4	3.6	--	8.5	81.0	142.20	1,309.43

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)						Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)
				P ₂ O ₅	Al ₂ O ₃	Fe ₂ O ₃	F	Loss on ignition	Acid insoluble		
P - 48	Mudstone, phosphatic	RMC-104-47	2.0	10.7	11.0	3.7	--	11.5	52.6	144.2	1,330.81
P - 47	Mudstone	RMC-103-47	0.9	4.0	11.5	3.5	--	8.9	73.7	145.1	1,334.41
P - 46	Mudstone and calcareous mudstone	RMC-102-47	1.4	5.1	11.6	3.9	--	10.8	64.0	146.5	1,341.55
P - 45	Limestone; fos. col. no. 47-HW-233	RMC-101-47	1.1	0.6	2.3	1.1	--	38.6	14.3	147.6	1,342.21
P - 44	Mudstone, calcareous and phosphatic, calcareous mudstone	RMC-100-47	1.8	14.6	9.2	3.2	--	12.1	41.9	149.4	1,368.49
P - 43	Phosphate rock, argillaceous	RMC- 99-47	0.6	21.7	5.1	1.8	--	14.3	24.4	150.0	1,381.51
P - 42	Phosphate rock, argillaceous, calcareous	RMC- 98-47	0.5	14.7	7.9	2.5	--	17.0	33.4	150.5	1,388.86
P - 41	Mudstone, calcareous, phosphatic	RMC- 97-47	1.5	8.0	7.5	2.7	--	18.5	44.0	152.0	1,400.86
P - 40	Mudstone, phosphatic	VEM-327-47	0.8	12.2	8.9	3.2	--	11.8	49.8	152.8	1,410.62
P - 39	Phosphate rock, argillaceous	VEM-326-47	0.8	16.3	9.4	2.5	--	11.7	38.9	153.6	1,423.66
P - 38	Phosphate rock, argillaceous, contains limestone lens at top	VEM-325-47	1.2	15.5	7.8	2.5	--	15.2	34.4	154.8	1,442.26
--	Limestone lens between bed P-38 and bed P-37	VEM-324-47	(0.0-1.1)	0.7	0.6	0.2	--	42.7	3.1	--	1,442.26
P - 37	Mudstone, phosphatic, calcareous	VEM-323-47	1.5	11.1	10.1	3.2	--	13.5	49.4	156.3	1,458.91
P - 36	Mudstone, phosphatic, calcareous	VEM-322-47	1.5	10.6	10.5	3.2	--	15.1	47.4	157.80	1,474.81
P - 35	Phosphate rock, argillaceous, calcareous	VEM-321-47	0.7	15.2	6.3	2.7	--	16.1	36.2	158.5	1,485.45
P - 34	Phosphate rock; fos. col. no. 47-HW-232	VEM-320-47	1.6	27.1	2.8	1.2	--	14.1	11.3	160.1	1,528.81
P - 33	Phosphate rock, argillaceous	VEM-319-47	0.8	16.5	4.3	2.5	--	25.5	23.1	160.9	1,542.01
P - 32	Phosphate rock	VEM-318-47	0.8	30.8	1.4	1.6	--	10.7	6.8	161.7	1,566.65
P - 31	Phosphate rock	VEM-317-47	1.2	26.1	2.8	1.5	--	11.1	17.8	162.9	1,597.97
P - 30	Limestone	VEM-316-47	1.6	2.7	1.8	0.7	--	38.6	11.9	164.5	1,602.29
--	Limestone lens, argillaceous, phosphatic, in bed P-29	VEM-315-47	(0.0-0.8)	10.2	4.6	1.3	--	22.4	31.0	--	--
P - 29	Limestone, argillaceous, phosphatic	VEM-314-47	0.8	10.1	4.9	1.3	--	22.1	31.3	165.3	1,610.37
P - 28	Mudstone, calcareous, phosphatic	VEM-313-47	2.7	9.6	7.6	2.3	--	16.3	42.4	168.0	1,636.29
P - 27	Limestone	VEM-312-47	1.8	1.1	3.1	1.3	--	36.9	19.8	169.8	1,638.27
P - 26	Phosphate rock, calcareous, argillaceous	VEM-311-47	0.9	16.8	3.2	1.1	1.49	18.6	21.0	170.7	1,653.39
P - 25	Phosphate rock	RAW- 60-47	0.8	28.6	2.2	1.0	2.86	10.3	14.7	171.5	1,676.27
P - 24	Phosphate rock	RAW- 59-47	0.8	29.2	1.8	0.6	2.82	11.5	10.7	172.3	1,699.63
P - 23	Phosphate rock	RAW- 58-47	1.4	27.7	2.4	1.1	2.48	10.8	15.2	173.7	1,738.41
P - 22	Phosphate rock, argillaceous	RAW- 49-47	1.3	18.6	5.4	2.0	1.94	9.4	37.6	175.0	1,762.59
P - 21	Limestone, argillaceous; fos. col. no. 47-HW-224	RAW- 48-47	1.2	3.0	2.9	1.6	0.31	29.9	25.6	176.2	1,766.19

P - 20	Phosphate rock	RAW- 47-47	0.9	32.5	1.3	0.8	3.30	8.8	6.8	177.1	1,795.44
P - 19	Phosphate rock	RAW- 46-47	2.1	28.7	2.5	0.9	2.47	9.4	14.1	179.2	1,855.71
--	Limestone lens in bed P-18	RAW- 45-47	(0.5)	1.3	0.4	0.2	--	41.0	3.8	--	--
P - 18	Phosphate rock	RAW- 44-47	2.0	26.2	2.5	1.3	2.50	10.0	19.8	181.2	1,908.11
P - 17	Phosphate rock, argillaceous	RAW- 43-47	1.7	23.1	4.1	1.3	2.16	11.0	23.4	182.9	1,947.38
P - 16	Limestone, phosphatic	RAW- 42-47	0.9	8.9	1.3	0.7	0.86	32.6	7.8	183.8	1,955.39
P - 15	Limestone	RAW- 41-47	0.8	2.0	2.5	0.7	--	40.6	8.2	184.6	1,956.99
P - 14	Phosphate rock	RAW- 40-47	1.5	26.9	3.2	0.7	2.55	9.9	16.7	186.1	1,997.34
P - 13	Phosphate rock, calcareous, fos. col. no. 47-HW-223	RAW- 39-47	1.4	20.2	2.8	1.0	2.04	15.5	18.2	187.5	2,025.62
P - 12	Limestone, phosphatic, fos. col. no. 47-HW-222	RAW- 38-47	1.5	10.5	0.8	1.2	1.06	31.1	8.4	189.0	2,041.37
P - 11	Phosphate rock	RAW- 37-47	1.0	32.6	1.24	0.4	2.67	8.5	4.0	190.0	2,073.97
P - 10	Phosphate rock	RAW- 36-37	1.1	32.4	0.94	0.5	3.21	9.8	3.8	191.1	2,109.61
P - 9	Phosphate rock	RAW- 35-47	1.2	32.0	1.1	0.8	3.17	10.7	3.7	192.3	2,148.01
P - 8	Phosphate rock	RAW- 34-47	1.1	32.4	0.98	0.6	3.24	9.9	3.3	193.4	2,183.65
P - 7	Phosphate rock	RAW- 33-47	0.6	30.1	1.4	0.9	3.07	13.0	5.2	194.0	2,201.71
P - 6	Phosphate rock	RAW- 32-47	1.4	31.0	1.4	0.8	3.17	8.3	8.9	195.4	2,245.11
P - 5	Mudstone, calcareous	RAW- 31-47	1.2	3.8	9.8	3.5	--	13.2	64.0	196.6	2,249.67
P - 4	Limestone, argillaceous	RAW- 30-47	2.6	0.4	4.2	2.0	--	29.5	34.5	199.2	2,250.71
P - 3	Mudstone, calcareous	RAW- 29-47	2.3	0.7	8.0	2.3	--	15.5	61.4	201.5	2,252.32
P - 2	Phosphate rock, argillaceous	RAW- 28-47	0.2	20.8	5.6	1.8	--	6.1	30.9	201.7	2,256.48
P - 1	Phosphate rock, fos. col. no. 47-HW-221	RAW- 61-47	0.4	29.6	1.1	0.6	2.90	8.0	7.8	202.1	2,268.32

Wells formation

Cw- 1	Limestone, fos. col. no. 47-HW-220	--	4.6	--	--	--	--	--	--	--	--
Cw- 2	Phosphate rock	--	0.2	--	--	--	--	--	--	--	--

SPECTROGRAPHIC ANALYSES—MABIE CANYON, IDAHO. LOT NO. 1210.

Semi-quantitative analyses of samples of the Phosphoria formation, Mabie Canyon, Idaho (see immediately preceding pages for location of section, thickness and description of strata, and chemical analyses of samples), made by U. S. Bureau of Mines Laboratory, Albany, Oregon. In addition to the elements listed in the table below, Sb, As, Ba, Be, Bi, Cd, Cb, Ga, Ge, Au, In, Pb, Li, Hg, Pb, Ta, Sn, and W were looked for in all samples but were not detected.

Explanation of symbols

A = more than 10 percent E = 0.01-0.1 percent
 B = 5-10 percent F = 0.001-0.01 percent
 C = 1-5 percent G = less than 0.001 percent
 D = 0.1-1 percent ND = not detected

Bed no.	Sample no.	Al	B	Ca	Cr	Co	Cu	Fe	Mg	Mn	Mo	Ni	Si	Ag	Na	Sr	Ti	V	Zn	Zr
R - 5	VEM-470-47	C	F	C	E	ND	G	C	C	E	F	E	A	G	E	F	E	E	ND	E
R - 4	VEM-469-47	C	F	A	E	ND	G	C	C	E	F	E	A	G	E	F	E	E	ND	E
R - 3	VEM-468-47	C	F	C	E	ND	G	C	D	E	F	E	A	G	E	F	E	E	ND	E
R - 2	VEM-467-47	C	F	A	E	ND	G	C	C	E	F	E	A	G	E	F	E	E	E	E
R - 1	VEM-466-47	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
P -170	VEM-465-47	C	F	A	E	ND	G	C	D	E	F	E	A	G	E	F	E	E	E	E
P -169	VEM-464-47	C	F	A	E	ND	G	C	D	E	F	E	A	G	E	E	E	E	E	E
P -168	VEM-463-47	C	F	C	E	ND	G	C	D	E	F	E	A	G	E	F	E	E	E	E
P -167	VEM-462-47	C	F	C	E	ND	G	C	D	E	F	E	A	G	E	F	E	D	E	E
P -166	VEM-461-47	C	F	C	E	ND	G	C	D	E	F	E	A	G	D	F	E	E	E	E
--	VEM-460-47	C	F	A	E	ND	G	C	C	E	F	E	B	G	E	F	E	E	E	E
P -165	VEM-459-47	C	F	C	E	ND	G	C	D	E	F	E	A	G	E	F	E	E	E	E
P -164	VEM-458-47	C	F	C	E	ND	G	C	C	E	F	E	A	G	E	F	E	E	ND	E
P -163	VEM-457-47	C	F	C	E	ND	G	C	D	E	F	E	A	G	D	F	E	E	ND	E
P -162	VEM-456-47	C	F	C	E	ND	G	C	D	E	F	E	A	G	D	F	E	E	ND	E
P -161	VEM-455-47	C	F	A	E	ND	G	C	C	E	F	E	C	G	E	F	E	E	ND	E
P -160	VEM-454-47	C	F	C	E	ND	G	C	D	E	F	E	A	G	D	F	E	E	ND	E
P -159	VEM-453-47	C	F	C	E	ND	G	C	D	E	F	E	A	G	D	F	E	E	ND	E
P -158	VEM-452-47	C	F	A	E	ND	G	C	C	E	F	E	A	G	E	F	E	E	ND	E
P -157	VEM-451-47	C	F	C	E	ND	G	C	D	E	F	E	A	G	D	F	E	E	ND	E
P -156	VEM-450-47	C	F	A	E	ND	G	C	D	E	F	E	A	G	E	E	E	E	E	E
P -155	VEM-449-47	C	F	C	E	ND	G	C	D	E	F	E	A	G	D	F	E	E	E	E
P -154	VEM-448-47	D	F	C	E	ND	G	C	D	E	F	E	C	ND	ND	F	E	E	N	E
P -153	VEM-447-47	C	F	C	E	ND	G	C	D	E	F	E	A	G	D	F	E	E	E	E
P -152	VEM-446-47	C	F	C	E	ND	G	C	D	E	F	E	A	G	D	F	E	E	E	E
P -151	VEM-445-47	D	F	A	E	ND	G	C	D	F	F	E	C	G	E	E	E	E	E	E
P -150	VEM-444-47	C	F	A	E	ND	G	C	D	F	F	E	C	G	E	E	E	E	E	E
P -149	VEM-443-47	C	F	C	E	ND	G	C	D	F	F	E	A	G	E	F	E	E	E	E
P -148	VEM-442-47	C	F	A	E	ND	G	C	D	E	F	E	B	G	E	E	E	D	E	E

P -147	VEM-441-47	C	F	A	E	ND	G	C	D	E	F	E	B	G	E	E	D	E	E
P -146	VEM-440-47	C	F	A	E	ND	G	C	D	E	F	E	B	G	E	E	D	E	E
P -145	VEM-439-47	C	F	A	E	ND	G	C	D	E	F	E	B	G	E	E	D	E	E
P -144	VEM-438-47	C	F	A	E	ND	G	C	D	E	F	E	B	G	E	E	D	E	E
P -143	VEM-437-47	C	F	A	E	ND	G	C	D	E	F	E	B	G	E	E	D	E	E
P -142	VEM-436-47	C	F	A	E	ND	G	C	D	E	F	E	A	G	D	E	E	E	E
P -141	VEM-435-47	C	F	A	E	ND	G	C	D	E	F	E	A	G	D	E	E	E	E
P -140	VEM-434-47	C	F	B	E	ND	G	C	D	E	F	E	A	G	D	E	E	E	E
P -139	VEM-433-47	C	F	A	E	ND	G	C	D	F	F	E	A	G	D	E	E	E	E
P -138	VEM-432-47	C	F	A	E	ND	G	C	D	F	F	E	A	G	D	E	E	E	E
P -137	VEM-431-47	C	F	A	E	ND	G	C	D	F	F	E	A	F	E	E	E	E	E
--	VEM-430-47	C	F	A	E	ND	G	C	D	F	F	E	A	F	E	E	E	E	E
P -136	VEM-429-47	C	F	A	E	ND	G	C	D	F	F	E	A	F	E	E	E	E	E
P -135	VEM-428-47	C	F	A	E	ND	G	C	D	F	F	E	A	F	E	E	E	E	E
P -134	VEM-427-47	C	F	A	E	ND	G	C	D	F	F	E	A	F	E	E	E	E	E
P -133	VEM-426-47	C	F	A	E	ND	G	C	D	E	F	E	A	F	E	D	E	E	E
P -132	VEM-425-47	C	F	A	E	ND	G	C	D	E	F	E	A	F	E	D	E	E	E
P -131	VEM-424-47	C	F	A	E	ND	G	C	D	E	F	E	A	F	E	D	E	E	E
P -130	VEM-423-47	C	F	A	E	ND	G	C	D	E	F	E	A	F	E	D	E	E	E
P -129	VEM-422-47	C	F	A	E	ND	G	C	D	E	F	E	A	F	E	D	E	E	E
P -128	VEM-421-47	C	F	A	E	ND	G	C	D	E	F	E	A	F	D	E	E	E	E
P -127	VEM-420-47	C	F	A	E	ND	G	C	D	E	F	E	A	F	D	E	E	E	E
P -126	VEM-419-47	C	F	A	D	ND	G	C	D	E	F	E	A	F	D	E	E	E	E
P -125	VEM-418-47	C	F	A	D	ND	G	C	D	E	F	E	A	F	D	E	E	E	E
P -124	VEM-417-47	C	F	A	D	ND	G	C	D	E	F	E	A	F	D	E	E	E	E
P -123	VEM-416-47	C	F	A	E	ND	G	C	D	E	F	E	A	G	D	E	E	E	E
P -122	VEM-415-47	C	F	A	E	ND	G	C	D	E	F	E	A	G	D	E	E	E	E
P -121	VEM-414-47	C	F	A	E	ND	G	C	D	E	F	E	A	G	D	E	E	E	E
P -120	VEM-413-47	C	F	A	D	ND	G	C	D	E	F	E	A	G	D	E	E	E	E
P -119	VEM-412-47	C	F	A	E	ND	G	C	D	E	F	E	A	G	D	E	E	E	E
P -118	VEM-411-47	C	F	A	E	ND	G	C	D	E	F	E	A	G	D	E	E	E	E
P -117	VEM-410-47	C	F	B	E	ND	G	C	D	E	F	E	A	G	D	E	E	E	E
P -116	VEM-409-47	C	F	A	E	ND	G	C	D	E	F	E	A	G	D	E	E	E	E
P -115	VEM-408-47	C	F	A	E	ND	G	C	D	E	F	E	A	G	D	E	E	E	E
P -114	VEM-407-47	C	F	A	E	ND	G	C	D	E	F	E	A	G	D	E	E	E	E
P -113	VEM-406-47	C	F	A	E	ND	G	C	D	E	F	E	A	G	D	E	E	E	E
P -112	VEM-405-47	C	F	A	E	ND	G	C	D	E	F	E	A	G	D	E	E	E	E
P -111	VEM-404-47	C	F	A	E	ND	G	C	D	E	F	E	A	G	D	E	E	E	E
P -110	VEM-403-47	C	F	A	E	ND	G	C	D	E	F	E	A	G	D	E	E	E	E
P -109	VEM-402-47	C	F	A	E	ND	G	C	D	E	F	E	A	G	D	E	E	E	E
P -108	VEM-401-47	C	F	A	E	ND	G	C	D	E	F	E	A	G	D	E	E	E	E
P -107	VEM-400-47	C	F	A	E	ND	G	C	D	E	F	E	A	G	D	E	E	E	E
P -106	VEM-399-47	C	F	A	E	ND	G	C	D	E	F	E	A	G	D	E	E	E	E
P -105	VEM-398-47	C	F	A	E	ND	G	C	D	E	F	E	A	G	D	E	E	E	E
P -104	VEM-397-47	C	F	A	D	ND	G	C	D	E	F	E	A	G	D	E	E	E	E

Bed no.	Sample no.	Al	B	Ca	Cr	Co	Cu	Fe	Mg	Mn	Mo	Ni	Si	Ag	Na	Sr	Ti	V	Zn	Zr
P - 103	VEM-396-47	C	F	B	D	ND	G	C	D	E	F	E	A	G	D	E	E	D	E	E
P - 102	VEM-395-47	C	F	C	E	ND	G	C	D	E	F	E	A	G	D	F	E	E	N	E
P - 101	VEM-394-47	C	F	C	E	E	G	C	D	E	F	E	A	G	D	F	E	E	N	E
P - 100	VEM-393-47	C	F	B	E	ND	G	C	C	E	F	E	A	G	D	F	E	D	E	E
P - 99	VEM-392-47	C	F	A	E	ND	G	C	D	E	F	E	A	F	D	E	E	D	E	E
P - 98	VEM-391-47	C	F	C	E	ND	G	C	D	E	F	E	A	F	D	E	E	D	E	E
P - 97	VEM-390-47	C	F	C	E	ND	G	C	D	E	F	E	A	G	D	F	E	D	E	E
P - 96	VEM-389-47	C	F	C	E	ND	G	C	D	E	F	E	A	G	D	E	E	D	E	E
P - 95	VEM-388-47	C	F	C	D	ND	G	C	D	E	F	E	A	G	D	E	E	D	E	E
P - 94	VEM-387-47	C	F	A	E	ND	G	C	D	E	F	E	A	G	D	D	E	D	E	E
P - 93	VEM-386-47	C	F	B	E	ND	G	C	D	E	F	E	A	G	D	E	E	D	E	E
P - 92	VEM-385-47	C	F	A	D	ND	G	C	D	E	F	E	A	F	D	E	E	D	E	E
P - 91	VEM-384-47	C	F	B	D	ND	G	C	D	E	F	E	A	F	D	E	E	D	E	E
P - 90	VEM-383-47	C	F	A	E	ND	G	C	D	E	F	E	A	F	D	D	E	D	E	E
P - 89	VEM-382-47	C	F	C	E	ND	G	C	D	E	F	E	A	F	D	E	E	D	E	E
P - 88	VEM-381-47	C	F	B	E	ND	G	C	D	E	F	E	A	G	D	E	E	E	ND	E
P - 87	VEM-380-47	C	F	C	E	ND	G	C	D	E	F	E	A	G	D	F	E	E	ND	E
P - 86	VEM-379-47	C	F	A	E	ND	G	C	C	E	F	E	A	G	D	F	E	E	ND	E
P - 85	VEM-378-47	C	F	C	E	ND	G	C	D	E	F	E	A	G	D	F	E	E	ND	E
P - 84	VEM-377-47	C	F	C	E	ND	G	C	D	E	F	E	A	G	D	F	D	E	ND	E
P - 83	VEM-376-47	C	F	A	E	ND	G	C	C	E	F	E	A	G	D	F	E	E	ND	E
P - 82	VEM-375-47	C	F	A	E	ND	G	C	D	E	F	E	A	G	D	E	E	E	ND	E
P - 81	VEM-374-47	C	F	B	E	ND	G	C	D	E	F	E	A	G	D	E	E	E	ND	E
P - 80	VEM-373-47	C	F	C	E	ND	G	C	D	E	F	E	A	G	D	F	D	E	ND	E
P - 79	VEM-372-47	C	F	A	E	ND	G	C	D	E	F	E	B	G	D	D	E	E	ND	E
P - 78	VEM-371-47	C	F	A	E	ND	G	C	D	E	F	E	A	G	D	D	E	E	ND	E
P - 77	VEM-370-47	C	F	C	E	ND	G	C	D	E	F	E	A	G	D	F	D	E	ND	E
P - 76	VEM-369-47	C	F	A	E	ND	G	C	D	F	E	E	A	G	D	E	E	E	ND	E
P - 75	VEM-368-47	C	F	C	E	ND	G	C	D	F	F	E	A	G	D	F	E	E	ND	E
P - 74	VEM-367-47	C	F	C	E	ND	G	C	D	E	F	E	A	G	D	F	E	D	ND	E
P - 73	VEM-366-47	C	F	A	D	ND	G	C	D	F	F	E	A	G	D	E	E	E	ND	E
P - 72	VEM-365-47	C	F	C	E	ND	G	C	D	E	F	E	A	G	D	F	D	E	ND	E
P - 71	VEM-364-47	C	F	C	E	ND	G	C	D	E	F	E	A	G	D	F	D	E	ND	E
P - 70	VEM-363-47	C	F	A	D	ND	G	C	D	F	F	E	A	G	E	E	E	E	E	E
P - 69	VEM-362-47	C	F	A	E	ND	G	C	D	F	F	E	C	G	E	E	E	E	E	E
P - 68	VEM-361-47	C	F	A	E	ND	G	C	D	E	F	E	A	G	D	E	E	E	E	E
P - 67	VEM-360-47	C	F	A	E	ND	G	C	D	E	F	E	A	G	D	E	E	E	E	E
P - 66	VEM-359-47	C	F	B	E	ND	G	C	D	E	F	E	A	F	D	D	E	E	E	E
P - 65	VEM-344-47	C	F	B	D	ND	G	C	D	E	F	E	A	F	E	E	E	D	E	E
P - 64	VEM-343-47	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
P - 63	VEM-342-47	C	F	A	D	ND	G	C	C	E	E	E	A	G	D	E	E	D	E	E

P - 62	VEM-341-47	C	F	A	E	ND	G	C	C	E	E	E	A	G	D	E	E	D	E	E
P - 61	VEM-340-47	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
P - 60	VEM-339-47	C	F	A	E	ND	G	D	B	E	F	E	C	G	E	F	E	E	ND	E
P - 59	VEM-338-47	C	F	A	E	ND	G	D	B	E	F	E	C	G	E	F	E	E	ND	E
P - 58	VEM-337-47	C	F	A	E	ND	G	C	C	E	F	E	A	G	D	F	E	E	E	E
P - 57	VEM-336-47	C	F	A	E	ND	G	C	B	E	F	E	B	G	E	F	E	E	ND	E
P - 56	VEM-335-47	C	F	A	E	ND	G	D	D	E	F	E	B	G	E	F	E	E	E	E
P - 55	VEM-334-47	C	F	C	E	ND	G	C	D	E	F	E	A	G	D	F	E	E	E	E
P - 54	VEM-333-47	C	F	C	E	ND	G	C	D	E	F	E	A	G	D	F	E	E	E	E
P - 53	VEM-332-47	C	F	C	E	ND	G	C	D	E	F	E	A	G	D	F	E	E	E	E
P - 52	VEM-331-47	C	F	A	E	ND	G	C	D	E	F	E	A	G	D	E	D	E	E	E
P - 51	VEM-330-47	C	F	A	E	ND	G	C	D	E	F	E	A	G	D	E	D	E	E	E
P - 50	VEM-329-47	C	F	A	E	ND	G	C	D	E	F	E	A	G	D	E	D	E	E	E
P - 49	VEM-328-47	C	F	A	E	ND	G	C	D	E	F	E	A	G	D	E	D	E	ND	E
P - 48	RMC-104-47	C	F	B	E	ND	G	C	D	F	F	E	A	G	D	E	E	E	E	E
P - 47	RMC-103-47	C	F	C	E	ND	G	C	D	F	F	E	A	G	D	F	E	E	E	E
P - 46	RMC-102-47	C	F	C	E	ND	G	C	D	F	F	E	A	G	D	F	E	E	E	E
P - 45	RMC-101-47	C	F	A	E	ND	G	C	C	F	F	E	A	G	D	E	E	E	E	E
P - 44	RMC-100-47	C	F	A	E	ND	G	C	C	F	F	E	A	G	D	E	E	E	E	E
P - 43	RMC- 99-47	C	F	A	D	ND	G	C	D	F	F	E	A	G	D	E	E	E	E	E
P - 42	RMC- 98-47	C	F	A	E	ND	G	C	D	F	F	E	A	G	D	E	E	E	E	E
P - 41	RMC- 97-47	C	F	A	E	ND	G	C	C	F	F	E	A	G	D	E	E	E	E	E
P - 40	VEM-327-47	C	F	A	E	ND	G	C	D	F	F	E	A	G	D	E	E	E	E	E
P - 39	VEM-326-47	C	F	A	E	ND	G	C	D	F	F	E	A	G	D	E	E	E	E	E
P - 38	VEM-325-47	C	F	A	E	ND	G	C	D	E	E	E	A	G	D	E	E	E	E	E
--	VEM-324-47	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
P - 37	VEM-323-47	C	F	A	E	ND	G	C	D	E	E	E	A	G	D	E	D	D	E	E
P - 36	VEM-322-47	C	F	A	E	ND	F	C	D	E	E	E	A	G	D	E	D	D	E	E
P - 35	VEM-321-47	C	F	A	E	ND	F	C	D	E	E	E	A	G	D	E	E	D	E	E
P - 34	VEM-320-47	C	F	A	D	ND	F	C	D	F	F	E	B	F	D	E	E	D	E	E
P - 33	VEM-319-47	C	F	A	D	ND	E	C	D	F	E	E	A	F	E	E	D	C	E	E
P - 32	VEM-318-47	C	F	A	E	ND	G	C	D	F	E	E	A	G	E	E	E	D	E	E
P - 31	VEM-317-47	C	F	A	E	ND	G	C	D	F	E	E	A	G	E	E	E	D	E	E
P - 30	VEM-316-47	C	F	A	E	ND	G	C	B	F	E	E	A	G	E	F	E	D	E	E
--	VEM-315-47	C	F	A	E	ND	G	C	C	E	F	E	A	G	D	F	E	D	E	E
P - 29	VEM-314-47	C	F	A	E	ND	G	C	C	E	F	E	A	G	D	F	E	D	E	E
P - 28	VEM-313-47	C	F	A	E	ND	G	C	C	E	F	E	A	G	E	F	E	D	E	E
P - 27	VEM-312-47	C	F	A	F	ND	G	D	B	E	F	E	A	G	E	F	E	D	ND	E
P - 26	VEM-311-47	C	F	A	E	ND	G	C	C	F	F	E	A	G	E	E	E	D	E	E
P - 25	RAW- 60-47	C	F	A	E	ND	G	C	D	F	F	E	B	G	E	E	E	D	E	E
P - 24	RAW- 59-47	C	F	A	E	ND	G	C	D	F	F	E	B	G	E	E	E	D	E	E
P - 23	RAW- 58-47	C	F	A	E	ND	G	C	D	F	F	E	B	G	E	E	E	D	E	E
P - 22	RAW- 49-47	C	F	A	E	ND	G	C	D	F	F	E	A	G	E	E	E	D	E	E
P - 21	RAW- 48-47	C	F	A	E	ND	G	C	C	F	F	E	A	G	E	E	E	D	ND	E
P - 20	RAW- 47-47	C	F	A	E	ND	G	C	D	F	F	E	B	G	E	E	E	D	E	E

Bed no.	Sample no.	Al	B	Ca	Cr	Co	Cu	Fe	Mg	Mn	Mo	Ni	Si	Ag	Na	Sr	Ti	V	Zn	Zr
P - 19	RAW- 46-47	C	F	A	E	ND	G	C	D	F	F	E	A	F	D	E	E	D	E	E
--	RAW- 45-47	C	F	A	E	ND	G	D	D	F	F	E	C	G	E	F	E	E	ND	E
P - 18	RAW- 44-47	C	F	A	E	ND	G	C	D	F	F	E	A	F	D	E	E	D	E	E
P - 17	RAW- 43-47	C	F	A	E	ND	G	C	D	F	F	E	A	F	D	E	E	D	E	E
P - 16	RAW- 42-47	C	F	A	E	ND	G	D	C	F	F	E	C	G	E	F	E	D	E	E
P - 15	RAW- 41-47	C	F	A	E	ND	G	D	C	F	F	E	C	G	E	F	E	D	E	E
P - 14	RAW- 40-47	C	F	A	E	ND	G	C	D	F	F	E	C	F	D	E	E	D	E	E
P - 13	RAW- 39-47	C	F	A	E	ND	G	C	C	F	F	E	B	F	D	F	E	E	E	E
P - 12	RAW- 38-47	C	F	A	E	ND	G	C	C	F	F	E	C	G	D	F	E	D	E	E
P - 11	RAW- 37-47	C	F	A	E	ND	G	D	D	F	F	E	C	G	D	E	E	D	E	E
P - 10	RAW- 36-47	C	F	A	E	ND	G	C	D	F	F	E	C	G	D	E	E	D	E	E
P - 9	RAW- 35-47	C	F	A	E	ND	G	C	D	F	F	E	C	G	D	E	E	D	E	E
P - 8	RAW- 34-47	C	F	A	E	ND	G	C	D	F	F	E	C	G	D	E	E	D	E	E
P - 7	RAW- 33-47	C	F	A	E	ND	G	C	D	F	F	E	C	G	D	E	E	D	E	E
P - 6	RAW- 32-47	C	F	A	E	ND	G	C	D	F	F	E	C	G	D	E	E	D	E	E
P - 5	RAW- 31-47	C	F	C	E	ND	G	C	D	F	F	E	A	G	E	F	E	D	E	E
P - 4	RAW- 30-47	C	F	A	E	ND	G	C	C	E	F	E	A	G	E	F	E	D	E	E
P - 3	RAW- 29-47	C	F	C	E	ND	G	C	C	E	F	E	A	G	E	F	E	D	E	E
P - 2	RAW- 28-47	C	F	A	E	ND	G	C	D	E	F	E	A	G	D	F	E	D	E	E
P - 1	RAW- 61-47	C	F	A	E	ND	G	C	D	F	F	E	C	G	D	E	E	E	E	E

CONDA, IDAHO. LOT NO. 1200.

Phosphatic shale member of Phosphoria formation sampled in 300 level east crosscut of Conda mine, sec. 13, T. 8 S., R. 42 E., Caribou County, Idaho, on west limb of Trail syncline. Beds strike N. 10° W., and dip 55° E. Section measured by F. C. Armstrong, R. A. Hoppin, and L. E. Smith and sampled by R. A. Gulbrandsen, O. A. Payne, R. S. Sears, and R. P. Sheldon in July 1947. Samples analyzed by Tennessee Valley Authority.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)						Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)
				P ₂ O ₅	Al ₂ O ₃	Fe ₂ O ₃	V ₂ O ₅	Loss on ignition	Acid insoluble		
Rex member of Phosphoria formation											
R - 4	Chert and mudstone	--	2.7	--	--	--	--	--	--	2.70	--
R - 3	Limestone, cherty	--	1.75	--	--	--	--	--	--	4.45	--
R - 2	Chert, calcareous	--	3.0	--	--	--	--	--	--	7.45	--
R - 1	Mudstone, calcareous	FCA-141-47	0.3	1.3	5.5	2.4	.045	8.6	56.3	7.75	0.39
Phosphatic shale member of Phosphoria formation											
P -142	Phosphate rock, calcareous; fos. col. no. 47-HW-12 ¹	FCA-140-47	0.8	24.0	1.8	1.3	.025	16.2	15.1	0.80	19.20
P -141	Mudstone, calcareous	FCA-139-47	0.35	4.2	9.4	3.2	.095	13.2	54.4	1.15	20.67
P -140	Mudstone, calcareous; fos. col. no. 47-HW-11	FCA-138-47	1.7	1.7	8.9	3.9	.095	13.2	60.3	2.85	23.56
P -139	Mudstone, calcareous	FCA-137-47	0.75	5.6	9.6	3.1	.03	15.8	51.5	3.60	27.76
P -138	Mudstone, calcareous; fos. col. no. 47-HW-10	FCA-144-47	4.9	1.2	8.6	4.0	.025	24.8	58.6	8.50	33.64
P -137	Limestone, argillaceous; fos. col. 47-HW-9	FCA-143-47	2.8	4.1	4.1	1.9	.015	13.5	31.6	11.30	45.12
P -136	Phosphate rock, argillaceous	FCA-142-47	0.25	24.6	5.1	2.3	.035	24.8	20.3	11.55	51.27
P -135	Phosphate rock	FCA-136-47	1.35	28.8	2.1	1.3	.08	8.4	12.3	12.90	90.15
P -134	Mudstone, calcareous	FCA-135-47	0.35	4.6	8.6	3.2	.17	15.8	54.0	13.25	91.76
P -133	Phosphate rock, calcareous; fos. col. no. 47-HW-8	FCA-134-47	0.65	25.0	0.7	0.8	.035	15.3	5.1	13.90	108.01
P -132	Phosphate rock	FCA-133-37	0.35	34.2	0.4	0.6	.06	8.5	2.3	14.25	119.98
P -131	Phosphate rock	FCA-132-47	0.55	26.9	2.2	1.1	.14	13.5	9.9	14.80	134.78
P -130	Phosphate rock	FCA-131-47	0.85	33.4	0.5	0.6	.065	8.8	2.6	15.65	163.17
P -129	Phosphate rock	FCA-130-47	0.3	30.1	1.9	1.4	.06	7.7	11.3	15.95	172.20
P -128	Phosphate rock, calcareous	FCA-129-47	0.8	22.3	1.8	1.2	.04	13.8	14.3	16.75	190.04
P -127	Phosphate rock	FCA-128-47	0.75	32.4	1.0	1.0	.09	7.4	5.2	17.50	214.34
P -126	Phosphate rock, calcareous near base	FCA-127-47	0.75	26.9	2.4	1.5	.09	8.7	15.0	18.25	234.52
P -125	Phosphate rock	FCA-126-47	0.35	26.5	2.5	1.6	.13	9.6	15.3	18.60	243.80
P -124	Limestone, phosphatic	FCA-125-47	0.65	7.8	1.5	0.7	.03	31.0	11.7	19.25	248.87
P -123	Phosphate rock, calcareous	FCA-124-47	0.8	24.2	1.4	0.8	.08	15.8	6.9	20.05	268.23

¹ Fossil collection by H. Wedow, Paleontology and Stratigraphy Branch, U. S. Geological Survey.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)						Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)
				P ₂ O ₅	Al ₂ O ₃	Fe ₂ O ₃	V ₂ O ₅	Loss on ignition	Acid insoluble		
P -122	Mudstone and phosphate rock	FCA-123-47	0.6	17.5	4.8	2.0	.24	14.0	28.1	20.65	278.73
P -121	Phosphate rock, calcareous	FCA-122-47	0.7	20.0	2.6	1.5	.19	16.2	16.0	21.35	292.73
P -120	Limestone, phosphatic	FCA-121-47	1.1	15.6	0.9	0.8	.08	25.0	6.7	22.45	309.87
P -119	Limestone, argillaceous	FCA-120-47	0.9	6.7	4.8	2.0	.25	23.0	31.0	23.35	315.92
P -118	Mudstone, calcareous	FCA-119-47	0.7	3.0	7.3	2.9	.36	22.0	44.6	24.05	318.02
P -117	Mudstone, calcareous	FCA-118-47	0.25	1.0	7.4	3.7	.49	23.5	44.9	24.30	318.27
P -116	Mudstone	FCA-117-47	0.4	1.1	7.9	4.1	.42	21.0	50.4	24.70	318.71
P -115	Limestone, argillaceous	FCA-116-47	0.4	1.9	7.0	3.0	.36	22.8	46.0	25.10	319.47
P -114	Mudstone	FCA-115-47	0.65	4.7	7.5	3.4	.33	18.7	49.4	25.75	322.53
P -113	Mudstone	FCA-114-47	0.3	1.8	8.9	3.2	.41	21.7	51.3	26.05	323.07
P -112	Limestone, phosphatic, argillaceous	FCA-111-47	0.75	14.1	3.9	1.7	.38	24.1	21.6	26.80	333.65
P -111	Mudstone, phosphatic, calcareous	FCA-110-47	0.6	12.5	6.2	2.4	.30	14.8	41.4	27.40	341.15
P -110	Limestone, phosphatic	RAH-146-47	0.6	18.4	0.4	0.4	0.95	9.6	4.3	28.00	352.19
P -109	Limestone, phosphatic	RAH-145-47	2.2	8.9	1.6	1.0	.12	24.4	11.1	30.20	371.77
P -108	Limestone, phosphatic	RAH-144-47	3.5	12.8	2.9	1.4	.22	36.6	15.7	33.70	416.57
P -107	Limestone, phosphatic	RAH-143-47	2.1	13.8	3.5	1.5	.31	28.7	19.1	35.80	445.55
P -106	Phosphate rock, argillaceous, calcareous	RAH-142-47	1.6	14.5	5.4	2.2	.09	24.6	33.1	37.40	468.75
P -105	Limestone, argillaceous	RAH-141-47	2.1	2.6	4.6	2.2	.04	18.6	35.0	39.50	474.21
P -104	Mudstone, calcareous, phosphatic	RAH-140-47	1.3	10.8	6.7	2.4	.015	26.7	37.6	40.80	488.25
P -103	Mudstone, phosphatic, calcareous	LES-243-47	1.8	11.6	6.5	2.5	.055	18.9	40.6	42.60	509.13
P -102	Mudstone, calcareous	LES-242-47	4.2	4.5	7.3	3.3	.02	11.5	59.1	46.80	528.03
P -101	Mudstone	LES-241-47	1.9	2.4	7.3	3.3	.015	11.1	75.1	38.70	532.59
P -100	Phosphate rock, argillaceous, calcareous	LES-240-47	0.6	16.2	5.2	3.2	.024	12.5	35.6	49.30	542.31
P - 99	Mudstone, calcareous	LES-239-47	2.4	1.4	7.6	3.0	.018	15.3	64.0	51.79	545.67
P - 98	Mudstone, calcareous	FCA-109-47	0.9	2.7	8.5	2.8	.02	12.6	70.8	52.60	548.10
P - 97	Mudstone, calcareous, phosphatic	FCA-108-47	1.4	8.0	7.1	3.0	.025	12.8	55.9	54.00	559.30
P - 96	Mudstone, calcareous	FCA-107-47	2.0	6.5	5.9	2.4	.03	15.2	55.9	56.00	572.30
P - 95	Mudstone, calcareous	FCA-106-47	3.0	4.3	8.1	3.2	.03	13.0	65.8	59.00	585.20
P - 94	Limestone	FCA-105-47	1.8	0.5	2.2	1.2	.015	35.9	19.1	60.80	586.10
P - 93	Mudstone, calcareous	FCA-104-47	1.1	5.5	7.6	2.8	.025	18.2	60.8	61.90	592.15
P - 92	Mudstone, calcareous, phosphatic	FCA-103-47	0.8	7.8	5.1	2.4	.025	14.6	53.4	62.70	598.39
P - 91	Mudstone, phosphatic, calcareous	FCA-102-47	0.7	11.3	5.9	2.4	.03	15.8	43.2	63.40	606.30
P - 90	Mudstone, calcareous	FCA-101-47	2.7	3.8	8.2	3.1	.025	14.6	61.1	66.10	616.56
P - 89	Mudstone, calcareous	FCA-100-47	2.5	3.8	7.3	2.7	.03	18.8	51.9	68.60	626.06
P - 88	Phosphate rock, argillaceous, calcareous	FCA- 99-47	1.15	14.0	5.3	3.5	.03	14.3	39.2	69.75	642.16
P - 87	Mudstone	FCA- 98-47	1.3	5.7	5.5	2.7	.04	18.1	50.9	71.05	649.57
P - 86	Phosphate rock, argillaceous, calcareous	FCA- 97-47	1.1	14.1	4.0	1.9	.04	17.0	36.6	72.15	665.08

P - 85	Mudstone, calcareous	FCA- 96-47	0.8	4.4	8.6	3.2	.04	15.8	60.4	72.95	668.60
P - 84	Phosphate rock, argillaceous, calcareous	LES-238-47	0.35	20.9	4.5	3.0	.036	13.3	23.9	73.30	675.92
P - 83	Mudstone, calcareous	LES-237-47	0.9	3.2	8.2	3.9	.03	13.2	61.4	74.20	678.80
P - 82	Mudstone	LES-236-47	0.75	2.2	8.3	4.2	.03	12.6	65.9	74.95	680.45
P - 81	Limestone, argillaceous	LES-235-47	3.4	1.1	4.8	2.1	.018	26.0	34.5	78.35	684.19
P - 80	Mudstone, calcareous and phosphate rock; fos. col. no. 47-HW-7	LES-234-47	0.45	19.4	4.1	2.8	.018	11.3	26.6	78.80	692.92
P - 79	Mudstone, calcareous	LES-233-47	0.9	7.4	7.8	4.2	.018	9.9	59.9	79.70	699.58
P - 78	Mudstone	LES-232-47	2.5	1.2	9.7	4.4	.018	9.5	76.2	82.20	702.58
P - 77	Phosphate rock, argillaceous; fos. col. no. 47-HW-6	LES-231-47	0.35	18.5	4.4	4.0	.018	10.8	29.2	82.55	709.06
P - 76	Mudstone	LES-230-47	1.0	7.3	8.3	5.5	.018	9.7	60.7	83.55	716.36
P - 75	Mudstone	LES-229-47	1.3	2.3	9.0	5.1	.03	8.4	75.0	84.85	719.35
P - 74	Mudstone	LES-228-47	2.3	5.6	8.2	4.5	.018	8.9	65.9	87.15	732.23
P - 73	Limestone, argillaceous	LES-227-47	1.9	3.2	7.1	3.3	.018	21.7	43.6	89.05	738.31
P - 72	Phosphate rock, argillaceous, calcareous	LES-226-47	0.65	16.2	3.5	4.1	.024	12.3	35.6	89.70	748.84
P - 71	Phosphate rock and mudstone	LES-225-47	0.5	18.6	5.2	2.8	.03	16.0	27.3	90.20	758.14
P - 70	Mudstone, calcareous	LES-224-47	1.0	1.3	6.7	3.8	.018	12.1	54.3	91.20	759.44
P - 69	Mudstone, phosphatic, calcareous	LES-223-47	0.35	14.5	5.9	3.3	.03	12.0	41.4	91.55	764.52
P - 68	Mudstone, calcareous	LES-222-47	1.8	1.2	9.1	4.2	.043	10.3	74.9	93.35	766.68
P - 67	Limestone, phosphatic, argillaceous	LES-221-47	1.0	13.4	3.2	2.3	.018	20.0	22.0	94.35	780.08
P - 66	Mudstone, contains calcareous concretions near top	LES-220-47	3.9	0.6	10.1	4.0	.015	8.8	77.6	98.25	782.42
P - 65	Mudstone	LES-219-47	3.9	0.4	10.6	4.4	.015	8.9	78.4	102.15	783.98
P - 64	Mudstone, phosphatic, calcareous	LES-218-47	0.9	9.3	9.0	4.1	.018	11.9	53.2	103.05	792.35
P - 63	Mudstone, calcareous	LES-217-47	5.4	5.8	8.4	3.6	.015	8.7	60.3	108.45	823.67
P - 62	Limestone, phosphatic, argillaceous	LES-216-47	1.05	11.8	3.8	2.2	.03	21.3	20.6	109.50	836.06
P - 61	Mudstone, dolomitic	FCA- 95-47	2.15	5.4	7.0	2.7	.03	19.8	46.2	111.65	847.67
P - 60	Limestone, argillaceous, phosphatic	FCA- 94-47	1.2	7.7	5.8	2.4	.03	21.3	35.3	112.85	856.91
P - 59	Limestone, argillaceous	FCA- 93-47	2.8	2.8	4.4	1.8	.015	28.7	29.2	115.65	864.75
P - 58	Limestone, argillaceous	FCA- 92-47	1.6	5.3	3.0	2.0	.035	28.3	27.8	117.25	873.23
P - 57	Limestone, argillaceous	FCA- 91-47	2.2	6.4	3.5	1.7	.045	30.0	28.8	119.45	887.31
P - 56	Limestone, argillaceous	FCA- 90-47	2.6	4.5	4.9	2.1	.03	26.8	33.7	122.05	899.01
P - 55	Limestone, argillaceous	FCA- 89-47	3.5	5.5	4.8	2.4	.025	28.2	27.2	125.55	918.26
P - 54	Limestone, argillaceous	FCA- 88-47	2.9	5.2	3.2	2.9	.03	21.4	40.9	128.45	933.34
P - 53	Dolomite, calcareous; fos. col. no. 47-HW-5	FCA- 87-47	3.2	0.9	2.6	1.3	.03	37.5	17.6	131.65	936.22
P - 52	Mudstone, calcareous	FCA- 86-47	0.9	2.2	7.8	4.2	.04	12.0	69.8	132.55	938.20
P - 51	Mudstone, calcareous	FCA- 85-47	2.3	2.3	9.9	3.9	.055	15.5	63.7	134.85	943.49

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)						Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)
				P ₂ O ₅	Al ₂ O ₃	Fe ₂ O ₃	V ₂ O ₅	Loss on ignition	Acid insoluble		
P - 50	Mudstone, calcareous	FCA- 84-47	4.2	3.1	9.5	4.0	.01	14.0	64.1	139.05	956.51
P - 49	Mudstone, calcareous, phosphatic	LES-215-47	3.2	8.9	8.0	2.9	.024	13.8	45.8	142.25	984.99
P - 48	Limestone, argillaceous; fos. col. no. 47-HW-4	LES-214-47	1.6	2.7	5.2	2.1	.015	27.2	33.0	143.85	989.31
P - 47	Mudstone, phosphatic, calcareous	LES-213-47	1.1	11.8	8.2	3.0	.03	17.4	39.3	144.95	1,002.29
P - 46	Mudstone, phosphatic	LES-212-47	2.0	12.3	7.2	2.4	.03	18.8	33.4	146.95	1,026.89
P - 45	Limestone	LES-211-47	1.6	0.3	2.9	1.2	.015	36.5	16.7	148.55	1,027.37
P - 44	Limestone, argillaceous	LES-210-47	0.8	4.5	5.6	2.1	.015	24.5	34.0	149.35	1,030.97
P - 43	Mudstone, phosphatic, calcareous	LES-209-47	0.7	11.6	8.4	3.0	.03	15.1	44.2	150.05	1,039.09
P - 42	Mudstone, phosphatic, contains gypsum	LES-208-47	0.45	13.7	8.5	2.6	.03	17.0	37.0	150.50	1,045.26
P - 41	Phosphate rock	LES-207-47	0.35	31.8	7.1	2.5	.03	17.9	3.5	150.85	1,056.39
P - 40	Phosphate rock	LES-206-47	1.1	31.0	7.3	2.9	.03	18.4	3.8	151.95	1,090.49
P - 39	Mudstone, phosphatic	LES-189-47	0.7	12.8	8.3	2.9	.015	17.7	43.8	152.65	1,099.45
Possible shear zone, beds P-31 to P-38: rock structure largely destroyed; stratigraphic relations and thicknesses uncertain.											
P - 38	Mudstone, phosphatic	LES-188-47	0.8	13.5	8.1	3.1	.015	19.0	39.3	153.45	1,110.25
P - 37	Limestone, dolomitic, argillaceous	LES-187-47	0.5	1.5	4.9	1.2	.01	35.0	24.0	153.95	1,111.00
P - 36	Limestone, argillaceous, phosphatic	LES-186-47	1.4	8.1	6.6	2.1	.01	24.7	31.8	155.35	1,122.34
P - 35	Mudstone, phosphatic	LES-185-47	0.8	12.1	7.8	2.9	.015	17.8	40.6	156.15	1,132.02
P - 34	Mudstone, calcareous	LES-184-47	0.6	6.9	7.0	2.5	.015	16.4	47.6	156.75	1,136.16
P - 33	Limestone, argillaceous, phosphatic	LES-183-47	1.6	10.1	7.5	2.4	.010	20.5	36.0	158.35	1,152.32
P - 32	Mudstone, phosphatic, calcareous	LES-182-47	1.3	11.9	7.2	2.5	.015	18.3	36.7	159.65	1,167.79
P - 31	Phosphate rock, calcareous	LES-181-47	1.2	18.2	4.2	1.6	.040	20.2	18.0	160.85	1,189.63
P - 30	Phosphate rock, calcareous	LES-180-47	0.4	15.7	4.4	1.7	.050	17.0	27.0	161.25	1,195.91
P - 29	Phosphate rock, argillaceous	FCA- 83-47	0.4	17.4	5.8	2.8	.065	12.7	33.9	161.65	1,202.87
P - 28	Phosphate rock, calcareous	FCA- 82-47	1.9	26.0	1.5	1.5	.03	14.1	8.8	163.55	1,252.27
P - 27	Limestone	FCA- 81-47	2.1	3.5	1.5	0.7	.025	28.0	10.0	165.65	1,259.62
P - 26	Mudstone, phosphatic	FCA- 80-47	0.9	12.2	8.2	2.9	.03	12.6	43.0	166.55	1,270.60
P - 25	Limestone, dolomitic	FCA- 79-47	2.4	6.4	3.6	1.5	.03	29.4	21.0	168.95	1,285.96
P - 24	Phosphate rock	FCA- 78-47	2.5	26.3	2.7	1.4	.12	10.0	17.3	171.45	1,351.71
P - 23	Phosphate rock	FCA- 77-47	1.8	29.3	2.0	1.2	.26	10.4	12.2	173.25	1,404.45
P - 22	Phosphate rock, argillaceous, calcareous	FCA- 76-47	2.5	17.1	3.8	1.7	.13	15.5	25.4	175.75	1,447.20
P - 21	Phosphate rock	FCA- 75-47	1.4	29.6	1.8	1.0	.19	10.7	11.1	177.15	1,488.64
P - 20	Phosphate rock	FCA- 74-47	1.45	26.5	2.4	1.5	.25	11.8	14.7	178.60	1,527.06
P - 19	Phosphate rock; fos. col. no. 47-HW-3	FCA- 73-47	1.6	27.7	2.4	1.2	.25	12.6	14.2	180.20	1,571.38
P - 18	Limestone, phosphatic	FCA- 72-47	2.3	9.3	3.2	1.4	.1	27.2	20.6	182.50	1,592.77
P - 17	Phosphate rock, calcareous	FCA- 71-47	2.65	18.5	2.2	1.4	.04	17.4	19.2	185.15	1,641.80
P - 16	Dolomite, phosphatic	FCA- 70-47	1.6	8.7	1.2	0.7	.03	33.3	8.0	186.75	1,655.72

P - 15	Phosphate rock	LES-205-47	1.35	31.6	1.1	0.9	.12	10.5	4.6	188.10	1,698.38
P - 14	Phosphate rock	LES-204-47	0.9	30.4	0.9	0.6	.18	10.6	4.6	189.00	1,725.74
P - 13	Phosphate rock	LES-203-47	0.65	30.9	0.9	0.5	.28	10.2	4.3	189.65	1,745.82
P - 12	Phosphate rock, argillaceous	LES-202-47	1.4	16.0	0.9	0.6	.51	9.3	32.0	191.05	1,768.22
P - 11	Phosphate rock, argillaceous	LES-201-47	0.55	14.4	0.9	0.6	.54	10.2	36.8	191.60	1,776.14
P - 10	Phosphate rock	LES-200-47	0.5	31.6	0.8	0.5	.54	9.8	2.7	192.10	1,791.94
P - 9	Phosphate rock	LES-199-47	1.25	31.2	1.2	0.6	.26	8.7	5.3	193.35	1,830.94
P - 8	Limestone	LES-198-47	0.5	0.1	1.5	0.7	.16	26.3	7.7	193.85	1,830.99
P - 7	Phosphate rock	LES-197-47	0.55	27.5	2.1	1.1	.21	9.3	12.4	194.40	1,846.12
P - 6	Mudstone, calcareous	LES-196-47	1.0	5.7	8.2	2.9	.45	13.9	57.3	195.40	1,851.82
P - 5	Limestone, argillaceous	LES-195-47	1.65	0.6	5.3	2.1	.07	25.0	44.6	197.05	1,852.81
P - 4	Mudstone, calcareous	LES-194-47	0.65	1.0	10.5	3.6	.22	9.5	77.5	197.70	1,853.46
P - 3	Mudstone, calcareous	LES-193-47	0.85	0.3	7.0	2.1	.08	16.4	61.5	198.55	1,853.71
P - 2	Mudstone, calcareous	LES-192-47	0.35	7.5	10.1	3.3	.25	9.0	55.6	198.90	1,856.34
P - 1	Phosphate rock; fos. col. no. 47-HW-2	LES-191-47	0.25	34.0	0.9	0.6	.025	4.8	4.5	199.15	1,864.84

Wells formation

Cw- 1	Limestone; fos. col. no. 47-HW-1	LES-190-47	1.2	0.7	0.8	0.4	.02	44.4	2.7	1.2	--
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SPECTROGRAPHIC ANALYSES—CONDA, IDAHO. LOT NO. 1200.

Semi-quantitative analyses of samples of the Phosphoria formation, Conda, Idaho (see immediately preceding pages for location of section, thickness and description of strata, and chemical analyses of samples), made by U. S. Bureau of Mines Laboratory, Albany, Oregon. In addition to the elements listed in the table below, Sb, As, Be, Bi, Cd, Co, Ga, Au, Li, Mg, Pt, Ta, Sn, and W were looked for in all samples but were not detected.

Explanation of symbols

A = more than 10 percent E = 0.01-0.1 percent
 B = 5-10 percent F = 0.001-0.01 percent
 C = 1-5 percent G = less than 0.001 percent
 D = 0.1-1 percent ND = not detected

Bed no.	Sample no.	Al	Ba	B	Ca	Cr	Cb	Cu	Fe	Pb	Mg	Mn	Mo	Ni	Si	Ag	Na	Sr	Ti	V	Zn	Zr
R - 1	FCA-141-47	C	ND	E	C	E	ND	G	C	ND	D	E	F	E	A	ND	E	ND	E	E	ND	F
P -142	FCA-140-47	C	ND	F	A	E	ND	G	D	ND	D	E	F	E	C	ND	E	E	E	D	E	F
P -141	FCA-139-47	C	ND	E	C	E	ND	G	C	ND	D	E	F	E	A	G	D	E	E	D	D	F
P -140	FCA-139-47	C	ND	E	C	E	ND	G	C	ND	D	E	F	E	A	ND	D	ND	E	D	ND	F
P -139	FCA-137-47	C	ND	E	C	E	ND	G	C	ND	D	E	F	E	A	ND	E	ND	E	E	E	F
Beds P-138 through P-136 not analyzed.																						
P -135	FCA-136-47	C	ND	F	A	E	ND	G	D	ND	D	E	F	E	C	G	D	E	E	D	E	F
P -134	FCA-135-47	C	ND	E	C	E	ND	G	C	ND	D	E	E	E	A	G	D	E	D	D	D	F
P -133	FCA-134-47	D	ND	F	A	E	ND	G	D	ND	D	F	F	F	D	G	E	E	F	E	E	F
P -132	FCA-133-47	D	ND	F	A	E	ND	G	D	ND	D	F	F	F	D	G	E	E	E	E	D	F
P -131	FCA-132-47	C	E	F	A	D	ND	G	C	ND	D	F	E	E	B	G	E	E	E	D	D	F
P -130	FCA-131-47	D	E	F	A	E	ND	G	C	ND	D	F	F	F	C	G	E	E	E	E	E	F
P -129	FCA-130-47	C	E	F	A	E	ND	G	C	ND	D	F	F	E	B	G	E	E	E	E	E	F
P -128	FCA-129-47	C	E	F	A	E	ND	G	C	ND	D	F	F	F	C	G	E	F	E	E	ND	F
P -127	FCA-128-47	C	E	F	A	E	ND	G	C	ND	D	F	F	E	C	G	E	E	E	D	E	F
P -126	FCA-127-47	C	E	F	A	E	ND	G	C	ND	D	F	F	E	C	G	E	E	E	D	E	F
P -125	FCA-126-47	C	E	F	A	E	ND	G	C	ND	D	F	F	E	C	G	E	E	E	D	E	F
P -124	FCA-125-47	C	E	F	A	E	ND	G	D	ND	C	F	F	F	C	G	E	F	E	E	ND	F
P -123	FCA-124-47	C	E	F	A	E	ND	G	D	ND	D	F	F	E	C	G	E	E	E	E	E	F
P -122	FCA-123-47	C	E	E	A	E	E	G	C	ND	D	F	E	E	A	G	E	E	E	D	D	F
P -121	FCA-122-47	C	E	F	A	E	E	G	D	ND	D	F	E	E	B	G	E	E	E	D	ND	F
P -120	FCA-121-47	D	E	F	A	E	ND	G	D	ND	C	F	F	F	C	G	E	E	E	E	E	F
P -119	FCA-120-47	C	E	F	A	E	E	G	C	ND	C	E	E	E	A	G	D	E	E	D	E	F
P -118	FCA-119-47	C	E	E	B	E	E	G	C	ND	D	F	E	E	A	G	D	F	E	D	D	F
P -117	FCA-118-47	C	E	E	C	E	E	G	C	ND	D	F	E	E	A	G	D	F	E	D	E	F
P -116	FCA-117-47	C	E	E	C	E	E	G	C	ND	D	F	E	E	A	G	D	F	E	D	E	F
P -115	FCA-116-47	C	E	E	C	E	E	G	C	ND	D	E	E	E	A	G	D	F	E	D	E	F

P -114	FCA-115-47	C	E	E	C	E	E	G	C	ND	C	E	E	E	A	G	D	F	E	D	E	E	E
P -113	FCA-114-47	C	E	E	C	E	E	G	C	E	C	E	E	E	A	G	D	F	E	E	D	E	E
P -112	FCA-111-47	C	E	F	C	E	E	G	C	E	C	E	E	E	A	G	D	F	E	E	D	E	E
P -111	FCA-110-47	C	E	F	C	E	E	G	C	E	C	E	E	E	A	G	D	F	E	E	D	E	E
P -110	RAH-146-47	C	ND	F	A	E	ND	G	C	ND	D	E	E	E	B	ND	E	E	E	D	E	E	E
P -109	RAH-145-47	C	ND	F	A	E	ND	G	D	ND	D	E	E	E	B	G	E	E	E	D	E	E	E
P -108	RAH-144-47	C	ND	F	A	E	ND	G	D	ND	D	E	E	E	B	G	E	E	E	D	E	E	E
P -107	RAH-143-47	C	ND	F	A	E	ND	G	D	ND	D	E	E	E	B	G	E	E	E	D	E	E	E
P -106	RAH-142-47	C	ND	F	A	E	ND	G	C	ND	D	E	E	E	A	G	E	E	E	D	E	E	E
P -105	RAH-141-47	C	ND	F	A	E	ND	G	C	ND	C	E	E	E	A	G	E	E	E	D	E	E	E
P -104	RAH-140-47	C	ND	E	A	E	ND	G	C	ND	D	E	F	E	A	G	D	E	E	E	E	E	F
Beds P-103 through P-99 not analyzed.																							
P - 98	FCA-109-47	C	E	F	C	E	ND	G	C	E	D	E	F	F	A	G	D	F	E	E	E	ND	E
P - 97	FCA-108-47	C	E	F	C	E	ND	G	C	ND	D	E	F	F	A	G	D	F	E	E	E	E	E
P - 96	FCA-107-47	C	E	F	C	E	ND	G	C	ND	D	E	F	F	A	G	D	F	E	E	E	E	E
P - 95	FCA-106-47	C	E	F	C	E	ND	G	C	ND	D	E	F	F	A	G	D	F	E	E	E	E	E
P - 94	FCA-105-47	C	E	F	B	E	ND	G	D	ND	C	F	F	F	C	G	D	F	E	E	E	ND	F
P - 93	FCA-104-47	C	E	F	C	E	ND	G	C	ND	D	E	F	F	A	G	D	F	E	E	E	E	F
P - 92	FCA-103-47	C	E	F	C	E	ND	G	C	ND	D	E	F	F	A	G	D	F	E	E	E	E	F
P - 91	FCA-102-47	C	E	F	C	E	ND	G	C	ND	D	E	F	F	A	G	D	F	E	E	E	ND	F
P - 90	FCA-101-47	C	E	F	C	E	ND	G	C	ND	D	E	F	F	A	G	D	F	E	E	E	E	F
P - 89	FCA-100-47	C	E	F	B	E	ND	G	C	ND	D	E	F	F	A	G	D	E	E	E	E	E	F
P - 88	FCA- 99-47	C	E	F	B	E	ND	G	C	ND	D	E	F	F	A	G	D	E	E	E	E	E	F
P - 87	FCA- 98-47	C	E	F	C	E	ND	G	C	ND	D	E	F	F	A	G	D	E	E	E	E	E	F
P - 86	FCA- 97-47	C	E	F	C	E	ND	G	C	ND	D	E	F	F	A	G	D	E	E	E	E	E	F
P - 85	FCA- 96-47	C	E	F	C	E	ND	G	C	ND	D	E	F	F	A	G	D	E	E	E	E	E	F
P - 84	LES-238-47	C	E	F	B	E	ND	G	C	ND	D	E	F	F	B	G	E	E	E	E	E	E	F
P - 83	LES-237-47	C	E	F	C	E	ND	G	C	ND	D	E	F	F	A	G	E	E	E	E	E	ND	F
P - 82	LES-236-47	C	E	F	C	E	ND	G	C	ND	D	E	F	F	A	G	E	E	E	E	E	ND	F
P - 81	LES-235-47	C	E	F	C	E	ND	G	C	ND	D	E	F	F	B	G	E	E	E	E	E	ND	F
P - 80	LES-234-47	C	E	F	B	E	ND	G	C	ND	D	E	F	F	B	G	E	E	E	E	E	ND	F
P - 79	LES-233-47	C	E	F	C	E	ND	G	C	ND	D	E	F	F	A	G	D	F	E	E	E	ND	E
P - 78	LES-232-47	C	E	F	D	ND	ND	G	C	ND	D	E	F	F	A	G	D	F	E	E	E	ND	E
P - 77	LES-231-47	C	E	F	B	E	ND	G	C	ND	D	E	F	F	A	G	D	F	E	E	E	ND	E
P - 76	LES-230-47	C	E	F	C	E	ND	G	C	ND	D	E	F	F	A	G	D	F	E	E	E	ND	E
P - 75	LES-229-47	C	E	F	C	E	ND	G	C	ND	D	E	F	F	A	G	D	F	E	E	E	ND	E
P - 74	LES-228-47	C	E	F	C	E	ND	G	C	ND	D	E	F	F	A	G	D	F	E	E	E	ND	E
P - 73	LES-227-47	C	E	F	B	E	ND	G	C	ND	D	E	F	F	A	G	D	F	E	E	E	ND	E
P - 72	LES-226-47	C	E	F	B	E	ND	G	C	ND	D	E	F	F	B	G	D	F	E	E	E	ND	E
P - 71	LES-225-47	C	E	F	B	E	ND	G	C	ND	D	E	F	F	B	G	D	F	E	E	E	ND	E
P - 70	LES-224-47	C	E	F	C	F	ND	G	C	ND	D	E	F	F	B	G	D	E	E	E	E	ND	E
P - 69	LES-223-47	C	E	F	B	E	ND	G	C	ND	D	E	F	F	B	G	D	E	E	E	D	ND	E

Bed no.	Sample no.	Al	Ba	B	Ca	Cr	Cb	Cu	Fe	Pb	Mg	Mn	Mo	Ni	Si	Ag	Na	Sr	Ti	V	Zn	Zr
P - 68	LES-222-47	C	E	F	C	E	ND	G	C	ND	D	E	F	E	A	G	D	F	D	E	ND	E
P - 67	LES-221-47	C	E	F	C	E	ND	G	C	ND	D	E	F	E	A	ND	D	F	E	E	ND	E
P - 66	LES-220-47	C	E	F	D	F	ND	G	C	ND	D	E	F	E	A	ND	D	ND	E	E	ND	E
P - 65	LES-219-47	C	E	F	D	F	ND	G	C	ND	D	E	F	E	A	ND	D	ND	E	E	ND	E
P - 64	LES-218-47	C	E	F	C	E	ND	G	D	ND	D	F	F	E	B	ND	D	ND	E	E	ND	E
P - 63	LES-217-47	C	E	F	C	E	ND	G	C	ND	D	E	F	E	A	G	D	F	E	E	E	E
P - 62	LES-216-47	C	E	F	B	E	ND	G	C	ND	D	E	F	E	A	G	D	F	E	E	E	E
P - 61	FCA- 95-47	C	E	F	C	E	ND	G	C	ND	D	E	F	E	A	G	D	F	E	E	E	E
P - 60	FCA- 94-47	C	E	F	B	E	ND	G	C	ND	D	E	F	E	A	G	D	F	E	E	ND	F
P - 59	FCA- 93-47	C	E	F	B	E	ND	G	D	ND	D	E	F	E	B	G	D	F	E	E	ND	F
P - 58	FCA- 92-47	C	E	F	C	D	ND	G	C	ND	D	E	F	E	A	G	E	E	E	E	E	F
P - 57	FCA- 91-47	C	E	F	C	D	ND	G	C	ND	D	E	F	E	B	G	D	E	E	E	ND	F
P - 56	FCA- 90-47	C	E	F	C	E	ND	G	C	ND	D	E	F	E	C	G	E	E	E	E	E	F
P - 55	FCA- 89-47	C	E	F	C	E	ND	G	C	ND	D	E	F	E	A	G	E	E	E	E	ND	F
P - 54	FCA- 88-47	C	E	F	C	E	ND	G	C	ND	D	E	F	E	A	G	D	E	E	E	ND	F
P - 53	FCA- 87-47	C	E	F	B	E	ND	G	D	ND	C	E	F	E	C	G	E	F	E	E	ND	F
P - 52	FCA- 86-47	C	E	F	C	E	ND	G	C	ND	D	E	F	E	A	G	D	F	E	E	ND	F
P - 51	FCA- 85-47	C	E	F	C	E	ND	G	C	ND	D	E	F	E	A	G	E	F	E	E	ND	F
P - 50	FCA- 84-47	C	E	F	C	E	ND	G	D	ND	D	E	F	E	A	G	E	F	E	E	ND	F
P - 49	LES-215-47	C	E	F	C	E	ND	G	C	ND	D	E	F	E	A	G	D	F	E	E	E	F
P - 48	LES-214-47	C	E	F	C	E	ND	G	D	ND	C	E	F	E	B	ND	E	ND	E	E	ND	F
P - 47	LES-213-47	C	E	F	C	E	ND	G	C	ND	D	F	F	E	A	G	E	F	E	E	E	F
P - 46	LES-212-47	C	E	F	C	E	ND	G	C	ND	D	F	F	E	A	G	D	F	E	E	E	F
P - 45	LES-211-47	C	ND	F	B	F	ND	G	D	ND	C	E	F	F	C	ND	D	F	E	E	ND	F
P - 44	LES-210-47	C	ND	F	C	F	ND	G	D	ND	C	E	F	F	C	ND	D	ND	E	E	ND	F
P - 43	LES-209-47	C	E	F	C	E	ND	G	C	ND	D	F	F	E	A	G	E	F	E	E	E	F
P - 42	LES-208-47	C	E	F	B	E	ND	G	C	ND	D	F	F	E	C	G	E	F	E	E	E	F
P - 41	LES-207-47	C	E	F	A	E	ND	G	C	ND	D	F	F	E	B	G	E	F	E	E	ND	F
P - 40	LES-206-47	C	E	F	C	E	ND	G	C	ND	D	F	F	E	B	G	E	F	E	E	E	F
P - 39	LES-189-47	C	ND	F	A	E	ND	G	D	ND	D	F	F	E	C	G	D	E	E	E	E	F
P - 38	LES-188-47	C	ND	F	C	D	ND	G	D	ND	D	F	F	E	A	G	D	ND	E	F	F	F
P - 37	LES-187-47	C	ND	F	B	E	ND	G	D	ND	C	F	F	E	C	G	E	ND	E	F	E	F
P - 36	LES-186-47	C	ND	F	C	E	ND	G	D	ND	C	F	F	E	B	G	E	ND	E	F	E	F
P - 35	LES-185-47	C	ND	F	C	E	ND	G	D	ND	D	F	F	E	C	G	E	ND	E	F	E	F
P - 34	LES-184-47	C	ND	F	B	E	ND	G	D	ND	D	F	F	E	B	G	D	ND	E	F	E	F
P - 33	LES-183-47	C	ND	F	B	E	ND	G	D	ND	D	F	F	E	B	G	E	ND	E	F	E	F
P - 32	LES-182-47	C	ND	E	A	E	ND	G	C	ND	D	F	F	E	A	G	D	ND	E	F	E	F
P - 31	LES-181-47	C	ND	F	A	E	ND	G	D	ND	D	F	F	E	C	G	E	ND	E	F	E	F
P - 30	LES-180-47	C	E	F	A	D	ND	G	C	ND	D	F	F	E	B	G	D	E	D	E	E	F
P - 29	FCA- 83-47	C	E	F	B	E	ND	G	C	ND	D	F	F	E	B	G	E	E	E	D	E	F
P - 28	FCA- 82-47	D	E	F	A	E	ND	G	C	ND	D	E	F	E	C	G	E	E	E	D	E	F

P - 27	FCA- 81-47	D	E	F	B	E	ND	G	D	ND	C	F	F	E	C	G	E	F	E	E	ND	F
P - 26	FCA- 80-47	C	E	F	B	E	ND	G	C	ND	C	E	F	E	B	G	E	F	E	E	E	F
P - 25	FCA- 79-47	C	E	F	B	E	ND	G	C	ND	C	E	F	E	B	G	E	F	E	E	E	F
P - 24	FCA- 78-47	D	E	F	B	E	ND	G	C	ND	D	F	F	E	B	G	E	E	E	E	E	F
P - 23	FCA- 77-47	D	E	F	B	E	ND	G	C	ND	D	F	F	E	B	G	E	E	E	E	E	F
P - 22	FCA- 76-47	C	E	F	B	E	ND	G	C	ND	C	E	F	E	B	G	D	F	E	E	E	F
P - 21	FCA- 75-47	E	E	F	C	E	ND	G	D	ND	D	F	F	E	B	G	D	E	E	E	E	F
P - 20	FCA- 74-47	D	E	F	A	E	ND	G	C	ND	D	E	F	E	B	G	D	E	E	E	E	F
P - 19	FCA- 73-47	D	E	F	B	E	ND	G	D	ND	D	E	F	E	B	G	D	E	E	E	E	F
P - 18	FCA- 72-47	C	E	F	B	E	ND	G	D	ND	C	E	F	E	B	G	E	F	E	E	E	F
P - 17	FCA- 71-47	C	E	F	B	E	ND	G	D	ND	D	F	F	E	C	G	E	F	E	E	E	F
P - 16	FCA- 70-47	D	E	F	B	E	ND	G	D	ND	C	F	F	E	C	G	E	F	E	E	E	F
P - 15	LES-205-47	D	ND	F	A	E	ND	G	D	ND	D	F	F	E	C	G	D	E	E	E	E	F
P - 14	LES-204-47	D	ND	F	A	E	ND	G	D	ND	D	ND	F	E	C	G	D	E	E	E	E	F
P - 13	LES-203-47	D	ND	F	B	E	ND	G	D	ND	D	ND	F	E	C	G	D	E	E	E	E	F
P - 12	LES-202-47	D	ND	F	A	E	ND	G	D	ND	D	ND	F	E	C	G	D	E	E	E	E	F
P - 11	LES-201-47	D	ND	F	B	E	ND	G	D	ND	D	ND	F	E	C	G	D	E	E	E	E	F
P - 10	LES-200-47	D	ND	F	B	E	ND	G	E	ND	D	ND	F	E	C	G	D	E	E	E	E	F
P - 9	LES-199-47	D	ND	F	A	E	ND	G	D	ND	D	ND	F	E	C	G	D	E	E	E	E	F
P - 8	LES-198-47	D	ND	F	B	E	ND	G	D	ND	C	F	F	E	C	G	D	E	ND	E	E	F
P - 7	LES-197-47	C	ND	F	A	E	ND	G	D	ND	D	F	F	E	C	G	D	E	E	E	E	F
P - 6	LES-196-47	C	ND	E	C	E	ND	G	C	ND	D	F	F	E	C	G	D	E	E	E	E	F
P - 5	LES-195-47	C	ND	E	C	F	ND	G	C	ND	C	F	F	E	C	G	D	E	ND	ND	ND	F
P - 4	LES-194-47	C	ND	E	D	E	ND	G	C	ND	C	F	F	E	C	G	D	E	ND	ND	ND	F
P - 3	LES-193-47	C	ND	E	C	F	ND	G	D	ND	C	F	F	E	C	G	D	E	ND	ND	ND	F
P - 2	LES-192-47	C	ND	E	C	F	ND	G	C	ND	D	E	F	E	C	G	D	ND	D	D	E	F
P - 1	LES-191-47	C	ND	F	A	F	ND	G	D	ND	D	F	F	E	C	G	D	E	F	F	E	F



DIAMOND DRILL HOLE 6, SLUG CREEK VALLEY, IDAHO. LOT NO. 1277.

Part of phosphatic shale member of Phosphoria formation cored in diamond drill hole 6 on west slope of hill above Slug Creek Valley, sec. 30, T. 8 S., R. 44 E., Caribou County, Idaho, on west limb of Schmid syncline. Beds strike north and dip 8° E. Hole drilled in September 1948 by U. S. Bureau of Mines, A. E. Long in charge, and core measured and sampled by D. F. Davidson. Samples analyzed by U. S. Bureau of Mines, Albany, Oregon.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)		Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)
				P ₂ O ₅	Acid insoluble		
Phosphatic shale member of Phosphoria formation—lower beds only							
P-32	Phosphate rock, argillaceous	DFD-1111	2.5	16.8	41.9	2.5	42.00
P-31	Phosphate rock, argillaceous	DFD-1112	2.0	16.3	39.0	4.5	74.60
P-30	Phosphate rock, argillaceous	DFD-1113	0.5	21.2	25.4	5.0	85.20
P-29	Phosphate rock	DFD-1114	2.2	28.0	14.5	7.2	146.80
P-28	Mudstone, phosphatic, calcareous	DFD-1115	0.7	13.0	29.8	7.9	155.90
P-27	Limestone	DFD-1116	2.1	2.4	9.9	10.0	160.94
P-26	Limestone	DFD-1117	1.4	7.6	17.9	11.4	171.58
P-25	Phosphate rock, argillaceous	DFD-1118	0.5	22.3	26.0	11.9	182.73
P-24	Limestone	DFD-1119	0.8	3.7	15.8	12.7	185.69
P-23	Limestone, argillaceous, phosphatic	DFD-1120	1.3	9.1	27.5	14.0	197.52
P-22	Mudstone, phosphatic	DFD-1121	1.5	11.3	53.9	15.5	214.47
P-21	Limestone, argillaceous	DFD-1122	1.6	4.1	28.4	17.1	221.03
P-20	Limestone, argillaceous	DFD-1123	0.7	0.4	30.8	17.8	221.31
P-19	Limestone	DFD-1124	0.7	6.7	16.2	18.5	226.00
P-18	Phosphate rock	DFD-1125	1.3	28.9	14.7	19.8	263.57
P-17	Phosphate rock	DFD-1126	1.1	30.9	10.9	20.9	297.56
P-16	Phosphate rock	DFD-1127	0.8	28.8	14.5	21.7	320.60
P-15	Phosphate rock, argillaceous	DFD-1128	1.5	22.4	30.2	23.2	354.20
P-14	Limestone, argillaceous	DFD-1129	1.4	3.6	27.7	24.6	359.24
P-13	Phosphate rock, calcareous	DFD-1130	4.2	24.2	11.0	28.8	460.88
P-12	Phosphate rock	DFD-1131	1.5	22.8	16.5	30.3	495.08
P-11	Phosphate rock, argillaceous	DFD-1132	1.1	22.7	23.7	31.4	520.05
P-10	Limestone, phosphatic	DFD-1133	1.1	13.9	13.4	32.5	535.34
P-9	Limestone, phosphatic	DFD-1134	0.9	9.8	8.6	33.4	544.16
P-8	Phosphate rock	DFD-1135	1.0	31.4	7.3	34.4	575.56
P-7	Phosphate rock	DFD-1136	1.3	33.7	2.8	35.7	619.37
P-6	Phosphate rock	DFD-1137	2.5	33.6	2.3	38.2	703.37
P-5	Phosphate rock	DFD-1138	2.3	31.8	6.1	40.5	776.51
P-4	Mudstone	DFD-1139	1.0	6.1	64.6	41.5	782.61
P-3	Limestone, argillaceous	DFD-1140	1.1	2.0	42.6	42.6	784.81
P-2	Mudstone, calcareous	DFD-1141	2.1	1.1	56.2	44.7	787.12
P-1	Phosphate rock	DFD-1142	0.4	30.7	7.4	45.1	799.40

Wells formation

Cw-1	Limestone	DFD-1143	0.6	0.8	3.9	0.6	0.48
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DIAMOND DRILL HOLE 3, MIDDLE SULPHUR CANYON, IDAHO. LOT NO. 1274.

Part of phosphatic shale member of Phosphoria formation cored in diamond drill hole 3 on south slope of Middle Sulphur Canyon, sec. 8, T. 9 S., R. 43 E., Caribou County, Idaho, on west limb of Trail Creek syncline. Beds strike north-northwest and dip 15° E. Hole drilled in September 1948 by U. S. Bureau of Mines, A. E. Long in charge, and core measured and sampled by D. F. Davidson. Samples analyzed by U. S. Bureau of Mines Laboratory, Albany, Oregon.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)		Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)
				P ₂ O ₅	Acid insoluble		
Phosphatic shale member of Phosphoria formation—partial section							
P-25	Mudstone	DFD-961	1.2	4.4	73.4	1.2	5.28
P-24	Mudstone	DFD-962	0.8	2.2	84.9	2.0	7.04
P-23	Mudstone	DFD-963	3.8	3.4	78.9	5.8	19.96
P-22	Mudstone	DFD-964	2.0	6.4	66.6	7.8	32.76
P-21	Mudstone	DFD-965	2.3	7.8	65.9	10.1	50.70
P-20	Mudstone, phosphatic	DFD-966	4.7	12.8	50.6	14.8	110.86
P-19	Mudstone, phosphatic	DFD-967	2.2	13.5	50.3	17.0	140.56
P-18	Phosphate rock, argillaceous	DFD-968	3.5	19.1	37.7	20.5	207.41
P-17	Phosphate rock, argillaceous	DFD-969	1.1	24.4	20.6	21.6	234.25
P-16	Phosphate rock, calcareous	DFD-970	2.1	25.0	13.1	23.7	286.75
P-15	Phosphate rock	DFD-971	0.7	25.3	17.3	24.4	304.46
P-14	Phosphate rock and mudstone	DFD-972	0.4	21.4	28.0	24.8	313.02
P-13	Phosphate rock and mudstone	DFD-973	3.0	24.5	16.6	27.8	386.52
P-12	Phosphate rock, argillaceous	DFD-974	0.7	18.8	35.1	28.5	399.67
P-11	Mudstone, phosphatic	DFD-975	1.9	12.8	52.4	30.4	424.00
P-10	Phosphate rock, argillaceous	DFD-976	2.6	19.8	39.3	33.0	475.48
P- 9	Phosphate rock	DFD-977	1.3	27.9	17.2	34.3	511.75
P- 8	Phosphate rock, argillaceous	DFD-978	1.9	20.8	36.0	36.2	551.27
P- 7	Mudstone, phosphatic	DFD-979	0.9	14.5	51.0	37.1	564.32
--	Core missing	--	0.3	--	--	37.4	--
P- 6	Phosphate rock, argillaceous	DFD-980	2.4	27.5	21.2	39.8	66.00*
P- 5	Phosphate rock	DFD-981	2.7	28.8	19.7	42.5	143.76
P- 4	Phosphate rock, argillaceous	DFD-982	1.3	19.9	36.7	43.8	169.63
P- 3	Phosphate rock, argillaceous	DFD-983	1.3	23.8	27.5	45.1	200.57
P- 2	Phosphate rock, argillaceous	DFD-984	0.7	28.8	24.1	45.8	220.73**
--	Core missing	--	22.4	--	--	68.2	--
P- 1	Phosphate rock	DFD-985	1.2	32.4	9.1	69.4	38.88*

* Cumulative data incomplete due to missing information. Computations start from zero after interruption.

** Note incompleteness of cumulative data.

DIAMOND DRILL HOLE 4, MIDDLE SULPHUR CANYON, IDAHO. LOT NO. 1275.

Phosphatic shale member of Phosphoria formation cored in diamond drill hole 4 on north slope of Middle Sulphur Canyon, sec. 8, T. 9 S., R. 43 E., Caribou County, Idaho, on west limb of Trail Creek syncline. Beds strike north-northwest and dip 22° E. Hole drilled in September 1948 by U. S. Bureau of Mines, A. E. Long in charge. Partial section measured and sampled by D. F. Davidson. Samples analyzed by U. S. Bureau of Mines Laboratory, Albany, Oregon.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)		Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)
				P ₂ O ₅	Acid insoluble		
Phosphatic shale member of Phosphoria formation—basal beds only							
P- 8	Phosphate rock	DFD-986	1.2	29.1	15.6	1.2	34.92
P- 7	Phosphate rock	DFD-987	0.9	27.6	19.4	2.1	59.76
P- 6	Phosphate rock, argillaceous	DFD-988	2.5	27.2	21.8	4.6	127.76
P- 5	Phosphate rock, argillaceous	DFD-989	4.4	26.6	21.5	9.0	244.80
P- 4	Phosphate rock	DFD-990	4.1	32.8	5.9	13.1	379.28
P- 3	Mudstone	DFD-991	3.0	2.4	78.5	16.1	386.48
P- 2	Mudstone	DFD-992	0.4	1.2	80.9	16.5	386.96
P- 1	Mudstone, phosphatic	DFD-993	0.6	9.9	59.7	17.1	392.90
Wells formation							
Cw-1	Limestone	DFD-994	1.0	0.2	2.8	1.0	0.20

NORTH DAIRY, IDAHO. LOT NO. 1212.

Upper part of phosphatic shale member of Phosphoria formation sampled in bulldozer trench near north end of Dairy syncline, NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 20, T. 9 S., R. 44 E., Caribou County, Idaho. The stratigraphic sequence of the units is questionable for, because of a large number of faults, some beds may be omitted or repeated. No cumulative totals are given for this reason. Section measured by R. M. Campbell and L. E. Smith and sampled by R. S. Sears, R. P. Sheldon, and R. A. Smart in August and September 1947. Samples analyzed by U. S. Bureau of Mines Laboratory, Albany, Oregon.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)				
				P ₂ O ₅	Al ₂ O ₃	Fe ₂ O ₃	Loss on ignition	Acid insoluble
Rex member of Phosphoria formation—basal bed only								
R- 1	Chert	LES-400-47	0.8	6.2	--	--	--	79.6
Phosphatic shale member of Phosphoria formation—upper part only								
P-61	Phosphate rock	LES-399-47	0.6	30.8	--	--	--	12.9
P-60	Mudstone	LES-398-47	0.8	--	--	--	--	--
P-59	Mudstone	LES-397-47	0.5	6.9	--	--	--	60.1
P-58	Mudstone	LES-396-47	2.0	1.5	--	--	--	79.3
P-57	Mudstone	LES-395-47	1.2	1.2	--	--	--	78.6
P-56	Mudstone	LES-394-47	0.3	3.9	--	--	--	67.7
P-55	Mudstone	LES-393-47	1.1	4.7	--	--	--	73.9
P-54	Mudstone	LES-392-47	1.5	6.2	--	--	--	67.3
P-53	Mudstone	LES-391-47	3.4	2.2	--	--	--	78.0
P-52	Phosphate rock, argillaceous	LES-390-47	1.0	26.6	--	--	--	23.3
P-51	Mudstone	LES-389-47	1.3	3.9	--	--	--	69.0
P-50	Mudstone	LES-388-47	1.8	1.0	--	--	--	83.3
Several beds may be missing in fault zone between LES-388-47 and RMC-50-47.								
P-49	Phosphate rock	RMC-50-47	1.3	34.2	1.60	0.94	4.26	7.1
P-48	Mudstone and phosphatic mudstone	RMC-49-47	1.1	11.7	7.60	3.0	5.10	59.2
P-47	Phosphate rock and mudstone	RMC-48-47	0.9	27.2	3.4	1.61	5.98	22.8
P-46	Mudstone	RMC-47-47	0.3	5.8	11.0	4.3	5.48	69.2
P-45	Phosphate rock	RMC-46-47	0.6	31.3	1.6	0.89	4.24	12.8
P-44	Phosphate rock, argillaceous	RMC-45-47	1.4	18.8	5.0	1.86	5.92	40.1
P-43	Phosphate rock	RMC-44-47	1.0	28.7	2.1	0.92	6.40	16.1
P-42	Mudstone, phosphatic	RMC-43-47	1.2	12.5	8.6	2.56	6.20	54.5
P-41	Phosphate rock	RMC-42-47	1.4	32.7	1.1	1.45	6.36	7.3
P-40	Phosphate rock, argillaceous	RMC-41-47	0.7	24.4	3.3	1.29	7.30	25.6
P-39	Phosphate rock	RMC-40-47	0.7	26.2	2.0	1.32	9.92	18.2

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)				
				P ₂ O ₅	Al ₂ O ₃	Fe ₂ O ₃	Loss on ignition	Acid insoluble
P-38	Phosphate rock and phosphatic mudstone	RMC-39-47	0.7	20.8	4.1	1.42	7.02	35.9
P-37	Mudstone	RMC-38-47	0.6	5.6	9.20	3.10	5.84	73.2
P-36	Mudstone, phosphatic	RMC-37-47	0.5	13.4	7.40	2.50	5.82	55.2
P-35	Phosphate rock, argillaceous	RMC-36-47	0.9	21.7	4.90	1.70	8.64	30.0
P-34	Mudstone, phosphatic	RMC-35-47	1.0	10.4	8.40	2.90	9.72	55.3
P-33	Mudstone, calcareous and phosphate rock	RMC-34-47	0.3	17.3	7.10	2.4	9.60	38.8
P-32	Mudstone	RMC-33-47	0.2	3.5	12.00	4.10	14.84	63.3
P-31	Mudstone, phosphatic, calcareous	RMC-32-47	0.4	9.2	8.90	2.10	1.10	56.3
P-30	Phosphate rock and phosphatic mudstone	RMC-31-47	0.4	29.1	1.9	0.77	8.62	13.4
P-29	Phosphate rock and phosphatic mudstone	RMC-30-47	0.4	21.5	5.1	1.70	7.62	32.6
P-28	Phosphate rock	RMC-29-47	0.4	32.3	0.93	0.46	6.02	10.3
P-27	Phosphate rock, contains chert lens	RMC-28-47	0.37	30.1	0.55	0.70	4.29	16.6
P-26	Phosphate rock and argillaceous phosphate rock	RMC-27-47	0.43	31.3	1.6	0.70	8.04	10.2
P-25	Phosphate rock and argillaceous phosphate rock	RMC-26-47	0.5	29.6	1.3	0.63	9.52	12.1
P-24	Phosphate rock and argillaceous phosphate rock	RMC-25-47	0.8	31.4	1.4	0.68	9.34	13.6
P-23	Phosphate rock	RMC-24-47	0.57	26.8	2.4	0.97	12.54	14.3
P-22	Phosphate rock	RMC-23-47	0.5	27.6	2.3	0.86	11.78	8.0
	Fault zone, correlation not positive.							
P-21	Mudstone	LES-387-47	0.85	1.1	--	--	--	83.9
P-20	Phosphate rock and mudstone	Sample lost	0.35	--	--	--	--	--
P-19	Mudstone, phosphatic	LES-385-47	0.55	12.4	--	--	--	45.2
P-18	Mudstone, phosphatic	LES-384-47	0.7	10.4	--	--	--	53.1
P-17	Mudstone, phosphatic	LES-383-47	0.5	13.4	--	--	--	46.6
P-16	Mudstone, phosphatic	LES-382-47	0.55	15.8	--	--	--	40.9
P-15	Phosphate rock, argillaceous	LES-381-47	0.45	20.1	--	--	--	35.3
P-14	Mudstone, phosphatic	LES-380-47	0.3	8.8	--	--	--	58.0
P-13	Mudstone and phosphate rock	LES-379-47	0.55	6.9	--	--	--	60.2
P-12	Mudstone, phosphatic	LES-378-47	0.5	8.1	--	--	--	62.1
P-11	Mudstone	LES-377-47	0.6	5.9	--	--	--	73.2
P-10	Mudstone, phosphatic	LES-376-47	0.7	7.8	--	--	--	63.9
P-9	Mudstone, phosphatic	LES-375-47	0.5	8.5	--	--	--	63.4
P-8	Mudstone	LES-374-47	0.5	6.5	--	--	--	70.7
P-7	Mudstone	LES-373-47	0.5	6.1	--	--	--	69.6
P-6	Mudstone	LES-372-47	0.6	1.9	--	--	--	76.2
P-5	Mudstone	LES-371-47	0.4	6.9	--	--	--	67.1
P-4	Mudstone, phosphatic	LES-370-47	0.6	11.3	--	--	--	55.8

P- 3	Mudstone, chert, and phosphate rock	Sample lost	0.3	--	--	--	--
P- 2	Mudstone, contains chert nodules	LES-368-47	0.35	3.0	--	--	80.3
P- 1	Mudstone, contains chert nodules	LES-367-47	2.4	2.4	--	--	85.1

SWAN LAKE GULCH, IDAHO. LOT NO. 1265.

Phosphatic shale member and part of Rex member of Phosphoria formation sampled in bulldozer trench in Swan Lake gulch, NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 29, T. 9 S., R. 43 E., Caribou County, Idaho, on west limb of faulted and contorted syncline. Beds of Rex member strike N. 46° W. and dip 54° E. Section measured by F. W. O' Malley, R. P. Sheldon, and R. G. Waring and sampled by Waring and H. A. Larsen in September 1948. Samples analysed by U. S. Bureau of Mines Laboratory, Albany, Oregon.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)					Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)
				P ₂ O ₅	Al ₂ O ₃	Fe ₂ O ₃	Loss on ignition	Acid insoluble		
Rex member of Phosphoria formation—basal beds only										
R- 8	Chert	WOM-3011	2.7	0.2	--	--	--	79.4	2.7	0.54
R- 7	Limestone, argillaceous	WOM-3020	3.5	0.3	--	--	--	35.4	6.2	1.59
R- 6	Chert, calcareous	WOM-3019	3.5	0.4	--	--	--	77.4	9.7	2.99
R- 5	Chert, calcareous and limestone	WOM-3018	2.5	0.6	--	--	--	65.9	12.2	4.49
R- 4	Limestone, argillaceous	WOM-3017	1.5	0.4	--	--	--	24.6	13.7	5.09
R- 3	Chert	WOM-3016	0.9	0.5	--	--	--	77.8	14.6	5.54
R- 2	Chert, calcareous	WOM-3015	5.9	0.5	--	--	--	70.3	20.5	8.49
R- 1	Chert, calcareous	WOM-3014	2.9	0.7	--	--	--	60.7	23.4	10.52
Phosphatic shale member of Phosphoria formation										
P-97	Phosphate rock, argillaceous, calcareous; fos. col. no. 48-JES-243 ¹	WOM-3013	0.9	19.5	--	--	--	28.9	0.9	17.55
P-96	Mudstone, calcareous	WOM-3012	1.2	1.5	--	--	--	74.8	2.1	19.35
P-95	Mudstone, calcareous	RGW-3010	1.1	6.4	--	--	--	54.5	3.2	26.39
P-94	Mudstone; fos. col. no. 48-JES-242	RGW-3009	2.0	1.8	--	--	--	76.4	5.2	29.99
P-93	Mudstone, calcareous; fos. col. no. 48-JES-241	RGW-3008	3.5	0.6	--	--	--	68.4	8.7	32.09
P-92	Mudstone, calcareous; fos. col. no. 48-JES-240	RGW-3007	1.5	0.9	--	--	--	73.9	10.2	33.44
P-91	Limestone	RGW-3006	0.6	0.7	--	--	--	19.7	10.8	33.86
P-90	Mudstone, calcareous; fos. col. no. 48-JES-239	RGW-3005	1.0	3.5	--	--	--	59.3	11.8	37.36
P-89	Mudstone, calcareous; fos. col. no. 48-JES-238	RGW-3004	2.2	3.2	--	--	--	66.1	14.0	44.40
P-88	Mudstone	RGW-3003	1.7	3.5	--	--	--	72.1	15.7	50.35
P-87	Mudstone, phosphatic	RGW-3002	0.3	12.3	--	--	--	43.3	16.0	54.04
P-86	Limestone, phosphatic	RGW-3001	0.5	15.8	--	--	--	18.9	16.5	61.94
P-85	Limestone, argillaceous	RPS- 2850	1.0	0.8	--	--	--	47.1	17.5	62.74
P-84	Phosphate rock	RPS- 2849	1.4	32.8	--	--	--	6.9	18.9	108.66
P-83	Phosphate rock, argillaceous, calcareous	RPS- 2848	0.4	20.9	--	--	--	23.0	19.3	117.02
P-82	Mudstone, phosphatic; fos. col. no. 48-JES-237	WOM-3000	2.7	15.8	--	--	--	39.4	22.0	159.68

P-81	Mudstone, calcareous, phosphatic; fos. col. no. 48-JES-236	WOM-2999	2.4	10.3	--	--	--	38.9	24.4	184.40
P-80	Phosphate rock, calcareous	WOM-2998	0.8	25.2	--	--	--	13.2	25.2	204.56
--	Limestone concretion	WOM-2973	(0.4)	0.9	--	--	--	0.7	--	--
P-79	Phosphate rock, calcareous	WOM-2997	4.0	18.2	--	--	--	19.2	29.2	277.36
P-78	Limestone, phosphatic; fos. col. no. 48-JES-235	WOM-2996	1.5	12.6	--	--	--	18.6	30.7	296.26
P-77	Limestone, phosphatic; fos. col. no. 48-JES-234	WOM-2995	1.7	15.2	--	--	--	18.9	32.4	322.10
P-76	Phosphate rock, calcareous, argillaceous; fos. col. no. 48-JES-233	RPS- 2847	4.2	15.8	--	--	--	25.7	36.6	388.46
--	Limestone concretion	RPS- 2846	(0.5)	1.3	--	--	--	1.5	--	--
P-75	Mudstone, phosphatic; fos. col. no. 48-JES-232	RPS- 2845	2.5	11.1	--	--	--	48.3	39.1	416.21
P-74	Mudstone	RPS- 2844	0.9	0.9	--	--	--	85.5	40.0	417.02
P-73	Mudstone and argillaceous phosphate rock	RPS- 2843	3.3	10.7	--	--	--	52.2	43.3	452.33
P-72	Mudstone; fos. col. no. 48-JES-231	RPS- 2842	3.4	5.2	--	--	--	71.6	46.7	470.01
P-71	Mudstone, phosphatic	RPS- 2841	0.5	14.4	--	--	--	51.7	47.2	477.21
P-70	Mudstone	RPS- 2840	1.3	2.2	--	--	--	85.2	48.5	480.07
P-69	Phosphate rock, argillaceous	RPS- 2839	1.0	18.4	--	--	--	45.2	49.5	498.47
P-68	Mudstone	RPS- 2838	1.7	1.4	--	--	--	87.2	51.2	500.85
P-67	Mudstone, phosphatic	WOM-2994	4.0	10.2	--	--	--	61.7	55.2	541.65
P-66	Mudstone	WOM-2993	4.8	4.9	--	--	--	75.9	60.0	565.17
P-65	Mudstone	WOM-2992	2.5	5.5	--	--	--	66.6	62.5	578.92
P-64	Phosphate rock	WOM-2991	0.3	28.3	--	--	--	18.1	62.8	587.41
P-63	Mudstone; fos. col. no. 48-JES-230	WOM-2990	0.8	5.2	--	--	--	71.7	63.6	591.57
P-62	Phosphate rock, argillaceous	WOM-2989	0.4	17.4	--	--	--	40.9	64.0	598.53
P-61	Mudstone	WOM-2988	1.0	6.2	--	--	--	62.6	65.0	604.73
P-60	Phosphate rock, argillaceous and mudstone	WOM-2987	1.4	15.6	--	--	--	39.4	66.4	626.57
P-59	Mudstone	WOM-2986	1.4	5.9	--	--	--	63.2	67.8	634.83
P-58	Mudstone, phosphatic	WOM-2985	1.1	13.6	--	--	--	47.2	68.9	649.79
P-57	Mudstone	WOM-2984	1.8	1.6	--	--	--	85.7	70.7	652.67
P-56	Mudstone, phosphatic	WOM-2983	0.8	14.3	--	--	--	48.4	71.5	664.11
P-55	Mudstone	WOM-2982	2.5	1.1	--	--	--	85.6	74.0	666.86
P-54	Mudstone; fos. col. no. 48-JES-229	WOM-2981	4.0	1.3	--	--	--	85.3	78.0	672.06
P-53	Phosphate rock, argillaceous	WOM-2980	0.6	21.6	--	--	--	33.0	78.6	685.02
P-52	Mudstone	WOM-2979	0.6	5.5	--	--	--	71.7	79.2	688.32
P-51	Mudstone	WOM-2978	1.4	3.7	--	--	--	80.8	80.6	693.50
P-50	Mudstone	WOM-2977	0.8	0.3	--	--	--	88.3	81.4	693.74
P-49	Mudstone; fos. col. no. 48-JES-228	WOM-2976	1.6	1.4	--	--	--	83.1	83.0	695.98
P-48	Mudstone	WOM-2975	1.0	0.4	--	--	--	84.6	84.0	696.38

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

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)					Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)
				P ₂ O ₅	Al ₂ O ₃	Fe ₂ O ₃	Loss on ignition	Acid insoluble		
P-47	Mudstone	WOM-2974	1.4	0.4	--	--	--	85.7	85.4	696.94
P-46	Phosphate rock, argillaceous	WOM-2972	1.7	20.3	--	--	--	34.9	87.1	731.45
P-45	Mudstone; fos. col. no. 48-JES-227	WOM-2971	5.0	1.4	--	--	--	85.5	92.1	738.45
P-44	Mudstone, phosphatic	WOM-2970	1.1	8.1	--	--	--	71.0	93.2	747.36
P-43	Mudstone; fos. col. no. 48-JES-226	WOM-2969	2.0	3.0	--	--	--	76.2	95.2	753.36
P-42	Phosphate rock, argillaceous	WOM-2968	0.7	18.8	--	--	--	37.3	95.9	766.52
P-41	Phosphate rock	WOM-2967	0.9	27.7	--	--	--	19.1	96.8	791.45
P-40	Mudstone	WOM-2966	3.5	1.2	--	--	--	88.1	100.3	795.65
P-39	Mudstone	WOM-2965	1.3	1.0	--	--	--	87.1	101.6	796.95
P-38	Mudstone; fos. col. no. 48-JES-225	WOM-2964	3.0	4.2	--	--	--	77.0	104.6	809.55
P-37	Mudstone	WOM-2963	4.4	2.1	--	--	--	87.8	109.0	818.79
P-36	Phosphate rock, argillaceous	WOM-2962	0.5	22.1	--	--	--	37.8	109.5	829.84
P-35	Mudstone	WOM-2961	4.7	4.2	--	--	--	74.1	114.2	849.58
P-34	Phosphate rock, argillaceous	WOM-2960	0.5	25.3	--	--	--	24.9	114.7	862.23
P-33	Mudstone; fos. col. no. 48-JES-224	WOM-2959	1.7	1.2	--	--	--	86.5	116.4	864.27
P-32	Phosphate rock and mudstone	WOM-2958	0.7	21.3	--	--	--	35.5	117.1	879.18
P-31	Mudstone; fos. col. no. 48-JES-223	WOM-2957	0.8	2.6	--	--	--	82.7	117.9	881.26
P-30	Mudstone, phosphatic, calcareous	WOM-2956	2.4	14.5	--	--	--	38.7	120.3	916.06
P-29	Mudstone	WOM-2955	1.8	3.2	--	--	--	75.9	122.1	921.82
P-28	Mudstone	WOM-2954	0.7	3.3	--	--	--	75.7	122.8	924.13
P-27	Mudstone	WOM-2953	0.8	1.5	--	--	--	83.3	123.6	925.33
P-26	Mudstone	WOM-2952	1.0	4.9	--	--	--	68.9	124.6	930.23
P-25	Phosphate rock, argillaceous, calcareous	WOM-2951	0.4	16.4	--	--	--	31.7	125.0	936.79
P-24	Mudstone, calcareous	WOM-2950	1.1	6.7	--	--	--	53.7	126.1	944.16
P-23	Mudstone, phosphatic, calcareous	WOM-2949	3.0	13.4	--	--	--	42.0	129.1	984.36
P-22	Phosphate rock, calcareous, argillaceous	WOM-2948	2.5	21.4	--	--	--	21.3	131.6	1,037.86
P-21	Mudstone, phosphatic	WOM-2947	0.6	13.3	--	--	--	42.3	132.2	1,045.84
P-20	Phosphate rock	WOM-2946	2.6	26.7	--	--	--	14.8	134.8	1,115.26
P-19	Phosphate rock, argillaceous	WOM-2945	1.0	17.4	--	--	--	35.2	135.8	1,132.66
P-18	Limestone	WOM-2944	2.0	2.8	--	--	--	13.3	137.8	1,138.26
P-17	Mudstone, phosphatic, calcareous	WOM-2943	2.3	12.0	--	--	--	48.7	140.1	1,165.86
P-16	Limestone, argillaceous	WOM-2942	2.1	1.5	--	--	--	21.6	142.2	1,169.01
P-15	Limestone, phosphatic, argillaceous	WOM-2941	0.4	11.7	--	--	--	20.0	142.6	1,173.69
P-14	Phosphate rock, argillaceous	WOM-2940	2.9	25.6	2.1	0.80	8.74	21.7	145.5	1,247.93
P-13	Phosphate rock, argillaceous	WOM-2939	1.0	19.0	5.1	1.7	7.20	37.8	146.5	1,266.93
P-12	Phosphate rock, argillaceous	WOM-2938	0.7	21.35	2.6	1.3	5.92	34.6	147.2	1,281.87
P-11	Phosphate rock	WOM-2937	1.3	27.6	2.7	1.1	6.76	19.7	148.5	1,317.75
P-10	Phosphate rock, argillaceous	WOM-2936	1.0	25.6	2.5	0.79	9.02	20.8	149.5	1,343.35
P-9	Mudstone; fos. col. no. 48-JES-222	WOM-2935	0.3	3.0	8.9	2.8	7.60	77.8	149.8	1,344.25
P-8	Phosphate rock, argillaceous; fos. col. no. 48-JES-221	WOM-2934	1.3	22.3	4.0	3.9	6.54	28.5	151.1	1,373.24

P- 7	Phosphate rock, argillaceous; fos. col. no. 48-JES-220	WOM-2933	1.0	25.1	2.8	1.7	7.90	23.2	152.1	1,398.34
P- 6	Phosphate rock	WOM-2932	1.9	33.0	1.2	0.63	7.38	5.8	154.0	1,461.04
P- 5	Phosphate rock	WOM-2931	3.6	33.7	0.81	0.48	7.92	4.7	157.6	1,582.36
P- 4	Phosphate rock; fos. col. no. 48-JES-219	WOM-2890	1.4	26.5	3.1	1.2	8.10	18.1	159.0	1,619.46
P- 3	Mudstone, calcareous, phosphatic	WOM-2889	1.5	8.5	--	--	--	53.5	160.5	1,632.21
P- 2	Mudstone	WOM-2874	0.9	3.9	--	--	--	66.7	161.4	1,635.72
P- 1	Phosphate rock	WOM-2873	0.2	32.8	--	--	--	5.3	161.6	1,642.28

Wells formation

Cw-1	Limestone; fos. col. no. 48-JES-218	WOM-2872	1.5	1.6	--	--	--	3.7	1.5	2.40
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DEER CREEK, IDAHO. LOT NO. 1268.

Phosphatic shale member of Phosphoria formation sampled in Trench I (hand trench) on north side of Deer Creek, S $\frac{1}{2}$ SW $\frac{1}{4}$ sec. 34, T. 9 S., R. 45 E., Bannock County, Idaho. Section measured and partially sampled by C. F. Deiss in 1944. Unsampled part of section remeasured by R. P. Sheldon and sampled by R. G. Waring in 1948. All I series samples analyzed by Tennessee Valley Authority. All RPS series samples analyzed by U. S. Bureau of Mines Laboratory, Albany, Oregon.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)		Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)
				P ₂ O ₅	Acid insoluble		
Phosphatic shale member of Phosphoria formation							
P-82	Phosphate rock, calcareous	57-I	0.3	24.1	14.9	0.3	7.23
P-81	Mudstone, calcareous	RPS-2837	0.8	2.1	64.8	1.1	8.91
P-80	Mudstone, phosphatic	RPS-2836	1.0	5.2	--	2.1	14.11
P-79	Mudstone, calcareous	RPS-2835	2.0	1.6	69.7	4.1	17.31
P-78	Mudstone, calcareous	RPS-2834	6.0	0.3	57.1	10.1	19.11
P-77	Mudstone, calcareous	RPS-2833	0.4	0.4	74.4	10.5	19.27
P-76	Mudstone, calcareous	RPS-2832	4.5	2.3	67.9	15.0	29.62
P-75	Limestone	RPS-2831	2.3	0.9	13.4	17.3	31.69
P-74	Mudstone and phosphate rock	RPS-2830	0.7	11.4	62.2	18.0	39.67
P-73	Mudstone	RPS-2829	1.8	1.9	78.9	19.8	43.09
P-72	Phosphate rock	RPS-2828	0.5	27.4	11.2	20.3	56.79
P-71	Mudstone, calcareous	RPS-2827	3.4	1.4	74.4	23.7	61.55
RPS-2827 through RPS-2837 equivalent to Deiss' unit nos. 69 through 73.							
P-70	Phosphate rock	56-I	0.8	35.5	4.4	24.5	89.95
P-69	Phosphate rock	55-I	1.3	33.8	6.8	25.8	133.89
P-68	Mudstone, phosphatic	54-I	0.8	9.0	61.8	26.6	134.61
P-67	Limestone	--	0.9	--	--	27.5	--
P-66	Phosphate rock and mudstone	53-I	2.3	21.8	30.5	29.8	50.14*
P-65	Phosphate rock	52-I	1.7	32.0	6.4	31.5	104.54
P-64	Phosphate rock and mudstone	51-I	1.8	17.0	40.7	33.3	135.14
P-63	Phosphate rock	50-I	1.0	34.4	4.7	34.3	169.54
P-62	Phosphate rock	49-I	2.0	34.3	4.6	36.3	238.14
P-61	Phosphate rock, contains limestone nodules	48-I	2.5	20.1	11.1	38.8	288.39
P-60	Phosphate rock	47-I	3.5	25.4	12.5	42.3	377.29
P-59	Phosphate rock, contains limestone nodules	46-I	3.8	18.1	29.6	46.1	446.07
P-58	Limestone, argillaceous	45-I	2.5	2.3	35.1	48.6	451.82
P-57	Phosphate rock and mudstone	44-I	1.7	16.7	32.2	50.3	480.21
P-56	Mudstone, phosphatic	43-I	4.2	13.0	47.1	54.5	534.81
P-55	Phosphate rock	42-I	0.9	28.0	18.7	55.4	560.01
P-54	Mudstone	41-I	1.4	6.0	69.8	56.8	568.41
P-53	Phosphate rock, argillaceous	40-I	0.5	84.2	22.8	57.3	610.51

P-52	Mudstone, phosphatic	39-I	2.4	10.7	59.5	59.7	636.19
P-51	Limestone	RPS-2826	1.0	1.3	12.0	60.7	637.49
RPS-2826 equivalent to Deiss' unit no. 49.							
P-50	Mudstone, calcareous	38-I	1.3	3.2	59.3	62.0	641.65
P-49	Mudstone, phosphate rock, and limestone	37-I	1.8	14.6	39.9	63.8	667.93
P-48	Mudstone	36-I	2.2	2.2	78.7	66.0	672.77
P-47	Mudstone	35-I	1.5	4.7	64.5	67.5	679.82
P-46	Mudstone	34-I	2.7	2.6	76.3	70.2	686.84
P-45	Phosphate rock and mudstone	33-I	1.5	13.4	43.8	71.7	706.94
P-44	Phosphate rock and mudstone	32-I	1.2	22.6	25.8	72.9	734.06
P-43	Mudstone	31-I	7.3	2.4	66.5	80.2	751.58
P-42	Phosphate rock and mudstone	30-I	1.2	17.5	42.9	81.4	772.58
P-41	Mudstone and phosphate rock	29-I	0.7	9.6	58.2	82.1	779.30
P-40	Limestone and mudstone, phosphatic	28-I	1.4	12.6	27.4	83.5	796.94
P-39	Limestone	--	0.3	--	--	83.8	--
P-38	Mudstone, limestone, and phosphate rock	27-I	3.3	9.6	39.7	87.1	31.68
P-37	Mudstone, phosphate rock, and limestone	26-I	2.0	7.9	30.4	89.1	47.48
P-36	Mudstone, phosphatic and limestone	25-I	3.6	9.4	35.6	92.7	81.32
P-35	Limestone	RPS-2825	2.7	0.1	12.4	95.4	81.59
RPS-2825 equivalent to Deiss' unit no. 33.							
P-34	Mudstone, calcareous	24-I	1.8	2.0	65.1	97.2	85.19
P-33	Mudstone, phosphatic	23-I	2.0	9.2	53.3	99.2	103.59
P-32	Limestone	RPS-2824	2.5	0.2	11.8	101.7	104.09
RPS-2824 equivalent to Deiss' unit no. 30.							
P-31	Mudstone	22-I	1.2	2.0	76.5	102.9	106.49
P-30	Limestone	21-I	4.3	0.3	17.2	107.2	107.78
P-29	Mudstone	20-I	4.2	2.5	74.0	111.4	118.28
--	Limestone concretion	RPS-2823	(0.6)	0.6	3.2	--	--
RPS-2823 equivalent to Deiss' unit no. 26. Concretion occurs between Deiss-25 and Deiss-27.							
--	Limestone concretion	RPS-2822	(1.1)	0.7	4.4	--	--
RPS-2822 occurs within Deiss' unit no. 25.							

¹ The full section was measured but only part of the section was sampled by Deiss. The I series sample data here listed are taken from table 9, p. 91 of Deiss' report. The beds not sampled by Deiss are included in the columnar section for Trench I (as shown on plates 6 and 7 of Deiss' report) and are there identified by unit numbers which do not correspond to the sample numbers of table 9. The beds sampled by Sheldon (RPS series) are correlated with the unit numbers of Deiss.

* Cumulative data incomplete due to missing information. Computations start from zero after interruption.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)		Cumulative thickness (feet)	Thickness x percent P_2O_5 (cumulative)
				P_2O_5	Acid insoluble		
P-28	Mudstone	19-I	5.2	2.4	74.0	116.6	130.76
P-27	Mudstone, phosphatic and limestone	18-I	4.5	7.3	53.7	121.1	163.61
P-26	Limestone	RPS-2821	1.1	1.7	18.8	122.2	165.48
RPS-2821 equivalent to Deiss' unit no. 23.							
P-25	Phosphate rock, argillaceous and limestone	17-I	3.4	13.6	29.2	125.6	211.72
--	Limestone concretion?	RPS-2819	(1.2)	1.4	2.3	--	--
RPS-2819 equivalent to Deiss' unit no. 21 and occurs between RPS-2820 and Deiss-22.							
P-24	Phosphate rock and calcareous mudstone	RPS-2820	0.5	15.9	31.0	126.1	219.67
P-23	Mudstone, phosphatic and limestone	16-I	4.3	12.0	37.9	130.4	271.27
P-22	Limestone	RPS-2818	1.2	0.9	3.0	131.6	272.35
RPS-2818 equivalent to Deiss' unit no. 19.							
P-21	Mudstone, phosphatic	15-I	2.4	10.2	47.0	134.0	296.83
P-20	Phosphate rock, calcareous, argillaceous	14-I	1.2	20.4	22.2	135.2	321.31
P-19	Phosphate rock, calcareous	13-I	1.5	23.3	14.5	136.7	356.26
P-18	Phosphate rock and mudstone	12-I	2.8	23.9	17.0	139.5	423.18
P-17	Phosphate rock and mudstone	11-I	1.9	23.9	17.6	141.4	468.59
P-16	Limestone, argillaceous	10-I	3.0	5.1	20.9	144.4	483.89
P-15	Mudstone, calcareous, phosphatic	9-I	2.7	9.2	45.8	147.1	508.73
P-14	Limestone, argillaceous	RPS-2812	2.5	0.6	20.9	149.6	510.23
RPS-2812 equivalent to Deiss' unit no. 11.							
P-13	Phosphate rock and mudstone	8-I	2.7	25.2	18.4	152.3	578.27
P-12	Phosphate rock, mudstone, and limestone	7-I	3.5	18.7	34.9	155.8	643.72
P-11	Phosphate rock and mudstone	6-I	7.6	25.4	17.6	163.4	836.76
--	Limestone concretion	RPS-2811	(0.6)	9.8	12.8	--	--
RPS-2811 concretion occurs within RPS-2810.							
P-10	Phosphate rock and calcareous mudstone	RPS-2810	1.7	24.9	15.7	165.1	879.09
P-9	Limestone	RPS-2809	1.1	2.3	6.5	166.2	904.39
RPS-2809 and RPS-2810 equivalent to Deiss' unit no. 7.							
P-8	Phosphate rock, argillaceous	5-I	3.0	21.9	34.6	169.2	970.09
P-7	Limestone	RPS-2808	1.6	6.6	6.9	170.8	980.65
RPS-2808 equivalent to Deiss' unit no. 5.							
P-6	Phosphate rock	4-I	0.8	28.0	8.1	171.6	1,003.05

P- 5	Phosphate rock	3-I	3.2	32.1	4.1	174.8	1,105.77
P- 4	Phosphate rock	2-I	1.5	33.0	3.9	176.3	1,155.27
P- 3	Mudstone	1-I	0.9	2.9	71.8	177.2	1,157.88
P- 2	Limestone, argillaceous	RPS-2807	3.5	0.3	38.8	180.7	1,158.93
P- 1	Phosphate rock	RPS-2806	0.5	31.2	6.8	181.2	1,174.53**

Wells formation

Cw-5	Limestone	RPS-2817	7.0	1.2	5.6	7.0	8.40
Cw-4	Phosphate rock	RPS-2816	0.1	33.4	4.2	7.1	11.74
Cw-3	Limestone	RPS-2815	3.0	1.9	3.8	10.1	17.44
Cw-2	Phosphate rock	RPS-2814	0.1	34.6	5.9	10.2	20.90
Cw-1	Limestone	RPS-2813	1.8	0.7	6.1	12.0	22.16

** Note incompleteness of cumulative data.

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UNITED STATES
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45. GEOLOGICAL SURVEY

Reports-open file series

STRATIGRAPHIC SECTIONS OF THE PHOSPHORIA FORMATION IN IDAHO
Second Idaho Report

by

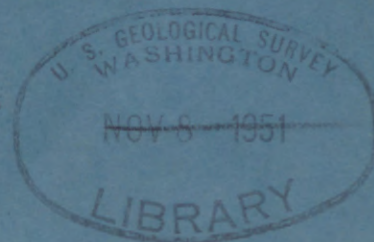
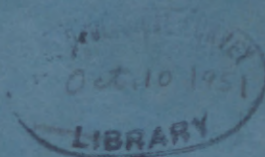
minerals
V. E. McKelvey, R. A. Hoppin, F. C. Armstrong,
R. A. Gulbrandsen, L. E. Smith, and R. M. Campbell

MINERAL DEPOSITS BRANCH

Spokane, Washington

August 1951

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This report is preliminary and has not been edited or reviewed for conformity with U. S. Geological Survey standards and nomenclature.

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STRATIGRAPHIC SECTIONS OF THE PHOSPHORIA FORMATION IN IDAHO

Second Idaho Report

by

V. E. McKelvey, R. A. Hoppin, F. C. Armstrong,
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INTRODUCTION

The first of a series of reports giving detailed stratigraphic sections of the Phosphoria formation in the Western phosphate field as measured and described by the Geological Survey will be released as Circulars within the next few months. Because of the needs of industry for many of these data during the 1951 field season, and in view of the unavoidable delays attendant on publication, the tabular data to be included in these Circulars are hereby placed on open file in simple reproduction form (prepared by Ozalid from photographic negatives) and without explanatory text so that immediate use may be made of the data.

The first four sets of tables, one each for the states of Montana, Idaho, Wyoming, and Utah, were released on open file on August 15, 1951. This report includes data of the same character but of samples from different localities and is the second report on samples from Idaho. The tables include name and location of section measured, brief description of geologic setting, acknowledgments for field and analytical work, abstract data on the sections (bed number, rock name, sample number, and thickness), and analytical data on the samples. The analytical data include reports on P_2O_5 and acid insoluble for all samples and additional analyses, such as Al_2O_3 , Fe_2O_3 , loss on ignition, F, and V_2O_5 , for selected samples. Spectrographic analyses for a large number of elements are included for samples from selected localities.

These reports are placed on open file at the offices of the Geological Survey in Washington, D. C., Spokane, Washington, Salt Lake City, Utah, and Montpelier, Idaho, and at the offices of the Idaho Bureau of Mines and Geology, Moscow, Idaho, the Montana Bureau of Mines and Geology, Butte, Montana, and the Wyoming Geological Survey, Laramie, Wyoming, and the University of Utah, Salt Lake City, Utah.

NORTH WOOLEY RANGE, IDAHO. LOT NO. 1230.

Phosphatic shale member of Phosphoria formation sampled in bulldozer trench on northeast limb of Wooley Valley anticline, sec. 24, T. 6 S., R. 42 E., Caribou County, Idaho. Beds strike N. 40° W. and dip 57° NE. Section measured by R. A. Hoppin, C. E. Weaver, R. L. Parker, R. P. Sheldon, F. W. O' Malley, and V. E. McKelvey and sampled by J. A. Noel and R. A. Smart in July 1948. Samples analyzed by U. S. Bureau of Mines Laboratory, Albany, Oregon.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)					Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)
				P ₂ O ₅	Al ₂ O ₃	Fe ₂ O ₃	Loss on ignition	Acid insoluble		
Rex member of Phosphoria formation—basal bed only										
R- 1	Chert	1289- RAH	7.4	1.1	--	--	--	85.3	2.3	2.53
Phosphatic shale member of Phosphoria formation										
P-92	Mudstone	1288- RAH	2.3	2.8	--	--	--	68.7	2.3	6.44
P-91	Mudstone	1287- RAH	1.7	6.0	--	--	--	77.0	4.0	16.64
P-90	Mudstone, calcareous and mudstone	1286- RAH	3.7	0.2	--	--	--	67.6	7.7	17.38
P-89	Mudstone	1285- RAH	3.3	1.5	--	--	--	79.6	11.0	22.33
P-88	Mudstone; fos. col. no. 48-JES-81 ¹	1284- RAH	4.1	3.5	--	--	--	71.9	15.1	36.68
P-87	Phosphate rock, argillaceous; fos. col. no. 48-JES-80	1283- RAH	0.8	25.5	--	--	--	24.8	15.9	57.08
P-86	Mudstone; fos. col. no. 48-JES-79	1282- RAH	2.0	5.6	--	--	--	78.5	17.9	68.28
P-85	Mudstone, calcareous; fos. col. no. 48-JES-78	1281- RAH	0.8	0.5	--	--	--	63.8	18.7	68.68
P-84	Mudstone; fos. col. no. 48-JES-77	1280- RAH	1.7	6.1	--	--	--	80.7	20.4	79.05
P-83	Phosphate rock	1205- RLP	1.7	35.0	1.4	0.46	5.90	4.7	22.1	138.55
P-82	Mudstone and limestone	1204- RLP	1.6	5.0	8.5	2.59	12.32	57.9	23.7	146.55
P-81	Phosphate rock	1203- RLP	1.5	33.1	1.6	0.74	4.74	9.4	25.2	196.20
P-80	Phosphate rock	1202- RLP	0.8	32.2	2.2	0.85	4.64	11.6	26.0	221.96
P-79	Mudstone, calcareous; fos. col. no. 48-JES-76	1201- RLP	1.0	7.5	6.6	2.46	10.64	55.3	27.0	229.46
P-78	Phosphate rock	1200- RLP	1.2	29.4	3.3	0.96	5.22	16.8	28.2	264.74
P-77	Phosphate rock	1305-WOM	0.6	36.3	0.76	0.37	4.80	4.4	28.8	286.52
P-76	Phosphate rock; fos. col. no. 48-JES-75	1304-WOM	4.7	31.5	2.7	0.60	7.86	9.7	33.5	434.57
P-75	Phosphate rock, argillaceous; fos. col. no. 48-JES-74	1212-CEW	3.55	25.2	3.9	1.2	9.60	21.0	37.05	524.03
P-74	Phosphate rock and phosphatic mudstone	1211-CEW	1.5	26.5	4.1	1.3	9.02	24.0	38.55	563.78
P-73	Mudstone, phosphatic, and argillaceous phosphate rock; fos. col. no. 48-JES-73	1210-CEW	1.6	15.8	7.5	2.2	9.80	46.4	40.15	589.06
P-72	Mudstone, phosphatic; fos. col. no. 48-JES-72	1229- RPS	1.2	8.3	--	--	--	62.4	11.35	599.02
P-71	Limestone and mudstone	1228- RPS	2.8	0.7	--	--	--	33.1	44.15	600.98

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

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)					Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)
				P ₂ O ₅	Al ₂ O ₃	Fe ₂ O ₃	Loss on ignition	Acid insoluble		
P-70	Mudstone, phosphatic, calcareous; fos. col. no. 48-JES-71	1227- RPS	2.3	12.8	--	--	--	45.0	46.45	630.42
P-69	Mudstone; fos. col. no. 48-JES-70	1226- RPS	1.2	5.4	--	--	--	64.4	47.65	636.90
P-68	Mudstone, phosphatic	1225- RPS	1.3	11.8	--	--	--	53.3	48.95	652.24
P-67	Mudstone, phosphatic	1224- RPS	2.4	11.6	--	--	--	48.5	51.35	680.08
P-66	Mudstone	1223- RPS	1.1	5.5	--	--	--	71.1	52.45	686.13
P-65	Mudstone, phosphatic; fos. col. no. 48-JES-69	1222- RPS	3.1	12.3	--	--	--	54.6	55.55	724.26
P-64	Phosphate rock, argillaceous	1218- CEW	1.5	25.5	--	--	--	25.8	57.05	762.51
P-63	Mudstone; fos. col. no. 48-JES-68	1303-WOM	1.0	6.1	--	--	--	75.9	58.05	768.61
P-62	Mudstone	1302-WOM	1.6	2.8	--	--	--	81.4	59.65	773.09
P-61	Mudstone; fos. col. no. 48-JES-67	1301-WOM	1.2	5.8	--	--	--	80.2	60.85	780.05
P-60	Mudstone, phosphatic	1300-WOM	0.8	11.4	--	--	--	61.0	61.65	789.17
P-59	Mudstone, phosphatic; fos. col. no. 48-JES-66	1232-WOM	4.8	12.1	--	--	--	58.3	66.45	847.25
P-58	Mudstone	1231-WOM	0.6	6.9	--	--	--	68.9	67.05	851.39
P-57	Mudstone, phosphatic; fos. col. no. 48-JES-65	1230-WOM	0.8	9.4	--	--	--	65.7	67.85	858.91
P-56	Mudstone and phosphate rock	1215- CEW	1.9	12.6	--	--	--	49.6	69.75	882.85
P-55	Mudstone	1214- CEW	2.8	3.3	--	--	--	81.0	72.55	892.09
P-54	Mudstone and phosphatic mudstone	1221- RPS	2.7	4.5	--	--	--	71.7	75.25	904.24
P-53	Mudstone	1220- RPS	0.9	1.8	--	--	--	79.9	76.15	905.86
P-52	Mudstone and phosphatic mudstone	1239- RPS	1.2	5.6	--	--	--	73.6	77.35	912.58
P-51	Mudstone and phosphate rock	1238- RPS	1.1	24.0	--	--	--	26.1	78.45	938.98
P-50	Mudstone and argillaceous phosphate rock; fos. col. no. 48-JES-64	1237- RPS	0.8	12.5	--	--	--	56.7	79.25	948.98
P-49	Mudstone and phosphate rock	1236- RPS	1.2	16.9	--	--	--	38.6	80.45	969.26
P-48	Mudstone and phosphate rock	1235- RPS	1.0	17.4	--	--	--	37.2	81.45	986.66
P-47	Mudstone; fos. col. no. 48-JES-63	1234- RPS	3.0	5.9	--	--	--	72.7	84.45	1,004.36
P-46	Mudstone	1269- VEM	2.9	4.9	--	--	--	65.9	87.35	1,018.57
P-45	Phosphate rock	1268- VEM	2.9	31.8	--	--	--	10.5	90.25	1,110.79
P-44	Mudstone, phosphatic	1267- VEM	3.0	10.0	--	--	--	60.5	93.25	1,140.79
P-43	Mudstone, calcareous, phosphatic	1266- VEM	1.4	10.7	--	--	--	43.4	94.65	1,155.77
P-42	Mudstone, phosphatic	1265- VEM	0.6	14.7	--	--	--	37.4	95.25	1,164.59
P-41	Mudstone	1264- VEM	0.6	5.8	--	--	--	68.8	95.85	1,168.07
P-40	Mudstone, phosphatic	1263- VEM	0.8	12.0	--	--	--	48.9	96.65	1,177.67
P-39	Mudstone, phosphatic	1262- VEM	0.5	8.0	--	--	--	59.9	97.15	1,181.67
P-38	Mudstone, phosphatic	1261- VEM	1.1	12.1	--	--	--	41.3	98.25	1,194.98
P-37	Mudstone, phosphatic	1260- VEM	2.1	16.5	--	--	--	43.5	100.35	1,229.63
P-36	Limestone; fos. col. no. 48-JES-62	1279-WOM	1.0	2.2	--	--	--	13.7	101.35	1,231.83
P-35	Limestone; fos. col. no. 48-JES-61	1278-WOM	2.7	0.4	--	--	--	9.7	104.05	1,232.91

P-34	Mudstone; fos. col. no. 48-JES-60	1277-WOM	1.0	2.7	--	--	--	80.7	105.05	1,235.61
P-33	Mudstone, phosphatic	1276-WOM	0.5	8.9	--	--	--	56.5	105.55	1,240.06
P-32	Mudstone; fos. col. no. 48-JES-59	1275-WOM	1.8	5.7	--	--	--	74.9	107.35	1,250.32
P-31	Mudstone, phosphatic; fos. col. no. 48-JES-58	1274-WOM	2.6	13.7	--	--	--	52.7	109.95	1,285.94
P-30	Mudstone, phosphatic	1273-WOM	3.5	14.5	--	--	--	46.1	113.45	1,336.69
P-29	Mudstone, phosphatic	1272-WOM	1.0	11.8	--	--	--	65.7	114.45	1,348.49
P-28	Mudstone, phosphatic	1247-CEW	0.7	7.9	--	--	--	65.7	115.15	1,354.02
P-27	Mudstone and phosphate rock	1246-CEW	3.2	14.6	--	--	--	48.6	118.35	1,400.74
P-26	Mudstone and phosphate rock	1245-CEW	1.1	16.3	5.8	2.44	6.06	36.7	119.45	1,418.67
P-25	Phosphate rock	1244-CEW	3.3	32.3	2.1	1.31	5.40	9.0	122.75	1,525.26
P-24	Phosphate rock	1243-CEW	2.2	28.5	3.6	1.97	5.12	15.5	124.95	1,587.96
P-23	Phosphate rock, argillaceous	1242-CEW	1.5	26.3	3.7	1.47	7.32	20.4	126.45	1,627.41
P-22	Phosphate rock, argillaceous; fos. col. no. 48-JES-57	1241-CEW	1.9	25.6	3.4	1.29	7.40	21.9	128.35	1,676.05
P-21	Mudstone, phosphatic	1240-CEW	2.3	13.0	6.5	2.48	11.54	46.4	130.65	1,705.95
P-20	Mudstone and phosphate rock	1309-CEW	2.0	16.8	6.4	2.02	7.90	41.6	132.65	1,739.55
P-19	Phosphate rock, argillaceous	1308-CEW	1.2	25.2	4.8	1.54	4.64	23.8	133.85	1,769.79
P-18	Phosphate rock	1307-CEW	3.4	33.8	1.4	0.71	3.76	6.1	137.25	1,884.71
P-17	Phosphate rock, argillaceous	1306-CEW	4.0	29.9	2.1	0.86	6.32	11.8	141.25	2,004.31
P-16	Mudstone, phosphatic	1219-CEW	1.9	16.3	6.8	2.45	5.52	48.3	143.15	2,035.28
P-15	Phosphate rock	1314-RAH	2.5	31.6	1.9	0.91	4.56	9.0	145.65	2,114.28
P-14	Mudstone, phosphatic	1313-RAH	1.6	9.7	9.4	3.10	3.80	62.2	147.25	2,129.80
P-13	Phosphate rock	1312-RAH	1.8	33.7	1.8	0.68	3.84	5.7	149.05	2,190.46
P-12	Mudstone, phosphatic and phosphate rock; fos. col. no. 48-JES-56	1311-RAH	1.5	24.6	5.5	1.57	5.32	23.5	150.55	2,227.36
P-11	Phosphate rock	1310-RAH	2.3	28.2	2.5	0.87	6.10	14.0	152.85	2,292.22
P-10	Phosphate rock, argillaceous; fos. col. no. 48-JES-55	1294-WOM	0.6	22.9	0.76	0.55	4.16	28.7	153.45	2,305.96
P-9	Phosphate rock, argillaceous	1299-WOM	0.3	27.0	4.5	1.66	5.36	21.3	153.75	2,314.06
P-8	Phosphate rock	1298-WOM	2.9	34.4	0.94	0.47	5.94	3.4	156.65	2,413.82
P-7	Phosphate rock	1297-WOM	2.0	29.9	2.3	1.00	7.56	12.3	158.65	2,473.62
P-6	Mudstone	1292-WOM	1.2	1.8	--	--	--	72.6	159.85	2,475.79
P-5	Limestone, argillaceous	1291-WOM	1.2	0.3	--	--	--	35.4	161.05	3,476.14
P-4	Mudstone; fos. col. no. 48-JES-54	1290-WOM	0.4	0.9	--	--	--	76.4	161.45	2,476.50
P-3	Mudstone	1271-WOM	0.6	0.1	--	--	--	79.4	162.05	2,476.56
P-2	Limestone, argillaceous; fos. col. no. 48-JES-53	1270-WOM	0.8	1.8	--	--	--	43.8	162.85	2,478.00
P-1	Phosphate rock	1296-WOM	0.4	32.7	--	--	--	5.9	163.25	2,491.08

Wells formation

Cw-1	Limestone; fos. col. no. 48-JES-52	1295-WOM	0.7	0.5	--	--	--	4.2	--	--
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SPECTROGRAPHIC ANALYSES—NORTH WOOLEY RANGE, IDAHO. LOT NO. 1230.

Semi-quantitative analyses of selected samples of the phosphatic shale member of the Phosphoria formation, North Wooley Range, Idaho (see immediately preceding pages for location of section, thickness and description of strata, and chemical analyses of samples), made by the U. S. Geological Survey, Geochemistry and Petrology Branch, Washington, D. C. In addition to the elements listed in the table below, Sb, As, Be, Bi, Cs, Co, Cb, Dy, Er, Eu, Gd, Au, Hf, Ho, Li, Lu, Nd, Pt, K, Pr, Rb, Sm, Sc, Ta, Te, Tb, Tl, Th, Tm, Ti, and W were looked for in all samples but were not detected.

Explanation of symbols

A = more than 10 percent F = 0.001-0.01 percent
 B' = 1-10 percent¹ G = less than 0.001 percent
 D = 0.1-1 percent ND = not detected
 E = 0.01-0.1 percent

Sample no.	Al	Ba	B	Cd	Ca	Cr	Cu	Fe	Ga	In	La	Pb	Mg	Mn	Mo	Ni	P	Si	Ag	Na	Sr	Ti	V	Y	Yb	Zn	Zr
Beds P-92 through P-84 not analyzed.																											
1205- RLP	D	F	ND	ND	A	D	F	E	ND	ND	E	ND	E	E	F	E	A	B'	G	D	D	E	D	E	G	ND	F
1204- RLP	A	F	F	ND	B'	D	F	B'	ND	F	F	F	D	D	F	E	B'	A	G	D	D	E	D	E	G	E	F
1203- RLP	B'	F	ND	ND	A	D	F	D	F	ND	E	F	E	E	F	E	A	B'	G	D	D	E	E	E	G	ND	F
1202- RLP	B'	F	ND	ND	A	D	F	D	ND	ND	E	ND	E	E	F	E	A	B'	G	D	D	E	E	E	G	ND	F
1201- RLP	A	E	F	ND	B'	D	E	B'	F	G	F	F	D	D	F	E	B'	A	G	D	D	E	D	E	G	E	E
1200- RLP	B'	E	ND	ND	A	D	F	D	F	ND	E	ND	E	E	F	E	A	B'	G	D	D	E	D	E	G	E	F
1305-WOM	B'	F	ND	E	A	D	F	D	ND	ND	E	ND	E	E	F	E	A	B'	G	D	D	E	D	E	G	E	F
1304-WOM	D	F	ND	F	A	D	F	E	ND	ND	E	ND	E	E	F	E	A	B'	G	D	D	F	D	E	G	ND	F
1212-CEW	B'	F	ND	E	A	D	E	D	F	G	ND	E	E	E	F	E	A	B'	G	D	D	E	D	E	G	E	F
1211-CEW	B'	F	ND	E	A	D	E	D	F	G	ND	E	E	E	F	E	A	B'	G	D	D	E	D	E	G	E	F
1210-CEW	A	E	ND	E	B'	D	E	B'	F	G	E	E	E	D	E	E	B'	A	G	D	D	D	D	E	G	E	E
Beds P-72 through P-27 not analyzed.																											
1245-CEW	B'	E	ND	ND	A	D	E	B'	F	ND	E	F	E	E	F	E	A	B'	G	D	D	E	E	E	G	E	F
1244-CEW	B'	F	ND	ND	A	D	E	D	F	ND	E	F	E	E	F	E	A	B'	G	D	D	E	E	E	G	E	F
1243-CEW	B'	ND	ND	ND	A	D	F	B'	F	G	E	F	E	D	F	E	A	B'	G	D	D	E	E	E	G	E	F
1242-CEW	B'	F	ND	E	A	D	E	D	F	G	E	E	E	D	F	E	A	B'	G	D	D	E	D	E	F	E	E
1241-CEW	B'	F	ND	ND	A	D	E	D	F	ND	E	E	E	E	F	E	A	B'	F	D	D	E	D	E	F	E	F
1240-CEW	A	E	ND	E	B'	D	E	B'	F	G	E	E	E	E	E	E	B'	A	F	D	D	E	D	E	G	E	F
1309-CEW	A	F	ND	E	B'	D	E	B'	F	ND	E	F	E	E	E	E	B'	A	F	D	D	E	D	E	G	E	F
1308-CEW	B'	F	ND	E	A	E	E	D	F	G	E	F	E	D	F	E	A	B'	G	D	D	E	D	E	G	E	F
1307-CEW	B'	F	ND	E	A	D	F	D	ND	ND	E	F	E	E	F	E	A	B'	G	D	D	E	D	E	G	E	F

NORTH RASMUSSEN VALLEY, IDAHO. LOT NO. 1233.

Phosphoria formation sampled in bulldozer trench on northeast slope of Rasmussen Valley, sec. 6, T. 7 S., R. 44 E., Caribou County, Idaho, on southwest limb of Snowdrift anticline. Beds strike N. 53° W. and dip 63° SW. Section measured by R. A. Hoppin, C. E. Weaver, R. L. Parker, R. P. Sheldon, D. F. Davidson, and F. W. O' Malley and sampled by R. A. Smart and R. G. Waring. Samples analyzed by U. S. Bureau of Mines Laboratory, Albany, Oregon.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)					Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative) ⁵
				P ₂ O ₅	Al ₂ O ₃	Fe ₂ O ₃	Loss on ignition	Acid insoluble		
Dinwoody formation										
Td-2	Siltstone	1418- RAH	4.0	0.5	--	--	--	78.2	--	--
Td-1	Phosphate rock, argillaceous, conglomeratic	1417- RAH	0.6	21.2	--	--	--	31.6	--	--
Rex member of Phosphoria formation										
R-24	Mudstone; fos. col. no. 48-JES-82 ¹	1416- RAH	2.3	4.0	--	--	--	77.0	2.3	9.20
R-23	Mudstone; fos. col. no. 48-JES-83	1415- RAH	10.0	4.2	--	--	--	71.6	12.3	51.20
R-22	Mudstone	1414- RAH	10.0	5.6	--	--	--	62.7	22.3	107.20
R-21	Phosphate rock, argillaceous	1413- RAH	2.0	21.2	--	--	--	31.4	24.3	149.60
R-20	Mudstone	1412- RAH	2.1	2.2	--	--	--	69.7	26.4	154.22
R-19	Mudstone	1411- RAH	10.5	3.1	--	--	--	73.6	36.9	186.77
R-18	Mudstone, cherty	1410- RAH	7.0	1.5	--	--	--	83.7	43.9	197.27
R-17	Mudstone; fos. col. no. 48-JES-84	1409- RAH	10.0	1.9	--	--	--	82.4	53.9	216.27
R-16	Chert	1408- RAH	2.0	2.1	--	--	--	88.4	55.9	220.47
R-15	Mudstone, cherty; fos. col. no. 48-JES-85	1407- RAH	12.0	2.4	--	--	--	73.3	67.9	249.27
R-14	Mudstone	1406- RAH	10.0	2.1	--	--	--	77.0	77.9	270.27
R-13	Mudstone	1405- RAH	10.0	1.3	--	--	--	80.4	87.9	283.27
R-12	Mudstone	1404- RAH	10.0	1.5	--	--	--	81.2	97.9	298.27
R-11	Mudstone	1403- RAH	10.0	1.6	--	--	--	82.2	107.9	314.27
R-10	Mudstone	1402- RAH	10.0	1.9	--	--	--	76.5	117.9	333.27
R- 9	Mudstone	1401- RAH	10.0	1.6	--	--	--	79.2	127.9	349.27
R- 8	Mudstone	1400- RAH	10.0	1.3	--	--	--	83.5	137.9	362.27
R- 7	Mudstone	1399- RAH	10.0	1.9	--	--	--	81.3	147.9	381.27
R- 6	Mudstone	1398- RAH	10.0	1.2	--	--	--	83.7	157.9	393.27
R- 5	Chert	1397- RAH	5.4	0.6	--	--	--	92.2	163.3	396.51
R- 4	Chert and mudstone	1396- RAH	5.1	0.9	--	--	--	88.5	168.4	401.10
R- 3	Chert	1395- RAH	4.0	1.2	--	--	--	90.2	172.4	405.90
R- 2	Chert	1394- RAH	10.0	2.9	--	--	--	87.1	182.4	434.90
R- 1	Chert	1384- DFD	10.0	0.2	--	--	--	88.9	192.4	436.90

Phosphatic shale member of Phosphoria formation

P-83	Mudstone	1383- DFD	1.6	1.3	--	--	--	82.6	1.6	2.08
P-82	Mudstone	1382- DFD	0.9	2.5	--	--	--	70.6	2.5	4.33
P-81	Mudstone	1381- DFD	2.5	3.9	--	--	--	69.3	5.0	14.08
P-80	Mudstone, phosphatic	1380- DFD	0.9	9.5	--	--	--	40.1	5.9	22.63
P-79	Mudstone, phosphatic; fos. col. no. 48-JES-103	1339- DFD	0.7	16.1	--	--	--	48.2	6.6	33.90
P-78	Mudstone	1338- DFD	1.7	3.2	--	--	--	76.6	8.3	39.34
P-77	Mudstone; fos. col. no. 48-JES-104	1337- DFD	2.1	1.1	--	--	--	80.1	10.4	41.65
P-76	Mudstone	1336- DFD	0.8	3.7	--	--	--	73.1	11.2	44.61
P-75	Phosphate rock	1335- RLP	1.3	36.2	1.1	0.36	6.50	3.7	12.5	91.67
P-74	Phosphate rock and mudstone	1334- RLP	1.0	26.4	3.1	1.64	7.90	15.2	13.5	118.07
P-73	Mudstone	1525-WOM	0.4	7.3	8.4	3.89	9.50	65.1	13.9	120.99
P-72	Phosphate rock	1524-WOM	2.0	31.3	1.9	0.94	27.28	12.3	15.9	183.59
P-71	Phosphate rock, argillaceous	1332- RLP	1.8	23.9	4.9	1.65	8.08	27.5	17.7	226.61
P-70	Phosphate rock	1331- RLP	1.2	33.8	1.6	0.58	6.96	5.7	18.9	267.17
P-69	Phosphate rock	1330- RLP	1.0	35.5	1.5	0.52	5.12	3.3	19.9	302.67
P-68	Phosphate rock	1523-WOM	1.3	29.9	2.8	1.05	11.32	11.3	21.2	341.54
P-67	Phosphate rock	1522-WOM	4.1	27.4	3.2	1.14	9.80	17.4	25.3	453.88
P-66	Mudstone, phosphatic	1379-WOM	2.4	13.1	8.3	2.37	11.04	50.9	27.7	485.32
P-65	Mudstone	1349- RPS	1.3	6.0	--	--	--	67.3	29.0	493.12
P-64	Mudstone, phosphatic	1348- RPS	0.8	11.3	--	--	--	51.7	29.8	502.16
P-63	Mudstone and argillaceous phosphate rock	1347- RPS	1.8	11.3	--	--	--	49.3	31.6	522.50
P-62	Mudstone and phosphate rock; fos. col. no. 48-JES-105	1521-WOM	1.2	9.0	--	--	--	52.7	32.8	533.30
P-61	Phosphate rock, argillaceous	1520-WOM	0.8	19.5	--	--	--	28.7	33.6	548.90
P-60	Mudstone	1345- RPS	1.4	7.6	--	--	--	63.3	35.0	559.54
P-59	Phosphate rock and mudstone	1344- RPS	2.3	16.8	--	--	--	42.5	37.3	598.18
P-58	Phosphate rock, argillaceous	1343- RPS	1.4	25.4	--	--	--	26.3	38.7	633.74
P-57	Mudstone	1342- RPS	1.1	6.6	--	--	--	73.4	39.8	641.00
P-56	Mudstone, phosphatic	1529-WOM	2.6	14.0	--	--	--	52.6	42.4	677.40
P-55	Mudstone, phosphatic; fos. col. no. 48-JES-106	1528-WOM	3.0	8.3	--	--	--	68.0	45.4	702.30
P-54	Mudstone	1340- RPS	0.6	7.7	--	--	--	66.3	46.0	706.92
P-53	Mudstone	1369- RAH	1.0	7.4	--	--	--	66.6	47.0	714.32
P-52	Phosphate rock, argillaceous	1368- RAH	0.6	26.3	--	--	--	22.0	47.6	730.10
P-51	Mudstone	1367- RAH	0.7	6.8	--	--	--	62.9	48.3	734.86
P-50	Mudstone	1366- RAH	1.1	5.9	--	--	--	69.2	49.4	741.35
P-49	Mudstone and phosphate rock	1365- RAH	3.5	7.4	--	--	--	63.1	52.9	767.25
P-48	Mudstone	1364- RAH	1.1	5.2	--	--	--	71.4	54.0	772.97
P-47	Mudstone	1363- RAH	3.6	5.6	--	--	--	69.9	57.6	793.13
P-46	Phosphate rock, argillaceous	1378-WOM	1.1	21.2	--	--	--	32.2	58.7	816.45
P-45	Mudstone, phosphatic	1377-WOM	0.6	8.6	--	--	--	62.5	59.3	821.61

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

P-11	Mudstone, phosphatic	1354-CEW	1.0	11.3	7.9	2.71	7.16	53.6	115.60	1,796.85
P-10	Phosphate rock	1353-CEW	4.0	34.5	1.4	0.56	8.88	5.9	119.60	1,934.85
P- 9	Mudstone, phosphatic	1352-CEW	0.45	13.5	7.8	2.13	8.42	52.0	120.05	1,940.93
P- 8	Phosphate rock, argillaceous	1351-CEW	0.7	24.5	4.2	1.54	5.98	25.6	120.75	1,958.08
P- 7	Mudstone	1350-CEW	0.8	4.9	1.7	0.55	8.08	9.2	121.55	1,961.99
P- 6	Phosphate rock	1000- RAH	1.4	27.9	3.4	1.01	5.98	16.4	122.95	2,001.06
P- 5	Phosphate rock, calcareous, argillaceous; fos. col. no. 48-JES-125	1319- RAH	0.7	15.7	3.0	1.06	6.70	21.1	123.65	2,012.05
P- 4	Phosphate rock	1419-WOM	2.0	33.9	1.0	0.56	7.18	5.3	125.65	2,079.85
P- 3	Phosphate rock	1233-WOM	3.0	32.5	1.1	0.93	8.06	6.6	128.65	2,177.35
P- 2	Mudstone, calcareous	1317- RAH	3.0	2.2	6.8	2.65	19.66	51.9	131.65	2,183.95
P- 1	Phosphate rock	1316- RAH	0.5	32.4	0.98	0.82	19.80	5.1	132.15	2,200.15

Wells formation

Cw-1	Limestone	1315- RAH	3.1	0.6	--	--	--	1.8	--	--
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SPECTROGRAPHIC ANALYSES—NORTH RASMUSSEN VALLEY, IDAHO. LOT NO. 1233.

Semi-quantitative analyses of selected samples of the phosphatic shale member of the Phosphoria formation, North Rasmussen Valley, Idaho (see immediately preceding pages for location of section, thickness and description of strata, and chemical analyses of samples), made by U. S. Geological Survey, Geochemistry and Petrology Branch, Washington, D. C. In addition to the elements listed in the table below, Sb, As, Be, Bi, Cs, Cb, Dy, Er, Eu, Gd, Au, Hf, Ho, Li, Lu, Nd, Pt, K, Pr, Rb, Sm, Sc, Ta, Te, Tb, Tl, Th, Tm, Sn, Ti, and W were looked for in all samples but were not detected.

Explanation of symbols

A = more than 10 percent F = 0.001-0.01 percent
 B' = 1-10 percent¹ G = less than 0.001 percent
 D = 0.1-1 percent ND = not detected
 E = 0.01-0.1 percent

Bed no.	Sample no.	Al	Ba	B	Cd	Ca	Cr	Co	Cu	Fe	Ga	La	Pb	Mg	Mn	Mo	Ni	P	Si	Ag	Na	Sr	Sn	Ti	V	Y	Yb	Zn	Zr
Beds P-83 through P-76 not analyzed.																													
P-75	1353-CEW	D	F	ND	E	A	E	ND	F	D	ND	E	ND	E	E	F	E	A	B'	ND	D	E	ND	F	E	E	G	ND	F
P-74	1334-RLP	B'	F	ND	E	A	E	ND	F	B'	F	E	ND	D	E	ND	E	A	B'	G	D	D	ND	E	E	E	G	E	F
P-73	1525-WOM	B'	F	ND	ND	B'	E	ND	F	B'	F	ND	ND	D	F	F	E	B'	A	G	D	E	ND	D	E	ND	ND	F	F
P-72	1224-WOM	B'	G	ND	ND	A	E	ND	F	B'	ND	E	ND	E	F	ND	E	A	B'	G	D	E	ND	E	E	E	G	ND	F
P-71	1332-RLP	B'	F	ND	E	A	D	ND	F	B'	F	E	ND	D	E	ND	E	A	A	G	D	D	ND	E	E	E	G	E	F
P-70	1331-RLP	D	F	ND	E	A	E	ND	F	D	ND	E	ND	E	E	ND	E	A	B'	G	D	D	ND	E	E	E	G	E	F
P-69	1330-RLP	D	F	ND	E	A	D	ND	F	D	ND	E	ND	D	E	ND	E	A	B'	G	D	D	ND	E	E	E	G	E	F
P-68	1523-WOM	B'	G	ND	ND	A	D	ND	F	B'	ND	E	ND	D	F	ND	E	A	B'	G	D	E	ND	E	E	E	G	ND	F
P-67	1522-WOM	B'	F	ND	ND	A	D	ND	F	B'	ND	E	ND	D	F	ND	E	A	B'	G	D	E	ND	E	E	E	G	ND	F
P-66	1379-WOM	A	F	ND	ND	B'	D	ND	F	B'	F	ND	F	D	F	F	E	B'	A	G	D	E	ND	E	E	E	G	ND	F
Beds P-65 through P-24 not analyzed.																													
P-23	1393-WOM	B'	F	ND	E	B'	D	ND	F	B'	F	E	ND	D	E	F	E	B'	A	G	D	E	ND	E	E	E	G	E	F
P-22	1392-WOM	B'	F	ND	E	A	D	ND	F	B'	F	E	ND	D	E	F	E	B'	B'	G	D	D	ND	E	E	E	G	E	F
P-21	1391-WOM	B'	F	ND	E	B'	D	ND	E	B'	F	E	E	D	F	F	E	B'	A	F	D	E	ND	E	E	E	G	E	F
P-20	1390-WOM	B'	F	ND	E	B'	D	ND	E	B'	F	E	E	D	F	F	E	B'	A	F	D	E	ND	E	E	E	G	E	F
--	1389-WOM	B'	F	ND	E	B'	D	ND	E	B'	F	E	E	D	F	F	E	B'	A	F	D	D	ND	E	E	E	G	E	F
P-19	1388-WOM	B'	F	ND	E	A	D	ND	F	B'	ND	E	ND	D	F	F	E	A	B'	F	D	D	ND	E	E	E	G	E	F
P-18	1387-WOM	B'	F	ND	E	B'	E	ND	F	B'	F	E	ND	D	E	F	E	B'	A	G	D	D	ND	E	E	E	G	E	F
P-17	1386-WOM	B'	F	ND	E	A	D	ND	F	B'	ND	E	F	D	F	F	E	A	B'	G	D	D	ND	E	E	E	G	E	F
P-16	1359-CEW	D	E	G	E	A	E	F	E	D	ND	E	F	D	F	G	E	A	B'	G	D	E	F	E	D	E	G	E	F
P-15	1358-CEW	D	E	F	E	A	E	ND	F	D	ND	F	F	D	F	G	E	A	B'	G	D	E	F	E	D	E	G	E	F
P-14	1357-CEW	D	F	ND	E	A	E	E	F	B'	ND	E	E	D	ND	F	E	A	B'	ND	B'	D	ND	E	E	E	G	E	F
P-13	1356-CEW	B'	F	ND	E	B'	E	ND	F	B'	F	ND	E	D	E	F	E	B'	A	G	D	E	ND	D	E	F	G	E	F
P-12	1355-CEW	B'	F	ND	E	A	E	ND	F	B'	ND	E	ND	D	E	F	E	A	B'	G	D	D	ND	E	E	F	G	E	F
P-11	1354-CEW	A	F	ND	E	B'	E	ND	F	B'	F	ND	ND	D	E	F	E	B'	A	G	D	E	ND	D	E	F	G	E	F
P-10	1353-CEW	D	F	ND	E	A	E	ND	F	D	ND	E	ND	D	F	ND	E	A	B'	G	D	D	ND	E	E	F	G	E	F

P- 9	1352-CEW	A	F	ND	E	B'	E	ND	F	B'	F	ND	ND	D	E	F	E	B'	A	G	D	E	ND	E	E	F	G	E	F
P- 8	1351-CEW	B'	F	ND	E	A	E	ND	F	B'	F	E	ND	D	E	F	E	B'	B'	G	D	E	ND	E	E	F	G	E	F
P- 7	1350-CEW	D	F	ND	E	A	E	ND	F	D	ND	ND	F	A	E	F	E	D	B'	G	D	E	ND	F	E	F	G	E	F
P- 6	1000-RAH	B'	E	F	E	A	E	ND	E	D	ND	E	F	D	F	F	E	A	B'	G	D	E	ND	E	D	E	G	E	F
P- 5	1319-RAH	B'	F	ND	E	A	E	ND	F	B'	ND	E	ND	B'	E	F	E	B'	B'	G	D	E	ND	E	E	F	G	E	F
P- 4	1419-WOM	D	G	ND	E	A	E	ND	F	D	ND	E	ND	D	F	ND	E	A	D	G	D	E	ND	F	E	E	G	E	F
P- 3	1233-WOM	D	F	ND	E	A	D	ND	F	B'	ND	E	E	D	F	F	E	A	B'	G	B'	E	ND	E	E	E	G	E	F
P- 2	1317-RAH	B'	F	ND	E	B'	E	ND	F	B'	F	ND	ND	B'	E	F	D	D	A	ND	D	E	ND	E	E	F	G	E	F
P- 1	1316-RAH	B'	F	ND	E	A	E	ND	F	B'	ND	E	ND	D	E	ND	E	A	B'	G	D	E	ND	E	E	F	G	E	F

¹ B' is equivalent to B and C of the Bureau of Mines analyses as recorded in other reports.

SOUTH RASMUSSEN VALLEY, IDAHO. LOT NO. 1232.

Phosphatic shale member of Phosphoria formation sampled in bulldozer trench on northeast slope of Rasmussen Valley, sec. 9, T. 7 S., R. 44 E., Caribou County, Idaho, on southwest limb of Snowdrift anticline. Beds strike N. 45° W. and dip about 60° SW. Many beds within the phosphatic shale member are locally tightly folded, faulted, and overturned. Section measured by F. W. O' Malley and D. F. Davidson and sampled by R. A. Smart and R. G. Waring in July 1948. Samples analyzed by U. S. Bureau of Mines Laboratory, Albany, Oregon.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)					Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)
				P ₂ O ₅	Al ₂ O ₃	Fe ₂ O ₃	Loss on ignition	Acid insoluble		
Rex member of Phosphoria formation—basal beds only										
R- 6	Chert	1492- DFD	0.8	0.6	--	--	--	94.4	0.8	0.48
R- 5	Chert	1491- DFD	1.8	0.6	--	--	--	94.4	2.6	1.56
R- 4	Chert	1490- DFD	1.2	0.5	--	--	--	94.5	3.8	2.16
R- 3	Chert	1474- DFD	1.4	0.4	--	--	--	92.9	5.2	2.72
R- 2	Chert	1473- DFD	2.3	0.1	--	--	--	92.7	7.5	2.95
R- 1	Chert	1472- DFD	1.5	4.4	--	--	--	74.6	9.0	9.55
Phosphatic shale member of Phosphoria formation										
P-72	Mudstone, cherty	3190-WOM	0.9	2.7	--	--	--	83.2	0.9	2.43
P-71	Mudstone	3189-WOM	0.7	4.5	--	--	--	72.2	1.6	5.58
P-70	Mudstone	3188-WOM	1.2	3.7	--	--	--	73.6	2.8	10.02
P-69	Phosphate rock, argillaceous	3187-WOM	0.8	25.9	--	--	--	28.5	3.6	30.74
P-68	Mudstone	3186-WOM	1.7	1.5	--	--	--	79.2	5.3	33.29
P-67	Mudstone	3185-WOM	1.7	0.6	--	--	--	83.8	7.0	34.31
P-66	Phosphate rock, argillaceous	3184-WOM	0.3	21.7	--	--	--	34.8	7.3	40.82
P-65	Mudstone	3183-WOM	0.9	1.3	--	--	--	80.9	8.2	41.99
P-64	Mudstone	1459- DFD	0.7	6.9	--	--	--	67.9	8.9	46.82
P-63	Mudstone, calcareous, phosphatic	1458- DFD	1.1	26.6	3.3	1.01	5.74	20.8	10.0	78.06
P-62	Phosphate rock	1457- DFD	1.1	36.0	1.4	0.53	3.24	3.6	11.1	115.68
P-61	Phosphate rock	1456- DFD	1.0	30.1	2.6	0.80	9.28	12.0	12.1	145.78
P-60	Phosphate rock	1455- DFD	1.4	29.8	3.2	0.80	37.00	12.0	13.5	187.50
P-59	Phosphate rock, argillaceous	1454- DFD	1.0	25.8	3.8	1.24	9.88	21.1	14.5	213.30
P-58	Phosphate rock, argillaceous	1453- DFD	2.6	27.1	3.4	1.15	8.84	20.1	17.1	283.76
P-57	Phosphate rock, argillaceous	1452- DFD	0.5	27.2	3.1	0.85	8.38	20.5	17.6	297.36
P-56	Phosphate rock, argillaceous	1451- DFD	0.6	20.0	5.7	1.31	9.72	36.0	18.2	309.36
P-55	Phosphate rock, argillaceous	1450- DFD	0.6	17.8	6.7	1.22	9.86	40.4	18.8	320.04
P-54	Mudstone, phosphatic	1439- DFD	1.3	14.6	8.3	1.95	9.74	45.3	20.1	339.02
P-53	Mudstone, calcareous	1438- DFD	0.6	8.4	--	--	--	62.5	20.7	344.06
P-52	Mudstone	1437- DFD	1.3	5.4	--	--	--	66.7	22.0	351.08
P-51	Mudstone, phosphatic	1479- DFD	1.1	13.2	--	--	--	44.8	23.1	365.60
P-50	Mudstone, phosphatic	1478- DFD	0.7	8.7	--	--	--	58.7	23.8	371.69
P-49	Mudstone, phosphatic	1477- DFD	1.2	15.8	--	--	--	43.2	25.0	390.65

P-48	Mudstone, phosphatic	1476- DFD	0.9	12.3	--	--	--	55.9	25.9	401.72
P-47	Mudstone, phosphatic	1475- DFD	4.6	12.8	--	--	--	49.3	30.5	460.60
P-46	Mudstone, phosphatic	1436- DFD	4.0	10.2	--	--	--	59.0	34.5	501.40
P-45	Mudstone, calcareous and phosphate rock	1435- DFD	3.2	15.2	--	--	--	47.2	37.7	550.04
P-44	Phosphate rock, argillaceous	1434- DFD	0.8	20.6	--	--	--	39.8	38.5	566.52
P-43	Mudstone	1433- DFD	0.9	7.6	--	--	--	69.1	39.4	573.36
P-42	Mudstone, phosphatic; fos. col. no. 48-JES-128 ¹	1432- DFD	1.8	10.6	--	--	--	64.6	41.2	592.44
P-41	Mudstone, phosphatic	1431- DFD	2.5	10.5	--	--	--	64.6	43.7	618.69
P-40	Mudstone	1430- DFD	1.5	7.6	--	--	--	70.9	45.2	630.09
P-39	Mudstone and argillaceous phosphate rock	1445-WOM	2.2	7.8	--	--	--	65.6	47.4	647.25
P-38	Mudstone	1444-WOM	2.9	7.4	--	--	--	67.6	50.3	668.71
P-37	Mudstone	1443-WOM	1.2	3.7	--	--	--	61.5	51.5	673.15
P-36	Phosphate rock, argillaceous	1442-WOM	2.0	21.1	--	--	--	36.5	53.5	715.35
P-35	Mudstone, phosphatic	1441-WOM	2.4	17.1	--	--	--	44.6	55.9	756.39
P-34	Mudstone and calcareous argillaceous phosphate rock	1440-WOM	1.0	10.3	--	--	--	46.0	56.9	766.69
P-33	Mudstone	1429-WOM	1.1	4.2	--	--	--	73.8	58.0	771.31
P-32	Mudstone, phosphatic	1428-WOM	0.5	15.1	--	--	--	48.1	58.5	778.86
P-31	Mudstone, phosphatic and argillaceous phosphate rock	1427-WOM	2.1	14.0	--	--	--	48.0	60.6	808.26
P-30	Mudstone, phosphatic, calcareous	1426-WOM	1.3	13.9	--	--	--	39.6	61.9	826.33
P-29	Mudstone	1425-WOM	1.6	3.7	--	--	--	59.3	63.5	832.25
P-28	Mudstone	1424-WOM	0.9	2.1	--	--	--	82.0	64.4	834.14
P-27	Mudstone, phosphatic	1423-WOM	2.3	12.2	--	--	--	53.4	66.7	862.20
P-26	Mudstone, phosphatic	1422-WOM	0.6	10.0	--	--	--	61.0	67.3	868.20
P-25	Mudstone, phosphatic	1421-WOM	2.8	15.4	--	--	--	42.9	70.1	911.32
P-24	Mudstone, phosphatic	1420-WOM	0.5	12.6	8.8	2.15	9.08	52.8	70.6	917.62
P-23	Mudstone, phosphatic	1488-WOM	0.5	13.8	9.8	0.76	12.14	46.1	71.1	924.52
P-22	Mudstone, phosphatic	1487-WOM	1.5	14.8	9.6	0.58	9.10	47.0	72.6	946.72
P-21	Phosphate rock, argillaceous, calcareous	1486-WOM	1.3	18.4	8.2	2.03	9.52	38.2	73.9	970.64
P-20	Phosphate rock; fos. col. no. 48-JES-126	1485-WOM	3.2	28.5	3.6	1.94	8.10	15.4	77.1	1,061.84

The thicknesses of beds P-20 through P-1 are approximation due to complications by folding and are possibly accurate to within only ten percent.

P-19	Mudstone, phosphatic, and argillaceous phosphate rock	1484-WOM	2.5?	16.6	5.0	1.30	11.10	41.3	79.6	1,103.34
P-18	Phosphate rock, argillaceous	1483-WOM	0.3	18.6	4.8	5.08	6.80	38.1	79.9	1,108.92
P-17	Mudstone, phosphatic	1482-WOM	1.7?	12.3	8.5	4.12	8.20	50.2	81.6	1,129.83
P-16	Mudstone, phosphatic	1481-WOM	0.6	16.7	7.7	1.80	4.96	47.7	82.2	1,139.85
P-15	Phosphate rock, argillaceous	1480-WOM	0.5	23.7	4.6	0.86	3.94	32.8	82.7	1,151.70

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

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)					Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)
				P ₂ O ₅	Al ₂ O ₃	Fe ₂ O ₃	Loss on ignition	Acid insoluble		
P-14	Phosphate rock	1469-WOM	4.0?	32.2	2.2	0.63	10.02	13.0	86.7	1,280.50
P-13	Mudstone, phosphatic	1468-WOM	0.5	13.7	7.9	1.00	6.04	45.8	87.2	1,287.35
P-12	Phosphate rock	1489-WOM	4.7	36.3	1.1	0.38	3.34	5.1	91.9	1,457.96
P-11	Phosphate rock	1467-WOM	2.3	32.0	1.9	0.48	5.24	24.6	94.2	1,531.56
P-10	Limestone, argillaceous, phosphatic	1466-WOM	0.3	12.4	8.2	0.68	6.00	32.0	94.5	1,535.28
P- 9	Phosphate rock, argillaceous, calcareous, and phosphatic mudstone	1465-WOM	1.6?	28.2	2.9	0.58	4.96	19.7	96.1	1,580.40
P- 8	Mudstone, calcareous, phosphatic	1464-WOM	0.7	12.1	12.0	4.29	9.92	37.5	96.8	1,588.87
P- 7	Phosphate rock	1463-WOM	4.5	28.0	2.4	0.70	6.38	14.0	101.3	1,714.87
P- 6	Phosphate rock, argillaceous	1462-WOM	0.4	24.3	4.3	0.72	6.20	37.1	101.7	1,724.59
P- 5	Phosphate rock; fos. col. no. 48-JES-127	1461-WOM	1.8?	32.1	1.3	0.46	5.04	6.7	103.5	1,782.37
P- 4	Phosphate rock, calcareous	1460-WOM	0.4?	29.9	1.6	0.57	7.26	8.7	103.9	1,794.33
P- 3	Phosphate rock	1449-WOM	1.1	32.2	2.6	0.48	5.74	14.7	105.0	1,829.75
P- 2	Mudstone, calcareous	1448-WOM	4.0?	1.7	9.2	2.78	8.60	71.8	109.0	1,836.55
P- 1	Phosphate rock, calcareous	1447-WOM	0.5	1.7	1.2	7.54	5.20	54.9	109.5	1,837.40

Wells formation

Cw-1	Mudstone, calcareous	1446-WOM	3.5	1.3	--	--	--	67.0	3.5	4.55
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SPECTROGRAPHIC ANALYSES—SOUTH RASMUSSEN VALLEY, IDAHO. LOT NO. 1232.

Semi-quantitative analyses of selected samples of phosphatic shale member of Phosphoria formation, South Rasmussen Valley, Idaho (see immediately preceding pages for location of section, thickness and description of strata, and chemical analyses of samples), made by U. S. Geological Survey Laboratory, Geochemistry and Petrology Branch, Washington, D. C. In addition to the elements listed in the table below, Sb, As, Be, Bi, Ce, Cs, Co, Ch, Dy, Er, Eu, Gd, Ge, Au, Ho, Li, Lu, Nd, Pt, Pr, Rb, Sm, Sc, Ta, Te, Tb, Tl, Tm, and W were looked for in all samples but were not detected.

Explanation of symbols

A = more than 10 percent F = 0.001-0.01 percent
 B¹ = 1-10 percent¹ G = less than 0.001 percent
 D = 0.1-1 percent ND = not detected
 E = 0.01-0.1 percent

Bed no.	Sample no.	Al	Ba	B	Cd	Ca	Cr	Cu	Fe	Ga	La	Pb	Mg	Mn	Mo	Ni	P	Si	Ag	Na	Sr	Sn	Ti	V	Y	Yb	Zn	Zr
Beds P-72 through P-64 not analyzed.																												
P-63	1458- DFD	B ¹	E	G	E	A	E	E	D	F	E	E	D	F	ND	F	A	B ¹	G	D	E	F	E	D	E	G	E	F
P-62	1457- DFD	D	E	F	E	A	E	E	D	ND	E	ND	D	F	ND	F	A	B ¹	G	D	E	F	E	D	E	G	E	F
P-61	1456- DFD	B ¹	E	G	E	A	E	E	D	F	E	F	D	F	ND	E	A	B ¹	G	D	E	ND	E	D	E	G	E	F
P-60	1455- DFD	B ¹	E	G	E	A	E	E	D	F	F	F	D	F	ND	E	A	B ¹	G	D	E	ND	E	D	E	G	E	F
P-59	1454- DFD	B ¹	E	G	E	A	E	E	D	F	E	F	D	F	ND	E	A	B ¹	G	D	E	ND	E	D	E	G	E	F
P-58	1453- DFD	B ¹	E	G	E	A	E	E	D	F	E	F	D	F	ND	E	A	B ¹	G	D	E	F	E	D	E	G	E	F
P-57	1452- DFD	B ¹	E	G	E	A	E	E	D	F	E	F	D	F	ND	E	A	B ¹	G	D	E	F	E	D	E	G	E	F
P-56	1451- DFD	B ¹	E	F	E	A	E	E	D	F	E	F	D	F	ND	E	B ¹	A	G	D	E	ND	E	D	E	G	E	E
P-55	1450- DFD	B ¹	E	F	E	A	E	E	D	F	F	F	D	F	ND	E	B ¹	A	G	D	E	F	E	D	E	G	E	E
P-54	1439- DFD	B ¹	E	F	E	A	E	E	D	F	F	F	D	F	ND	E	B ¹	A	G	D	E	ND	E	D	E	G	E	E
Beds P-53 through P-25 not analyzed.																												
P-24	1420-WOM	A	E	F	ND	B ¹	E	E	D	F	F	F	D	F	ND	E	B ¹	A	G	D	E	ND	D	D	E	G	E	E
P-23	1488-WOM	A	E	F	ND	B ¹	D	E	D	F	F	ND	D	F	ND	E	B ¹	A	G	D	E	ND	D	D	E	G	E	E
P-22	1487-WOM	A	E	F	ND	B ¹	D	E	D	F	F	F	D	F	ND	E	B ¹	A	G	D	E	ND	E	E	E	G	E	E
P-21	1486-WOM	A	E	F	ND	B ¹	E	E	B ¹	F	E	F	D	F	ND	E	B ¹	A	G	D	E	ND	E	D	E	G	E	E
P-20	1485-WOM	B ¹	E	G	F	A	E	E	D	F	E	F	D	E	ND	E	A	B ¹	G	D	E	ND	E	D	E	G	E	E
P-19	1484-WOM	B ¹	E	F	E	B ¹	D	E	D	F	E	F	D	F	ND	E	B ¹	A	F	D	E	ND	D	D	D	G	E	E
P-18	1483-WOM	B ¹	E	F	F	B ¹	E	E	B ¹	F	F	F	D	F	G	E	B ¹	A	F	D	E	ND	E	D	E	G	E	E
P-17	1482-WOM	A	E	F	F	B ¹	E	E	B ¹	F	F	ND	D	F	G	E	B ¹	A	G	D	E	ND	E	D	E	G	E	E
P-16	1481-WOM	B ¹	E	F	F	B ¹	E	E	D	F	E	F	D	F	ND	E	B ¹	A	F	D	E	ND	E	D	E	G	E	E
P-15	1480-WOM	B ¹	E	G	F	B ¹	E	E	D	F	E	ND	D	F	ND	E	B ¹	A	G	D	E	ND	E	E	E	G	E	E
P-14	1469-WOM	D	E	G	E	A	E	E	E	F	E	F	D	F	ND	E	A	B ¹	G	D	E	F	E	D	E	G	E	E
P-13	1468-WOM	A	E	G	F	B ¹	E	E	D	F	F	F	D	F	ND	E	B ¹	A	G	D	E	ND	D	D	F	G	E	E
P-12	1489-WOM	D	E	ND	E	A	E	E	E	ND	F	F	D	F	ND	E	A	B ¹	G	D	E	F	E	D	E	G	E	E

¹ B¹ is equivalent to B and C of Bureau of Mines analyses as recorded in other reports.

Bed no.	Sample no.	Al	Ba	B	Cd	Ca	Cr	Cu	Fe	Ga	La	Pb	Mg	Mn	Mo	Ni	P	Si	Ag	Na	Sr	Sn	Ti	V	Y	Yb	Zn	Zr
P-11	1467-WOM	D	E	G	E	A	E	E	E	ND	F	F	D	F	ND	E	A	B'	G	D	E	F	E	D	E	G	E	E
P-10	1466-WOM	A	E	G	F	B'	E	E	D	F	F	F	D	F	ND	E	B'	A	G	D	E	ND	D	D	F	G	E	E
P- 9	1464-WOM	B'	E	G	E	A	E	E	D	F	F	F	D	F	ND	E	A	B'	G	D	E	F	E	D	E	G	E	E
P- 8	1464-WOM	A	E	F	F	B'	E	E	B'	F	F	F	B'	F	F	D	B'	A	G	D	E	ND	E	D	E	G	E	E
P- 7	1463-WOM	B'	E	G	E	A	E	E	D	F	E	F	D	F	ND	E	A	B'	G	B'	E	F	E	D	E	G	E	E
P- 6	1462-WOM	B'	E	G	E	A	E	E	D	F	E	ND	D	E	ND	E	A	B'	G	B'	E	F	E	D	E	G	E	E
P- 5	1461-WOM	B'	E	ND	E	A	E	E	E	ND	E	F	D	F	ND	E	A	B'	G	B'	E	F	E	D	E	G	E	F
P- 4	1460-WOM	D	E	G	E	A	E	E	E	F	E	F	D	F	ND	E	A	B'	G	B'	E	F	E	D	E	G	E	F
P- 3	1449-WOM	D	E	ND	E	A	E	E	E	F	F	F	D	F	ND	E	A	B'	G	B'	E	F	E	D	E	G	E	F
P- 2	1448-WOM	A	E	F	F	B'	E	E	B'	F	ND	F	B'	D	ND	D	D	A	G	D	E	ND	D	D	F	G	D	E
P- 1	1447-WOM	D	E	G	E	A	F	F	B'	ND	E	ND	D	D	ND	D	ND	B'	G	B'	E	ND	E	D	E	G	E	F

TRAIL CANYON, IDAHO. LOT NO. 1206.

Phosphatic shale member and part of Rex chert member of Phosphoria formation sampled in bulldozer trenches and from natural outcrop on north side of Trail Canyon, SW corner of NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 30, T. 8 S., R. 43 E., Caribou County, Idaho, on west limb of Trail Creek syncline. Beds strike N. 12° W. and dip 55° E. Section measured by R. A. Gulbrandsen, R. A. Hoppin, V. E. McKelvey, and L. E. Smith and sampled by R. S. Sears, R. P. Sheldon, O. A. Payne, and Gulbrandsen in August 1947. Samples analyzed by U. S. Bureau of Mines Laboratory, Albany, Oregon.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)						Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)
				P ₂ O ₅	Al ₂ O ₃	Fe ₂ O ₃	F	Loss on ignition	Acid insoluble		
Rex member of Phosphoria formation											
R- 39	Chert	RAH-241-47	8.4	0.4	--	--	--	--	88.4	8.4	4.20
R- 38	Chert	RAH-240-47	10.8	0.6	--	--	--	--	87.5	19.2	10.68
R- 37	Chert, silty	RAH-239-47	8.9	0.5	--	--	--	--	88.4	28.1	15.13
R- 36	Chert	RAH-238-47	9.7	0.6	--	--	--	--	87.9	37.8	20.95
R- 35	Chert, silty	RAH-237-47	7.9	0.6	--	--	--	--	88.8	45.7	25.69
R- 34	Mudstone	RAH-236-47	6.8	0.4	--	--	--	--	88.2	52.5	28.41
R- 33	Mudstone	RAH-235-47	8.2	0.5	--	--	--	--	87.0	60.7	32.51
R- 32	Mudstone	RAH-234-47	10.0	0.5	--	--	--	--	87.8	70.7	37.51
R- 31	Mudstone	RAH-233-47	6.7	0.5	--	--	--	--	85.5	77.4	40.86
R- 30	Chert	RAH-232-47	2.9	1.2	--	--	--	--	86.4	80.3	44.34
R- 29	Chert	RAH-231-47	3.1	1.1	--	--	--	--	86.1	83.4	47.75
R- 28	Chert	RAH-230-47	7.4	0.1	--	--	--	--	90.8	90.8	48.49
R- 27	Chert	RAH-229-47	7.3	0.4	--	--	--	--	94.4	98.1	51.41
R- 26	Chert	RAH-228-47	12.4	0.7	--	--	--	--	94.5	110.5	60.09
R- 25	Chert	RAH-227-47	6.0	0.5	--	--	--	--	94.9	116.5	63.09
R- 24	Chert	RAH-226-47	5.6	0.2	--	--	--	--	94.1	122.1	64.21
R- 23	Chert	RAH-225-47	4.7	0.3	--	--	--	--	93.7	126.8	65.62
R- 22	Chert	RAH-224-47	6.7	0.4	--	--	--	--	94.8	133.5	68.30
R- 21	Chert	RAH-223-47	1.6	0.7	--	--	--	--	94.7	135.1	69.42
R- 20	Chert	RAH-222-47	10.5	0.6	--	--	--	--	92.9	145.6	75.72
R- 19	Chert	RAH-221-47	8.3	0.2	--	--	--	--	86.6	153.9	77.38
R- 18	Chert	RAH-220-47	10.2	0.2	--	--	--	--	89.4	164.1	79.42
R- 17	Chert and limestone	RAH-219-47	3.6	0.3	--	--	--	--	82.6	167.7	80.50
R- 16	Chert and limestone	RAH-218-47	8.7	0.6	--	--	--	--	81.5	176.4	85.72
R- 15	Chert and limestone; fos. col. no. 47-HW-152 ¹	RAH-218-47	3.8	0.6	--	--	--	--	82.6	180.2	88.00

Preceding section measured along road (beds R-26 to R-39) and in cut 50 feet above road (beds R-15 to R-25); following section (beds R-1 to R-14) measured in trench 200 feet above road. Contact between beds R-25 and R-26 (black chert and pinkish white chert) is exposed at road and lower cut; beds below R-15 are concealed along road and beds R-15 to R-25 are largely concealed at upper trench level.

Thickness of beds R-15 to R-25 is 69.7 feet, but computed thickness of same sequence at upper trench is 59 feet. The larger (measured) figure is used in computing total thickness of Rex member.

¹ Fossil collection made by H. Wedow, Paleontology and Stratigraphy Branch, U. S. Geological Survey.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)						Cumulative thickness (feet)	Thickness x percent P_2O_5 (cumulative)
				P_2O_5	Al_2O_3	Fe_2O_3	F	Loss on ignition	Acid insoluble		
R- 14	Limestone, cherty	RAH-213-47	0.9	0.4	--	--	--	--	42.9	181.1	88.36
R- 13	Chert	RAH-212-47	3.1	0.7	--	--	--	--	81.9	184.2	90.53
R- 12	Limestone, locally cherty	RAH-211-47	0.7	0.3	--	--	--	--	28.5	184.9	90.74
R- 11	Chert, contains scattered limestone concretions	RAH-210-47	8.1	0.6	--	--	--	--	73.3	193.0	95.60
R- 10	Chert, contains limestone concretions and lenses	RAH-209-47	6.4	0.6	--	--	--	--	86.2	199.4	99.44
R- 9	Limestone, locally cherty	RAH-208-47	0.8	0.2	--	--	--	--	31.0	200.2	99.60
R- 8	Chert, contains thin limestone lenses	RAH-207-47	5.7	0.4	--	--	--	--	77.7	205.9	101.88
R- 7	Limestone, argillaceous	RAH-206-47	1.3	0.6	--	--	--	--	30.5	207.2	102.66
R- 6	Chert, contains thin limestone lenses	RAH-205-47	3.3	0.7	--	--	--	--	88.7	210.5	104.97
R- 5	Limestone, contains cherty limestone beds	RAH-204-47	2.0	0.7	--	--	--	--	45.5	212.5	106.37
R- 4	Chert	RAH-203-47	5.6	0.8	--	--	--	--	85.8	218.1	110.85
R- 3	Limestone, argillaceous	RAH-202-47	3.3	0.6	--	--	--	--	32.9	221.4	112.83
R- 2	Chert	RAH-201-47	4.0	0.8	--	--	--	--	90.5	225.4	116.03
R- 1	Chert, contains mudstone layers	RAH-200-47	2.7	0.7	--	--	--	--	87.8	228.1	117.92

Phosphatic shale member of Phosphoria formation

P-210	Mudstone, phosphatic; fos. col. no. 47-HW-122	VEM-274-47	0.3	8.0	--	--	--	--	68.1	0.3	2.40
P-209	Phosphate rock, argillaceous; fos. col. no. 47-HW-172	VEM-273-47	0.4	26.6	--	--	--	--	21.5	0.7	13.04
P-208	Mudstone	VEM-272-47	0.9	1.4	--	--	--	--	77.5	1.6	14.30
P-207	Mudstone, phosphatic	VEM-271-47	0.7	8.8	--	--	--	--	57.9	2.3	20.46
P-206	Mudstone	VEM-270-47	0.9	1.8	--	--	--	--	75.1	3.2	22.08
P-205	Mudstone; fos. col. no. 47-HW-123	VEM-269-47	0.7	2.2	--	--	--	--	70.6	3.9	23.62
P-204	Mudstone, argillaceous; fos. col. no. 47-HW-124	VEM-268-47	2.9	0.2	--	--	--	--	53.9	6.8	24.20
P-203	Mudstone, calcareous, possibly concretionary	VEM-267-47	0.7	1.1	--	--	--	--	67.0	7.5	24.97
P-202	Mudstone, possibly concretionary; fos. col. no. 47-HW-153	VEM-266-47	1.4	1.3	--	--	--	--	78.4	8.9	26.79
P-201	Limestone, argillaceous; fos. col. no. 47-HW-154	RAG- 6-47	1.24	2.4	--	--	--	--	39.8	10.14	29.67
P-200	Mudstone; fos. col. no. 47-HW-154	RAG- 5-47	1.65	3.2	--	--	--	--	72.6	11.79	35.11
P-199	Phosphate rock, argillaceous; fos. col. no. 47-HW-173	RAG- 4-47	0.73	23.1	--	--	2.14	--	25.5	12.52	51.28
P-198	Mudstone	RAG- 3-47	0.71	6.9	--	--	1.09	--	56.7	13.23	56.19
P-197	Phosphate rock	RAG- 2-47	1.15	28.6	1.6	0.80	2.75	9.64	9.4	14.38	89.08
P-196	Phosphate rock	RAG- 1-47	0.68	28.0	2.3	0.98	2.90	8.86	12.9	15.06	108.13

P-195	Phosphate rock	VEM-265-47	0.6	36.7	0.7	0.58	3.65	4.18	3.2	15.66	130.15
P-194	Phosphate rock	VEM-264-47	0.8	31.6	1.9	1.3	3.04	5.22	11.7	16.46	155.43
P-193	Phosphate rock, contains phosphatic limestone concretion 0.2 foot thick	VEM-263-47	0.6	33.9	1.1	0.80	3.23	5.22	6.7	17.06	175.86
P-192	Mudstone	VEM-262-47	0.3	2.7	9.8	3.7	0.31	10.14	70.2	17.36	176.67
P-191	Phosphate rock	VEM-259-47	1.0	30.6	1.5	0.97	2.97	5.02	14.6	18.36	207.27
P-190	Limestone	VEM-258-47	1.0	2.7	1.4	0.80	--	35.88	12.0	19.36	209.97
P-189	Mudstone	VEM-257-47	0.4	0.3	1.4	0.68	--	9.58	83.0	19.76	210.09
P-188	Phosphate rock	VEM-256-47	0.6	34.0	0.8	0.61	3.27	6.18	5.7	20.36	230.49
--	Phosphate rock, calcareous, concretion in bed P-188	VEM-255-47	(0.0-0.4)	23.5	0.8	0.45	2.26	16.14	7.3	--	--
P-187	Phosphate rock and phosphatic mudstone; fos. col. no. 47-HW-155	VEM-254-47	0.3	16.4	6.0	2.0	1.61	10.12	36.3	20.66	235.41
P-186	Phosphate rock, calcareous, contains phosphatic mudstone concretions; fos. col. no. 47-HW-156	VEM-253-47	0.6	20.9	1.8	0.66	2.06	19.68	9.3	21.26	247.95
P-185	Phosphate rock, argillaceous	VEM-252-47	0.4	20.0	3.8	1.3	2.06	12.16	25.5	21.66	255.95
P-184	Phosphate rock, calcareous	VEM-251-47	0.8	23.5	0.8	0.91	2.22	15.96	7.3	22.46	274.75
--	Limestone concretion; fos. col. no. 47-HW-157	VEM-250-47	(0.0-0.7)	1.6	--	--	--	--	11.4	--	--
P-183	Mudstone, calcareous, phosphatic; fos. col. no. 47-HW-158	VEM-249-47	1.2	9.1	--	--	--	--	42.8	23.66	285.67
P-182	Mudstone; fos. col. no. 47-HW-159	VEM-248-47	0.5	3.1	--	--	--	--	50.9	24.16	287.22
P-181	Mudstone; fos. col. no. 47-HW-160	VEM-247-47	0.8	3.9	--	--	--	--	61.4	24.96	290.34
P-180	Mudstone; fos. col. no. 47-HW-161	VEM-246-47	1.1	3.3	--	--	--	--	63.1	26.06	293.97
P-179	Mudstone; fos. col. no. 47-HW-162	VEM-245-47	1.0	3.5	--	--	--	--	65.3	27.06	297.47
P-178	Phosphate rock, argillaceous	VEM-244-47	0.6	16.2	--	--	--	--	31.6	27.66	307.19
P-177	Mudstone, phosphatic	VEM-243-47	1.0	15.7	--	--	--	--	41.8	28.66	322.89
P-176	Phosphate rock	VEM-242-47	0.5	33.6	--	--	--	--	3.8	29.16	339.69
P-175	Phosphate rock, argillaceous, and calcareous mudstone	VEM-241-47	0.8	25.5	--	--	--	--	14.8	29.96	360.09
P-174	Phosphate rock, calcareous, argillaceous; fos. col. nos. 47-HW-163 and 47-HW-164	VEM-240-47	0.8	18.7	--	--	--	--	23.1	30.76	375.05
P-173	Phosphate rock, calcareous; fos. col. no. 47-HW-165	VEM-239-47	0.7	17.2	--	--	--	--	14.2	31.46	387.09
P-172	Limestone, phosphatic, argillaceous; fos. col. no. 47-HW-166	VEM-238-47	0.4	12.7	--	--	--	--	23.4	31.86	392.17
P-171	Phosphate rock, calcareous, argillaceous; fos. col. no. 47-HW-167	VEM-261-47	0.6	16.6	--	--	--	--	20.1	32.46	402.13
P-170	Phosphate rock, calcareous, argillaceous; fos. col. no. 47-HW-168	LES-356-47	0.4	16.3	--	--	--	--	21.4	32.86	408.65

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)						Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)
				P ₂ O ₅	Al ₂ O ₃	Fe ₂ O ₃	F	Loss on ignition	Acid insoluble		
--	Limestone	VEM-260-47	(0.0-0.3)	6.0	--	--	--	--	7.6	--	--
VEM-260 represents two concretions of 0.0-0.3 and 0.0-0.2 foot thickness in beds P-171 and P-170 respectively.											
P-169	Phosphate rock, calcareous, argillaceous, contains calcareous concretions; fos. col. no. 47-HW-169	LES- 355-47	0.75	21.0	--	--	--	--	21.0	33.61	425.45
P-168	Phosphate rock, calcareous; fos. col. no. 47-HW-170	LES- 349-47	0.6	16.6	--	--	--	--	19.5	34.21	435.41
--	Limestone, concretion in bed P-168	LES- 350-47	(0.45)	1.3	--	--	--	--	1.9	--	--
P-167	Limestone, phosphatic, argillaceous; fos. col. no. 47-HW-171	LES- 348-47	0.4	10.8	--	--	--	--	26.0	34.61	439.73
P-166	Limestone, argillaceous, phosphatic	LES- 347-47	0.55	8.9	--	--	--	--	29.1	35.16	444.63
P-165	Limestone, phosphatic, argillaceous; fos. col. no. 47-HW-88	LES- 346-47	0.75	15.2	--	--	--	--	19.9	35.91	456.03
P-164	Phosphate rock, calcareous	LES- 345-47	0.55	18.2	--	--	--	--	13.2	36.46	466.03
P-163	Phosphate rock, calcareous	LES- 344-47	0.6	18.0	--	--	--	--	19.1	37.06	476.83
P-162	Phosphate rock, calcareous, argillaceous	LES- 343-47	0.6	15.5	--	--	--	--	29.8	37.66	486.13
P-161	Phosphate rock, calcareous, argillaceous	LES- 342-47	0.65	15.3	--	--	--	--	22.6	38.31	496.08
P-160	Phosphate rock, calcareous, argillaceous	LES- 341-47	0.7	17.8	--	--	--	--	20.3	39.01	508.54
P-159	Phosphate rock, calcareous, argillaceous	LES- 340-47	0.6	18.7	--	--	--	--	22.7	39.61	519.76
P-158	Phosphate rock, calcareous, argillaceous	LES- 339-47	0.5	18.8	--	--	--	--	25.9	40.11	529.16
P-157	Phosphate rock, calcareous, argillaceous, contains limestone concretions	LES- 338-47	0.55	14.8	--	--	--	--	21.5	40.66	537.30
P-156	Phosphate rock, calcareous, argillaceous	LES- 337-47	0.6	16.9	--	--	--	--	27.9	41.26	547.44
P-155	Phosphate rock, argillaceous	LES- 336-47	0.55	16.4	--	--	--	--	31.0	41.81	556.46
P-154	Mudstone, phosphatic	LES- 335-47	0.6	14.7	--	--	--	--	39.6	42.41	565.28
P-153	Mudstone, phosphatic	LES- 334-47	0.6	15.4	--	--	--	--	40.1	43.01	574.52
P-152	Mudstone, phosphatic	LES- 333-47	0.5	12.8	--	--	--	--	44.1	43.51	580.92
P-151	Mudstone, phosphatic	LES- 332-47	0.6	11.1	--	--	--	--	48.4	44.11	587.58
P-150	Limestone, argillaceous	LES- 331-47	0.65	4.9	--	--	--	--	39.2	44.76	590.77
P-149	Limestone; fos. col. no. 47-HW-87	LES- 330-47	1.3	0.9	--	--	--	--	29.6	46.06	591.94

P-148	Mudstone, calcareous	VEM-237-47	0.4	3.9	--	--	--	--	49.6	46.46	593.90
P-147	Mudstone, phosphatic	VEM-236-47	1.3	12.9	--	--	--	--	45.0	47.76	610.27
P-146	Mudstone, phosphatic	VEM-235-47	1.4	12.4	--	--	--	--	47.0	49.16	627.63
P-145	Phosphate rock, argillaceous	VEM-234-47	0.4	16.9	--	--	--	--	41.3	49.56	634.39
P-144	Mudstone	VEM-233-47	1.1	7.7	--	--	--	--	61.9	50.66	642.86
P-143	Mudstone	VEM-232-47	1.6	6.5	--	--	--	--	65.2	52.26	653.26
P-142	Mudstone; fos. col. no. 47-HW-86	VEM-231-47	1.6	3.9	--	--	--	--	74.1	53.86	659.50
P-141	Mudstone	VEM-230-47	1.6	4.6	--	--	--	--	72.1	55.46	666.86
P-140	Mudstone	VEM-229-47	1.0	6.2	--	--	--	--	73.2	56.46	673.06
P-139	Mudstone, phosphatic	VEM-228-47	0.3	13.4	--	--	--	--	54.8	57.76	677.08
P-138	Mudstone	VEM-227-47	1.8	2.8	--	--	--	--	85.7	58.56	682.12
P-137	Phosphate rock, argillaceous	VEM-226-47	0.6	19.9	--	--	--	--	39.7	59.16	694.06
P-136	Mudstone	VEM-225-47	1.6	2.8	--	--	--	--	82.2	60.76	698.54
P-135	Mudstone	VEM-224-47	1.4	3.5	--	--	--	--	79.6	62.16	703.44
P-134	Mudstone, phosphatic	VEM-223-47	0.8	14.0	--	--	--	--	51.0	62.96	714.64
P-133	Mudstone, phosphatic	VEM-222-47	0.5	12.1	--	--	--	--	54.6	63.46	720.69
P-132	Mudstone	VEM-221-47	1.5	6.8	--	--	--	--	69.8	64.96	730.89
P-131	Mudstone; fos. col. no. 47-HW-85	VEM-220-47	1.7	4.4	--	--	--	--	76.0	66.66	738.37
P-130	Mudstone	VEM-219-47	2.8	4.3	--	--	--	--	77.0	69.46	750.41
P-129	Mudstone	VEM-218-47	1.4	0.8	--	--	--	--	87.7	70.86	751.53
P-128	Mudstone	VEM-217-47	1.9	4.1	--	--	--	--	77.2	72.76	759.32
P-127	Mudstone and phosphate rock	VEM-216-47	1.3	16.8	--	--	--	--	42.9	74.06	781.16
P-126	Mudstone	VEM-215-47	0.5	6.0	--	--	--	--	70.7	74.56	784.16
P-125	Mudstone, phosphatic	VEM-214-47	0.8	10.7	--	--	--	--	59.4	75.36	792.72
P-124	Mudstone; fos. col. no. 47-HW-84	VEM-213-47	2.6	2.0	--	--	--	--	79.4	77.96	797.92
P-123	Mudstone	VEM-212-47	2.1	1.7	--	--	--	--	81.4	80.06	801.49
P-122	Mudstone, phosphatic and phosphate rock	VEM-211-47	0.6	17.2	--	--	--	--	43.3	80.66	811.81
P-121	Mudstone	VEM-210-47	0.8	6.9	--	--	--	--	68.2	81.46	817.33
P-120	Mudstone, phosphatic	VEM-209-47	1.9	9.2	--	--	--	--	56.2	83.36	834.81
P-119	Phosphate rock, argillaceous	VEM-208-47	1.8	17.0	--	--	--	--	42.4	85.16	865.41
P-118	Mudstone	VEM-207-47	0.7	4.0	--	--	--	--	74.1	85.86	868.21
P-117	Mudstone	VEM-206-47	2.3	5.9	--	--	--	--	72.8	88.16	881.78
P-116	Limestone, argillaceous	VEM-205-47	2.1	0.2	--	--	--	--	30.8	90.26	882.20
P-115	Mudstone	VEM-204-47	1.1	0.4	--	--	--	--	81.2	91.36	882.64
P-114	Phosphate rock	VEM-203-47	0.3	22.5	--	--	--	--	7.9	91.66	889.39
P-113	Mudstone	VEM-202-47	1.7	2.2	--	--	--	--	80.0	93.36	893.13
P-112	Mudstone	VEM-201-47	0.4	5.8	--	--	--	--	78.7	93.76	895.45
P-111	Limestone, argillaceous	VEM-200-47	1.5	1.1	--	--	--	--	46.6	95.26	897.10
P-110	Mudstone	VEM-199-47	0.7	1.2	--	--	--	--	84.0	95.96	897.94
P-109	Phosphate rock, argillaceous	VEM-198-47	0.3	29.2	--	--	--	--	20.2	96.26	906.70
P-108	Mudstone	VEM-197-47	0.9	2.1	--	--	--	--	79.3	97.16	908.59
P-107	Mudstone, phosphatic	VEM-196-47	0.3	14.3	--	--	--	--	48.0	97.46	912.88
P-106	Mudstone	VEM-195-47	0.5	2.2	--	--	--	--	80.6	97.96	913.98
P-105	Mudstone	VEM-194-47	1.1	1.2	--	--	--	--	82.3	99.06	915.30

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)						Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)
				P ₂ O ₅	Al ₂ O ₃	Fe ₂ O ₃	F	Loss on ignition	Acid insoluble		
P-104	Mudstone	VEM-193-47	0.7	1.2	--	--	--	--	81.2	99.76	916.14
P-103	Mudstone	VEM-192-47	0.6	4.4	--	--	--	--	71.6	100.36	918.78
P-102	Mudstone; fos. col. no. 47-HW-83	VEM-191-47	0.9	0.7	--	--	--	--	83.7	101.26	919.41
P-101	Phosphate rock, argillaceous	VEM-190-47	0.5	20.4	--	--	--	--	35.3	101.76	929.61
P-100	Mudstone	VEM-189-47	0.6	1.6	--	--	--	--	70.1	102.36	930.57
P- 99	Phosphate rock, argillaceous	VEM-188-47	0.3	26.5	--	--	--	--	23.8	102.66	938.52
P- 98	Mudstone, phosphatic	VEM-187-47	0.5	11.0	--	--	--	--	56.1	103.16	944.02
P- 97	Phosphate rock, argillaceous, and phosphatic mudstone	VEM-186-47	0.5	19.2	--	--	--	--	33.7	103.66	953.62
P- 96	Mudstone	VEM-185-47	2.3	5.5	--	--	--	--	75.5	105.96	966.27
P- 95	Phosphate rock, argillaceous	VEM-184-47	0.5	24.0	--	--	--	--	28.1	106.46	978.27
P- 94	Mudstone	VEM-183-47	1.6	0.7	--	--	--	--	88.1	108.06	979.39
P- 93	Mudstone	VEM-182-47	0.9	6.7	--	--	--	--	68.5	108.96	985.42
P- 92	Mudstone; fos. col. no. 47-HW-82	VEM-181-47	3.4	1.6	--	--	--	--	84.6	112.36	990.86
P- 91	Mudstone, phosphatic and chert	LES- 329-47	0.3	14.2	--	--	--	--	50.5	112.66	995.12
P- 90	Mudstone	LES- 328-47	2.0	1.7	--	--	--	--	82.6	114.66	993.52
P- 89	Mudstone, phosphatic, contains chert nodules	LES- 327-47	0.4	14.7	--	--	--	--	46.9	115.06	1,004.40
P- 88	Mudstone	LES- 326-47	0.75	1.2	--	--	--	--	86.5	115.81	1,005.30
P- 87	Mudstone, contains chert nodules	LES- 325-47	0.4	7.0	--	--	--	--	70.7	116.21	1,008.10
P- 86	Mudstone; fos. col. no. 47-HW-81	LES- 324-47	2.0	0.6	--	--	--	--	88.5	118.21	1,009.30
P- 85	Phosphate rock, argillaceous	LES- 323-47	0.75	17.7	--	--	--	--	34.1	118.96	1,022.58
P- 84	Mudstone, phosphatic	LES- 322-47	1.45	14.9	--	--	--	--	43.9	120.41	1,044.18
P- 83	Mudstone	LES- 321-47	0.55	6.2	--	--	--	--	68.9	120.96	1,047.59
P- 82	Mudstone, phosphatic	LES- 320-47	1.0	8.1	--	--	--	--	59.6	121.96	1,055.69
P- 81	Mudstone	LES- 319-47	1.0	1.6	--	--	--	--	84.0	122.96	1,057.29
P- 80	Mudstone and phosphate rock	LES- 318-47	0.75	6.0	--	--	--	--	60.4	123.71	1,061.79
P- 79	Mudstone, phosphatic	LES- 317-47	1.6	10.8	--	--	--	--	52.0	125.31	1,079.07
P- 78	Mudstone, phosphatic	LES- 316-47	1.0	12.4	--	--	--	--	37.3	126.31	1,091.47
P- 77	Mudstone, phosphatic	LES- 315-47	0.65	11.2	--	--	--	--	45.7	126.96	1,098.75
P- 76	Mudstone, calcareous	LES- 314-47	1.2	6.6	--	--	--	--	43.5	128.16	1,106.67
P- 75	Mudstone, calcareous, phosphatic	LES- 313-47	0.7	8.3	--	--	--	--	38.7	128.86	1,112.48
P- 74	Limestone, argillaceous, phosphatic	LES- 312-47	1.0	9.0	--	--	--	--	26.3	129.86	1,121.48
P- 73	Limestone, argillaceous, phosphatic	LES- 311-47	0.75	8.5	--	--	--	--	24.7	130.61	1,127.86
P- 72	Mudstone, contains limy concretions	LES- 310-47	0.9	7.3	--	--	--	--	31.4	131.51	1,134.42
P- 71	Limestone, argillaceous	LES- 309-47	2.2	6.3	--	--	--	--	27.8	133.71	1,148.28
P- 70	Phosphate rock and calcareous mudstone	LES- 308-47	0.35	10.4	--	--	--	--	40.4	134.06	1,151.92

P- 69	Mudstone, calcareous	LES- 307-47	2.0	5.1	--	--	--	--	46.0	136.06	1, 162. 12
P- 68	Limestone and calcareous mudstone; fos. col. no. 47-HW-80	LES- 306-47	1.35	0.4	--	--	--	--	10.0	137.41	1, 162. 66
P- 67	Limestone and calcareous mudstone; fos. col. no. 47-HW-79	LES- 305-47	2.2	0.6	--	--	--	--	10.3	139.61	1, 163. 98
P- 66	Chert and mudstone	LES- 304-47	0.65	1.3	--	--	--	--	78.4	140.26	1, 164. 83
P- 65	Mudstone, calcareous	LES- 303-47	1.9	2.3	--	--	--	--	58.6	142.16	1, 169. 20
P- 64	Mudstone	LES- 302-47	0.6	0.4	--	--	--	--	80.5	142.76	1, 169. 44
P- 63	Mudstone	LES- 301-47	0.6	2.4	--	--	--	--	73.4	143.36	1, 170. 88
P- 62	Mudstone, phosphatic	LES- 300-47	0.6	7.8	--	--	--	--	54.8	143.96	1, 175. 56
P- 61	Limestone	LES- 299-47	0.7	2.2	--	--	--	--	16.9	144.66	1, 177. 10
P- 60	Mudstone	LES- 298-47	1.5	5.0	--	--	--	--	66.5	146.16	1, 184. 60
P- 59	Mudstone, calcareous	LES- 297-47	1.0	5.6	--	--	--	--	54.7	147.16	1, 190. 20
P- 58	Mudstone, calcareous	LES- 296-47	0.9	1.0	--	--	--	--	68.1	148.06	1, 191. 10
P- 57	Mudstone	LES- 295-47	0.8	1.7	--	--	--	--	80.7	148.86	1, 192. 46
P- 56	Mudstone, calcareous	LES- 294-47	0.9	7.0	--	--	--	--	54.3	149.76	1, 198. 76
P- 55	Mudstone, contains mudstone lenses; fos. col. no. 47-HW-78	LES- 293-47	0.55	7.4	--	--	--	--	59.9	150.31	1, 202. 83
P- 54	Mudstone, phcsphatic, calcareous	LES- 291-47	1.6	11.2	--	--	--	--	47.8	151.91	1, 220. 75
--	Limestone concretion in bed										
P- 53	Mudstone, calcareous	LES- 292-47	(0.8)	0.6	--	--	--	--	3.3	--	--
P- 52	Mudstone	LES- 290-47	0.4	4.5	--	--	--	--	66.5	152.31	1, 222. 55
P- 51	Mudstone	LES- 289-47	0.4	4.9	--	--	--	--	67.5	152.71	1, 224. 51
	Mudstone, calcareous, and calcareous phosphate rock	LES- 288-47	0.6	6.2	--	--	--	--	58.3	153.31	1, 228. 23
P- 50	Mudstone, calcareous; fos. col. no. 47-HW-77	LES- 287-47	1.0	4.5	--	--	--	--	65.6	154.31	1, 232. 73
P- 49	Mudstone, calcareous, phosphatic	LES- 286-47	2.25	9.4	--	--	--	--	41.0	156.56	1, 253. 88
P- 48	Limestone, phosphatic, argillaceous	LES- 285-47	0.45	9.0	--	--	--	--	20.9	157.01	1, 257. 93
--	Limestone concretion in bed										
P- 47	Limestone, phosphatic, argillaceous	LES- 284-47	(0.8)	1.1	--	--	--	--	1.7	--	--
		LES- 283-47	0.8	11.7	--	--	--	--	26.4	157.81	1, 267. 29
P- 46	Mudstone, calcareous, phosphatic	LES- 282-47	0.5	11.5	--	--	--	--	38.3	158.31	1, 273. 04
P- 45	Mudstone, calcareous, phosphatic; fos. col. no. 47-HW-76	LES- 281-47	1.05	8.9	--	--	--	--	39.3	159.36	1, 282. 38
P- 44	Limestone, argillaceous; fos. col. no. 47-HW-75	LES- 280-47	1.0	0.5	--	--	--	--	21.3	160.36	1, 282. 88
P- 43	Mudstone, calcareous, phosphatic	LES- 279-47	0.4	9.9	--	--	--	--	42.8	160.76	1, 286. 84
P- 42	Mudstone, calcareous	LES- 268-47	0.4	4.0	--	--	--	--	45.0	161.16	1, 288. 44
P- 41	Mudstone, phosphatic	LES- 267-47	1.1	11.7	--	--	--	--	48.9	162.26	1, 301. 32
P- 40	Mudstone, phosphatic, calcareous	LES- 264-47	4.2	14.1	--	--	--	--	38.7	166.46	1, 360. 54
--	Limestone concretion in bed										
	P-40	LES- 266-47	(0.5)	1.3	--	--	--	--	8.5	--	--
--	Limestone concretion in bed										
	P-40	LES- 265-47	(0.1)	4.6	--	--	--	--	14.3	--	--

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)						Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative) ⁵
				P ₂ O ₅	Al ₂ O ₃	Fe ₂ O ₃	F	Loss on ignition	Acid insoluble		
P- 39	Mudstone, calcareous, phosphatic	LES- 263-47	0.6	11.3	--	--	--	--	41.3	167.06	1,367.32
P- 38	Mudstone, calcareous, phosphatic	LES- 262-47	0.65	12.1	--	--	--	--	36.1	167.71	1,375.18
P- 37	Phosphate rock and calcareous mudstone	LES- 261-47	2.5	15.8	--	--	--	--	23.7	170.21	1,414.68
P- 36	Phosphate rock, contains laminations of calcareous mudstone	LES- 260-47	1.0	23.1	--	--	--	--	17.4	171.21	1,437.78
P- 35	Mudstone and phosphate rock	LES- 259-47	0.55	24.5	--	--	--	--	22.3	171.76	1,451.26
P- 34	Phosphate rock, calcareous	LES- 278-47	0.5	28.8	--	--	--	--	4.6	172.26	1,465.66
P- 33	Limestone, contains phosphate rock lenses	LES- 277-47	0.8	8.2	--	--	--	--	10.4	173.06	1,472.22
P- 32	Phosphate rock, calcareous	LES- 276-47	0.55	24.2	--	--	--	--	13.4	173.61	1,485.52
P- 31	Phosphate rock and mudstone; fos. col. no. 47-HW-174	LES- 275-47	1.15	28.4	--	--	--	--	12.9	174.76	1,518.18
P- 30	Phosphate rock and phosphatic mudstone	LES- 274-47	0.6	18.4	--	--	--	--	34.5	175.36	1,529.22
P- 29	Limestone	LES- 273-47	3.2	4.6	--	--	--	--	13.7	178.56	1,543.94
P- 28	Mudstone, phosphatic	LES- 272-47	1.75	11.0	--	--	--	--	46.1	180.31	1,563.20
P- 27	Limestone	LES- 271-47	0.9	3.0	--	--	--	--	15.0	181.21	1,565.90
P- 26	Limestone	LES- 270-47	2.85	3.8	--	--	--	--	18.7	184.06	1,576.72
P- 25	Phosphate rock, argillaceous	LES- 269-47	0.6	21.8	4.5	1.6	1.99	7.36	29.9	184.66	1,589.80
P- 24	Phosphate rock, calcareous, and calcareous phosphatic mudstone	LES- 248-47	1.45	29.6	2.3	1.2	2.82	7.38	14.4	186.11	1,632.72
P- 23	Phosphate rock and phosphatic calcareous mudstone	LES- 247-47	0.5	29.4	2.2	1.1	2.67	6.18	16.5	186.61	1,647.42
P- 22	Phosphate rock, argillaceous	LES- 246-47	0.55	25.1	3.3	1.5	2.25	6.74	26.1	187.16	1,661.23
P- 21	Mudstone and phosphate rock	LES- 245-47	1.1	18.8	6.4	2.2	1.62	6.84	40.2	188.26	1,681.91
P- 20	Mudstone	LES- 244-47	0.4	6.7	9.40	2.97	0.57	5.92	70.2	188.66	1,684.59
P- 19	Phosphate rock	VEM-180-47	1.0	33.1	1.3	0.58	2.49	6.16	8.6	189.66	1,717.69
P- 18	Phosphate rock	VEM-179-47	1.4	27.8	2.8	1.1	2.56	6.76	18.9	191.06	1,756.61
P- 17	Phosphate rock	VEM-178-47	0.9	31.8	1.7	0.91	2.84	5.96	10.4	191.96	1,785.23
P- 16	Phosphate rock, argillaceous	VEM-177-47	1.3	26.2	2.7	1.2	2.64	6.90	20.6	193.26	1,819.29
P- 15	Phosphate rock, argillaceous	VEM-176-47	1.2	21.9	5.4	1.9	1.92	7.48	31.4	194.46	1,845.57
P- 14	Phosphate rock and phosphatic mudstone	VEM-175-47	0.6	16.3	7.3	1.9	1.43	9.44	39.9	195.06	1,855.35
P- 13	Phosphate rock, argillaceous; fos. col. no. 47-HW-74	RAH-189-47	2.5	24.0	3.9	1.5	2.08	5.76	26.3	197.56	1,915.35
P- 12	Phosphate rock, argillaceous	WOM - 3182	1.35	25.4	1.3	0.55	3.25	6.24	25.5	198.91	1,949.64
P- 11	Phosphate rock	WOM - 3181	2.1	33.0	3.5	1.7	2.55	5.24	6.9	201.01	1,018.94
P- 10	Phosphate rock	RAH-186-47	1.9	33.3	0.7	0.52	3.40	6.24	4.3	202.91	2,082.21
P- 9	Phosphate rock	RAH-185-47	1.7	35.0	--	--	3.60	--	3.0	204.61	2,141.71
P- 8	Phosphate rock	RAH-184-47	0.4	26.8	2.3	1.0	2.72	6.18	18.0	205.01	2,152.43

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P- 7	Phosphate rock	RAH-183-47	0.55	28.3	2.2	0.95	2.39	6.46	16.6	205.56	2,168.00
P- 6	Mudstone	RAH-182-47	2.1	2.5	11.6	3.0	--	10.24	68.4	207.66	2,173.24
P- 5	Mudstone	RAH-181-47	1.0	0.8	11.6	3.4	--	6.56	77.8	208.66	2,174.04
P- 4	Limestone, argillaceous	RAH-180-47	0.4	0.6	4.5	1.7	--	31.28	30.3	209.06	2,174.28
P- 3	Mudstone, calcareous	RAH-179-47	0.5	3.9	8.8	6.3	--	9.36	56.3	209.56	2,176.24
P- 2	Phosphate rock	RMC-133-47	1.1	30.2	2.2	1.4	--	5.66	12.8	210.66	2,209.46
P- 1	Phosphate rock	RMC-134-47	0.5	31.4	1.3	0.75	--	4.48	9.9	211.16	2,225.16

Wells formation

Cw- 1	Limestone	RAH-177-47	2.0	1.2	--	--	--	--	4.7	--	--
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SPECTROGRAPHIC ANALYSES—TRAIL CANYON, IDAHO. LOT NO. 1206.

Semi-quantitative analyses of selected samples of the phosphatic shale member of the Phosphoria formation, Trail Canyon, Idaho (see immediately preceding pages for location of section, thickness and description of strata, and chemical analyses of samples), made by U. S. Geological Survey Laboratory, Geochemistry and Petrology Branch, Washington, D. C. In addition to the elements listed in the table below, Sb, As, Bi, Cs, Cb, Dy, Er, Eu, Ga, Gd, Au, Ho, In, Li, Lu, Nd, Pt, Pr, Rb, Sm, Sc, Ta, Te, Tb, Tl, Tm, W, and Yb were looked for in all samples but were not detected.

Explanation of symbols

A = more than 10 percent F = 0.001-0.01 percent
 B' = 1-10 percent¹ G = less than 0.001 percent
 D = 0.1-1 percent ND = not detected
 E = 0.01-0.1 percent

Bed no.	Sample no.	Al	Ba	Be	B	Cd	Ca	Cr	Co	Cu	Fe	La	Pb	Mg	Mn	Mo	Ni	P	Si	Ag	Na	Sr	Sn	Ti	V	Y	Zn	Zr
Beds P-210 through P-198 not analyzed.																												
P-197	RAG- 2-47	B'	E	G	F	E	A	D	ND	E	D	E	F	D	D	F	E	A	B'	G	D	D	F	E	E	E	E	E
P-196	RAG- 1-47	B'	E	G	F	E	A	D	ND	E	D	E	F	D	D	F	E	A	B'	G	D	D	F	E	E	E	E	E
P-195	VEM-265-47	B'	F	ND	F	F	A	D	ND	F	D	E	F	D	F	F	E	A	B'	G	D	D	F	E	E	E	F	E
P-194	VEM-264-47	B'	F	ND	ND	F	A	D	ND	F	D	E	E	D	E	F	E	A	B'	G	D	D	F	E	E	E	F	E
P-193	VEM-263-47	B'	F	ND	F	F	A	D	ND	F	D	E	E	D	F	F	E	A	B'	G	D	D	F	E	E	E	F	E
P-192	VEM-262-47	B'	E	F	E	F	B'	D	ND	E	D	F	E	D	E	E	E	D	A	F	D	D	F	D	D	E	E	E
P-191	VEM-259-47	B'	E	G	F	F	A	D	ND	E	D	F	F	D	E	F	F	A	B'	G	D	D	F	E	E	F	F	E
P-190	VEM-258-47	B'	E	ND	F	F	A	D	ND	E	D	ND	F	B'	E	F	F	D	B'	G	D	D	F	E	E	ND	F	E
P-189	VEM-257-47	B'	E	ND	F	F	A	D	ND	E	D	F	F	D	E	F	F	A	B'	G	D	D	F	E	E	F	F	E
P-188	VEM-256-47	B'	E	ND	F	E	A	D	ND	E	D	F	F	D	E	F	F	A	B'	G	D	D	F	E	E	F	F	E
--	VEM-255-47	B'	E	G	F	E	A	D	ND	E	D	F	F	D	E	F	F	A	B'	G	D	D	F	E	E	F	E	E
P-187	VEM-254-47	B'	E	G	F	E	A	D	ND	E	D	F	F	D	E	E	E	A	B'	G	D	D	ND	D	D	F	F	E
P-186	VEM-253-47	B'	E	G	F	E	A	D	ND	E	D	F	F	D	E	F	E	A	B'	G	D	D	F	E	E	F	F	E
P-185	VEM-252-47	B'	E	ND	F	E	A	D	ND	E	D	F	F	D	E	F	E	A	B'	G	D	D	F	E	E	F	F	E
P-184	VEM-251-47	B'	E	ND	F	E	A	D	ND	E	D	F	F	D	E	F	F	A	B'	G	D	D	F	E	E	F	F	E
P-183	VEM-249-47	B'	E	G	F	ND	A	D	ND	E	D	E	F	D	F	F	E	A	B'	G	D	D	F	D	E	E	E	E
P-182	VEM 248-47	B'	E	G	F	F	A	D	ND	E	D	E	F	D	F	F	E	A	B'	G	D	D	F	E	E	E	E	E
P-181	VEM-247-47	B'	E	G	F	E	A	D	ND	E	D	E	F	D	E	F	E	A	B'	G	D	D	F	E	E	E	E	E
P-180	VEM-246-47	B'	E	G	F	E	A	D	ND	E	D	E	F	D	F	F	E	B'	B'	G	D	D	F	D	E	E	E	E
P-179	VEM-245-47	B'	E	G	F	E	A	D	ND	E	D	F	F	D	E	F	E	A	A	G	D	D	F	D	E	E	E	E
P-178	VEM-244-47	B'	E	G	F	ND	B'	D	ND	E	D	ND	F	D	D	F	E	B'	A	G	B'	D	F	D	E	F	E	D
Beds P-177 through P-20 not analyzed.																												

P- 19	VEM-180-47	B'	E	ND	ND	E	A	D	ND	E	D	F	F	D	F	F	F	A	B'	G	D	D	F	E	E	F	F	E
P- 18	VEM-179-47	B'	E	G	F	E	A	D	ND	E	D	F	F	D	F	F	F	A	B'	G	D	D	F	E	E	F	F	E
P- 17	VEM-178-47	B'	E	G	F	E	A	D	ND	E	D	F	F	D	F	F	F	A	B'	G	D	D	F	E	E	F	F	E
P- 16	VEM-177-47	B'	E	ND	F	E	A	D	ND	E	D	E	E	D	F	F	F	A	B'	G	D	D	F	E	E	F	F	E
P- 15	VEM-176-47	B'	E	ND	F	E	A	D	ND	E	D	E	E	D	F	F	F	A	B'	G	D	D	F	E	E	F	F	E
P- 14	VEM-175-47	B'	E	ND	E	E	A	D	ND	E	D	E	E	D	E	F	E	A	B'	F	D	D	F	D	E	E	E	D
P- 13	RAH- 189-47	B'	E	ND	F	E	A	D	ND	E	D	E	E	D	E	F	E	A	B'	F	D	D	F	D	E	E	E	D
P- 12	WOM- 3182	B'	E	ND	F	E	A	D	ND	E	D	E	E	D	F	F	E	A	B'	G	D	D	F	D	E	E	E	E
P- 11	WOM- 3181	B'	E	ND	F	F	A	E	ND	E	D	E	F	D	E	F	E	A	B'	G	D	D	F	D	E	E	E	E
P- 10	RAH- 186-47	B'	E	ND	F	E	A	D	ND	E	D	E	E	D	F	F	E	A	B'	G	D	D	F	D	E	E	E	E
P- 9	RAH- 185-47	D	E	ND	F	E	A	D	ND	E	D	F	E	D	F	F	E	A	B'	G	D	D	F	E	E	E	E	E
P- 8	RAH- 184-47	B'	E	ND	F	E	A	D	ND	E	D	F	E	D	F	F	E	A	B'	G	D	D	F	E	E	E	E	E
P- 7	RAH- 183-47	B'	E	ND	F	E	A	D	ND	E	D	F	E	D	F	F	E	A	B'	G	D	D	ND	E	E	E	E	E
P- 6	RAH- 182-47	B'	D	G	E	E	B'	D	ND	E	D	ND	F	D	E	F	E	B'	A	G	D	D	F	D	E	E	E	E
P- 5	RAH- 181-47	B'	E	G	E	E	B'	D	ND	E	D	ND	F	D	E	F	E	D	A	G	D	D	F	D	E	E	E	E
P- 4	RAH- 180-47	B'	E	G	F	E	B'	E	ND	F	D	ND	F	B'	D	F	E	D	A	G	D	D	F	E	E	ND	E	E
P- 3	RAH- 179-47	B'	D	G	F	E	B'	D	E	E	D	F	F	D	B'	E	B'	B'	A	G	D	D	F	E	D	E	E	E
P- 2	RMC-133-47	B'	E	ND	F	E	A	D	F	F	D	E	E	D	E	F	E	A	B'	G	D	D	F	E	E	E	E	E
P- 1	RMC-134-47	B'	E	ND	F	E	A	D	ND	F	D	E	E	D	F	F	E	A	B'	G	D	D	F	E	E	E	E	E

JOHNSON CREEK, IDAHO. LOT NO. 1209.

Phosphatic shale member of Phosphoria formation sampled in two bulldozer trenches on north side of Johnson Creek, SE $\frac{1}{4}$ sec. 23, T. 8 S., R. 43 E., Caribou County, Idaho, near north end of east limb of Aspen Range anticline. Beds strike N. 10-40° W. and dip 25-45° NE. Section measured by R. M. Campbell, R. A. Gulbrandsen, R. A. Hoppin, V. E. McKelvey, and R. A. Weeks and sampled by Campbell and Weeks in September and October 1947. Samples analyzed by U. S. Bureau of Mines Laboratory, Albany, Oregon.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)					Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative) ⁵
				P ₂ O ₅	Al ₂ O ₃	Fe ₂ O ₃	Loss on ignition	Acid insoluble		
Rex member of Phosphoria formation—basal beds only										
R- 2	Chert	RAW- 73-47	8.1	0.7	--	--	--	93.0	8.1	5.67
R- 1	Chert and mudstone	RAW- 72-47	3.5	1.2	--	--	--	81.2	11.6	9.87
Phosphatic shale member of Phosphoria formation										
P-119	Mudstone	RAW- 71-47	0.6	2.9	--	--	--	91.7	0.6	1.74
P-118	Phosphate rock, calcareous; fos. col. no. 47-HW-230 ¹	RAW- 70-47	0.5	27.6	--	--	--	7.6	1.1	15.54
P-117	Mudstone	RAW- 69-47	1.5	2.4	--	--	--	84.0	2.6	19.14
P-116	Mudstone	RAW- 68-47	1.4	1.5	--	--	--	75.6	4.0	21.24
P-115	Limestone, argillaceous	RAW- 67-47	1.0	5.7	--	--	--	23.2	5.0	26.94
P-114	Mudstone; fos. col. no. 47-HW-229	RAW- 66-47	0.8	2.1	--	--	--	75.0	5.8	28.62
P-113	Mudstone, calcareous; fos. col. no. 47-HW-228	RAW- 65-47	2.6	0.9	--	--	--	65.2	8.4	30.96
P-112	Mudstone; fos. col. no. 47-HW-227	RAW- 64-47	2.4	3.2	--	--	--	71.7	10.8	38.64
P-111	Phosphate rock	RAW- 63-47	0.8	30.7	--	--	--	13.3	11.6	63.20
P-110	Mudstone; fos. col. no. 47-HW-226	RAW- 62-47	2.1	6.4	--	--	--	64.6	13.7	76.64
P-109	Mudstone; fos. col. no. 47-HW-225	RAW- 57-47	0.5	1.9	--	--	--	79.4	14.2	77.59
P-108	Phosphate rock	RAW- 56-47	0.6	36.9	0.63	0.46	1.84	5.6	14.8	99.73
P-107	Phosphate rock	RAW- 55-47	0.4	37.4	0.53	0.41	1.32	3.6	15.2	114.69
P-106	Phosphate rock	RAW- 54-47	0.4	35.3	2.0	0.87	3.88	4.0	15.6	128.81
P-105	Phosphate rock	RAW- 53-47	0.8	36.5	0.82	0.50	1.96	4.5	16.4	158.01
P-104	Phosphate rock	RAW- 52-47	0.9	35.3	1.4	0.70	1.68	7.3	17.3	189.78
P-103	Phosphate rock and mudstone	VEM-493-47	0.5	26.5	3.2	1.28	2.98	23.6	17.8	203.03
P-102	Phosphate rock	VEM-492-47	0.6	34.6	1.0	0.60	0.80	9.9	18.4	223.79
P-101	Phosphate rock	VEM-491-47	0.5	30.3	2.1	0.90	4.46	14.8	18.9	238.94
P-100	Phosphate rock	VEM-490-47	0.5	33.0	1.7	1.22	3.24	11.5	19.4	255.44
P- 99	Phosphate rock, argillaceous	VEM-489-47	0.6	19.7	7.5	2.26	7.22	35.1	20.0	267.26
P- 98	Mudstone	VEM-488-47	1.0	5.5	11.1	3.20	11.12	61.4	21.0	272.76
P- 97	Mudstone, phosphatic	VEM-487-47	1.3	9.5	9.4	1.88	10.78	55.3	22.3	285.11
P- 96	Phosphate rock	VEM-486-47	0.6	28.9	4.1	1.59	7.00	15.5	22.9	302.45
P- 95	Phosphate rock	VEM-485-47	0.6	31.8	1.3	0.30	5.40	11.7	23.5	321.53
P- 94	Phosphate rock	VEM-484-47	0.6	34.5	1.1	0.43	4.86	6.0	24.1	342.23

P- 93	Phosphate rock	VEM-483-47	0.4	32.3	2.2	0.70	6.48	8.7	24.5	355.15
P- 92	Phosphate rock	VEM-482-47	0.8	32.4	1.6	1.49	5.84	9.2	25.3	381.07
P- 91	Mudstone; fos. col. no. 47-HW-303	VEM-481-47	0.8	3.0	4.2	1.23	10.54	77.1	26.1	383.47
P- 90	Phosphate rock, argillaceous; fos. col. no. 47-HW-302	VEM-480-47	0.6	19.9	5.2	1.60	13.54	29.1	26.7	395.41
P- 89	Phosphate rock, argillaceous; fos. col. no. 47-HW-301	VEM-479-47	0.6	20.4	5.5	1.53	15.76	24.8	27.3	407.65
P- 88	Phosphate rock	VEM-478-47	1.0	26.3	3.2	1.22	16.42	11.2	28.3	433.95
P- 87	Phosphate rock, argillaceous	VEM-477-47	0.7	23.9	4.1	1.48	16.74	20.1	29.0	450.68
P- 86	Phosphate rock, argillaceous	VEM-476-47	0.7	19.4	5.5	1.91	11.18	30.0	29.7	464.26
P- 85	Phosphate rock, argillaceous	VEM-475-47	0.6	19.2	6.6	2.15	15.14	28.5	30.3	475.78
P- 84	Phosphate rock, argillaceous	VEM-474-47	0.8	22.6	4.7	1.65	14.42	20.9	31.1	493.86
P- 83	Phosphate rock, argillaceous	VEM-473-47	1.2	20.4	4.5	1.59	14.64	27.2	32.3	518.34
P- 82	Mudstone and phosphate rock	VEM-472-47	1.0	16.6	--	--	--	33.0	33.3	534.94
P- 81	Mudstone, phosphatic	VEM-471-47	1.0	12.9	--	--	--	45.9	34.3	547.84
P- 80	Mudstone, phosphatic	VEM-358-47	1.2	15.6	--	--	--	42.0	35.5	566.56
P- 79	Mudstone, calcareous; fos. col. no. 47-HW-300	VEM-357-47	1.5	2.7	--	--	--	47.0	37.0	570.61
P- 78	Mudstone, phosphatic	VEM-356-47	2.0	14.1	--	--	--	46.6	39.0	598.81
P- 77	Mudstone, phosphatic; fos. col. no. 47-HW-299	VEM-355-47	0.8	15.5	--	--	--	46.4	39.8	611.21
P- 76	Mudstone	VEM-354-47	2.9	7.1	--	--	--	67.2	42.7	631.80
P- 75	Mudstone, phosphatic	VEM-353-47	1.7	10.7	--	--	--	60.5	44.4	649.99
P- 74	Mudstone	VEM-352-47	0.8	3.3	--	--	--	78.1	45.2	652.63
P- 73	Mudstone; fos. col. no. 47-HW-298	VEM-351-47	1.6	2.4	--	--	--	88.3	46.8	656.47
P- 72	Phosphate rock, argillaceous	VEM-350-47	0.8	18.5	--	--	--	45.9	47.6	671.27
P- 71	Mudstone	VEM-349-47	1.2	1.5	--	--	--	85.7	48.8	673.07
P- 70	Mudstone, phosphatic	VEM-348-47	1.3	8.2	--	--	--	69.5	50.1	683.73
P- 69	Mudstone, phosphatic and chert	VEM-347-47	0.8	15.3	--	--	--	47.2	50.9	695.97
P- 68	Mudstone, phosphatic	VEM-346-47	1.7	8.0	--	--	--	67.2	52.6	709.57
P- 67	Mudstone	VEM-345-47	2.4	4.7	--	--	--	77.2	55.0	720.85
P- 66	Mudstone, cherty	RMC- 90-47	1.2	3.2	--	--	--	83.1	56.2	724.69
P- 65	Mudstone	RAW- 51-47	1.1	1.1	--	--	--	86.8	57.3	725.90
P- 64	Mudstone and phosphate rock	RAW- 50-47	2.1	7.6	--	--	--	71.1	59.4	741.86
P- 63	Mudstone and phosphate rock	RAW- 27-47	1.5	12.6	--	--	--	54.1	60.9	760.76
P- 62	Mudstone	RAW- 26-47	0.9	7.3	--	--	--	71.1	61.8	767.33
P- 61	Mudstone	RAW- 25-47	0.6	7.5	--	--	--	63.3	62.4	771.83
P- 60	Mudstone	RAG- 15-47	4.82	4.3	--	--	--	74.3	67.22	792.56
P- 59	Mudstone, phosphatic	RAG- 14-47	0.75	16.6	--	--	--	44.5	67.97	805.01
P- 58	Mudstone, phosphatic; fos. col. no. 47-HW-297	RAG- 13-47	0.85	10.5	--	--	--	60.7	68.82	813.93
P- 57	Mudstone, phosphatic; fos. col. no. 47-HW-296	RAG- 12-47	0.30	15.6	--	--	--	50.7	69.12	818.61
P- 56	Mudstone; fos. col. no. 47-HW-295	RAG- 11-47	1.92	6.8	--	--	--	69.7	71.04	831.67

¹ Fossil collection made by H. Wedow, Paleontology and Stratigraphy Branch, U. S. Geological Survey.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)					Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative) ⁵
				P ₂ O ₅	Al ₂ O ₃	Fe ₂ O ₃	Loss on ignition	Acid insoluble		
P- 55	Mudstone, phosphatic; fos. col. no. 47-HW-294	RAG- 10-47	1.02	14.8	--	--	--	46.5	72.06	846.76
P- 54	Mudstone	RAG- 9-47	2.62	5.5	--	--	--	70.8	74.68	861.17
P- 53	Mudstone, phosphatic, contains chert nodules	RAG- 8-47	0.62	11.8	--	--	--	58.9	75.30	868.49
P- 52	Mudstone	RAG- 7-47	3.3	1.3	--	--	--	86.8	78.60	872.78
P- 51	Phosphate rock, argillaceous	RAH- 216-47	0.4	23.0	--	--	--	32.0	79.00	881.98
P- 50	Mudstone	RAH- 215-47	1.9	1.8	--	--	--	84.2	80.90	885.40
P- 49	Mudstone	RAH- 214-47	1.3	0.6	--	--	--	87.3	82.20	886.18
P- 48	Mudstone	RAH- 199-47	0.9	0.7	--	--	--	88.5	83.10	886.81
P- 47	Phosphate rock	RAH- 198-47	0.3	30.0	--	--	--	18.9	83.40	895.81
P- 46	Mudstone	RAH- 197-47	1.0	3.3	--	--	--	77.9	84.40	899.11
P- 45	Mudstone	RAH- 196-47	3.0	2.4	--	--	--	84.1	87.40	906.31
P- 44	Mudstone; fos. col. no. 47-HW-293	RAH- 195-47	0.5	3.2	--	--	--	80.8	87.90	907.91
P- 43	Mudstone; fos. col. no. 47-HW-292	RAH- 194-47	1.9	0.8	--	--	--	85.6	89.80	909.43
P- 42	Mudstone, phosphatic	RAH- 193-47	0.9	9.8	--	--	--	62.0	90.70	918.25
P- 41	Mudstone	RAH- 192-47	1.4	1.6	--	--	--	84.6	92.10	920.49
P- 40	Mudstone, phosphatic; fos. col. no. 47-HW-291	RAH- 191-47	0.7	14.7	--	--	--	46.5	92.80	930.78
P- 39	Phosphate rock, argillaceous; fos. col. no. 47-HW-291	RAH- 190-47	0.6	19.7	--	--	--	39.0	93.40	942.60
P- 38	Mudstone	RAG- 24-47	2.64	4.4	--	--	--	79.9	96.04	954.22
P- 37	Mudstone, phosphatic	RAG- 23-47	1.48	11.9	--	--	--	61.9	97.52	971.83
P- 36	Mudstone	RAG- 22-47	1.91	7.0	--	--	--	73.2	99.43	985.20
P- 35	Mudstone; fos. col. no. 47-HW-290	RAG- 21-47	3.0	1.1	--	--	--	88.1	102.43	988.50
P- 34	Phosphate rock and phosphatic mudstone	RAG- 20-47	0.95	22.7	--	--	--	31.0	103.38	1,010.06
P- 33	Mudstone, phosphatic; fos. col. no. 47-HW-289	RAG- 19-47	1.16	8.0	--	--	--	70.8	104.54	1,019.34
P- 32	Phosphate rock	RAG- 18-47	0.45	32.0	--	--	--	8.2	104.99	1,033.74
P- 31	Mudstone	RAG- 17-47	1.71	4.3	--	--	--	78.2	106.70	1,041.10
P- 30	Mudstone, phosphatic	VEM-507-47	1.9	11.6	--	--	--	52.3	108.60	1,063.14
P- 29	Mudstone	VEM-506-47	0.6	3.0	--	--	--	78.6	109.20	1,064.94
P- 28	Mudstone, phosphatic	VEM-505-47	1.4	13.6	--	--	--	43.9	110.60	1,083.98
P- 27	Mudstone, phosphatic	VEM-504-47	1.6	12.4	--	--	--	48.8	112.20	1,103.82
P- 26	Mudstone, phosphatic	VEM-503-47	0.6	9.4	--	--	--	57.4	112.80	1,109.46
P- 25	Mudstone, phosphatic	VEM-502-47	0.8	9.0	--	--	--	58.2	113.60	1,116.66
P- 24	Mudstone	VEM-501-47	1.6	5.0	--	--	--	72.0	115.20	1,124.66
P- 23	Mudstone; fos. col. no. 47-HW-306	VEM-500-47	2.8	2.5	--	--	--	79.4	118.00	1,131.66
P- 22	Mudstone	VEM-499-47	0.8	4.7	--	--	--	72.6	118.80	1,135.42
P- 21	Mudstone; fos. col. no. 47-HW-305	VEM-498-47	1.1	3.9	--	--	--	77.1	119.90	1,139.71
P- 20	Mudstone	VEM-497-47	0.9	7.4	--	--	--	65.0	120.80	1,146.37
P- 19	Mudstone	VEM-496-47	1.5	1.2	--	--	--	86.0	122.30	1,148.17

P- 18	Mudstone, phosphatic	VEM-495-47	1.6	11.3	--	--	--	55.7	123.90	1,166.25
P- 17	Mudstone, phosphatic	VEM-494-47	1.1	8.8	--	--	--	61.9	125.00	1,175.93
P- 16	Mudstone	RMC-111-47	1.0	6.4	--	--	--	71.8	126.00	1,182.33
P- 15	Mudstone, phosphatic	RMC-110-47	1.4	12.4	--	--	--	52.8	127.40	1,199.69
P- 14	Mudstone, phosphatic	RMC-109-47	1.4	14.8	--	--	--	46.6	128.80	1,220.41
P- 13	Mudstone	RMC-108-47	0.9	3.0	--	--	--	82.9	129.70	1,223.11
P- 12	Mudstone, phosphatic	RMC-107-47	1.7	14.3	--	--	--	48.3	131.40	1,247.42
P- 11	Phosphate rock, argillaceous	RMC-106-47	1.5	16.8	--	--	--	40.0	132.90	1,272.62
P- 10	Mudstone and phosphate rock	RMC-105-47	1.3	14.8	--	--	--	47.6	134.20	1,291.86
P- 9	Mudstone, phosphatic	VEM-517-47	0.7	15.5	--	--	--	45.3	134.90	1,302.71
P- 8	Phosphate rock, argillaceous	VEM-516-47	2.0	21.2	--	--	--	27.5	136.90	1,345.11
P- 7	Phosphate rock	VEM-515-47	1.6	28.5	--	--	--	15.8	138.50	1,390.71
P- 6	Mudstone, phosphatic	VEM-514-47	1.9	13.2	--	--	--	50.2	140.40	1,415.79
P- 5	Mudstone, phosphatic	VEM-513-47	1.0	11.5	--	--	--	55.0	141.40	1,427.29
P- 4	Mudstone	VEM-512-47	1.2	5.6	--	--	--	68.8	142.60	1,434.01
P- 3	Mudstone	VEM-511-47	1.8	1.4	--	--	--	75.0	144.40	1,436.53
P- 2	Mudstone, phosphatic	VEM-510-47	0.4	9.5	--	--	--	56.5	144.80	1,440.33
P- 1	Phosphate rock	VEM-509-47	0.25	35.7	--	--	--	4.8	145.05	1,449.26

The lower phosphate bed appears to be absent due to faulting.

Wells formation

Cw- 1	Dolomite; fos. col. no. 47-HW-304	VEM-508-47	3.2	1.1	--	--	--	7.3	3.2	3.52
Cw- 2	Clay and phosphate rock	--	0.1	--	--	--	--	--	3.3	--
Cw- 3	Dolomite	--	0.2	--	--	--	--	--	3.5	--

SPECTROGRAPHIC ANALYSES—JOHNSON CREEK, IDAHO. LOT NO. 1209.

Semi-quantitative analyses of selected samples of the phosphatic shale member of the Phosphoria formation, Johnson Creek, Idaho (see immediately preceding pages for location of section, thickness and description of strata, and chemical analyses of samples), made by the U. S. Geological Survey Laboratory, Geochemistry and Petrology Branch, Washington, D. C. In addition to the elements listed in the table below, Sb, As, Be, Bi, Cs, Co, Cb, Dy, Sm, Sc, Ta, Te, Tb, Tl, Tm, W, and Yb were looked for in all samples but were not detected.

Explanation of symbols

A = more than 10 percent F = 0.001-0.01 percent
 B' = 1-10 percent¹ G = less than 0.001 percent
 D = 0.1-1 percent ND = not detected
 E = 0.01-0.1 percent

Bed no.	Sample no.	Al	Ba	B	Cd	Ca	Cr	Cu	Fe	Ga	La	Pb	Mg	Mn	Mo	Ni	P	Si	Ag	Na	Sr	Sn	Ti	V	Y	Zn	Zr
Beds P-119 through P-109 not analyzed.																											
P-108	RAW- 56-47	D	F	ND	F	A	D	F	D	ND	E	ND	E	F	ND	E	B'	B'	G	D	E	ND	E	D	E	E	F
P-107	RAW- 55-47	D	F	ND	F	A	D	F	D	ND	E	ND	E	F	ND	E	B'	B'	G	D	E	ND	F	D	E	E	F
P-106	RAW- 54-47	D	F	ND	F	A	D	ND	D	ND	E	E	D	F	ND	E	B'	B'	G	D	E	F	E	D	E	E	F
P-105	RAW- 53-47	D	F	ND	F	A	D	E	D	ND	E	ND	E	F	ND	E	B'	B'	G	D	E	F	E	D	E	E	F
P-104	RAW- 52-47	D	F	ND	ND	A	D	F	D	ND	E	E	E	F	ND	E	B'	B'	G	D	E	ND	E	D	E	E	F
P-103	VEM-493-47	B'	F	F	F	B'	D	F	D	ND	F	ND	E	E	ND	F	B'	A	G	D	D	ND	E	E	F	E	F
P-102	VEM-492-47	D	G	F	F	B'	D	F	D	ND	F	ND	E	E	ND	ND	B'	A	G	D	D	ND	E	E	F	F	F
P-101	VEM-491-47	D	G	F	F	B'	D	F	D	ND	F	ND	E	E	ND	ND	B'	A	G	D	D	ND	E	D	F	F	F
P-100	VEM-490-47	D	G	F	F	B'	D	F	D	ND	E	ND	E	F	ND	F	B'	A	G	D	D	ND	E	D	E	F	F
P- 99	VEM-489-47	B'	E	F	F	B'	D	F	D	F	F	F	E	E	ND	F	B'	A	G	D	D	ND	E	D	F	E	E
P- 98	VEM-488-47	B'	E	F	F	B'	D	F	B'	F	F	F	E	E	ND	E	D	A	G	D	E	ND	E	D	F	E	E
P- 97	VEM-487-47	B'	E	F	F	B'	D	F	D	F	F	F	E	E	ND	F	D	A	G	D	E	ND	E	D	F	E	F
P- 96	VEM-486-47	B'	F	F	E	B'	D	F	D	ND	F	ND	E	E	ND	F	B'	A	G	D	D	ND	E	E	F	E	F
P- 95	VEM-485-47	D	F	F	E	B'	D	F	D	ND	F	ND	E	F	ND	F	B'	A	G	D	D	ND	E	D	F	E	F
P- 94	VEM-484-47	D	G	F	E	B'	D	F	D	ND	F	ND	E	F	ND	F	B'	A	G	D	D	ND	E	D	F	E	F
P- 93	VEM-483-47	D	F	F	E	B'	D	F	D	ND	F	ND	E	F	ND	E	B'	A	G	D	D	ND	E	D	F	E	F
P- 92	VEM-482-47	D	G	F	E	B'	D	F	D	ND	F	ND	E	F	ND	F	B'	A	G	D	D	ND	E	D	F	E	F
P- 91	VEM-481-47	B'	F	F	E	A	D	E	D	ND	E	E	D	F	ND	E	B'	B'	F	D	E	ND	E	D	E	E	F
P- 90	VEM-480-47	B'	F	F	E	A	D	E	D	ND	E	E	D	F	F	E	B'	B'	F	D	E	ND	E	D	E	E	F
P- 89	VEM-479-47	B'	F	F	E	A	D	E	D	ND	E	E	D	F	F	E	B'	B'	F	D	E	ND	E	D	E	E	F
P- 88	VEM-478-47	B'	F	F	E	A	D	E	D	ND	F	E	D	F	ND	E	B'	B'	F	D	E	F	E	D	E	E	F
P- 87	VEM-477-47	B'	F	F	E	A	D	E	D	ND	F	E	D	F	ND	E	B'	B'	F	D	E	ND	E	D	E	E	F
P- 86	VEM-476-47	B'	E	F	E	A	D	E	D	ND	E	E	D	F	F	E	B'	B'	F	D	E	ND	E	D	E	E	F
P- 85	VEM-475-47	B'	E	F	E	A	D	E	D	ND	E	E	D	F	F	ND	B'	B'	F	D	E	ND	E	D	E	E	F

P- 84	VEM-474-47	B'	F	F	E	A	D	E	D	ND	E	ND	D	F	F	E	B'	B'	F	D	E	ND	E	D	E	E	F
P- 83	VEM-473-47	B'	F	F	E	A	D	E	D	ND	E	E	D	F	F	E	B'	B'	F	D	E	ND	E	D	E	E	F
Beds P-82 through P-1 not analyzed.																											

¹ B' is equivalent to B and C of Bureau of Mines analyses as recorded in other reports.

SOUTH DRY VALLEY, IDAHO. LOT NO. 1211.

Phosphatic shale member of Phosphoria formation sampled in two bulldozer trenches near south end of Dry Valley, NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 14, T. 9 S., R. 44 E., Caribou County, Idaho, on west limb of Schmid syncline. Beds strike N. 55° W. and dip 45° NE. Section measured by R. M. Campbell, R. A. Gulbrandsen, V. E. McKelvey, H. Wedow, and R. A. Weeks and sampled by Campbell and Weeks in September and October 1947. Samples analyzed by U. S. Bureau of Mines Laboratory, Albany, Oregon.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)						Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)
				P ₂ O ₅	Al ₂ O ₃	Fe ₂ O ₃	F	Loss on ignition	Acid insoluble		
Rex member of Phosphoria formation											
R- 4	Chert		12.0	--	--	--	--	--	--	12.0	--
R- 3	Chert	1020-HW	4.4	0.3	--	--	--	--	87.9	16.4	1.32
R- 2	Mudstone	1019-HW	0.3	0.5	--	--	--	--	71.4	16.7	1.47
R- 1	Chert	1018-HW	4.4	0.5	--	--	--	--	86.3	21.1	3.67
Phosphatic shale member of Phosphoria formation											
P-182	Phosphate rock, argillaceous; fos. col. no. 47-HW-288 ¹	1017-HW	0.5	23.8	--	--	--	--	32.3	0.5	11.90
P-181	Phosphate rock, argillaceous; fos. col. no. 47-HW-287	1016-HW	0.4	25.2	--	--	2.2	--	29.3	0.9	21.98
P-180	Mudstone, phosphatic	1015-HW	0.4	8.6	--	--	--	--	57.3	1.3	25.42
P-179	Mudstone	1014-HW	0.9	2.5	--	--	--	--	76.9	2.2	27.67
P-178	Mudstone; fos. col. no. 47-HW-286	1013-HW	1.4	5.2	--	--	--	--	65.3	3.6	34.95
P-177	Mudstone	1012-HW	1.5	1.9	--	--	--	--	75.4	5.1	37.80
P-176	Mudstone	1011-HW	0.4	2.9	--	--	--	--	72.0	5.5	38.96
P-175	Mudstone	1010-HW	1.1	0.9	--	--	--	--	79.9	6.6	39.95
P-174	Mudstone	1009-HW	2.7	0.7	--	--	--	--	79.9	9.3	41.84
P-173	Mudstone; fos. col. no. 47-HW-285	1008-HW	1.2	1.3	--	--	--	--	78.8	10.5	43.40
P-172	Mudstone; fos. col. no. 47-HW-284	1007-HW	0.8	4.5	--	--	--	--	67.8	11.3	47.00
P-171	Mudstone; fos. col. no. 47-HW-283	1006-HW	1.4	4.8	--	--	--	--	73.5	12.7	53.72
P-170	Mudstone; fos. col. no. 47-HW-282	1005-HW	0.5	5.6	--	--	--	--	74.1	13.2	56.52
P-169	Mudstone	1004-HW	1.7	0.9	--	--	--	--	84.7	14.9	58.05
P-168	Mudstone	1003-HW	1.3	6.8	--	--	--	--	66.2	16.2	66.89
P-167	Phosphate rock	1002-HW	0.8	30.9	--	--	--	--	16.0	17.0	91.61
P-166	Mudstone	1001-HW	1.8	3.5	--	--	--	--	72.4	18.8	97.91
P-165	Mudstone; fos. col. no. 47-HW-281	RAG-123-47	1.45	0.6	--	--	--	--	80.8	20.25	98.78
P-164	Mudstone	RAG-122-47	0.69	1.4	--	--	--	--	76.7	20.94	99.75
P-163	Phosphate rock	RAG-121-47	0.52	34.9	0.87	0.39	3.37	2.04	7.9	21.46	117.89
P-162	Phosphate rock	RAG-120-47	0.25	34.0	2.2	0.93	--	4.34	5.9	21.71	126.39
P-161	Phosphate rock	RAG-119-47	0.42	35.9	1.4	0.51	--	3.14	5.0	22.13	141.47
P-160	Phosphate rock	RAG-118-47	0.5	33.8	2.2	0.85	--	4.90	6.1	22.63	158.37
P-159	Phosphate rock and phosphatic mudstone	RAG-117-47	1.0	33.2	1.4	0.70	--	2.58	11.0	23.63	191.57

P-158	Mudstone, phosphatic	RAG-116-47	0.98	9.0	11.	3.29	--	3.34	61.8	24.61	200.39
P-157	Mudstone and argillaceous phosphate rock	RAG-115-47	0.74	24.8	5.7	2.15	2.53	3.46	27.4	25.35	218.74
P-156	Phosphate rock	RAG-114-47	0.6	32.5	2.2	1.10	--	2.84	12.9	25.95	238.24
P-155	Mudstone, phosphatic and phosphate rock	RAG-113-47	1.13	20.3	6.7	2.16	--	4.44	36.1	27.08	261.18
P-154	Phosphate rock	RAG-112-47	0.8	32.0	2.3	1.05	--	2.90	13.1	27.88	286.78
P-153	Mudstone, phosphatic and phosphate rock	RAG-111-47	0.79	12.6	9.2	2.76	--	4.82	54.0	28.67	296.74
P-152	Phosphate rock	RAW-104-47	0.8	34.4	1.8	0.74	--	3.20	7.2	29.47	324.26
--	Phosphate rock	RAG-110-47	(0.82)	35.3	--	--	--	--	6.0	--	--
P-151	Phosphate rock and phosphatic mudstone	RMC-96-47	0.5	26.4	4.5	1.48	--	5.56	22.6	29.97	337.46
--	Phosphate rock	RAG-109-47	(0.45)	32.0	--	--	--	--	14.4	--	--
RAG-109-47 and RAG-110-47 are logged as equivalent to RMC-96-47 and RAW-104-47.											
P-150	Phosphate rock and argillaceous phosphate rock	RMC-95-47	0.7	30.9	2.7	0.98	--	4.16	14.6	30.67	359.09
P-149	Phosphate rock	RMC-94-47	0.5	30.4	2.6	1.02	--	4.06	15.7	31.17	374.29
P-148	Mudstone, phosphatic; fos. col. no. 47-HW-280	RMC-93-47	0.5	11.8	8.3	2.71	--	6.32	57.1	31.67	380.19
P-147	Mudstone	RMC-92-47	0.5	5.2	11.	3.33	--	4.64	73.5	32.17	382.79
P-146	Mudstone, phosphatic	RMC-91-47	0.7	10.5	9.2	2.60	--	5.02	47.1	32.87	390.14
P-145	Phosphate rock and phosphatic mudstone	VEM-608-47	0.7	27.6	3.7	1.27	--	5.52	20.0	33.57	409.46
P-144	Phosphate rock and phosphatic mudstone	VEM-607-47	1.7	18.8	6.6	2.31	--	5.80	38.9	35.27	441.42
P-143	Mudstone	VEM-606-47	0.8	6.8	11.	3.90	--	8.74	63.3	36.07	446.86
P-142	Phosphate rock and phosphatic mudstone	VEM-605-47	0.6	27.1	3.8	1.32	--	5.92	20.5	36.67	463.12
P-141	Phosphate rock	VEM-604-47	0.6	33.9	1.4	0.58	--	5.14	8.0	37.27	483.46
P-140	Phosphate rock	VEM-603-47	0.8	31.1	2.2	0.88	--	12.48	11.2	38.07	508.34
P-139	Phosphate rock	VEM-602-47	1.1	30.8	2.6	1.06	--	6.06	12.0	39.77	560.70
P-138	Phosphate rock	RMC-132-47	0.5	31.6	2.3	0.84	--	5.72	11.5	40.27	576.50
P-137	Phosphate rock, argillaceous	RMC-131-47	0.7	23.4	5.3	2.28	--	9.34	24.7	40.97	592.88
P-136	Phosphate rock, argillaceous, calcareous	RMC-130-47	0.5	15.6	7.8	2.61	--	15.90	35.4	41.47	600.68
P-135	Phosphate rock, argillaceous, calcareous	RMC-129-47	1.0	18.4	6.1	2.14	--	14.28	30.9	42.47	619.08
P-134	Phosphate rock and argillaceous phosphate rock	RMC-128-47	0.8	22.2	5.0	1.89	--	12.86	24.5	43.27	636.84
P-133	Phosphate rock	RMC-127-47	0.8	25.8	3.4	1.48	--	13.88	16.1	44.07	657.48
P-132	Phosphate rock	RMC-126-47	1.1	27.6	2.7	1.3	--	9.48	14.6	45.17	687.84
P-131	Mudstone, phosphatic; fos. col. no. 47-HW-279	RMC-125-47	0.7	23.5	5.2	2.57	--	9.78	25.2	45.87	704.29

¹ Fossil collection made by H. Wedow, Paleontology and Stratigraphy Branch, U. S. Geological Survey.

P- 95	Phosphate rock, argillaceous	VEM-599-47	0.5	22.3	--	--	--	--	34.9	80.57	1,062.47
P- 94	Mudstone, phosphatic	VEM-598-47	0.8	9.6	--	--	--	--	62.1	81.37	1,070.15
P- 93	Mudstone, phosphatic	VEM-597-47	0.7	8.0	--	--	--	--	64.3	82.07	1,075.75
P- 92	Mudstone	VEM-596-47	0.6	5.8	--	--	--	--	65.8	82.67	1,079.23
P- 91	Mudstone	VEM-595-47	0.4	3.3	--	--	--	--	68.0	83.07	1,080.55
P- 90	Phosphate rock, mudstone, and phosphatic mudstone	VEM-594-47	0.9	8.3	--	--	--	--	63.7	83.97	1,088.02
P- 89	Mudstone, phosphatic	VEM-593-47	0.8	8.4	--	--	--	--	66.8	84.77	1,094.74
P- 88	Mudstone	VEM-592-47	2.8	5.1	--	--	--	--	74.6	87.57	1,109.02
P- 87	Phosphate rock, mudstone, and phosphatic mudstone	VEM-591-47	0.9	15.0	--	--	--	--	47.7	88.47	1,122.52
P- 86	Mudstone; fos. col. no. 47-HW-269	VEM-590-47	1.4	3.5	--	--	--	--	79.8	89.87	1,127.42
P- 85	Mudstone, phosphatic	VEM-589-47	1.4	9.1	--	--	--	--	61.2	91.27	1,140.16
P- 84	Mudstone and argillaceous phosphate rock	VEM-588-47	1.4	7.2	--	--	--	--	67.3	92.67	1,150.24
P- 83	Phosphate rock and phosphatic mudstone	VEM-587-47	0.6	14.6	--	--	--	--	48.4	93.27	1,159.00
P- 82	Mudstone, phosphatic	VEM-586-47	0.5	8.5	--	--	--	--	48.3	93.77	1,163.25
P- 81	Mudstone, phosphatic and mudstone; fos. col. no. 47-HW-268	VEM-585-47	2.3	7.0	--	--	--	--	66.7	96.07	1,179.35
P- 80	Phosphate rock, argillaceous, and phosphatic mudstone	VEM-584-47	0.8	13.6	--	--	--	--	57.2	96.87	1,190.23
P- 79	Mudstone; fos. col. no. 47-HW-267	VEM-583-47	2.7	0.9	--	--	--	--	87.5	99.57	1,192.66
P- 78	Mudstone and phosphate rock	VEM-582-47	0.9	13.9	--	--	--	--	56.3	100.47	1,205.17
P- 77	Mudstone	VEM-581-47	1.3	4.9	--	--	--	--	78.8	101.77	1,211.54
P- 76	Mudstone	VEM-580-47	2.1	0.7	--	--	--	--	86.9	103.87	1,213.01
P- 75	Mudstone	VEM-579-47	1.1	1.4	--	--	--	--	87.0	104.97	1,214.55
P- 74	Phosphate rock, argillaceous	VEM-578-47	0.3	23.6	--	--	--	--	31.1	105.27	1,221.63
P- 73	Mudstone	VEM-577-47	2.3	7.2	--	--	--	--	71.7	107.57	1,238.19
P- 72	Mudstone and phosphate rock	VEM-576-47	1.2	8.4	--	--	--	--	67.9	108.77	1,248.27
P- 71	Mudstone	VEM-575-47	1.0	1.2	--	--	--	--	87.6	109.77	1,249.47
P- 70	Phosphate rock	VEM-574-47	1.6	31.4	--	--	--	--	12.7	111.37	1,299.71
P- 69	Mudstone	VEM-573-47	1.2	5.2	--	--	--	--	76.5	112.57	1,305.95
P- 68	Phosphate rock, argillaceous	VEM-572-47	1.4	21.3	--	--	--	--	38.3	113.97	1,335.77
P- 67	Mudstone	VEM-571-47	1.0	6.5	--	--	--	--	73.9	114.97	1,342.27
P- 66	Phosphate rock and mudstone	VEM-570-47	1.4	7.6	--	--	--	--	65.3	116.37	1,352.91
P- 65	Mudstone	VEM-569-57	0.9	7.5	--	--	--	--	65.3	117.27	1,359.66
P- 64	Mudstone, phosphatic	VEM-568-47	0.8	9.1	--	--	--	--	61.9	118.07	1,366.94
P- 63	Phosphate rock, argillaceous	VEM-567-47	2.0	20.0	--	--	--	--	28.6	120.07	1,406.94
P- 62	Mudstone, phosphatic	VEM-566-47	1.5	9.9	--	--	--	--	55.8	121.57	1,421.79
P- 61	Mudstone	VEM-565-47	0.8	3.7	--	--	--	--	73.8	122.37	1,424.75
P- 60	Phosphate rock, argillaceous	VEM-564-47	0.9	15.1	--	--	--	--	37.8	123.27	1,438.34
P- 59	Mudstone, phosphatic	VEM-563-47	1.2	14.4	--	--	--	--	46.3	124.47	1,455.62
P- 58	Phosphate rock, argillaceous	VEM-562-47	1.1	16.8	--	--	--	--	37.9	125.57	1,474.10

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)						Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)
				P ₂ O ₅	Al ₂ O ₃	Fe ₂ O ₃	F	Loss on ignition	Acid insoluble		
P- 57	Mudstone	VEM-561-47	1.5	2.8	--	--	--	--	70.5	127.07	1,478.30
P- 56	Mudstone, phosphatic	VEM-560-47	1.2	8.5	--	--	--	--	60.3	128.27	1,488.50
P- 55	Mudstone	RAW- 87-47	0.6	1.5	--	--	--	--	81.7	128.87	1,489.40
P- 54	Mudstone and chert; fos. col. no. 47-HW-266	RAW- 86-47	0.8	0.9	--	--	--	--	91.7	129.67	1,490.12
P- 53	Mudstone; fos. col. no. 47-HW-265	RAW- 85-47	1.7	3.2	--	--	--	--	80.7	131.37	1,495.56
P- 52	Mudstone	RAW- 84-47	0.9	1.5	--	--	--	--	84.2	132.27	1,496.91
P- 51	Mudstone, phosphatic	RAW- 83-47	0.9	8.8	--	--	--	--	64.2	133.17	1,504.83
P- 50	Mudstone; fos. col. no. 47-HW-264	RAW- 82-47	2.1	5.2	--	--	--	--	75.2	135.27	1,515.75
P- 49	Mudstone	RAW- 81-47	1.6	0.7	--	--	--	--	89.6	136.87	1,516.87
P- 48	Mudstone, phosphatic	RAW- 80-47	1.9	11.6	--	--	--	--	57.1	138.77	1,538.91
P- 47	Mudstone; fos. col. no. 47-HW-263	RAW- 79-47	1.2	7.8	--	--	--	--	68.8	139.97	1,548.27
P- 46	Mudstone	RAW- 78-47	0.7	3.4	--	--	--	--	82.0	140.67	1,550.65
P- 45	Mudstone, phosphatic; fos. col. no. 47-HW-262	RAW- 77-47	1.1	9.4	--	--	--	--	64.2	141.77	1,560.99
P- 44	Mudstone, phosphatic	RAW- 76-47	1.7	16.4	--	--	--	--	42.7	143.47	1,588.87
P- 43	Mudstone, phosphatic	RAW- 75-47	0.5	13.0	--	--	--	--	50.8	143.97	1,595.37
P- 42	Mudstone	RAW- 74-47	0.6	2.8	--	--	--	--	80.0	144.57	1,597.05
P- 41	Mudstone, phosphatic	VEM-559-47	1.8	16.0	--	--	--	--	40.9	146.37	1,625.85
P- 40	Mudstone, phosphatic	VEM 558-47	2.2	10.2	--	--	--	--	57.4	148.57	1,648.29
P- 39	Mudstone, phosphatic	VEM-557-47	2.6	11.5	--	--	--	--	53.0	151.17	1,678.19
P- 38	Phosphate rock, argillaceous	VEM-556-47	0.9	19.7	--	--	--	--	35.8	152.07	1,695.92
P- 37	Phosphate rock, argillaceous	VEM-555-47	0.8	18.2	--	--	--	--	38.9	152.87	1,710.48
P- 36	Phosphate rock and mudstone	VEM 554-47	1.0	22.9	--	--	--	--	24.9	153.87	1,733.38
P- 35	Phosphate rock	VEM-553-47	1.8	26.3	--	--	--	--	18.2	155.67	1,780.72
P- 34	Phosphate rock and mudstone	VEM-552-47	1.3	31.5	--	--	--	--	11.0	156.97	1,821.67
P- 33	Phosphate rock and mudstone	VEM-551-47	1.7	21.7	--	--	--	--	29.3	158.67	1,858.56
P- 32	Mudstone, phosphatic	VEM-550-47	1.3	11.0	--	--	--	--	52.0	159.97	1,872.86
P- 31	Mudstone, phosphatic; fos. col. no. 47-HW-261	VEM-549-47	1.6	12.0	--	--	--	--	53.3	161.57	1,892.06
P- 30	Mudstone, phosphatic	VEM-548-47	1.4	13.8	--	--	--	--	50.4	162.97	1,911.38
P- 29	Mudstone, phosphatic	VEM-547-47	1.7	12.8	--	--	--	--	52.8	164.67	1,933.14
P- 28	Mudstone, phosphatic	VEM-546-47	1.5	11.9	--	--	--	--	52.5	166.17	1,950.99
P- 27	Mudstone, phosphatic; fos. col. no. 47-HW-260	VEM-545-47	0.9	12.6	--	--	--	--	52.2	167.07	1,962.33
P- 26	Limestone, argillaceous	VEM-544-47	1.5	1.2	--	--	--	--	26.5	168.57	1,964.13
P- 25	Mudstone, calcareous	VEM-543-47	1.0	4.6	--	--	0.39	--	44.5	169.57	1,968.73
P- 24	Phosphate rock, argillaceous	VEM-542-47	2.2	24.1	3.1	1.25	--	8.12	24.8	171.77	2,021.75
P- 23	Phosphate rock, argillaceous	VEM-541-47	1.7	25.5	2.4	1.08	2.35	9.14	20.8	173.47	2,065.10
P- 22	Phosphate rock, argillaceous	VEM-540-47	0.6	20.4	5.5	1.81	--	7.22	34.9	174.07	2,077.34
P- 21	Mudstone, phosphatic	VEM-539-47	0.4	15.0	6.2	2.09	1.52	7.28	48.7	174.47	2,083.34

P- 20	Mudstone, phosphatic	VEM-538-47	1.2	14.1	6.9	2.30	1.52	6.96	49.6	175.67	2,100.26
P- 19	Mudstone	VEM-537-47	0.4	6.3	9.7	3.17	0.62	5.36	70.7	176.07	2,102.78
P- 18	Phosphate rock, argillaceous; fos. col. no. 47-HW-247	VEM-536-47	1.8	27.1	--	--	--	6.48	21.7	177.87	2,151.56
P- 17	Phosphate rock	VEM-535-47	1.7	28.6	2.5	1.02	--	6.12	18.8	179.57	2,200.18
P- 16	Phosphate rock	VEM-534-47	1.9	29.1	2.9	1.07	--	6.54	19.2	181.47	2,255.47
P- 15	Mudstone, phosphatic	VEM-533-47	0.5	12.8	8.0	2.40	--	6.64	54.0	181.97	2,261.87
P- 14	Phosphate rock, argillaceous	VEM-532-47	0.7	26.9	4.1	1.25	--	5.70	22.2	182.67	2,280.70
P- 13	Mudstone, phosphatic	VEM-531-47	0.5	15.9	6.9	2.31	1.59	7.44	43.9	183.17	2,288.65
P- 12	Phosphate rock, argillaceous; fos. col. no. 47-HW-246	VEM-530-47	2.4	24.5	3.9	1.21	--	6.50	26.2	185.57	2,347.45
P- 11	Phosphate rock, argillaceous	VEM-529-47	0.8	21.4	5.9	2.46	--	5.34	33.9	186.37	2,364.57
P- 10	Phosphate rock	VEM-528-47	1.6	33.2	1.0	0.54	2.84	6.02	6.4	187.97	2,417.69
P- 9	Phosphate rock	VEM-527-47	1.2	32.7	1.4	0.66	--	5.98	6.0	189.17	2,456.93
P- 8	Phosphate rock	VEM-526-47	1.3	33.7	1.2	0.56	--	5.64	4.4	190.47	2,500.74
P- 7	Phosphate rock	VEM-525-47	1.5	33.4	0.53	0.44	--	7.08	4.9	191.97	2,550.84
P- 6	Phosphate rock	VEM-524-47	0.7	32.3	1.7	0.82	--	5.86	8.4	192.67	2,573.45
P- 5	Phosphate rock, argillaceous	VEM-523-47	1.0	25.4	4.5	1.27	--	6.46	22.9	193.67	2,598.85
P- 4	Mudstone	VEM-522-47	1.0	3.9	9.7	4.18	--	7.00	69.7	194.67	2,602.75
P- 3	Mudstone	VEM-521-47	2.5	1.2	10.	3.61	--	5.32	78.7	197.17	2,605.75
P- 2	Phosphate rock	VEM-520-47	0.6	33.7	1.4	0.66	3.33	4.06	7.2	197.77	2,625.97
P- 1	Phosphate rock and mudstone	VEM-519-47	0.6	26.2	5.1	2.32	--	5.02	19.0	198.37	2,641.69

Wells formation

Cw- 1	Dolomite; fos. col. no. 47-HW-244	VEM-518-47	3.2	1.0	--	--	--	--	4.8	3.2	3.20
Cw- 2	Phosphate rock	--	0.1	--	--	--	--	--	--	3.3	--
Cw- 3	Dolomite; fos. col. no. 47-HW-245	--	4.0	--	--	--	--	--	--	7.3	--

WEST DAIRY, IDAHO. LOT NO. 1208.

Phosphatic shale member and part of Rex member of Phosphoria formation sampled in bulldozer trench near SE corner of NE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 19, T. 9 S., R. 44 E., Caribou County, Idaho, on west limb of Dairy syncline. Beds strike N. 64° W. and dip 85° NE. Section measured by F. C. Armstrong, V. E. McKelvey, L. E. Smith, and R. A. Weeks and sampled by O. A. Payne and R. A. Smart in September 1947. Samples analyzed by U. S. Bureau of Mines Laboratory, Albany, Oregon.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)					Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)
				P ₂ O ₅	Al ₂ O ₃	Fe ₂ O ₃	Loss on ignition	Acid insoluble		
Rex member of Phosphoria formation—basal beds only										
R- 4	Mudstone and chert; fos. col. no. 47-HW-139 ¹	FCA-267-47	1.7	1.6	--	--	--	89.4	1.7	2.72
R- 3	Chert	FCA-268-47	1.0	0.5	--	--	--	93.9	2.7	3.22
R- 2	Mudstone and chert	FCA-269-47	0.25	1.7	--	--	--	90.1	2.95	3.65
R- 1	Chert, phosphatic	FCA-270-47	0.25	15.6	--	--	--	53.1	3.20	7.55
Phosphatic shale member of Phosphoria formation										
P-193	Mudstone, phosphatic	FCA-271-47	0.2	8.7	--	--	--	58.1	0.2	1.74
P-192	Mudstone	FCA-272-47	0.8	0.8	--	--	--	78.7	1.0	2.38
P-191	Mudstone, phosphatic	FCA-273-47	0.4	7.8	--	--	--	60.1	1.4	5.50
P-190	Mudstone	FCA-281-47	1.4	3.6	--	--	--	70.8	2.8	10.54
P-189	Mudstone; fos. col. no. 47-HW-140	FCA-280-47	2.9	1.3	--	--	--	75.0	5.7	14.31
P-188	Mudstone; fos. col. no. 47-HW-141	FCA-279-47	1.7	1.8	--	--	--	73.5	7.4	17.37
P-187	Mudstone; fos. col. no. 47-HW-142	FCA-278-47	0.5	3.7	--	--	--	70.2	7.9	19.22
P-186	Mudstone	FCA-277-47	0.9	3.2	--	--	--	75.5	8.8	22.10
P-185	Mudstone, phosphatic	FCA-276-47	0.35	15.7	--	--	--	46.9	9.15	27.66
P-184	Mudstone	FCA-275-47	1.4	1.7	--	--	--	77.0	10.55	29.98
P-183	Phosphate rock, argillaceous	FCA-274-47	0.35	19.0	--	--	--	37.1	10.90	36.63
P-182	Phosphate rock	RAW- 1-47	0.2	32.5	--	--	--	12.7	11.10	43.13
P-181	Mudstone	RAW- 2-47	1.1	2.8	--	--	--	73.0	12.20	46.21
P-180	Mudstone; fos. col. no. 47-HW-143	RAW- 3-47	0.9	0.6	--	--	--	79.3	13.10	46.75
P-179	Mudstone	RAW- 4-47	1.5	4.7	--	--	--	67.5	14.60	53.80
P-178	Mudstone; fos. col. no. 47-HW-144	RAW- 5-47	1.3	2.9	--	--	--	73.7	15.90	57.57
P-177	Phosphate rock	RAW- 6-47	0.5	30.5	--	--	--	15.3	16.40	72.82
P-176	Mudstone	RAW- 7-47	1.3	3.7	--	--	--	70.14	17.70	77.63
P-175	Mudstone; fos. col. no. 47-HW-145	RAW- 8-47	1.6	1.0	--	--	--	80.9	19.30	79.23
P-174	Phosphate rock	RAW- 9-47	0.5	32.3	1.8	0.40	4.98	11.4	19.80	95.38
P-173	Phosphate rock	RAW- 10-47	0.9	32.8	1.7	0.45	5.18	9.4	20.70	124.90
P-172	Phosphate rock	RAW- 11-47	0.5	33.3	2.2	0.33	5.30	8.7	21.20	141.55
P-171	Phosphate rock	RAW- 12-47	0.9	33.6	2.0	0.35	4.24	8.7	22.10	171.79
P-170	Mudstone, phosphatic	RAW- 13-47	0.7	14.5	7.8	2.50	6.62	48.6	22.80	181.94
P-169	Phosphate rock, argillaceous	RAW- 14-47	0.8	18.2	5.5	1.83	6.40	40.9	23.60	196.50

P-168	Phosphate rock, argillaceous	RAW- 15-47	0.9	20.2	5.0	1.65	5.80	36.6	24.50	214.68
P-167	Phosphate rock	RAW- 16-47	0.7	33.9	1.2	0.63	4.58	5.8	25.20	238.41
P-166	Phosphate rock and phosphatic mudstone	RAW- 17-47	1.0	16.9	7.3	2.00	5.88	44.5	26.20	255.31
P-165	Phosphate rock	VEM-304-47	0.3	33.8	1.5	0.70	4.24	9.0	26.50	265.45
P-164	Phosphate rock and argillaceous phosphate rock	VEM-303-47	1.0	25.9	3.2	1.15	5.20	25.6	27.50	291.35
P-163	Phosphate rock, argillaceous	VEM-302-47	0.8	26.1	3.9	1.26	6.86	21.0	28.30	312.23
P-162	Phosphate rock, argillaceous	VEM-301-47	1.3	20.5	5.2	1.75	6.20	37.0	29.60	338.88
P-161	Phosphate rock, argillaceous	VEM-300-47	0.3	20.9	6.6	1.85	7.60	32.3	29.90	345.15
P-160	Mudstone, phosphatic	VEM-299-47	0.9	11.4	9.5	2.91	8.24	53.3	30.80	355.41
P-159	Phosphate rock and phosphatic mudstone	VEM-298-47	0.7	12.6	8.07	2.73	8.32	50.3	31.50	364.23
P-158	Phosphate rock, argillaceous and phosphate rock	VEM-297-47	0.7	23.0	5.3	1.63	5.88	29.5	32.20	380.33
P-157	Phosphate rock	VEM-296-47	0.4	32.8	1.3	0.59	4.98	10.6	32.60	393.45
P-156	Phosphate rock	VEM-295-47	0.6	33.1	1.5	0.52	4.70	10.0	33.20	413.31
P-155	Phosphate rock	VEM-294-47	1.0	32.3	1.9	0.68	5.88	10.4	34.20	445.61
P-154	Phosphate rock	VEM-293-47	0.8	28.1	2.4	0.43	7.22	17.6	35.00	468.09
P-153	Phosphate rock, argillaceous	RAG- 131-47	1.0	20.1	5.7	1.68	13.7	27.4	36.00	488.19
P-152	Phosphate rock, argillaceous	RAG- 130-47	1.1	21.4	5.2	1.68	13.8	25.0	37.10	511.73
P-151	Phosphate rock, argillaceous	RAG- 129-47	1.5	23.1	4.4	1.58	13.1	21.5	38.60	546.38
P-150	Phosphate rock, argillaceous; fos. col. no. 47-HW-146	RAG- 128-47	1.0	21.9	5.1	1.70	13.0	26.3	39.60	568.28
P-149	Phosphate rock, argillaceous	RAG- 127-47	1.22	19.6	5.7	2.08	11.9	31.4	40.82	592.18
P-148	Mudstone, phosphatic	RAG- 126-47	1.05	15.5	--	--	--	39.2	41.87	608.48
P-147	Mudstone, phosphatic	RAG- 125-47	1.5	12.4	--	--	--	49.3	43.37	627.08
P-146	Mudstone	RAG- 108-47	0.95	7.0	--	--	--	68.6	44.32	633.73
P-145	Mudstone	RAG- 107-47	0.7	1.7	--	--	--	78.7	45.02	634.92
P-144	Mudstone, phosphatic; fos. col. no. 47-HW-175	RAG- 124-47	2.6	13.2	--	--	--	49.4	47.62	669.24
P-143	Mudstone, phosphatic	RMC- 89-47	1.2	13.0	--	--	--	53.1	48.82	684.84
P-142	Mudstone	RMC- 88-47	0.8	5.6	--	--	--	72.0	49.62	689.32
P-141	Mudstone, phosphatic	RMC- 87-47	1.1	7.9	--	--	--	66.6	50.72	698.01
P-140	Mudstone, phosphatic; fos. col. no. 47-HW-147	RMC- 86-47	0.7	12.3	--	--	--	55.7	51.42	706.62
P-139	Mudstone	RMC- 85-47	1.0	1.6	--	--	--	78.2	52.42	708.22
P-138	Mudstone, phosphatic	RMC- 84-47	2.4	8.5	--	--	--	70.6	54.82	728.62
P-137	Mudstone	RMC- 83-47	1.6	3.3	--	--	--	82.6	56.42	733.90
P-136	Mudstone, phosphatic	RMC- 82-47	0.9	10.9	--	--	--	63.2	57.32	743.71
P-135	Mudstone, phosphatic	VEM-310-47	0.7	12.6	--	--	--	56.0	58.02	752.53
P-134	Mudstone	VEM-309-47	2.3	7.7	--	--	--	71.0	60.32	770.24
P-133	Mudstone	VEM-308-47	1.8	5.5	--	--	--	75.5	62.12	780.14

¹ Fossil collection made by H. Wedow, Paleontology and Stratigraphy Branch, U. S. Geological Survey.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)					Cumulative Thick (feet)	Thickness x percent P ₂ O ₅ (cumulative)
				P ₂ O ₅	Al ₂ O ₃	Fe ₂ O ₃	Loss on ignition	Acid insoluble		
P-132	Mudstone	VEM-307-47	1.7	2.9	--	--	--	83.6	63.82	785.07
P-131	Mudstone	VEM-306-47	1.9	2.2	--	--	--	77.8	65.72	789.25
P-130	Mudstone	VEM-305-47	2.0	3.8	--	--	--	81.1	67.72	796.85
P-129	Mudstone, phosphatic	RAG-138-47	0.51	8.7	--	--	--	63.8	68.23	801.29
P-128	Phosphate rock, argillaceous	RAG-137-47	0.65	27.1	--	--	--	26.9	68.88	818.89
P-127	Mudstone, phosphatic	RAG-136-47	1.02	8.7	--	--	--	64.3	69.90	827.75
P-126	Mudstone	RAG-135-47	1.25	6.6	--	--	--	71.9	71.15	836.00
P-125	Mudstone and phosphatic mudstone	RAG-134-47	0.4	15.6	--	--	--	49.2	71.55	842.24
P-124	Mudstone; fos. col. no. 47-HW-148	RAG-133-47	2.15	6.5	--	--	--	71.2	73.70	856.23
P-123	Mudstone	RAG-132-47	0.6	3.5	--	--	--	71.4	74.30	858.33
P-122	Mudstone, phosphatic; fos. col. no. 47-HW-149	RAW-24-47	1.1	12.3	--	--	--	58.6	75.40	871.86
P-121	Mudstone	RAW-23-47	1.0	7.1	--	--	--	66.3	76.40	878.96
P-120	Mudstone, phosphatic; fos. col. no. 47-HW-150	RAW-22-47	0.8	9.1	--	--	--	65.2	77.20	886.24
P-119	Mudstone, phosphatic; fos. col. no. 47-HW-150	RAW-21-47	0.3	17.9	--	--	--	46.6	77.50	891.61
P-118	Mudstone, phosphatic	RAW-20-47	1.3	11.0	--	--	--	54.6	78.80	905.91
P-117	Mudstone; fos. col. no. 47-HW-151	RAW-19-47	1.2	4.7	--	--	--	73.2	80.00	911.55
P-116	Mudstone, phosphatic	RAW-18-47	1.3	14.9	--	--	--	52.0	81.30	930.92
P-115	Mudstone	FCA-288-47	1.2	1.0	--	--	--	28.0	82.50	932.12
P-114	Mudstone	FCA-287-47	1.3	3.4	--	--	--	80.3	83.80	936.54
P-113	Mudstone	FCA-286-47	0.9	0.6	--	--	--	90.5	84.70	937.08
P-112	Mudstone, phosphatic	FCA-285-47	0.4	17.3	--	--	--	45.1	85.10	944.00
P-111	Mudstone	FCA-284-47	1.7	3.0	--	--	--	82.5	86.80	949.10
P-110	Mudstone	FCA-283-47	0.8	4.7	--	--	--	76.7	87.60	952.86
P-109	Mudstone	FCA-282-47	1.0	0.8	--	--	--	89.8	88.60	953.66
P-108	Phosphate rock, argillaceous	RMC-81-47	0.3	29.1	--	--	--	20.0	88.90	962.39
P-107	Mudstone	RMC-80-47	0.75	3.7	--	--	--	78.3	89.65	965.17
P-106	Phosphate rock, argillaceous	RAG-106-47	0.3	23.6	--	--	--	32.8	89.95	972.25
P-105	Phosphate rock, argillaceous	RAG-105-47	0.8	0.2	--	--	--	91.4	90.75	972.41
P-104	Mudstone, phosphatic	RAG-104-47	0.4	8.0	--	--	--	69.4	91.15	975.61
P-103	Mudstone; fos. col. no. 47-HW-136	RAG-103-47	0.75	0.4	--	--	--	90.0	91.90	975.91
P-102	Mudstone, phosphatic	RAG-102-47	0.75	11.0	--	--	--	62.6	92.65	984.16
P-101	Mudstone	RAG-101-47	1.05	2.8	--	--	--	82.0	93.70	987.10
P-100	Phosphate rock	RAG-100-47	0.9	32.3	--	--	--	12.2	94.60	1,016.17
P-99	Mudstone and phosphatic mudstone	RAG-99-47	0.85	9.1	--	--	--	69.4	95.45	1,023.91
P-98	Phosphate rock	VEM-288-47	0.9	33.5	--	--	--	9.9	96.35	1,054.06
P-97	Mudstone	VEM-287-47	3.8	0.9	--	--	--	89.4	100.15	1,057.48
P-96	Mudstone and phosphate rock	VEM-286-47	0.8	10.6	--	--	--	62.3	100.95	1,065.96
P-95	Phosphate rock, cherty	VEM-285-47	1.3	27.0	--	--	--	25.8	102.25	1,069.47

P- 94	Phosphate rock, sandy; fos. col. no. 47-HW-135	RMC- 75-47	0.4	28.0	--	--	--	23.0	102.65	1,080.67
P- 93	Mudstone, phosphatic	RMC- 74-47	0.4	15.4	--	--	--	47.6	103.05	1,086.83
P- 92	Mudstone, phosphatic; fos. col. no. 47-HW-137	RMC- 73-47	0.9	9.2	--	--	--	65.9	103.95	1,095.11
P- 91	Mudstone, phosphatic and phosphate rock; fos. col. no. 47-HW-134	RMC- 72-47	0.3	9.7	--	--	--	61.1	104.25	1,098.02
P- 90	Mudstone and phosphatic mudstone	RMC- 71-47	0.7	6.0	--	--	--	70.5	104.95	1,102.22
P- 89	Mudstone, phosphatic	RMC- 79-47	0.25	8.6	--	--	--	53.9	105.20	1,104.37
P- 88	Mudstone	RMC- 78-47	0.5	3.9	--	--	--	74.7	105.70	1,106.32
P- 87	Mudstone	RMC- 77-47	0.4	1.6	--	--	--	81.9	106.10	1,106.96
P- 86	Mudstone and phosphatic mudstone	RMC- 76-47	1.0	7.7	--	--	--	64.3	107.10	1,114.66
P- 85	Phosphate rock, argillaceous	FCA- 266-47	0.9	23.2	--	--	--	25.0	108.00	1,135.54
P- 84	Mudstone, phosphatic	FCA- 265-47	0.5	12.1	--	--	--	54.0	108.50	1,141.59
P- 83	Mudstone, phosphatic	FCA- 264-47	0.9	15.1	--	--	--	41.2	109.40	1,155.18
P- 82	Mudstone	FCA- 263-47	0.9	4.7	--	--	--	69.6	110.30	1,159.41
P- 81	Phosphate rock, argillaceous	FCA- 262-47	0.4	15.2	--	--	--	38.1	110.70	1,165.49
P- 80	Phosphate rock, argillaceous	FCA- 261-47	0.4	19.7	--	--	--	30.3	111.10	1,173.37
P- 79	Mudstone, phosphatic	FCA- 260-47	1.8	13.7	--	--	--	44.0	112.90	1,198.03
P- 78	Mudstone, phosphatic; fos. col. no. 47-HW-133	FCA- 259-47	1.6	10.3	--	--	--	55.0	114.50	1,214.51
P- 77	Mudstone	RAG- 98-47	1.45	3.8	--	--	--	75.0	115.95	1,220.01
P- 76	Mudstone	RAG- 97-47	0.28	0.5	--	--	--	93.8	116.23	1,220.15
P- 75	Chert	RAG- 96-47	0.35	0.7	--	--	--	93.3	116.58	1,220.40
P- 74	Mudstone	RAG- 95-47	0.63	2.1	--	--	--	85.1	117.21	1,221.72
P- 73	Mudstone	RAG- 94-47	0.75	4.1	--	--	--	74.3	117.96	1,224.80
P- 72	Mudstone	RAG- 93-47	1.8	3.5	--	--	--	73.8	119.76	1,231.10
P- 71	Mudstone	RAG- 92-47	0.69	4.1	--	--	--	71.8	120.45	1,233.92
P- 70	Mudstone	RAG- 91-47	1.6	1.1	--	--	--	84.8	122.05	1,235.68
P- 69	Mudstone and phosphate rock	RMC- 70-47	0.63	3.5	--	--	--	76.9	122.68	1,237.89
P- 68	Mudstone and phosphate rock	RMC- 69-47	0.8	8.0	--	--	--	59.2	123.48	1,244.29
P- 67	Mudstone; fos. col. no. 47-HW-132	RMC- 68-47	1.4	3.2	--	--	--	79.0	124.88	1,248.77
P- 66	Mudstone	RMC- 67-47	0.5	4.4	--	--	--	77.2	125.38	1,250.97
P- 65	Mudstone, phosphatic	RMC- 66-47	0.5	8.7	--	--	--	61.8	125.88	1,255.32
P- 64	Mudstone	RMC- 65-47	1.0	1.2	--	--	--	85.5	126.88	1,256.52
P- 63	Mudstone	RMC- 64-47	0.7	0.6	--	--	--	86.3	127.58	1,256.94
P- 62	Mudstone, phosphatic	FCA- 258-47	1.7	8.7	--	--	--	59.5	129.28	1,271.73
P- 61	Mudstone, phosphatic	FCA- 257-47	1.4	12.0	--	--	--	52.7	130.68	1,288.53
P- 60	Mudstone	FCA- 256-47	0.85	4.6	--	--	--	74.8	131.53	1,292.44
P- 59	Mudstone	FCA- 255-47	0.7	5.6	--	--	--	68.5	132.23	1,296.36
P- 58	Mudstone, phosphatic	FCA- 254-47	0.5	8.7	--	--	--	63.4	132.73	1,300.71
P- 57	Mudstone, phosphatic	FCA- 253-47	1.0	11.0	--	--	--	56.5	133.73	1,311.71
P- 56	Mudstone, phosphatic	FCA- 252-47	2.0	15.1	--	--	--	45.6	135.73	1,341.91
P- 55	Mudstone, phosphatic	FCA- 251-47	1.1	11.5	--	--	--	53.7	136.83	1,354.56

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)					Cumulative thickness (feet)	Thickness x percent P_2O_5 (cumulative)
				P_2O_5	Al_2O_3	Fe_2O_3	Loss on ignition	Acid insoluble		
P- 54	Mudstone, phosphatic	VEM-284-47	1.4	11.9	--	--	--	55.0	138.23	1,371.22
P- 53	Mudstone, phosphatic	VEM-283-47	1.1	12.4	--	--	--	53.0	139.33	1,384.86
P- 52	Mudstone, phosphatic	VEM-282-47	1.5	14.7	--	--	--	46.9	140.83	1,406.91
P- 51	Mudstone, phosphatic	VEM-281-47	2.0	11.2	--	--	--	56.1	142.83	1,429.31
P- 50	Mudstone, phosphatic	VEM-280-47	2.0	13.5	--	--	--	50.3	144.83	1,456.31
P- 49	Phosphate rock, argillaceous	VEM-279-47	0.9	21.6	7.5	2.83	5.06	34.7	145.73	1,475.75
P- 48	Phosphate rock	VEM-278-47	0.8	28.1	5.2	1.75	3.94	19.4	146.53	1,498.23
P- 47	Phosphate rock	VEM-277-47	0.7	31.4	1.1	0.15	3.22	14.2	147.23	1,520.21
P- 46	Phosphate rock	VEM-276-47	0.5	35.3	2.0	1.13	2.20	6.7	147.73	1,537.86
P- 45	Phosphate rock, argillaceous	VEM-275-47	0.3	27.6	4.4	2.60	4.18	20.9	148.03	1,546.14
P- 44	Phosphate rock and mudstone	LES- 225-47	0.75	18.6	7.8	3.31	6.38	38.3	148.78	1,560.09
P- 43	Phosphate rock	LES- 424-47	0.5	31.6	2.4	1.66	5.02	12.1	149.28	1,575.89
P- 42	Phosphate rock	LES- 423-47	0.8	33.5	2.7	1.2	3.02	10.6	150.08	1,602.69
P- 41	Phosphate rock and mudstone	LES- 422-47	1.0	24.0	7.3	1.99	6.34	27.9	151.08	1,626.69
P- 40	Phosphate rock	LES- 421-47	1.15	30.8	1.6	1.28	3.94	16.2	152.23	1,662.11
P- 39	Mudstone, phosphatic, and argillaceous phosphate rock	LES- 420-47	0.85	17.6	7.1	2.55	7.06	41.8	153.08	1,677.06
P- 38	Phosphate rock and phosphatic mudstone	LES- 419-47	0.5	21.3	4.7	2.34	6.68	33.4	153.58	1,687.71
P- 37	Mudstone, phosphatic	LES- 418-47	0.45	16.4	6.7	2.52	6.28	48.1	154.03	1,695.09
P- 36	Mudstone, phosphatic	LES- 417-47	0.9	11.4	--	--	--	57.5	154.93	1,705.35
P- 35	Mudstone, phosphatic	LES- 416-47	2.2	13.8	--	--	--	50.8	157.13	1,735.71
P- 34	Mudstone, phosphatic; fos. col. no. 47-HW-131	LES- 415-47	0.45	10.4	--	--	--	56.9	157.58	1,740.39
P- 33	Mudstone, phosphatic	LES- 414-47	0.65	14.4	--	--	--	49.3	158.23	1,749.75
P- 32	Mudstone, phosphatic	LES- 413-47	0.65	7.8	--	--	--	64.4	158.88	1,754.82
P- 31	Mudstone	LES- 412-47	0.5	2.7	--	--	--	77.2	159.38	1,756.17
P- 30	Mudstone, phosphatic	LES- 411-47	0.3	15.2	--	--	--	46.8	159.68	1,760.73
P- 29	Phosphate rock and mudstone; fos. col. no. 47-HW-138	RMC- 63-47	0.9	22.2	4.3	1.50	5.86	32.5	160.58	1,780.71
P- 28	Phosphate rock and mudstone	RMC- 62-47	1.3	28.9	0.66	0.28	5.04	17.3	161.88	1,818.28
P- 27	Phosphate rock	RMC- 61-47	0.75	29.5	2.8	0.83	4.64	17.6	162.63	1,840.43
P- 26	Phosphate rock, argillaceous	FCA-250-47	0.4	25.6	4.2	1.29	4.78	26.5	163.03	1,850.67
P- 25	Phosphate rock, argillaceous	FCA-249-47	0.9	27.2	3.6	1.42	4.78	23.7	163.93	1,875.15
P- 24	Mudstone, phosphatic	FCA-248-47	1.3	14.2	7.8	1.99	6.90	51.4	165.23	1,893.61
P- 23	Phosphate rock	FCA-247-47	1.25	29.2	2.7	1.12	6.34	17.0	166.48	1,928.65
P- 22	Phosphate rock, argillaceous	FCA-246-47	1.05	26.7	3.6	1.26	6.34	24.4	167.53	1,956.65
P- 21	Phosphate rock	RAG- 90-47	1.75	28.5	6.7	0.70	7.26	17.6	169.28	2,006.65
P- 20	Mudstone, phosphatic	RAG- 89-47	0.88	15.1	2.4	1.75	6.70	50.6	170.16	2,019.94
P- 19	Phosphate rock and mudstone	RAG- 88-47	1.2	25.0	4.7	1.24	6.08	26.4	171.36	2,049.94
P- 18	Phosphate rock, argillaceous	RAG- 87-47	1.5	25.1	5.5	1.28	7.14	24.8	172.86	2,087.59
P- 17	Phosphate rock, argillaceous	RAG- 86-47	0.6	22.7	4.1	1.37	4.46	34.5	173.46	2,101.21
P- 16	Phosphate rock, argillaceous	RAG- 85-47	0.52	24.5	3.9	1.52	4.40	31.0	173.98	2,113.96

MONTPELIER CANYON, IDAHO. LOT NOS. 1207 AND 1236.

Phosphoria formation measured and sampled in hand trenches on westward-dipping fault block, northwest side of Montpelier Canyon three miles east of Montpelier, sec. 31, T. 12 S., R. 45 E., Bear Lake County, Idaho. Most of section (lot no. 1207) measured in long trench, exposing strata that strike N. 18° E. and dip 29° W., by F. C. Armstrong, R. M. Campbell, R. A. Gulbrandsen, and R. A. Hoppin and sampled by Campbell, O. A. Payne, R. A. Smart, and R. S. Sears during August 1947. Lower part of phosphatic shale (lot no. 1236) measured in two trenches 425 feet to the southwest exposing strata that strike N. 32° E. and dip 30° NW., by R. A. Gulbrandsen and R. P. Sheldon and sampled by R. A. Smart in September 1948. Samples analyzed by U. S. Bureau of Mines Laboratory, Albany, Oregon.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)						Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)
				P ₂ O ₅	Al ₂ O ₃	Fe ₂ O ₃	F	Loss on ignition	Acid insoluble		
Dinwoody formation—lot no. 1207											
Td- 1	Limestone, argillaceous; fos. col. no. 47-HW-187 ¹	RAH-242-47	4.0	0.8	--	--	--	--	46.8	4.0	3.20
Upper shale member of Phosphoria formation—lot no. 1207											
U- 12	Chert, phosphatic; fos. col. no. 47-HW-186	RAH-243-47	0.5	16.3	--	--	--	--	44.6	0.5	8.15
U- 11	Limestone, argillaceous	RAH-244-47	2.1	1.6	--	--	--	--	29.3	2.6	11.51
U- 10	Mudstone, calcareous	RAH-245-47	2.9	0.7	--	--	--	--	52.4	5.5	13.54
U- 9	Mudstone	RAH-246-47	3.4	1.4	--	--	--	--	69.8	8.9	18.30
U- 8	Mudstone	RAH-247-47	1.2	1.5	--	--	--	--	68.0	10.1	20.10
U- 7	Mudstone	RAH-248-47	1.6	2.4	--	--	--	--	70.6	11.7	23.94
U- 6	Limestone, argillaceous	RAH-249-47	1.3	1.2	--	--	--	--	40.8	13.0	25.50
U- 5	Mudstone	RAH-250-47	2.6	1.3	--	--	--	--	75.9	15.6	28.88
U- 4	Limestone, argillaceous	RAH-251-47	2.6	0.9	--	--	--	--	37.9	18.2	31.22
U- 3	Chert	RAH-252-47	2.1	1.4	--	--	--	--	82.0	20.3	34.16
U- 2	Chert, calcareous	RAH-253-47	4.7	1.5	--	--	--	--	61.1	25.0	41.21
U- 1	Mudstone	RAH-254-47	5.0	2.9	--	--	--	--	64.9	30.0	55.71
Rex member of Phosphoria formation—lot no. 1207											
R- 27	Limestone, cherty; fos. col. no. 47-HW-185	RAH-255-47	2.5	0.6	--	--	--	--	35.4	2.5	1.5
R- 26	Limestone, cherty; fos. col. no. 47-HW-184	RAH-256-47	2.2	0.6	--	--	--	--	45.9	4.7	2.82
R- 25	Chert, calcareous; fos. col. no. 47-HW-183	RAH-257-47	9.8	0.4	--	--	--	--	64.4	14.5	6.74
R- 24	Chert, calcareous	RAH-258-47	9.6	0.6	--	--	--	--	75.2	24.1	12.5
R- 23	Chert, calcareous	RAH-259-47	9.0	0.5	--	--	--	--	71.1	33.1	17.00
R- 22	Chert, calcareous	RAH-260-47	9.3	0.4	--	--	--	--	76.6	42.4	20.72
R- 21	Chert, calcareous	RAH-261-47	12.5	0.3	--	--	--	--	68.6	54.9	24.47

R- 20	Chert, calcareous	RAH-262-47	7.0	0.5	--	--	--	--	74.7	61.9	27.97
R- 19	Chert, calcareous	RAH-263-47	12.8	0.8	--	--	--	--	76.8	74.7	38.21
R- 18	Limestone, cherty	RAH-264-47	4.0	0.5	--	--	--	--	42.1	78.7	40.21
R- 17	Limestone, cherty	RAH-265-47	6.0	0.5	--	--	--	--	47.4	84.7	43.21
R- 16	Chert, calcareous	RAH-266-47	8.9	0.4	--	--	--	--	70.0	93.6	45.77
R- 15	Limestone, argillaceous	RAH-267-47	5.2	0.5	--	--	--	--	33.5	98.8	48.37
R- 14	Chert and limestone	RAH-268-47	4.4	0.6	--	--	--	--	67.0	103.2	51.01
R- 13	Chert, calcareous	RAH-269-47	4.5	0.3	--	--	--	--	53.5	107.7	52.36
R- 12	Chert and limestone	RAH-270-47	3.5	0.4	--	--	--	--	48.6	111.2	53.76
R- 11	Limestone and chert	RAH-271-47	3.8	0.3	--	--	--	--	46.8	115.0	54.90
R- 10	Limestone and chert; fos. col. no. 47-HW-182	RAH-272-47	4.3	0.4	--	--	--	--	33.4	119.3	56.62
R- 9	Chert, calcareous	RAH-273-47	3.0	0.5	--	--	--	--	73.4	122.3	58.12
R- 8	Limestone and chert	RAH-274-47	2.9	0.4	--	--	--	--	50.6	125.2	59.28
R- 7	Chert and limestone	RAH-275-47	5.0	0.3	--	--	--	--	53.7	130.2	60.78
R- 6	Limestone and chert	RAG- 51-47	3.65	0.4	--	--	--	--	36.8	133.85	62.24
R- 5	Chert, calcareous	RAG- 64-47	0.6	0.4	--	--	--	--	69.2	134.45	62.48
R- 4	Chert	RAG- 63-47	0.35	0.8	--	--	--	--	70.5	134.80	62.76
R- 3	Limestone, cherty	RAG- 62-47	0.4	0.5	--	--	--	--	38.6	135.20	62.96
R- 2	Limestone, argillaceous	FCA-209-47	1.0	0.8	--	--	--	--	21.2	136.20	63.76
R- 1	Chert, calcareous	FCA-210-47	0.3	0.9	--	--	--	--	76.1	136.50	64.03

Phosphatic shale member of Phosphoria formation—lot nos. 1207 and 1236

Lot no. 1207											
P-168	Phosphate rock, argillaceous	FCA-211-47	0.9	21.2	--	--	--	--	32.4	0.9	19.08
P-167	Mudstone, calcareous; fos. col. no. 47-HW-65	FCA-212-47	1.6	1.2	--	--	--	--	68.7	2.5	21.00
P-166	Mudstone; fos. col. no. 47-HW-68	FCA-213-47	1.1	2.5	--	--	--	--	64.6	3.6	23.75
P-165	Mudstone, calcareous	FCA-214-47	0.7	6.3	--	--	--	--	57.5	4.3	28.16
P-164	Mudstone	FCA-215-47	0.8	3.7	--	--	--	--	65.9	5.1	31.12
P-163	Mudstone	FCA-216-47	2.8	0.7	--	--	--	--	79.5	7.9	33.08
P-162	Mudstone	FCA-217-47	0.8	1.3	--	--	--	--	75.8	8.7	34.12
P-161	Mudstone, calcareous	FCA-208-47	0.6	0.5	--	--	--	--	67.7	9.3	34.42
P-160	Mudstone, calcareous; fos. col. no. 47-HW-67	FCA-207-47	0.6	4.8	--	--	--	--	58.8	9.9	37.30
P-159	Mudstone, calcareous; fos. col. no. 47-HW-66	FCA-206-47	1.2	2.4	--	--	--	--	66.7	11.1	40.18
P-158	Limestone; fos. col. no. 47-HW-69	FCA-205-47	1.8	3.7	--	--	--	--	14.9	12.9	46.84
P-157	Phosphate rock, argillaceous	FCA-204-47	0.3	16.6	--	--	--	--	37.7	13.2	51.82
P-156	Mudstone, calcareous	FCA-203-47	1.5	5.1	--	--	--	--	62.4	14.7	59.47
P-155	Mudstone, calcareous	FCA-202-47	0.6	7.0	--	--	--	--	59.1	15.3	63.67
P-154	Mudstone	FCA-201-47	1.0	0.7	--	--	--	--	72.0	16.3	64.37
P-153	Mudstone	FCA-188-47	0.4	5.7	--	--	--	--	62.5	16.7	66.65
P-152	Mudstone	FCA-187-47	0.6	0.6	--	--	--	--	70.0	17.3	67.01

¹ Fossil collection made by H. Wedow, Paleontology and Stratigraphy Branch, U. S. Geological Survey.

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)						Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)
				P ₂ O ₅	Al ₂ O ₃	Fe ₂ O ₃	F	Loss on ignition	Acid insoluble		
P-151	Limestone, argillaceous; fos. col. no. 47-HW-70	FCA-200-47	1.4	0.7	--	--	--	--	45.6	18.7	67.99
P-150	Mudstone, calcareous	FCA-199-47	0.65	3.4	--	--	--	--	64.2	19.35	70.20
P-149	Phosphate rock	FCA-198-47	0.8	31.3	0.49	0.43	3.30	9.42	3.7	20.15	95.24
P-148	Phosphate rock	FCA-197-47	0.75	33.1	0.8	0.34	3.54	6.48	5.7	20.90	120.04
P-147	Phosphate rock	FCA-196-47	0.5	30.9	1.1	0.43	3.26	7.82	7.9	21.40	135.49
P-146	Limestone, phosphatic	FCA-195-47	0.5	12.1	0.3	0.08	--	29.16	3.8	21.90	141.54
P-145	Phosphate rock	FCA-194-47	1.2	33.3	0.3	0.25	--	6.38	4.8	23.10	181.50
P-144	Phosphate rock, argillaceous	FCA-193-47	0.18	22.9	--	--	--	--	29.3	23.28	18,562
P-143	Mudstone, calcareous	FCA-192-47	0.55	2.4	--	--	--	--	47.1	23.83	186.94
P-142	Phosphate rock, argillaceous	FCA-191-47	0.35	18.9	--	--	--	--	30.9	24.18	193.55
P-141	Limestone, argillaceous; fos. col. no. 47-HW-181	FCA-190-47	0.8	2.6	--	--	--	--	35.8	24.98	195.63
P-140	Mudstone, phosphatic	FCA-189-47	0.4	8.7	--	--	--	--	55.9	25.38	199.61
P-139	Limestone, argillaceous; fos. col. no. 47-HW-180	FCA-165-47	1.1	1.1	--	--	--	--	35.2	26.48	200.82
P-138	Phosphate rock	FCA-164-47	0.8	27.2	2.3	1.18	--	6.54	16.3	27.28	222.58
P-137	Mudstone, calcareous	FCA-163-47	0.65	5.7	6.1	2.28	--	17.82	42.8	27.93	226.28
P-136	Phosphate rock	FCA-162-47	0.55	34.2	0.57	0.39	--	5.60	4.7	28.48	245.08
P-135	Limestone	FCA-161-47	0.65	4.9	1.4	0.43	--	32.96	12.0	29.13	248.26
P-134	Phosphate rock	FCA-160-47	0.4	35.7	0.7	0.41	--	4.10	3.9	29.53	262.54
P-133	Phosphate rock, argillaceous	FCA-159-47	0.3	26.8	3.7	1.50	--	4.34	21.9	29.83	270.58
P-132	Phosphate rock	FCA-113-47	0.55	33.8	1.1	0.86	--	4.54	6.7	30.38	291.96
P-131	Phosphate rock	FCA-112-47	1.0	36.4	0.4	0.30	--	3.38	3.3	31.38	328.36
P-130	Phosphate rock	FCA-147-47	1.0	33.8	0.8	0.58	--	4.84	5.8	32.38	362.16
P-129	Phosphate rock, argillaceous	FCA-146-47	0.95	17.4	7.0	2.3	--	6.44	40.3	33.33	378.81
P-128	Phosphate rock	FCA-145-47	0.28	27.8	2.4	1.12	--	9.44	13.2	33.61	386.61
P-127	Phosphate rock, calcareous, argillaceous	FCA- 49-47	0.6	15.0	6.0	1.7	1.41	15.22	29.0	34.21	395.61
P-126	Phosphate rock	FCA- 50-47	0.4	33.0	1.8	1.1	--	5.40	8.3	34.61	396.93
P-125	Phosphate rock	FCA- 51-47	0.75	28.0	1.0	0.55	--	6.32	8.6	35.36	417.93
P-124	Phosphate rock	FCA- 52-47	0.5	36.2	0.9	0.56	--	4.96	1.8	35.86	436.03
P-123	Phosphate rock	FCA-553-47	0.5	36.2	0.8	0.48	--	4.72	1.9	36.36	454.13
P-122	Phosphate rock	FCA- 54-47	0.4	34.4	1.4	0.66	--	5.92	4.6	36.76	467.89
P-121	Phosphate rock	FCA- 64-47	0.67	35.2	0.8	0.34	--	6.06	3.4	37.43	489.39
P-120	Phosphate rock	FCA- 64-47	0.35	32.1	1.8	0.65	--	7.44	7.9	37.78	500.64
P-119	Phosphate rock	FCA- 66-47	0.4	25.9	3.3	1.2	2.67	15.64	14.9	38.18	511.00
P-118	Phosphate rock	FCA- 67-47	0.6	26.0	2.2	0.86	--	11.04	14.2	38.78	526.60
P-117	Phosphate rock	FCA- 68-47	0.4	28.6	2.1	0.84	--	12.48	10.2	39.18	538.04
P-116	Phosphate rock	FCA- 69-47	0.4	32.8	1.0	0.55	--	9.72	4.9	39.58	551.16
P-115	Phosphate rock	FCA-148-47	0.8	28.0	2.3	1.2	--	12.34	13.7	40.38	573.56
P-114	Phosphate rock, argillaceous	FCA-149-47	0.4	24.1	3.9	1.3	--	11.60	22.3	40.78	583.20

Lot nos. 1207 and 1236.

P-113	Phosphate rock, calcareous, argillaceous	FCA-150-47	0.35	21.1	5.4	1.9	--	15.00	22.7	41.13	590.60
P-112	Phosphate rock	FCA-151-47	0.8	27.4	2.3	0.78	--	13.62	14.7	41.93	612.52
P-111	Phosphate rock, argillaceous	RAG- 25-47	2.6	20.1	5.1	1.8	--	15.16	27.3	44.53	664.78
P-110	Mudstone	RAG- 26-47	1.0	1.9	--	--	--	--	78.6	45.53	666.68
P-109	Mudstone, phosphatic	RAG- 27-47	0.56	13.6	--	--	--	--	39.6	46.09	674.28
P-108	Mudstone, phosphatic	RAG- 28-47	1.55	13.7	--	--	--	--	47.1	47.64	695.48
P-107	Mudstone	RAG- 29-47	0.87	2.8	--	--	--	--	77.9	48.51	697.92
P-106	Mudstone	RAG- 30-47	0.92	3.0	--	--	--	--	78.8	49.43	700.68
P-105	Mudstone	RAG- 31-47	0.88	2.2	--	--	--	--	81.1	50.31	702.62
P-104	Phosphate rock; fos. col. no. 47-HW-179	RAG- 32-47	0.55	29.4	--	--	--	--	15.9	50.86	718.82
P-103	Mudstone, phosphatic, calcareous	RAG- 33-47	0.87	14.2	--	--	1.49	--	36.2	51.73	731.20
P-102	Mudstone, phosphatic, calcareous	RAG- 34-47	0.55	11.4	--	--	--	--	44.3	52.28	737.58
P-101	Mudstone, phosphatic	RAG- 35-47	1.45	9.7	--	--	--	--	54.6	53.73	751.68
P-100	Phosphate rock, argillaceous	RAG- 36-47	0.42	18.5	--	--	--	--	35.3	54.15	759.43
P- 99	Mudstone	RAG- 37-47	1.1	7.6	--	--	--	--	63.4	55.25	767.79
P- 98	Mudstone, phosphatic	RAG- 38-47	0.37	11.6	--	--	--	--	52.4	55.62	772.08
P- 97	Mudstone; fos. col. no. 47-HW-178	RAG- 39-47	0.66	7.5	--	--	--	--	64.7	56.28	777.03
P- 96	Phosphate rock, argillaceous; fos. col. no. 47-HW-177	RAG- 40-47	1.9	17.4	--	--	--	--	35.9	58.18	810.09
P- 95	Mudstone, phosphatic, calcareous	RAG- 41-47	1.75	15.5	--	--	1.55	--	39.6	59.93	837.19
P- 94	Mudstone, phosphatic, calcareous	RAG- 42-47	0.91	12.1	--	--	--	--	46.7	60.84	848.19
P- 93	Phosphate rock, calcareous	RAG- 43-47	0.97	18.1	--	--	--	--	14.7	61.81	865.74
P- 92	Phosphate rock, argillaceous	RAG- 44-47	0.58	16.4	8.2	2.6	--	10.14	39.2	62.39	875.25
P- 91	Phosphate rock and phosphatic mudstone	RAG- 45-47	0.96	31.6	1.7	0.68	--	8.80	9.7	63.35	895.65
P- 90	Mudstone, phosphatic	RAG- 46-47	0.48	8.4	11.6	3.6	--	9.12	62.0	63.83	899.69
P- 89	Phosphate rock, argillaceous	RAG- 47-47	0.55	23.7	5.4	1.8	--	10.56	22.6	64.38	912.74
P- 88	Phosphate rock	RAG- 48-47	1.75	31.6	1.8	0.74	--	9.20	8.2	66.13	967.99
P- 87	Mudstone	RAG- 49-47	0.82	7.0	11.3	3.6	--	9.20	64.7	66.95	973.73
P- 86	Phosphate rock	RAG- 50-47	0.55	28.0	3.0	1.1	--	10.38	13.8	67.50	989.13
P- 85	Limestone, argillaceous	RAG- 52-47	0.31	6.8	--	--	--	--	39.7	67.81	991.24
P- 84	Phosphate rock	RAG- 63-47	2.53	24.9	--	--	--	--	18.7	70.34	1,054.24
--	Limestone concretion in bed P-84	RAG- 54-47	(0.0-1.2)	2.4	--	--	--	--	11.9	--	--
P- 83	Phosphate rock, argillaceous	RAG- 55-47	0.51	20.5	--	--	--	--	29.4	70.85	1,064.69
P- 82	Phosphate rock, argillaceous	RAG- 56-47	1.0	23.4	--	--	--	--	23.1	71.85	1,089.09
P- 81	Mudstone, calcareous	RAG- 57-47	0.64	3.5	--	--	--	--	39.3	72.49	1,090.49
P- 80	Phosphate rock	RAG- 58-47	2.2	27.3	--	--	--	--	14.2	74.69	1,150.55

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)						Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)
				P ₂ O ₅	Al ₂ O ₃	Fe ₂ O ₃	F	Loss on ignition	Acid insoluble		
P- 79	Limestone, argillaceous	RAG- 59-47	1.55	4.8	--	--	0.51	--	20.5	76.24	1,158.49
P- 78	Phosphate rock, argillaceous, calcareous	RAG- 60-47	2.23	17.5	--	--	--	--	33.0	78.47	1,197.49
P- 77	Mudstone, phosphatic	RAG- 61-47	1.4	10.6	--	--	--	--	56.6	79.87	1,212.33
P- 76	Mudstone, phosphatic, calcareous	RAG- 65-47	1.6	14.0	--	--	--	--	39.3	81.47	1,234.73
P- 75	Mudstone, calcareous, phosphatic	RAG- 66-47	3.55	11.5	--	--	--	--	37.8	85.02	1,275.63
P- 74	Limestone	RAG- 67-47	1.17	1.5	--	--	--	--	4.8	86.19	1,277.38
P- 73	Limestone, phosphatic, argillaceous	RMC- 22-47	0.7	13.4	--	--	--	--	30.1	86.89	1,286.76
P- 72	Phosphate rock, calcareous	RMC- 21-47	1.7	19.3	4.1	1.3	--	18.92	15.2	88.59	1,319.57
P- 71	Phosphate rock, calcareous	RMC- 20-47	0.5	22.4	2.8	1.25	--	17.42	13.0	89.09	1,330.77
P- 70	Phosphate rock, calcareous	RMC- 19-47	1.1	22.7	4.1	1.5	--	14.86	16.7	90.19	1,355.74
P- 69	Phosphate rock, argillaceous, calcareous	RMC- 18-47	0.3	22.2	4.3	1.83	--	13.44	22.0	90.49	1,362.40
P- 68	Phosphate rock	RAG- 76-47	1.25	25.5	3.5	1.2	--	14.40	13.8	91.74	1,394.30
P- 67	Phosphate rock	RAG- 75-47	1.95	32.2	0.9	0.36	--	9.18	3.5	93.69	1,457.10
P- 66	Phosphate rock	RAG- 74-47	1.45	31.9	1.0	0.37	--	10.44	3.8	95.14	1,503.35
P- 65	Phosphate rock, calcareous	RAG- 73-47	0.33	19.1	2.4	1.07	--	20.90	12.5	95.47	1,509.71
P- 64	Limestone	RAG- 72-47	0.85	2.9	0.3	0.06	--	42.38	1.4	96.32	1,512.18
--	Limestone concretion in bed P-63 and lower part of bed P-64	RAG- 71-47	(0.0-3.0)	0.3	1.3	0.41	--	41.98	8.6	--	--
P- 63	Phosphate rock, calcareous; fos. col. no. 47-HW-176	RAG- 70-47	2.66	22.0	4.4	1.4	--	16.40	16.7	98.98	1,570.68
P- 62	Mudstone, calcareous, phosphatic	RAG- 69-47	0.33	8.6	--	--	--	--	45.8	99.31	1,573.52
P- 61	Limestone	RAG- 68-47	1.35	0.9	--	--	--	--	15.7	100.66	1,574.74
P- 60	Limestone	RMC- 16-47	0.6	0.5	--	--	--	--	14.2	101.26	1,575.04
P- 59	Limestone	RMC- 15-47	0.9	0.7	--	--	--	--	8.6	102.16	1,575.67
P- 58	Limestone	RMC- 14-47	1.6	0.6	--	--	--	--	9.3	103.76	1,576.63
P- 57	Limestone, argillaceous	RMC- 13-47	0.4	0.5	--	--	--	--	44.2	104.16	1,576.83
P- 56	Limestone	RMC- 12-47	0.6	0.4	--	--	--	--	13.9	104.76	1,577.07
P- 55	Limestone	RMC- 11-47	1.8	0.4	--	--	--	--	14.0	106.56	1,577.79
P- 54	Limestone, argillaceous	FCA-228-47	1.1	0.9	--	--	--	--	27.4	107.66	1,578.78
P- 53	Mudstone, calcareous	FCA-227-47	0.75	2.0	--	--	--	--	62.6	108.41	1,580.28
--	Limestone concretion in bed P-53	FCA-226-47	(0.0-1.2)	0.2	--	--	--	--	14.9	--	--
P- 52	Mudstone	FCA-225-47	0.9	2.7	--	--	--	--	66.0	109.31	1,582.71
P- 51	Mudstone	FCA-224-47	1.0	4.0	--	--	--	--	62.2	110.31	1,586.71
P- 50	Mudstone	FCA-223-47	0.9	8.6	--	--	--	--	50.0	111.21	1,594.45

--	Limestone concretion in bed P-49	FCA-222-47	(0.0-0.35)	0.9	--	--	--	--	4.0	--	--
P- 49	Mudstone, calcareous, phosphatic	FCA-221-47	1.2	7.8	--	--	--	--	38.7	112.41	1,603.81
--	Limestone concretion in bed P-48	FCA-220-47	(0.0-0.45)	0.8	--	--	--	--	2.6	--	--
P- 48	Mudstone, phosphatic, calcareous	FCA-219-47	1.4	8.8	--	--	--	--	51.3	113.81	1,616.13
P- 47	Limestone; fos. col. no. 47-HW-71	FCA-218-47	1.4	2.4	--	--	--	--	11.4	115.21	1,619.09
P- 46	Phosphate rock, calcareous, argillaceous	FCA-158-47	1.3	15.6	--	--	--	--	25.7	116.51	1,639.37
--	Limestone concretion in bed P-46	FCA-157-47	(0.0-1.0)	2.3	--	--	--	--	8.7	--	--
P- 45	Limestone, argillaceous, phosphatic	FCA-156-47	0.9	9.6	--	--	--	--	32.5	117.41	1,648.06
P- 44	Mudstone, calcareous, phosphatic	FCA-155-47	1.4	9.7	--	--	--	--	38.9	118.81	1,661.64
P- 43	Phosphate rock, calcareous, argillaceous	FCA-154-47	0.8	15.1	--	--	--	--	29.1	119.61	1,673.72
P- 42	Limestone, phosphatic, argillaceous	FCA-153-47	0.5	12.6	--	--	--	--	23.2	120.11	1,680.02
P- 41	Phosphate rock and calcareous mudstone	FCA-152-47	0.7	15.1	--	--	--	--	29.7	120.81	1,690.59
P- 40	Limestone	FCA- 63-47	0.95	1.3	--	--	--	--	3.2	121.76	1,691.83
P- 39	Mudstone, phosphatic	FCA- 62-47	0.85	10.1	--	--	--	--	45.5	122.61	1,700.43
P- 38	Mudstone, phosphatic	FCA- 61-47	0.6	11.0	--	--	--	--	39.5	123.21	1,707.03
P- 37	Mudstone, phosphatic	FCA- 60-47	0.45	10.5	--	--	--	--	44.6	123.66	1,711.73
P- 36	Mudstone, phosphatic	FCA- 59-47	0.75	12.2	--	--	--	--	32.0	124.41	1,720.88
P- 35	Limestone, phosphatic, argillaceous	FCA- 58-47	0.6	13.2	--	--	--	--	27.3	125.01	1,728.80
--	Limestone concretion in bed P-34	FCA- 57-47	(0.0-0.8)	1.4	--	--	--	--	2.7	--	--
P- 34	Limestone, phosphatic, argillaceous	FCA- 56-47	0.9	11.0	--	--	--	--	25.2	125.91	1,738.70
P- 33	Limestone, phosphatic, argillaceous	FCA- 55-47	1.0	13.3	--	--	--	--	28.1	126.91	1,752.00
P- 32	Limestone, phosphatic, argillaceous	FCA-186-47	0.35	12.9	--	--	--	--	30.3	127.26	1,756.51
P- 31	Mudstone, phosphatic, calcareous	FCA-185-47	0.65	11.9	--	--	--	--	27.9	127.91	1,764.25
P- 30	Phosphate rock, calcareous	FCA-184-47	1.0	17.4	--	--	--	--	16.1	128.91	1,781.65
P- 29	Phosphate rock, calcareous	FCA-183-47	0.8	17.3	--	--	--	--	11.7	129.71	1,795.49
P- 28	Limestone, phosphatic	FCA-182-47	0.95	16.3	--	--	--	--	13.3	130.66	1,810.99
P- 27	Mudstone, calcareous, phosphatic	FCA-181-47	0.65	11.0	--	--	--	--	32.7	131.31	1,818.14
P- 26	Phosphate rock	FCA-180-47	0.6	24.2	--	--	--	--	17.4	131.91	1,832.66

Bed no.	Rock description	Sample no.	Thickness (feet)	Chemical analyses (percent)						Cumulative thickness (feet)	Thickness x percent P ₂ O ₅ (cumulative)
				P ₂ O ₅	Al ₂ O ₃	Fe ₂ O ₃	F	Loss on ignition	Acid insoluble		
P- 25	Limestone	FCA-179-47	0.35	3.4	--	--	--	--	10.2	132.26	1,833.85
P- 24	Phosphate rock, argillaceous	FCA-178-47	0.45	14.7	--	--	--	--	30.9	132.71	1,840.46
P- 23	Limestone, argillaceous	FCA-177-47	1.7	3.8	--	--	--	--	17.5	134.41	1,846.92
P- 22	Mudstone, phosphatic	FCA-172-47	2.6	9.6	--	--	--	--	49.1	137.01	1,871.88
P- 21	Mudstone, calcareous	FCA-171-47	0.8	6.8	--	--	0.63	--	58.5	137.81	1,877.32
P- 20	Mudstone, phosphatic	FCA-170-47	1.0	8.7	--	--	--	--	46.5	138.81	1,886.02

At the north trench (lot no. 1207) the strata at the base of the phosphatic shale are in fault contact with the underlying Wells formation. The strata at the south trenches (lot no. 1236) were measured and sampled to complete the information on this interval. Correlation between the trenches was based on a nodular zone below samples 3053-RPS and FCA-169-47.

Lot no. 1236											
P- 19	Limestone, argillaceous	3053-RPS	2.7	2.8	--	--	--	--	24.7	141.51	1,893.58
P- 18	Phosphate rock and mudstone	3052-RPS	3.2	23.6	3.1	1.20	--	10.18	26.0	144.71	1,969.10
P- 17	Phosphate rock and mudstone	3051-RPS	1.1	24.3	3.7	1.35	--	8.30	25.7	145.81	1,995.83
P- 16	Limestone, argillaceous	2859-RPS	0.75	7.6	2.9	1.04	--	25.42	26.7	146.56	2,001.53
--	Limestone lens in bed P-15	--	(0.0-1.2)	--	--	--	--	--	--	--	--
P- 15	Phosphate rock and mudstone	2858-RPS	3.6	20.8	4.1	1.46	--	9.08	32.4	150.16	2,076.41
P- 14	Phosphate rock	2857-RPS	2.2	27.7	2.3	0.95	--	9.12	16.6	152.36	2,137.35
P- 13	Phosphate rock, argillaceous, calcareous	2856-RPS	2.4	17.2	3.4	1.26	--	14.20	29.5	154.76	2,178.63
P- 12	Phosphate rock, argillaceous	2855-RPS	2.1	24.2	3.5	1.20	--	8.68	24.9	156.86	2,249.45
P- 11	Limestone	2854-RPS	1.7	2.4	1.8	0.41	--	37.22	11.4	158.65	2,233.53
P- 10	Phosphate rock, argillaceous, calcareous	2853-RPS	1.3	20.0	3.2	1.03	--	10.94	27.4	159.86	2,259.53
P- 9	Phosphate rock, argillaceous, calcareous	2852-RPS	0.8	18.8	--	--	--	--	27.4	160.66	2,274.57
P- 8	Phosphate rock, calcareous, argillaceous	2851-RPS	0.7	17.3	--	--	--	--	28.1	161.36	2,286.68
--	Limestone lens, argillaceous in bed P-7	2850-RPS	(0.0-1.5)	--	--	--	--	--	--	--	--
P- 7	Limestone	1106-RAG	1.8	5.1	--	--	--	--	8.4	163.16	2,295.86
P- 6	Phosphate rock	1105-RAG	3.4	31.4	1.1	0.51	3.41	8.54	5.6	166.56	2,402.62
P- 5	Phosphate rock	1104-RAG	2.4	32.6	0.58	0.48	3.57	7.70	2.6	168.96	2,480.86
P- 4	Mudstone, calcareous	1103-RAG	0.6	2.7	--	--	--	--	52.8	169.56	2,482.48
P- 3	Limestone, argillaceous	1102-RAG	2.6	4.2	--	--	--	--	33.5	172.16	2,493.40
P- 2	Mudstone, calcareous	1101-RAG	1.2	3.6	--	--	--	--	40.9	173.36	2,497.72
P- 1	Phosphate rock	1100-RAG	0.4	33.6	--	--	3.57	--	6.1	173.76	2,511.16
Lot no. 1207											
P- 12	Limestone, argillaceous; fos. col. no. 47-HW-64	FCA-169-47	(2.2)	1.2	--	--	--	--	22.0	--	--

Lot nos. 1207 and 1236.

FCA-169-47 is equivalent to 3053-RPS of lot no. 1236.											
P- 11	Phosphate rock	FCA-168-47	(1.4)	27.0	--	--	--	--	19.2	--	--
--	Mudstone concretion in bed P-10	FCA-167-47	(0.0-0.4)	5.7	--	--	0.49	--	65.9	--	--
P- 10	Phosphate rock, argillaceous	FCA-166-47	(1.05)	24.1	--	--	--	--	21.7	--	--
P- 9	Phosphate rock	RAH-176-47	(0.9)	27.1	--	--	2.70	--	14.4	--	--
P- 8	Limestone, phosphatic; fos. col. no. 47-HW-63	RAH-175-47	(0.7)	8.7	--	--	3.58	--	8.3	--	--
P- 7	Phosphate rock, argillaceous	RAH-174-47	(1.0)	25.3	--	--	--	--	21.0	--	--
--	Limestone concretion in bed P-7	RAH-173-47	(0.0-0.7)	3.3	--	--	--	--	4.1	--	--
P- 6	Phosphate rock, argillaceous	RAH-172-47	(0.6)	22.7	--	--	--	--	23.7	--	--
P- 5	Mudstone, calcareous	RAH-171-47	(0.35)	0.7	--	--	--	--	50.4	--	--
P- 4	Limestone, argillaceous	FCA-173-47	(1.0)	0.2	--	--	--	--	35.7	--	--
P- 3	Limestone	FCA-174-47	(0.15)	3.7	--	--	2.48	--	19.4	--	--
P- 2	Phosphate rock	FCA-175-47	(0.25)	32.3	--	--	--	--	5.5	--	--
P- 1	Limestone, phosphatic	RAG- 77-47	(0.5)	9.0	--	--	--	--	13.4	--	--
RAG-77-47 lies in fault contact with FCA-176-47 at the top of the Wells formation.											

Wells formation—top beds only

Cw- 1	Limestone; fos. col. no. 47-HW-62	FCA-176-47	3.1	2.6	--	--	--	--	5.0	3.1	8.06
Cw- 2	Limestone	--	3.0	--	--	--	--	--	--	6.1	--
Cw- 3	Chert	--	1.0	--	--	--	--	--	--	7.1	--
Cw- 4	Quartzite	--	2.4	--	--	--	--	--	--	9.5	--
Cw- 5	Quartzite, chert, and limestone	--	3.1	--	--	--	--	--	--	12.6	--
Cw- 6	Quartzite	--	3.0	--	--	--	--	--	--	15.6	--
Cw- 7	Quartzite	--	9.0	--	--	--	--	--	--	24.6	--
Cw- 8	Quartzite	--	11.55	--	--	--	--	--	--	36.15	--
Cw- 9	Quartzite, limestone, and chert	--	3.65	--	--	--	--	--	--	39.80	--
Cw-10	Quartzite and limestone	--	10.0	--	--	--	--	--	--	49.80	--
Cw-11	Quartzite and limestone	--	9.3	--	--	--	--	--	--	59.19	--
Cw-12	Quartzite and chert	--	6.48	--	--	--	--	--	--	65.58	--
Cw-13	Quartzite, calcareous	--	11.5	--	--	--	--	--	--	77.08	--
Cw-14	Sandstone and mudstone	--	0.82	--	--	--	--	--	--	77.90	--

SPECTROGRAPHIC ANALYSES—MONTPELIER CANYON, IDAHO. LOT NO. 1207.

Semi-quantitative analyses of two samples of phosphatic shale member of Phosphoria formation, Montpelier Canyon, Idaho (see immediately preceding pages for location of section, thickness and description of strata, and chemical analyses of samples), made by U. S. Bureau of Mines Laboratory, Albany, Oregon. In addition to the elements listed in the table below, Sb, As, Be, Bi, Cd, Co, Cb, Ga, Au, Li, Hg, Pt, Ta, Sn, W, and Zn were looked for but were not detected.

Explanation of symbols

A = more than 10 percent E = 0.01-0.1 percent
 B = 5-10 percent F = 0.001-0.01 percent
 C = 1-5 percent G = less than 0.001 percent
 D = 0.1-1 percent ND = not detected

Bed no.	Sample no.	Al	Ba	B	Ca	Cr	Cu	Fe	Pb	Mg	Mn	Mo	Ni	Si	Ag	Na	Sr	Ti	V	Zr
P-132	FCA-113-47	D	E	F	A	E	G	D	E	D	F	F	F	C	G	E	E	E	D	F
P-131	FCA-112-47	D	E	F	A	E	G	D	ND	D	F	ND	F	C	G	E	E	E	D	F