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Analyses and description

of

soil samples from

Mountain Lake and Peters Mountain Wilderness Study Areas

Virginia and West Virginia

by

Jerry M. Motooka, Craig A. Curtis, and Frank G. Lesure

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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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Abstract

Semiquantitative emission spectrographic analyses for 30 elements and atomic absorption analysis for zinc on 98 soil samples are reported here in detail. Location for all samples are in Universal Transverse Mercator (UTM) coordinates. A few samples of soil developed on Lower Devonian sandstone and chert contain more barium and zinc than soils on other formations but do not suggest the occurrence of economic concentrations of either element.

Introduction

A few stream sediment samples from the Mountain Lake and Peters Mountain Wilderness Study Areas, Craig and Giles County, Va. and Monroe County, W. Va., contain anomalous amounts of zinc (Lesure, Williams, and Dunn, 1978, plate 5). In order to evaluate these better Lesure, J.P. D'Agostino, A.E. Grosz, and J.T. Hanley collected soil samples in six areas that have drainage basins containing anomalous zinc. These samples were analysed in the U.S. Geological Survey laboratories, Denver, Colorado, and the results are given here in detail.

Sample description

The soil samples are from the A₂ or upper B soil zone, just below the dark organic-rich surface soil or A₁ zone. The soils are developed on Upper Silurian and Lower Devonian sedimentary rocks as shown in the following lists:

Geologic Unit	Soil sample numbers
Peters Mountain area	
Silurian System	
Keefer Sandstone	VPM 130, 131, 132, 133, 134,
(locally may include Tonoloway	136, 140, 141, 145, 146, 147,
Limestone and other Upper	148, 153, 154, 155, 156, 157,
Silurian sandstones)	158, 166, 167, 168, 169, 170,
	171, 172

Devonian System

Rocky Gap Sandstone

VPM 137, 139, 142, 143, 149,
152, 159, 161, 163, 164, 165,
178

Huntersville Chert

VPM 138, 142, 144, 150, 152,
162, 176, 177

Mountain Lake area

Silurian System

Keefer Sandstone or

Upper Silurian Sandstone, undivided

VML 169, 170, 174, 177, 178,
179, 180, 700, 701, 702, 708,
709, 716, 718, 724

Devonian System

Rocky Gap Sandstone and Huntersville Chert (undivided)

VML 166, 167, 175, 181, 182,
703, 707, 715, 717

Millboro Shale and Brallier Formation (undivided)

VML 160, 161, 162, 163, 164,
165, 168, 171, 172, 173, 176,
183, 184, 704, 705, 706, 710,
711, 712, 713, 714, 719, 720,
721, 722, 723

Analytical techniques

The soil samples were dried and sieved to minus 80-mesh (0.177 mm) in the laboratory; the minus 80-mesh fraction was pulverized and used for analyses.

Motooka analysed semiquantitatively all samples for 30 elements using a six-step, spectrographic analysis method (Grimes and Marranzino, 1968). Curtis analysed all samples for zinc using an atomic absorption technique (Ward and others, 1969, p. 20).

The semiquantitative spectrographic values are reported as six steps per order of magnitude (1, 0.7, 0.5, 0.3, 0.2, 0.15, or multiples of 10 of these numbers) and are approximate geometric midpoints of the concentration ranges. The precision is shown to be within one adjoining reporting interval on each side of the reported value 83 percent of the time and within two adjoining intervals 96 percent of the time (Motooka and Grimes, 1976).

Explanation of Table

Iron, magnesium, calcium, and titanium values are reported in percent (%); all others are in parts per million. Letters preceeding chemical symbols indicate the method of analyses: S, six-step semiquantitative spectrographic method; AA, atomic absorption. Other symbols represented on the table are: N, not detected; <, amount detected is below the limit of determination which is figure shown; >, amount detected is above the highest limit of determination, which is figure shown; P, partial digestion.

Elements looked for spectrographically but not found and the lower limit of determination: As(200), Au(10), Bi(10), Cd(20), Sb(100), Sn(10), and W(50).

The X-Y coordinates are Universal Transverse Mercator (UTM) grid, zone 17. The X coordinate is the easting value; the Y is the northing. Sample locations are shown on plates 3 and 4 in Lesure, Williams, and Dunn, 1978.

References Cited

- Grimes, D.J., and Marranzino, A.P., 1968, Direct-current arc and alternating-current spark emission spectrographic field methods for the semi-quantitative analysis of geologic materials: U.S. Geological Survey Circular 591, 6 p.
- Lesure, F.G., Williams, B.B., and Dunn, M.L., 1978, Mineral resources of Mill Creek, Mountain Lake, and Peters Mountain Wilderness Study Areas, Craig and Giles Counties, Virginia, and Monroe County, West Virginia: U.S. Geological Survey Open-File Report, OF 78-1076.
- Motooka, J.M. and Grimes, D.J., 1976, Analytical precision of one-sixth order semiquantitative spectrographic analyses: U.S. Geological Survey Circular 738, 25 p.
- Ward, F.M., Nakagawa, H.M., Harms, T.F., and Van Sickle, G.H., 1969, Atomic-absorption methods of analysis useful in geochemical exploration: U.S. Geological Survey Bulletin 1289, 45 p.

Soils

sample	X-COORD.	Y-COORD.	S-FEX	S-MGX	S-CAZ	S-TIX	S-MN	S-AG	S-B	S-BA	S-RE	S-CO	S-CR	S-CU	S-LA
VP4130	535,620	4,141,420	.30	.07	<.05	.50	300	N	70	100	<1.0	N	15	N	N
VP4131	535,680	4,141,520	1.00	.10	.05	.70	1,000	N	100	200	1.5	7	30	5	N
VP4132	535,620	4,141,700	1.00	.07	.05	.30	500	N	50	150	1.0	N	20	5	N
VP4133	535,650	4,141,840	.70	.07	.05	.70	300	N	100	150	<1.0	N	30	<5	N
VP4134	535,630	4,141,920	2.00	.20	.07	.70	3,000	N	100	300	1.5	10	30	20	30
VP4135	535,610	4,141,980	2.00	.15	.07	.70	3,000	N	100	300	1.5	10	30	10	20
VP4136	535,600	4,142,070	1.50	.07	<.05	.70	150	N	70	100	1.0	N	15	<5	<20
VP4137	535,540	4,142,140	2.00	.07	.05	.30	150	N	70	200	1.0	N	15	7	20
VP4138	535,530	4,142,180	1.50	.20	.07	.70	300	.7	70	1,500	1.0	N	30	15	30
VP4139	535,480	4,142,220	3.00	.20	.07	.70	150	N	70	1,000	1.0	<5	30	7	30
VP4140	535,460	4,142,290	.70	.10	.05	.50	150	N	100	150	<1.0	N	20	<5	N
VP4141	535,420	4,142,330	.15	.02	N	.15	20	N	70	70	N	N	<10	N	N
VP4142	535,770	4,142,470	.70	.07	<.05	.20	200	N	70	70	N	N	10	N	N
VP4143	535,820	4,142,420	7.00	.15	.10	.50	>5,000	N	50	5,000	2.0	20	30	20	50
VP4144	535,900	4,142,410	1.00	.15	.05	.70	1,000	<.5	70	700	1.0	7	20	7	20
VP4145	535,940	4,142,360	.70	.15	.07	.30	3,000	N	70	200	<1.0	30	20	7	N
VP4146	536,050	4,142,310	1.00	.10	<.05	.30	1,500	N	70	150	<1.0	15	20	7	<20
VP4147	536,090	4,142,270	.70	.05	<.05	.15	150	N	15	70	<1.0	N	10	<5	N
VP4148	536,100	4,142,200	.30	.05	.05	.30	30	N	70	50	N	N	<10	N	N
VP4149	536,130	4,142,120	1.00	.05	.05	.30	100	N	30	150	1.5	N	20	5	N
VP4150	536,120	4,142,020	1.50	.10	.07	.70	150	N	50	200	1.0	N	20	5	N
VP4151	536,080	4,141,830	.70	.10	.07	.70	100	N	50	150	<1.0	N	15	<5	N
VP4152	535,970	4,141,710	5.00	.10	.10	.50	150	N	50	150	1.5	N	30	15	N
VP4153	535,900	4,141,670	2.00	.05	.05	.70	100	N	70	200	<1.0	N	10	<5	N
VP4154	535,860	4,141,610	.50	.05	.07	.30	200	.5	70	100	<1.0	N	<10	N	N
VP4155	535,800	4,141,530	.70	.07	.07	.70	300	N	70	150	<1.0	N	15	N	N
VP4156	535,720	4,141,380	.70	.15	.07	.70	700	N	70	200	<1.0	7	20	N	N
VP4157	535,730	4,141,300	1.00	.15	.07	.70	1,500	N	70	200	2.0	10	20	5	N
VP4158	536,740	4,141,180	1.00	.10	.10	.50	1,000	N	50	150	<1.0	10	20	5	N
VP4159	535,850	4,141,150	1.50	.03	.05	.10	500	N	30	500	3.0	5	15	5	N
VP4160	536,480	4,141,410	2.00	.20	.05	.30	1,000	N	70	200	1.0	7	30	7	20
VP4161	536,600	4,141,660	1.50	.15	.10	.70	700	N	70	300	<1.0	5	30	7	20
VP4162	536,710	4,141,880	1.50	.15	.07	.70	150	N	70	700	1.5	5	50	7	30
VP4163	536,720	4,142,020	1.50	.10	.07	.50	200	N	50	700	1.5	N	30	10	20
VP4164	536,770	4,142,150	7.00	.05	.05	.30	150	N	50	150	2.0	5	30	15	20
VP4166	536,800	4,142,280	5.00	.07	.07	.50	150	N	50	150	<1.0	<5	30	7	20
VP4167	536,800	4,142,350	1.00	.10	.05	.50	150	N	70	200	<1.0	<5	30	<5	N
VP4168	536,760	4,142,450	.70	.10	<.05	.30	1,000	N	70	150	<1.0	7	20	<5	<20
VP4169	536,710	4,142,560	1.00	.15	.05	.50	2,000	N	70	300	1.5	7	30	5	30
VP4170	536,770	4,142,730	.70	.15	.05	.50	700	N	100	150	<1.0	7	20	<5	20
VP4171	536,750	4,142,860	1.50	.15	.05	.70	150	N	70	200	<1.0	5	30	5	20
VP4172	536,710	4,142,950	1.00	.15	<.05	.70	70	N	70	200	1.0	<5	30	<5	20
VP4173	536,570	4,142,520	1.00	.15	.05	.50	1,500	N	70	150	1.0	5	20	5	20
VP4174	536,470	4,142,460	1.50	.15	.05	.50	700	N	100	200	1.0	10	20	7	20
VP4175	536,380	4,142,480	1.00	.15	.05	.70	500	N	70	200	<1.0	15	20	5	20

Soils

sample	S-MO	S-NB	S-NI	S-PB	S-SC	S-SR	S-V	S-Y	S-2N	S-2R	AA-2N-P
VP#130	N	<20	<5	N	5	N	20	20	N	700	25
VP#131	N	<20	20	15	10	N	50	30	N	500	130
VP#132	N	<20	15	<10	7	N	30	20	N	1,000	70
VP#133	N	<20	5	<10	7	N	30	20	N	500	40
VP#134	N	<20	20	15	10	N	70	30	N	500	50
VP#135	N	<20	30	10	10	N	50	30	N	500	90
VP#136	N	20	5	N	7	N	30	20	N	1,000	40
VP#137	N	<20	15	20	5	N	30	20	N	500	100
VP#138	7	<20	7	30	10	100	100	30	N	500	30
VP#139	N	20	15	30	10	N	70	30	N	300	55
VP#140	N	<20	<5	<10	7	N	30	20	N	700	30
VP#141	N	N	<5	N	5	N	15	<10	N	500	10
VP#142	N	<20	<5	10	5	N	15	15	N	500	30
VP#143	N	<20	30	30	10	100	70	30	N	200	120
VP#144	5	<20	15	15	7	N	50	20	N	700	60
VP#145	N	<20	50	N	5	N	30	20	N	500	90
VP#146	N	<20	15	<10	5	N	30	20	N	500	75
VP#147	N	N	10	15	5	N	10	N	N	300	75
VP#148	N	N	<5	N	5	N	15	20	N	1,000	20
VP#149	N	N	<5	<10	7	N	30	20	N	200	50
VP#150	N	20	5	15	7	N	70	30	N	300	35
VP#151	N	<20	5	10	5	N	30	20	N	200	25
VP#152	N	<20	20	N	10	N	100	30	N	700	40
VP#153	N	<20	15	N	10	N	30	50	N	>1,000	60
VP#154	N	N	5	N	5	N	15	15	N	500	30
VP#155	N	20	5	<10	7	N	20	20	N	1,000	75
VP#156	N	20	10	10	7	N	30	30	<200	1,000	150
VP#157	N	<20	20	15	7	N	50	30	200	1,000	170
VP#158	N	<20	15	<10	5	N	30	20	N	500	75
VP#159	N	N	15	N	N	<100	20	30	N	100	60
VP#160	N	<20	15	10	7	N	70	20	N	300	60
VP#161	N	20	10	10	7	N	70	50	N	500	40
VP#162	N	20	15	30	10	N	100	30	N	300	60
VP#163	N	<20	7	20	7	N	70	20	N	300	30
VP#164	N	N	20	15	7	N	100	20	N	300	60
VP#165	N	<20	5	10	7	N	150	20	N	500	30
VP#166	N	<20	7	10	7	N	50	30	N	700	40
VP#167	N	<20	10	N	5	N	30	20	N	500	35
VP#168	N	<20	10	10	10	N	50	30	N	700	45
VP#169	N	<20	10	<10	7	N	30	30	N	1,000	40
VP#170	N	<20	10	<10	7	N	50	30	N	700	40
VP#171	N	<20	10	<10	7	N	50	30	N	700	30
VP#172	N	<20	5	N	10	N	50	30	N	700	20
VP#173	N	<20	10	10	7	N	30	30	N	300	45
VP#174	N	<20	20	20	10	N	30	30	N	1,000	70
VP#175	N	<20	15	10	10	200	50	30	N	500	50

Soils--continued

sample	X-COORD.	Y-COORD.	S-FEX	S-MGX	S-CAZ	S-TIX	S-MN	S-AG	S-B	S-BA	S-BE	S-CO	S-CR	S-CU	S-LA
VP4176	536,300	4,141,980	1.00	.15	<.05	.70	50	N	70	200	<1.0	<5	30	<5	<20
VP4177	536,390	4,141,860	1.50	.20	.05	.50	1,500	N	100	150	1.0	7	20	7	20
VP4178	536,450	4,141,720	2.00	.20	<.05	.50	3,000	N	70	300	1.5	15	20	10	20
VP4160	545,910	4,136,230	1.50	.20	<.05	.50	150	N	70	200	1.0	5	30	10	20
VP4161	545,960	4,136,140	1.00	.15	<.05	.70	70	N	100	150	<1.0	N	30	5	20
VP4162	545,990	4,136,040	.70	.10	<.05	.70	100	N	70	100	<1.0	N	20	<5	<20
VP4163	546,020	4,135,900	1.00	.10	<.05	.50	70	N	70	150	N	N	20	5	<20
VP4164	546,030	4,135,820	3.00	.50	<.05	.50	70	.5	100	300	1.0	N	50	20	20
VP4165	546,040	4,135,700	2.00	.20	<.05	.70	700	<.5	70	300	<1.0	5	30	20	20
VP4166	546,040	4,135,640	.50	.03	N	.30	30	N	70	.50	N	N	10	N	N
VP4167	546,090	4,135,600	3.00	.50	<.05	.50	100	2.0	150	700	1.0	N	70	70	30
VP4168	546,120	4,135,540	1.50	.10	<.05	.30	150	N	70	100	<1.0	N	15	<5	N
VP4169	545,480	4,135,230	3.00	.30	<.05	.50	100	N	150	300	1.5	N	70	30	30
VP4170	545,510	4,135,150	.15	.03	<.05	.20	10	N	150	N	N	N	<10	N	N
VP4171	545,440	4,135,300	.15	.03	<.05	.50	10	.5	150	50	N	N	<10	N	N
VP4172	545,400	4,135,400	.70	.05	<.05	.30	50	N	70	100	N	N	10	5	N
VP4173	545,350	4,135,330	2.00	.50	<.05	.70	100	N	100	300	1.0	5	50	15	20
VP4174	546,060	4,139,150	.70	.10	<.05	.50	300	N	50	70	<1.0	5	15	<5	N
VP4175	546,080	4,139,140	.50	.05	<.05	.50	70	N	50	70	N	N	10	<5	30
VP4176	546,130	4,139,120	3.00	.10	<.05	.20	150	N	50	150	1.0	5	15	20	50
VP4177	546,180	4,139,080	1.00	.07	<.05	.30	200	N	70	50	<1.0	<5	10	5	20
VP4178	546,220	4,139,060	.20	.03	<.05	.20	10	N	100	N	N	N	<10	N	N
VP4179	546,350	4,139,030	.70	.07	<.05	.20	100	N	100	70	<1.0	N	10	<5	N
VP4180	547,670	4,141,040	1.00	.20	<.05	.70	70	N	100	100	<1.0	N	20	<5	N
VP4181	547,680	4,141,030	5.00	.10	<.05	.15	200	N	30	500	1.0	N	20	30	50
VP4182	547,690	4,141,010	5.00	.10	.05	.20	300	N	20	1,000	3.0	15	30	50	70
VP4183	547,720	4,140,800	1.00	.15	.05	.70	200	N	100	200	1.0	<5	15	5	N
VP4184	547,810	4,140,730	3.00	.30	<.05	.70	150	.5	150	700	2.0	N	70	30	30
VP4185	550,620	4,144,600	3.00	.30	<.05	1.00	5,000	N	100	500	3.0	20	70	15	50
VP4186	550,620	4,144,720	5.00	.30	<.05	1.00	300	N	100	300	2.0	15	50	10	50
VP4187	550,640	4,144,840	2.00	.50	<.05	.70	200	N	70	200	<1.0	<5	30	<5	20
VP4188	550,610	4,144,940	5.00	.30	.07	.70	300	<.5	50	1,000	2.0	15	20	30	70
VP4189	550,570	4,145,070	1.00	.10	.05	.70	150	N	50	200	<1.0	N	20	5	N
VP4190	550,500	4,145,210	1.50	.15	<.05	.70	150	N	70	200	<1.0	N	30	5	N
VP4191	550,460	4,145,390	3.00	.20	.05	1.00	1,000	<.5	100	700	1.0	10	50	30	30
VP4192	550,390	4,145,510	3.00	.15	.10	.30	300	N	70	1,500	1.5	5	50	20	100
VP4193	550,350	4,145,680	.70	.10	<.05	.30	1,500	N	70	150	1.0	<5	15	<5	50
VP4194	550,370	4,145,600	1.00	.15	.05	.50	2,000	N	70	300	1.5	<5	20	5	50
VP4195	549,430	4,141,070	1.00	.07	<.05	.70	100	N	100	100	<1.0	<5	20	5	N
VP4196	549,310	4,141,230	1.50	.15	<.05	.70	70	N	70	200	<1.0	N	30	5	N
VP4197	549,180	4,141,470	.70	.03	<.05	.50	30	N	50	70	N	N	15	N	N
VP4198	549,110	4,141,560	3.00	.20	<.05	1.00	100	N	100	500	1.0	N	70	20	30
VP4199	549,000	4,141,720	1.00	.10	.05	.50	100	N	70	100	<1.0	N	20	15	N
VP4200	548,940	4,141,930	1.00	.07	<.05	.50	70	N	50	100	N	N	15	<5	<20
VP4201	548,810	4,139,370	1.50	.10	<.05	.50	1,000	N	50	150	<1.0	10	20	7	20

Soils--continued

sample	S-MO	S-NB	S-NI	S-PB	S-SC	S-SR	S-V	S-Y	S-ZN	S-ZR	AA-ZN-P
VP4176	N	<20	7	N	10	200	30	20	N	1,000	30
VP4177	N	20	15	30	10	200	30	20	700	500	260
VP4178	N	<20	20	30	10	200	50	30	700	500	230
V4L160	N	<20	7	10	10	200	50	20	N	150	40
V4L161	N	20	5	<10	10	200	50	20	N	500	25
V4L162	N	20	5	10	10	200	50	30	N	1,000	30
V4L163	N	<20	5	<10	7	200	50	20	N	300	30
V4L164	15	<20	5	<10	10	200	150	20	N	150	20
V4L165	30	<20	5	<10	10	200	100	20	N	300	35
V4L166	N	N	5	<10	5	200	20	10	N	500	15
V4L167	50	<20	15	50	15	200	500	30	N	150	25
V4L168	N	N	10	15	7	200	50	20	N	1,000	30
V4L169	7	N	7	15	15	200	150	20	N	100	25
V4L170	N	N	5	N	N	200	10	15	N	300	15
V4L171	N	N	5	N	5	200	15	20	N	1,000	20
V4L172	N	N	5	<10	5	200	30	20	N	500	30
V4L173	N	20	15	10	15	200	150	30	N	150	45
V4L174	N	<20	7	N	7	200	30	20	N	1,000	60
V4L175	N	<20	5	<10	7	200	30	20	N	1,000	50
V4L176	N	N	20	100	5	<100	50	50	300	200	140
V4L177	N	<20	7	15	5	N	30	30	N	500	60
V4L178	N	N	<5	N	5	N	10	20	N	>1,000	15
V4L179	N	N	<5	N	5	N	30	10	N	500	20
V4L180	N	<20	<5	N	7	N	30	20	N	700	30
V4L181	N	N	30	30	7	N	70	30	N	500	60
V4L182	N	N	70	50	7	150	70	50	500	200	170
V4L183	N	20	5	10	7	N	30	30	N	500	35
V4L184	30	20	7	10	15	100	200	30	N	150	25
V4L700	N	20	15	<10	15	100	100	50	N	500	40
V4L701	N	20	10	N	15	<100	100	50	N	1,000	35
V4L702	N	20	7	N	7	N	50	30	N	1,000	35
V4L703	10	<20	50	100	10	100	150	30	N	150	100
V4L704	<5	<20	5	<10	7	N	30	20	N	300	25
V4L705	N	<20	<5	N	7	N	70	20	N	200	20
V4L706	20	20	10	20	10	100	150	30	N	300	50
V4L707	N	<20	30	30	7	150	100	70	700	200	200
V4L708	N	<20	7	15	5	N	20	30	N	700	50
V4L709	N	<20	10	15	7	N	30	50	N	700	55
V4L710	N	<20	7	N	7	N	50	30	N	1,000	25
V4L711	N	<20	5	N	10	N	70	30	N	500	20
V4L712	N	N	5	N	5	N	20	20	N	500	15
V4L713	N	20	5	10	15	N	150	30	N	150	20
V4L714	N	<20	5	N	7	N	30	30	N	1,000	25
V4L715	N	<20	7	10	7	N	50	20	N	>1,000	30
V4L716	N	<20	10	10	7	N	50	30	N	500	45

Soils--continued

sample	X-COORD.	Y-COORD.	S-FEZ	S-MGZ	S-CAZ	S-TIZ	S-MN	S-AG	S-B	S-BA	S-BE	S-CO	S-CR	S-CU	S-LA
V#L717	546,410	4,139,300	3.00	.15	.07	.30	150	N	50	700	5.0	5	70	10	150
V#L718	546,550	4,139,260	2.00	.20	.05	.70	1,500	N	70	500	1.5	10	50	7	30
V#L719	546,800	4,139,310	2.00	.15	.05	.50	300	N	70	700	2.0	7	50	10	50
V#L720	547,110	4,139,250	1.00	.15	.05	.70	300	N	70	200	<1.0	5	30	<5	<20
V#L721	547,520	4,139,460	1.50	.07	<.05	.50	100	N	50	100	N	N	20	5	N
V#L722	547,050	4,139,600	1.50	.07	<.05	1.00	150	N	50	150	<1.0	<5	30	5	<20
V#L723	546,760	4,139,600	1.00	.10	<.05	.70	70	N	70	150	<1.0	5	20	<5	N
V#L724	546,530	4,139,690	1.50	.07	<.05	.50	1,000	N	70	100	<1.0	<5	20	5	N

Soils--continued

sample	S-MO	S-NB	S-NI	S-PB	S-SC	S-SR	S-V	S-Y	S-ZN	S-ZR	AA-2N-P
V#L717	N	<20	50	30	10	150	150	50	500	700	190
V#L718	N	<20	20	20	7	N	70	30	N	700	80
V#L719	N	<20	20	20	7	N	70	30	N	500	90
V#L720	N	<20	5	<10	7	N	50	20	N	700	30
V#L721	N	<20	5	<10	5	N	50	20	N	500	30
V#L722	N	20	10	<10	7	N	70	50	N	1,000	30
V#L723	N	<20	10	N	7	N	30	20	N	1,000	30
V#L724	N	<20	7	<10	7	N	30	20	N	1,000	30