J.S. Cummings Inc.

LITHOLOGIC LOG

Project T10R9 Lithologic Drilling **Hole no.** 109-1 **Dip** Vert. **Started** 8/14/79 **Elev.** ____

See Sketch

Job no. 275 **Township** T10-R9 **Coord.** 275-2 **Direction** ____ **Completed** 8/15/79

N 1/2 - on road

Lithotype

0'

Overburden

18'

Many Boulders

37'

Lapilli Agglomerate -

50'

66'

73'

B-1 or B-2 - Andesite-Basalt -

Lapilli Agglomerate -

100'

118'

Bottom of Hole

150'

200'

250'

300'

350'

400'

Lithotype

400'

450'

Highly altered, fragments blurred, sericite, some talc ?, very greasy.

Highly weathered and oxidized.

500'

Larger fragments than above unit, some > 2". Sericite-chlorite alteration. Some grains remain more distinct than above. At bottom, 6" of rhyolite or igmimbrite.

550'

600'

650'

700'

750'

800'

J.S. Cummings Inc.

C. Mattson

SULPHIDE LOG

Project T10-R9 Lithologic Hole no. 109-1 Dip Vert. Started 8/14/79 Elev. ____

Job no. 275 Township T10-R9 Coord. 275-2 See Sketch N 1/2 - on road Direction ____ Completed 8/15/79

FROM	TO	INTERVAL	EST. % SULPHIDES	EST. METAL (Cu, Pb, Zn)	ALTERATION
37	66	29'	1%	*	Sericite - Talc?
66	73	7'	None		
73	118	45'	1%		Sericite, Chlorit
Bottom of Hole					

J.S. Cummings Inc.

LITHOLOGIC LOG

Project T10R9 Lithologic Drilling **Hole no.** 109-2 **Dip** Vert. **Started** 8/15/79 **Elev.** _____

Job no. 275 **Township** T10-R9 **Coord.** See Sketch 275-2 **Direction** _____ **Completed** 8/16/79

N 1/2 - on road

Depth	Lithotype	Description
0'		Overburden
11'	E-1 with C-3	Alternating Grey to Black Shales With Gritty Tuffs - Shales - grey-black colored not graphitic, steep foliation or layers noted. Gritty Tuffs - distinctly angular fragments, poorly sorted material. Contacts between tuffs and shales are abrupt and show the same steep dip $\approx 25^{o}$-40° to long axis of core.
111'		Bottom of Hole

Depth scale: 0', 50', 100', 150', 200', 250', 300', 350', 400'

Depth scale: 400', 450', 500', 550', 600', 650', 700', 750', 800'

Lithotype

J.S. Cummings Inc. C . Mattson

SULPHIDE LOG

Project T10-R9 Ltihologic Hole no. 109-2 Dip Vert. Started 8/15/79 Elev. ____

Job no. 275 Township T10-R9 Coord. 275-2 Direction ____ Completed 8/16/79

See Sketch
N 1/2 - on road

FROM	TO	INTERVAL	EST. % SULPHIDES	EST. METAL (Cu, Pb, Zn)	ALTERATION
11	111	100'	1%	None	
Bottom of Hole					

J.S. Cummings Inc.

LITHOLOGIC LOG

Project T10R9 Lithologic Drilling **Hole no.** 109-3 **Dip** Vert. **Started** 8/16/79 **Elev.** _____

Job no. 275 **Township** T10-R9 **Coord.** See Sketch 275-2 **Direction** _____ **Completed** 8/16/79

N 1/2 - on road

Depth	Lithotype	Description
0'		
24'		Overburden
50'	E-1 with C-3	Alternating Shales and Tuffs - Same as 109-2. Grey-black shales with minor gritty tuff layers. More carbonate veins than 109-2. Steep dip is noted from 10°- 25° to long axis of core.
100'		
124'		Bottom of Hole
150'		
200'		
250'		
300'		
350'		
400'		

Depth	Lithotype
400'	
450'	
500'	
550'	
600'	
650'	
700'	
750'	
800'	

J.S. Cummings Inc.

C. Mattson

SULPHIDE LOG

Project T10-R9 Lithologic Hole no. 109-3 Dip Vert. Started 8/16/79 Elev.

See Sketch

Job no. 275 Township T10-R9 Coord. 275-2 Direction Completed 8/16/79

N 1/2 - on road

FROM	TO	INTERVAL	EST. % SULPHIDES	EST. METAL (Cu, Pb, Zn)	ALTERATION
24	124	100'	1%	None	
Bottom of Hole					

J.S. Cummings Inc.

LITHOLOGIC LOG

Project T10R9 Lithologic Drilling **Hole no.** 109-4 **Dip** Vert. **Started** 8/17/79 **Elev.** _____

Job no. 275 **Township** T10-R9 **Coord.** See Sketch 275-2 **Direction** _____ **Completed** 8/17/79

N 1/2 - on road

Depth	Lithotype	Description
0'		Overburden
34'		
46'		Basalt Boulders
50'	E-1 with C-3	Alternating Shale and Gritty Tuff - Grey-black shale, minor gritty tuff layers. Similar to 109-2 and 3. Layering somewhat contorted. Some undisturbed ? ones show a dip 30° - 50° to long axis of core.
100'		
134'		Bottom of Hole
150'		
200'		
250'		
300'		
350'		
400'		

Depth	Lithotype
400'	
450'	
500'	
550'	
600'	
650'	
700'	
750'	
800'	

J.S. Cummings Inc.

C. Mattson

SULPHIDE LOG

Project T10-R9 Lithologic Hole no. 109-4 Dip Vert. Started 8/17/79 Elev. _____

Job no. 275 Township T10-R9 Coord. 275-2 See Sketch N 1/2 - on road Direction _____ Completed 8/17/79

FROM	TO	INTERVAL	EST. % SULPHIDES	EST. METAL (Cu, Pb, Zn)	ALTERATION
34	134	100'	Mostly in 1% gritty tuff	None	
Bottom of Hole					

J.S. Cummings Inc.

LITHOLOGIC LOG

Project T10R9 Lithologic Drilling Hole no. 109-5 Dip Vert. Started 8/18/79 Elev. _____

Job no. 275 Township T10-R9 Coord. 275-2 Direction See Sketch Completed 8/18/79

N 1/2 - on road

Lithotype

0'

Overburden

22'

Grey Shale -
Similar to 109-2, 3, and 4.
Veins with weathered ? pyrite? throughout core. Layering 40° to 50° to long axis of core.
Minor gritty tuff with unweathered pyrite.

E-1

50'

100'

122'

Bottom of Hole

150'

200'

250'

300'

350'

400'

Lithotype

400'

450'

500'

550'

600'

650'

700'

750'

800'

J.S. Cummings Inc.

C. Mattson

SULPHIDE LOG

Project T10-R9 Lithologic Hole no. 109-5 Dip Vert. Started 8/18/79 Elev. _____

Job no. 275 Township T10-R9 Coord. 275-2 Direction See Sketch Completed 8/18/79

N 1/2 - on road

FROM	TO	INTERVAL	EST. % SULPHIDES	EST. METAL (Cu, Pb, Zn)	ALTERATION
22	122	100'	1%	None	
Bottom of Hole					

J.S. Cummings Inc.

LITHOLOGIC LOG

Project T10R9 Lithologic Drilling **Hole no.** 109-6 **Dip** Vert. **Started** 8/19/79 **Elev.** _____

Job no. 275 **Township** T10-R9 **Coord.** 275-2 **Direction** _____ **Completed** 8/20/79

See Sketch
N 1/2 - on road

	Lithotype
0'	
	Overburden
13'	
	Lapilli Agglomerate - Some fragments distinctly angular. Variety of fragments unaltered. Some Bald Mtn. type red chert fragments starting at 46', best at 59', >1". Rhyolite fragments, some >3".
50'	
100'	
113'	
	Bottom of Hole
150'	
200'	
250'	
300'	
350'	
400'	

	Lithotype
400'	
450'	
500'	
550'	
600'	
650'	
700'	
750'	
800'	

J.S. Cummings Inc.

C. Mattson

SULPHIDE LOG

Project T10-R9 Lithologic Hole no. 109-6 Dip Vert. Started 8/19/79 Elev. _____

Job no. 275 Township T10-R9 Coord. 275-2 See Sketch N 1/2 - on road Direction _____ Completed 8/20/79

FROM	TO	INTERVAL	EST. % SULPHIDES	EST. METAL (Cu, Pb, Zn)	ALTERATION
13	113	100'	1%	None	
Bottom of Hole					

J.S. Cummings Inc.

LITHOLOGIC LOG

Project T10R9 Lithologic Drilling Hole no. 109-7 Dip Vert. Started 8/20/79 Elev. ____

See Sketch

Job no. 275 Township T10-R9 Coord. 275-2 Direction ____ Completed 8/20/79

N 1/2 - on road

Lithotype

0'

11' Overburden

Black Shale - Graphitic - Layering, very broken and contorted. Some looks like a fragmental because layers are broken. Strongest graphite 84' - 94'. At 87' some fragments of layers of sulphide.

111' Bottom of Hole

150'

200'

250'

300'

350'

400'

Lithotype

400'

450'

500'

550'

600'

650'

700'

750'

800'

J.S. Cummings Inc.

C. Mattson

SULPHIDE LOG

Project T10-R9 Lithologic Hole no. 109-7 Dip Vert. Started 8/20/79 Elev. _____

Job no. 275 Township T10-R9 Coord. 275-2 Direction _____ Completed 8/20/79

See Sketch

N 1/2 - on road

FROM	TO	INTERVAL	EST. % SULPHIDES	EST. METAL (Cu, Pb, Zn)	ALTERATION
11	87	76'	1%		
87	88	1'	5%-7%		
88	111	23'	1%		
Bottom of Hole					

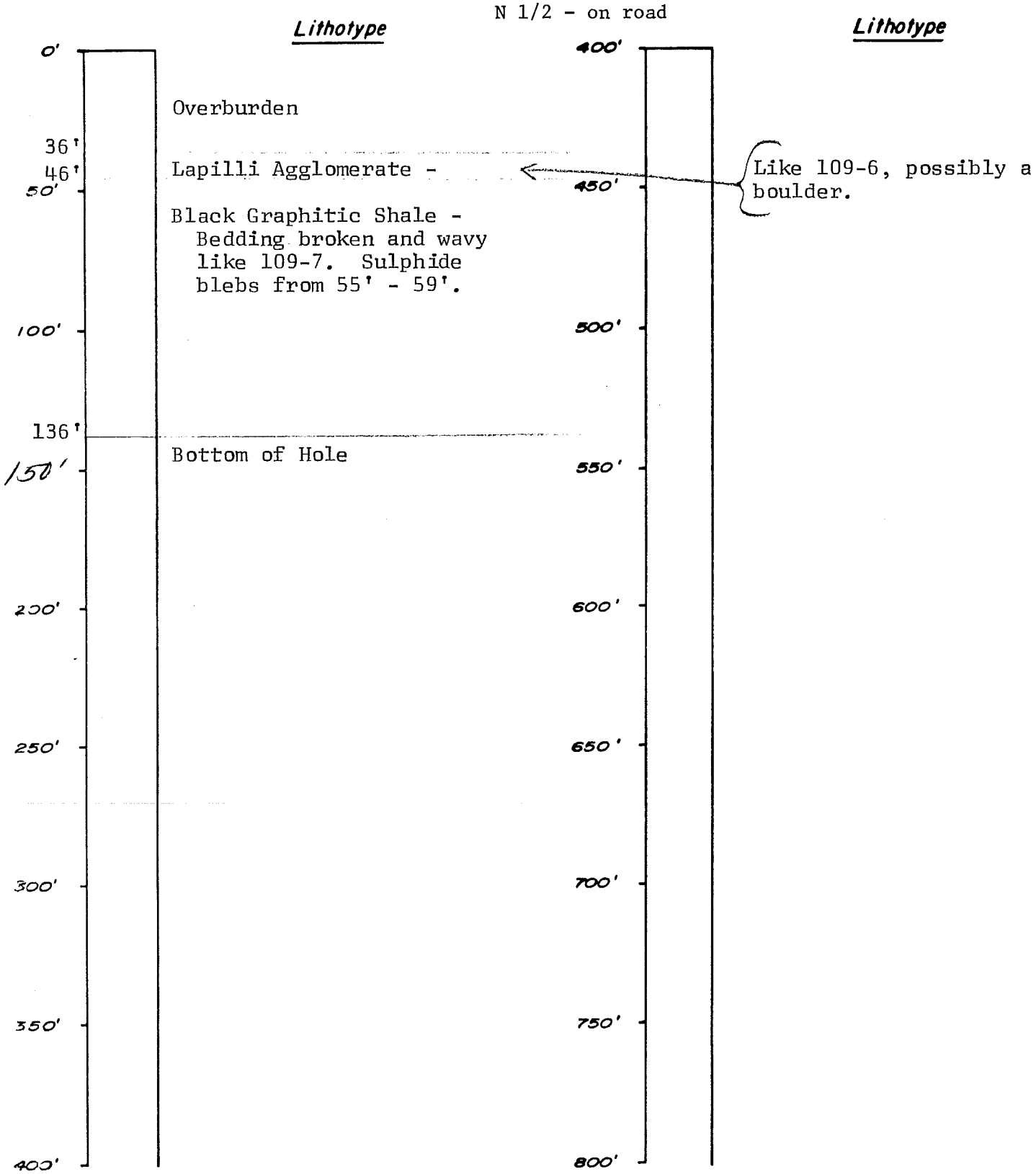
J.S. Cummings Inc.

LITHOLOGIC LOG

Project T10R9 Lithologic Drilling Hole no. 109-8 Dip Vert. Started 8/21/79 Elev. ____

Job no. 275 Township T10-R9 Coord. 275-2 Direction ____ Completed 8/21/79

See Sketch
N 1/2 - on road



J.S. Cummings Inc.

C. Mattson

SULPHIDE LOG

Project T10-R9 Lithologic Hole no. 109-8 Dip Vert. Started 8/21/79 Elev. _____

Job no. 275 Township T10-R9 Coord. 275-2 Direction _____ Completed 8/21/79

See Sketch

N 1/2 - on road

FROM	TO	INTERVAL	EST. % SULPHIDES	EST. METAL (Cu, Pb, Zn)	ALTERATION
36	55	9'	<1%		
55	59	4'	2%		
59	136	77'	<1%		
Bottom of Hole					

J.S. Cummings Inc.

LITHOLOGIC LOG

Project T10R9 Lithologic Drilling Hole no. 109-9 Dip Vert. Started 8/27/79 Elev. _____

Job no. 275 Township T10-R9 Coord. 275-2 (See Sketch) Direction _____ Completed 8/27/79

N 1/2 - on road

	Lithotype	
0'		
11'	Overburden	
	E-1 Black Graphitic Shale - Bedding wavy and not constant. Calcareous and graphitic bands. Some sulphide blebs.	
49'		
50'	Graphitic Agglomerate -	
66'		
	E-1 Black Graphitic Shale - Calcareous and graphitic bands, minor sulphide blebs.	
100'		
111'	Bottom of Hole	
150'		
200'		
250'		
300'		
350'		
400'		
400'		
450'		
	Graphitic matrix surrounding variety of fragments (some rhyolite), minor sulphide blebs. Bedding also broken making other fragments. (Calcareous and Graphitic).	
500'		
550'		
600'		
650'		
700'		
750'		
800'		

J.S. Cummings Inc.

C. Mattson

SULPHIDE LOG

Project T10-R9 Lithologic Hole no. 109-9 Dip Vert. Started 8/27/79 Elev. _____

See Sketch

Job no. 275 Township T10-R9 Coord. 275-2 Direction _____ Completed 8/27/79

N 1/2 - on road

FROM	TO	INTERVAL	EST. % SULPHIDES	EST. METAL (Cu, Pb, Zn)	ALTERATION
11	111	100'	<2%		
Bottom of Hole					

J.S. Cummings Inc.

LITHOLOGIC LOG

Project T10-R9 Lithologic Drilling Hole no. 109-10 Dip Vert. Started 8/28/79 Elev. _____

Job no. 275 Township T10-R9 Coord. 275-2 Direction See Sketch Completed 8/28/79

N 1/2 - on road

Lithotype

0'

6' Overburden

Greywacke -
Light grey, fine grained, some graphitic layers very incomplete, steep dip, might be indicated by layers? Becoming more siliceous with funny dark mottling toward bottom of hole. Minor agglomeritic sections with rhyolite fragments (some approaching block size - > 3").

50'

100'

106' Bottom of Hole

150'

200'

250'

300'

350'

400'

Lithotype

400'

450'

500'

550'

600'

650'

700'

750'

800'

J.S. Cummings Inc.

C. Mattson

SULPHIDE LOG

Project T10-R9 Lithologic Hole no. 109-10 Dip Vert. Started 8/28/79 Elev. _____

Job no. 275 Township T10-R9 Coord. 275-2 Direction _____ Completed 8/28/79

See Sketch
N 1/2 - on road

FROM	TO	INTERVAL	EST. % SULPHIDES	EST. METAL (Cu, Pb, Zn)	ALTERATION
6	106	100'	<1%		
Bottom of Hole					

HOLE #	COORDINATES	DATE COLLARED	DATE COMPLETED	DIP	BEARING	DEPTH	MOST SIGNIFICANT SULPHIDE INTERSECTION
109-1	See Sketch	8/12/79	8/15/79	Vert.		118'	
109-2	See Sketch	8/15/79	8/16/79	Vert.		111'	
109-3	See Sketch	8/16/79	8/16/79	Vert.		124'	
109-4	See Sketch	8/17/79	8/17/79	Vert.		134'	
109-5	See Sketch	8/18/79	8/18/79	Vert.		122'	
109-6	See Sketch	8/19/79	8/19/79	Vert.		113'	
109-7	See Sketch	8/20/79	8/20/79	Vert.		111'	
109-8	See Sketch	8/21/79	8/21/79	Vert.		136'	
109-9	See Sketch	8/27/79	8/27/79	Vert.		111'	
109-10	See Sketch	8/28/79	8/28/79	Vert.		106'	
					TOTAL	1186'	

T10-R9 LITHOLOGIC DRILLING

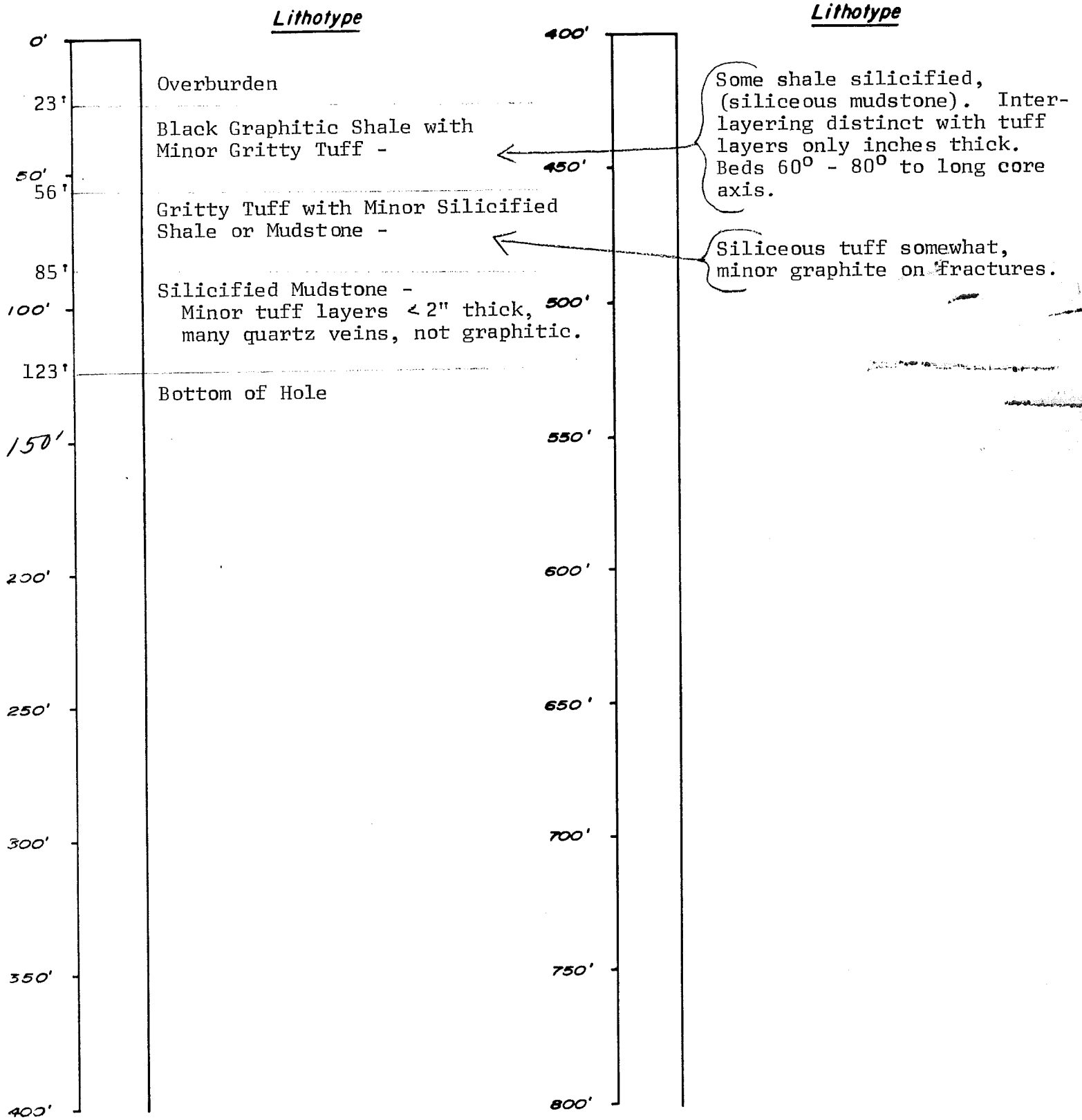
J. S. CUMMINGS, INC.

J.S. Cummings Inc.

LITHOLOGIC LOG

Project Spring Brook Hole no. SPB-1 Dip -45° Started 8/30/79 Elev. ____

Job no. 275.1 Township T10-R9 Coord. 2527N 2400W Direction 336° Completed 8/31/79



J.S. Cummings Inc.

C. Mattson

SULPHIDE LOG

Project Spring Brook Hole no. SPB-1 Dip -45° Started 8/30/79 Elev. _____

Job no. 275.1 Township T10-R9 Coord. 2527N 2400W Direction 336° Mag Completed 8/31/79

FROM	TO	INTERVAL	EST. % SULPHIDES	EST. METAL (Cu, Pb, Zn)	ALTERATION
23	56	33'	2%-3%	None	
56	85	29'	2%	None	
85	123	38'	2%-3%	None	
Bottom of Hole					

J.S. Cummings Inc.

LITHOLOGIC LOG

Project Spring Brook Hole no. SPB-2 Dip -45° Started 8/31/79 Elev. ____

Job no. 275.1 Township T10-R9 Coord. 2700N 3200W Direction 336° Completed 8/31/79

Lithotype

0'

Overburden

14'

Basalt -
Massive, medium to coarse grained, non-magnetic, occassional silver-black metallic grains throughout core, greenish-brown color.

50'

100'

114'

Bottom of Hole

150'

200'

250'

300'

350'

400'

Lithotype

400'

450'

500'

550'

600'

650'

700'

750'

800'

J.S. Cummings Inc.

C. Mattson

SULPHIDE LOG

Project Spring Brook Hole no. SPB-2 Dip -45° Started 8/31/79 Elev. _____

Job no. 275.1 Township T10-R9 Coord. 2700N 3200W Direction 336° Mag Completed 8/31/79

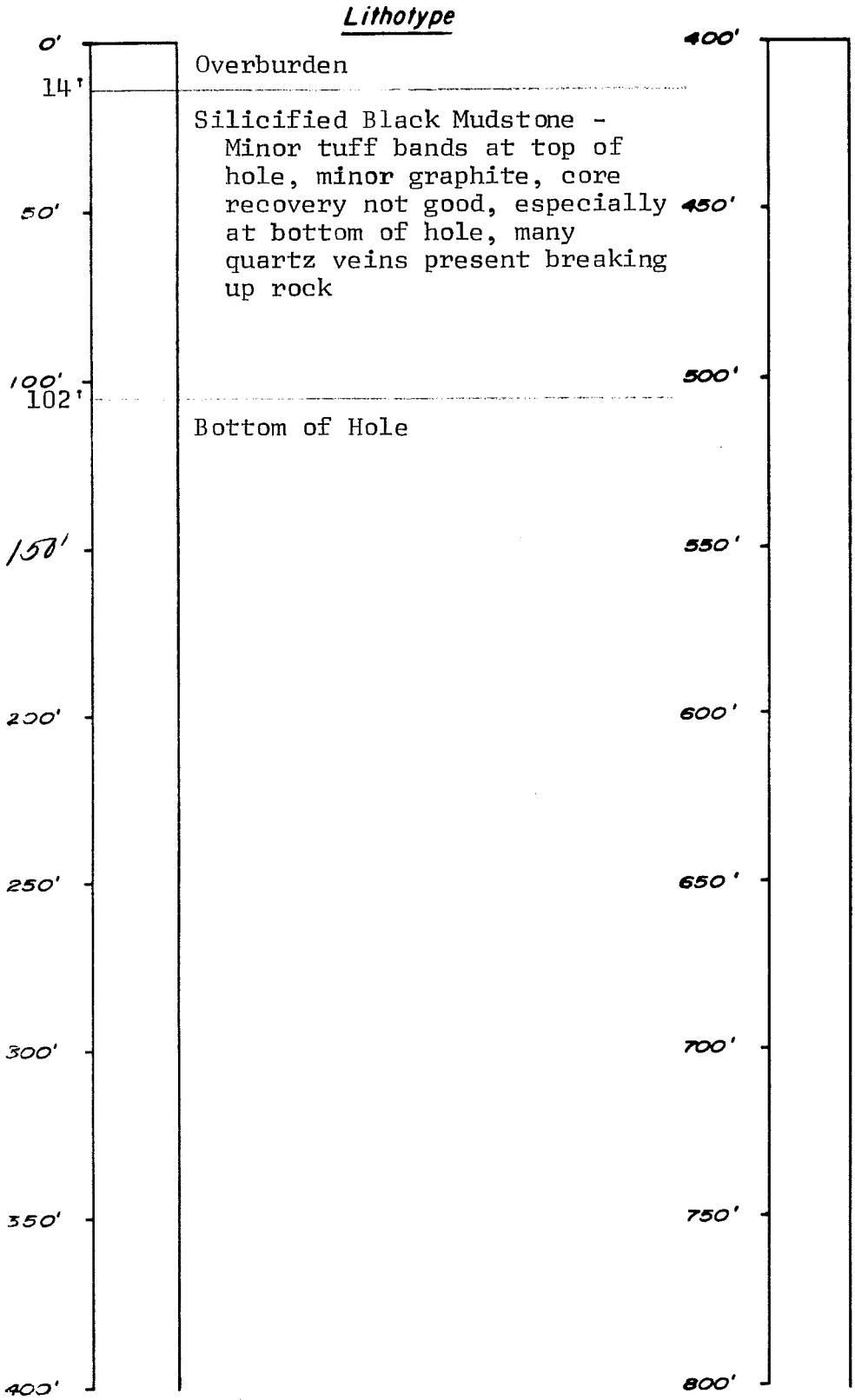
FROM	TO	INTERVAL	EST. % SULPHIDES	EST. METAL (Cu, Pb, Zn)	ALTERATION
14	114	100'	< 1%	Trace Cu, Trace Zn	
				@63' @99'	
Bottom of Hole					

J.S. Cummings Inc.

LITHOLOGIC LOG

Project Spring Brook Hole no. SPB-3 Dip -45° Started 9/1/79 Elev. ____

Job no. 275.1 Township T10-R9 Coord. 2871N 4000W Direction 336° Completed 9/2/79



J.S. Cummings Inc.

C. Mattson

SULPHIDE LOG

Project Spring Brook Hole no. SPB-3 Dip -45° Started 9/1/79 Elev. _____

Job no. 275.1 Township T10-R9 Coord. 2871N 4000W Direction 226° Mag Completed 9/2/79

FROM	TO	INTERVAL	EST. % SULPHIDES	EST. METAL (Cu, Pb, Zn)	ALTERATION
14	102	88'	∠1%	None	
	Bottom of Hole				

J.S. Cummings Inc.

LITHOLOGIC LOG

Project Spring Brook Hole no. SPB-4 Dip -45° Started 9/2/79 Elev. ____

Job no. 275.1 Township T10-R9 Coord. 2988N 4500W Direction 336° Completed 9/2/79

Lithotype

0'
8' Overburden

Silicified Black Mudstone - Minor tuff at top of hole, graphitic in places.

50'

100'
108' Bottom of Hole

150'

200'

250'

300'

350'

400'

Lithotype

400'

450'

500'

550'

600'

650'

700'

750'

800'

J.S. Cummings Inc.

C. Mattson

SULPHIDE LOG

Project Spring Brook Hole no. SPB-4 Dip -45° Started 9/2/79 Elev. _____

Job no. 275.1 Township T10-R9 Coord. 2988N 4500W Direction 336° Mag Completed 9/2/79

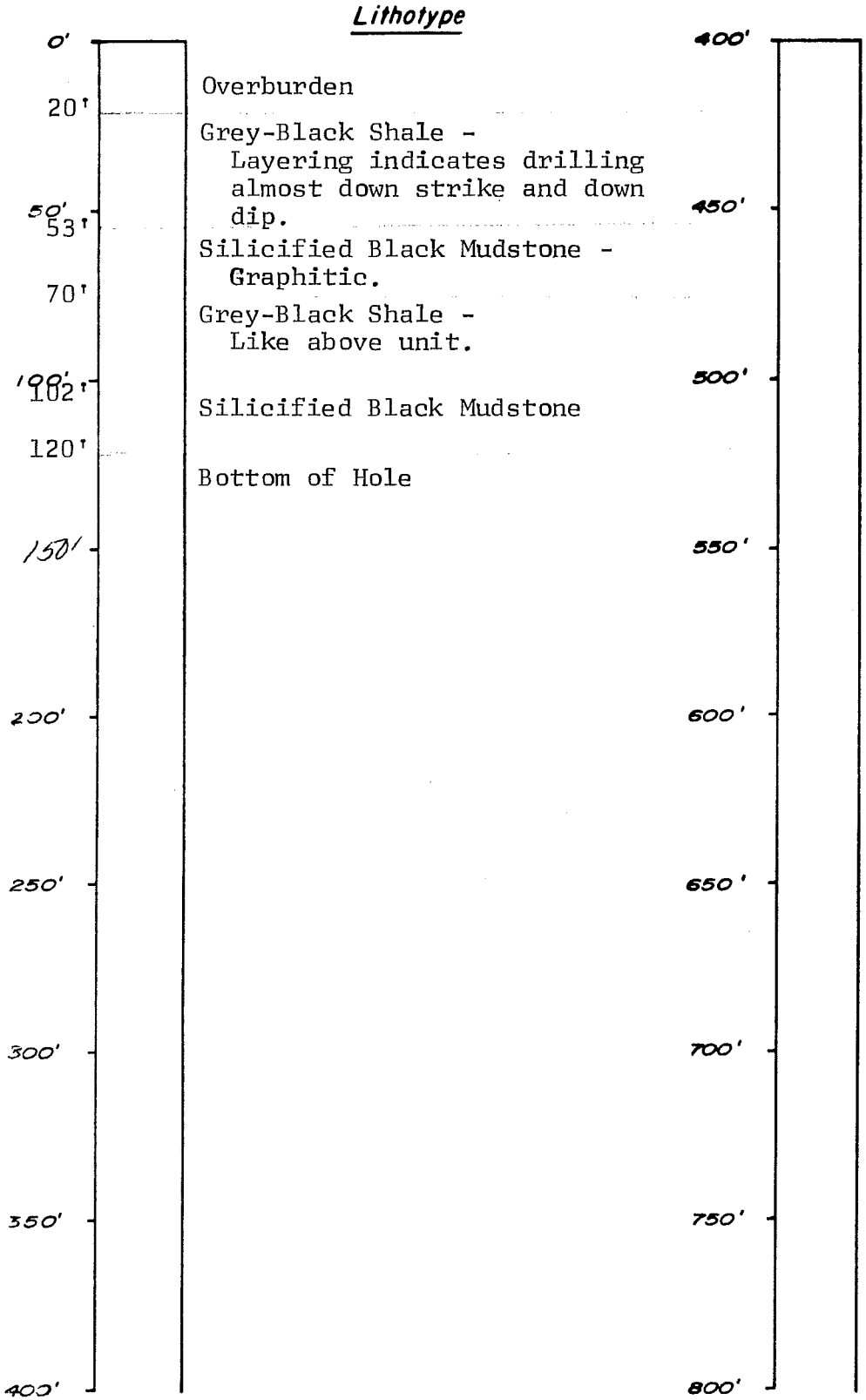
FROM	TO	INTERVAL	EST. % SULPHIDES	EST. METAL (Cu, Pb, Zn)	ALTERATION
8	108	100'	1%	None	
Bottom of Hole					

J.S. Cummings Inc.

LITHOLOGIC LOG

Project Spring Brook Hole no. SPB-5 Dip -45° Started 9/3/79 Elev. _____

Job no. 275.1 Township T10-R9 Coord. 3084N 5000W Direction 336° Completed 9/3/79



J.S. Cummings Inc.

C. Mattson

SULPHIDE LOG

Project Spring Brook Hole no. SPB-5 Dip -45° Started 9/3/79 Elev. _____

Job no. 275.1 Township T10-R9 Coord. 3084N 5000W Direction 336° Mag Completed 9/3/79

FROM	TO	INTERVAL	EST. % SULPHIDES	EST. METAL (Cu, Pb, Zn)	ALTERATION
20	53	33'	1%	None	
53	70	17'	2%-3%	None	
70	102	32'	1%	None	
102	120	18'	2%-3%	None	
Bottom of Hole					

J. S. Cummings, Inc.

DDH SPB-5- (Assays for Portion of Hole)

DEPTH (FEET) FROM COLLAR	% Zn	% Cu	% Pb	Oz/Ag	Oz/Au	S
53 - 63	Trace	None		None	Trace	2.99
63 - 70	Trace	0.012		0.7	None	2.97
103 - 113	None	None		None	None	1.43
113 - 120	Trace	0.006		None	None	2.33

Bottom of Hole: 120'

J.S. Cummings Inc.

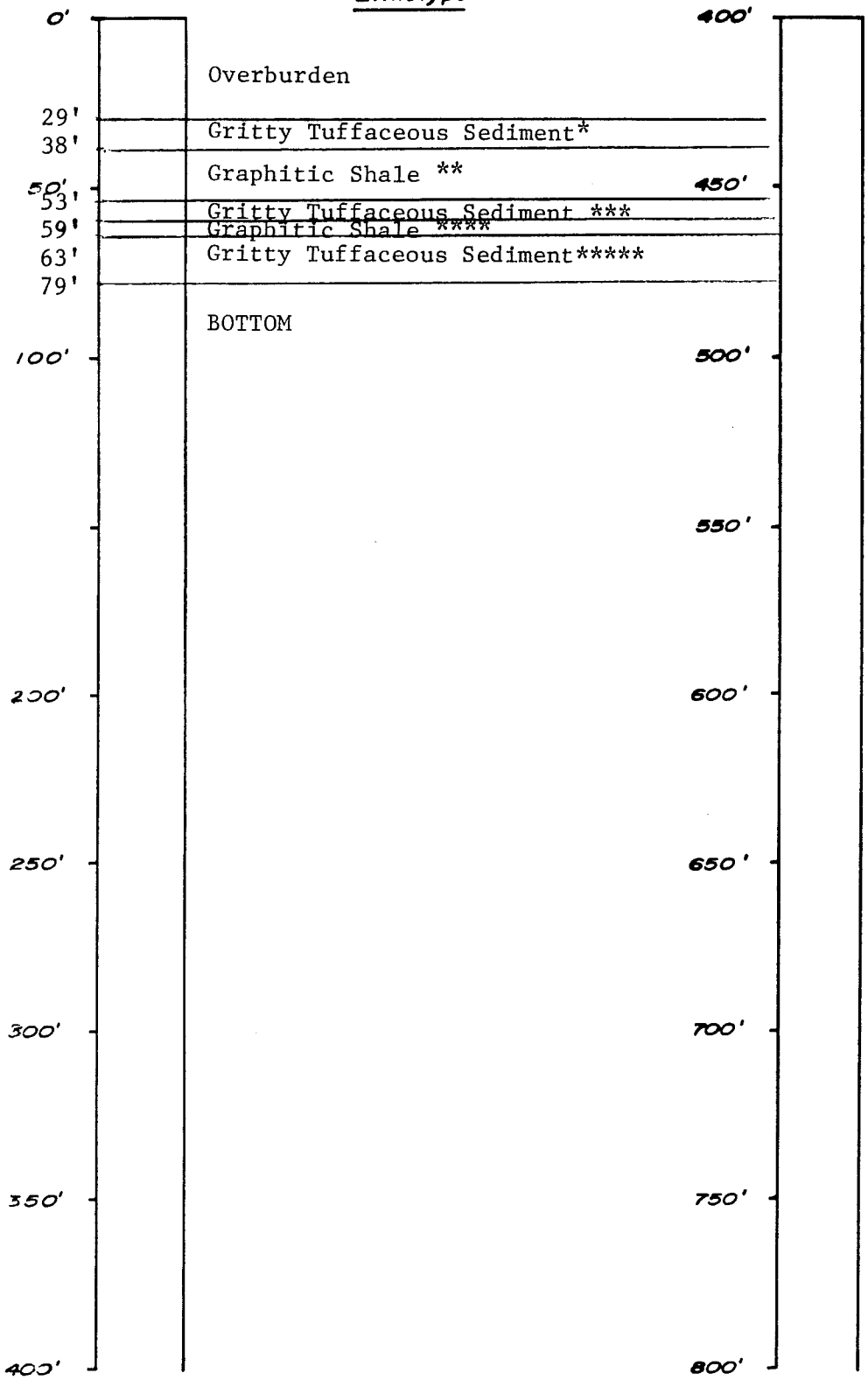
LITHOLOGIC LOG

Project SPRING BROOK Hole no. SPB-6 Dip 45° Started 8/27/80 Elev. ____

See Sketch

Job no. 275.1 Township T10-R9 Coord. 275-6 Direction 336° Completed 8/28/80

NE 1/4 - N of Spring Brook Hill



Gritty Tuffaceous Sediment*

Very fine to super fine grained. Very siliceous. Almost welded ap pearance. Finely layered, dip- ping 20° to 30° to core axis. Many small, hard black wispy len ses aligned subparallely. Tiny pyrite and pyrrhotite blebs 1% Cut by quartz veins up to 2" wid

Graphitic Shale**

Superfine to very fine grained. Quartz rich. Non-fissile, finel layered dipping 20° to 30° to core axis. Pyrite disseminated 2-3%, pyrrhotite in stringers. Short sericitized section at 49.

Gritty Tuffaceous Sediment ***

As above. Very quartz rich. Mo pyrite and pyrrhotite than above 2-4%. Individual particles dis- tinctly visible. Some chloritiz sections. No black wisps as abo

Graphitic Shale ****

As above. Layering shown most distinctly by elongation and ali ment of numerous small pyrite an pyrrhotite blebs 4-7% dipping as above. Graphite in seams. Rath siliceous

Gritty Tuffaceous Sediment*****

As above. Pyrite and pyrrhotite 1-3% - Very quartz rich. Indiv- idual particles tend to meld to- gether. No black wisps like the first section

I. Carlson

J.S. Cummings Inc.

LITHOLOGIC LOG

Project SPRING BROOK Hole no. SPB-7 Dip 45° Started 9/3/80 Elev. ____

Job no. 275.1 Township T19-R9 Coord. 275-6 Direction N45W Completed 9/4/80

See Sketch

NE 1/4 - N of Spring Brook Hill

Lithotype

0'

OVERBURDEN

28

50'

78

BOTTOM

100'

200'

250'

300'

350'

400'

Lithotype

400'

450'

500'

550'

600'

650'

700'

750'

800'

Graphitic Shale
Black, somewhat fissile, finely layered, dipping about 30° to core axis. Intermittent, but frequent layers of lighter colo ed slightly coarser material, some calcareous greywacke. Pyrite in tiny blebs in concentrated layers or disperced throughout whole sections up to 1-2%; also forming along fracture planes. Well cut by calcite veins.

J.S. Cummings Inc.

C. Mattson

SULPHIDE LOG

Project SPRING BROOK Hole no. SPB-7 Dip -45° Started 9/3/80 Elev. ____

Job no. 275.1 Township T10-R9 Coord. 275-6 Direction N45W Completed 9/4/80

See Sketch
NE 1/4 - N of Spring Brook Hill

FROM	TO	INTERVAL	EST. % SULPHIDES	EST. METAL (Cu, Pb, Zn)	ALTERATION
0'	28'	28'	Overburden		
28'	78'	50'	±1%		
	Bottom				

J.S. Cummings Inc. I. Carlson

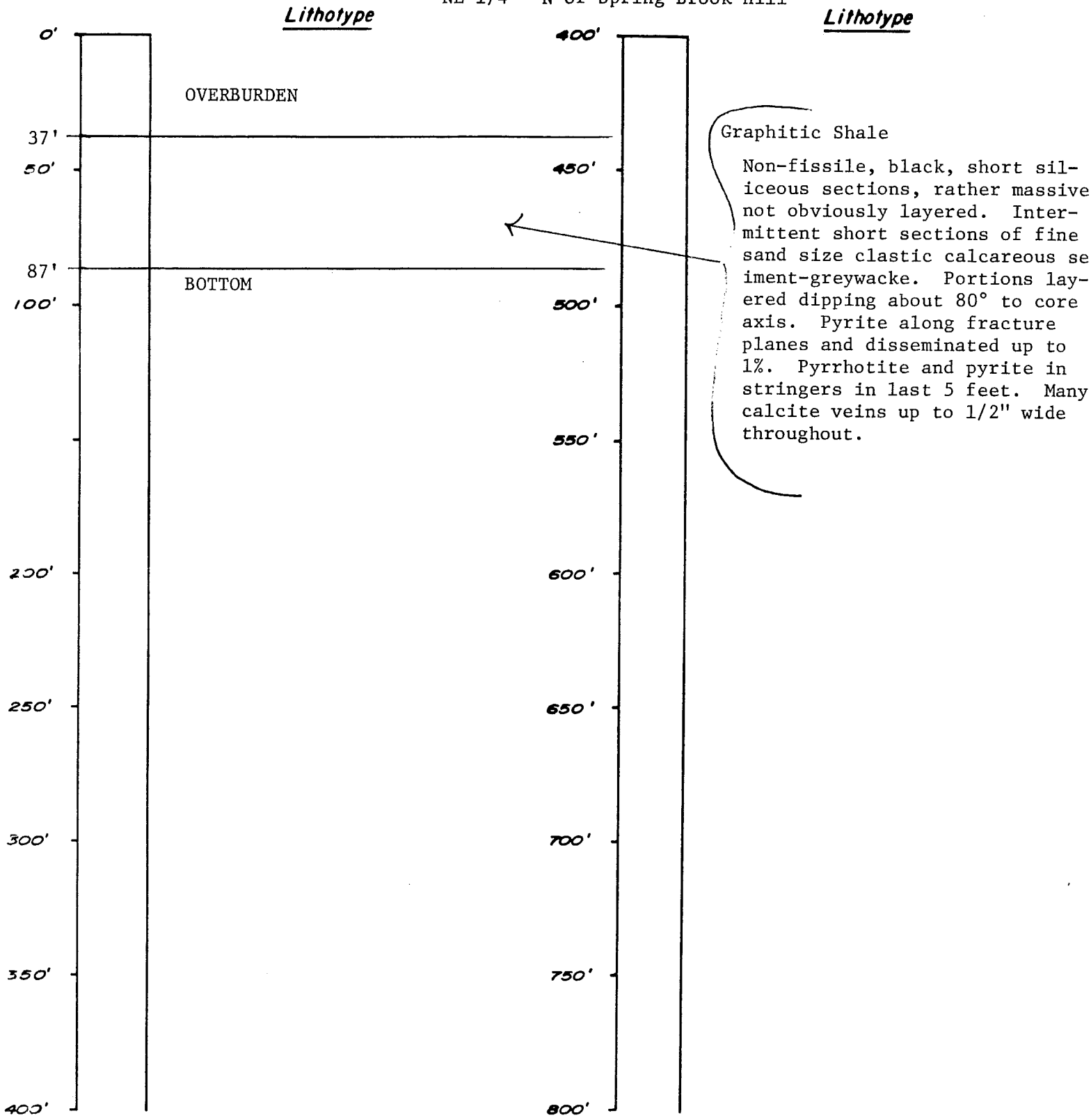
LITHOLOGIC LOG

Project SPRING BROOK Hole no. SPB-8 Dip -45° Started 8/29/80 Elev. ____

See Sketch

Job no. 275.1 Township T10-R9 Coord. 275-6 Direction N45°W Completed 9/2/80

NE 1/4 - N of Spring Brook Hill



J.S. Cummings Inc.

C. Mattson

SULPHIDE LOG

Project SPRING BROOK Hole no. SPB-8 Dip -45° Started 8/29/80 Elev. ____

See Sketch

Job no. 275.1 Township T10-R9 Coord. 275-6 Direction N45W Completed 9/2/80

NE 1/4 - N of Spring Brook Hill

FROM	TO	INTERVAL	EST. % SULPHIDES	EST. METAL (Cu, Pb, Zn)	ALTERATION
0'	37'	37'	Overburden		
37'	87'	50'	±1%	Pyrite and Pyrrhotite	
	Bottom				

J.S. Cummings Inc.

C. Mattson

LITHOLOGIC LOG

Project SPRING BROOK **Hole no.** SPB-9 **Dip** -45° **Started** 9/5/80 **Elev.** ____

Job no. 275.1 **Township** T10-R9 **Coord.** 275-6 **Direction** 336°mag **Completed** 9/8/80

See Sketch

NE 1/4 - N of Spring Brook Hill

Lithotype

0'

Overburden

30'

Basalt -
light grey colored, massive, carbonate in matrix, abundant veins chloritized with dense chlorite up to 3" thick. Rock looks similar to PRL-1 basalts, except sulphide → not as high in chlorite.

50'

80'

Bottom of hole

100'

150'

200'

250'

300'

350'

400'

Lithotype

400'

450'

500'

550'

600'

650'

700'

750'

800'

J.S. Cummings Inc.

C. Mattson

SULPHIDE LOG

Project SPRING BROOK Hole no. SPB-9 Dip -45° Started 9/5/80 Elev. _____

See Sketch

Job no. 275.1 Township T10-R9 Coord. 275-6 Direction 336°mag Completed 9/8/80

NE 1/4 - N of Spring Brook Hill

FROM	TO	INTERVAL	EST. % SULPHIDES	EST. METAL (Cu, Pb, Zn)	ALTERATION
30'	80'	50'	<1%	Pyrite and Pyrrhotite	Chlorite in ve
	Bottom				

Assays Spring Brook - SPB-9

HOLE #	DEPTH	% CaCO3	% SiO2
SPB-9	68'	4.35	43.19

Length of Hole: 80'

J.S. Cummings Inc. C. Mattson

LITHOLOGIC LOG

Project SPRING BROOK **Hole no.** SPB-10 **Dip** -45° **Started** 9/8/80 **Elev.** ____

Job no. 275.1 **Township** T10-R9 **Coord.** 275-6 **Direction** 336°mag **Completed** 9/9/80

See Sketch
NE 1/4 - N of Spring Brook Hill

Lithotype

0'
15' Overburden
25' Fractured Rhyolite *
Basalt
Same as basalt in SPB-9, light grey-green colored with abundant chlorite veins up to 3" thick, also abundant calcite in veins and matrix.
50'
66' Bottom of hole
100'
150'
200'
250'
300'
350'
400'

Lithotype

400'
Fractured Rhyolite *
dark grey with many fractures with black mineral on them, minor basalt
450'
500'
550'
600'
650'
700'
750'
800'

J.S. Cummings Inc.

C. Mattson

SULPHIDE LOG

Project SPRING BROOK Hole no. SPB-10 Dip -45° Started 9/8/80 Elev. _____

See Sketch

Job no. 275.1 Township T10-R9 Coord. 275-6 Direction 336°mag Completed 9/9/80

NE 1/4 - N of Spring Brook Hill

FROM	TO	INTERVAL	EST. % SULPHIDES	EST. METAL (Cu, Pb, Zn)	ALTERATION
15'	25'	10'	1% - 2%		
25'	66'	41'	<1%		Chlorite
	Bottom				

Assays Spring Brook SPB-10

HOLE #	DEPTH	% CaCO3	% SiO2
SPB-10	28'	4.96	43.21

Length of Hole: 66'

J.S. Cummings Inc.

C. Mattson

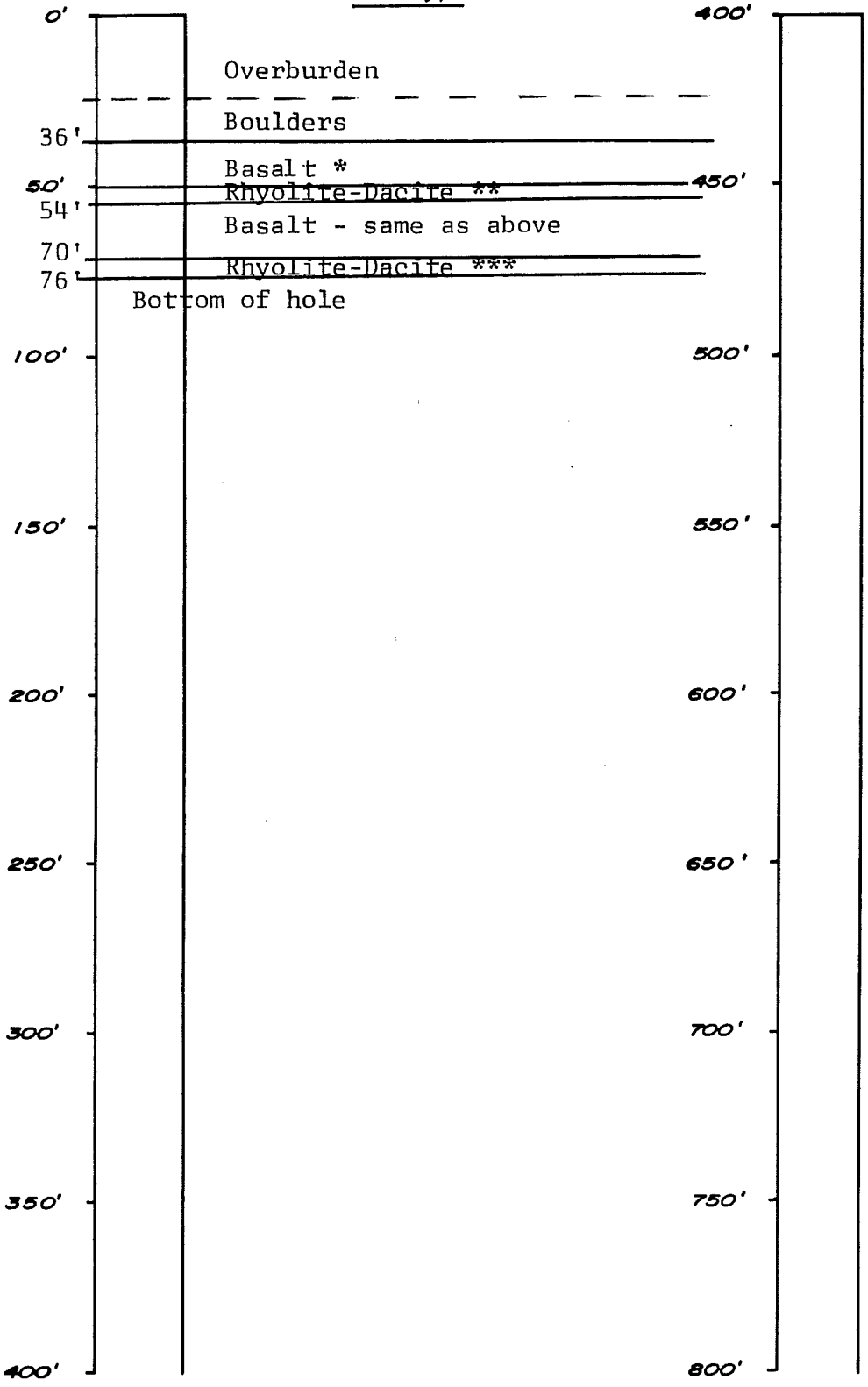
LITHOLOGIC LOG

Project Spring Brook Hole no. SPB-11 Dip -45° Started 9/9/80 Elev. ____

Job no. 275.1 Township T10-R9 Coord. 275-6 Direction 336° Completed 9/10/80

See Sketch

NE 1/4 - N of Spring Brook Hill



Basalt *
medium grained, massive, dark green colored

Rhyolite-Dacite **
fine grained, dark grey colored

Rhyolite-Dacite ***
fine grained, dark grey colored, sharp contact with basalt

J.S. Cummings Inc. C. Mattson

SULPHIDE LOG

Project SPRING BROOK Hole no. SPB-11 Dip -45° Started 9/9/80 Elev. _____

See Sketch

Job no. 275.1 Township T10-R9 Coord. 275-6 Direction 336°mag Completed 9/10/80

NE 1/4 - N of Spring Brook Hill

FROM	TO	INTERVAL	EST. % SULPHIDES	EST. METAL (Cu, Pb, Zn)	ALTERATION
36'	76'	40'	1%		Minor chlorite
	Bottom				

J.S. Cummings Inc.

C. Mattson

LITHOLOGIC LOG

Project Spring Brook Hole no. SPB-12 Dip -45° Started 9/11/80 Elev. ____

Job no. 275.1 Township T10-R9 Coord. 275-6 Direction 336° Completed 9/12/80

See Sketch
NE 1/4 - N of Spring Brook Hill

Lithotype

0'
Overburden
22'
Basalt -
medium-coarse grained, massive, dark green colored, minor chlorite alteration, pyrrhotite in sections, magnetic.
50'
72'
Bottom of hole
100'
150'
200'
250'
300'
350'
400'

Lithotype

400'
450'
500'
550'
600'
650'
700'
750'
800'

J.S. Cummings Inc.

C. Mattson

SULPHIDE LOG

Project SPRING BROOK Hole no. SPB-12 Dip -45° Started 9/11/80 Elev. _____

See Sketch

Job no. 275.1 Township T10-R9 Coord. 275-6 Direction 336°mag Completed 9/12/80

NE 1/4 - N of Spring Brook Hill

FROM	TO	INTERVAL	EST. % SULPHIDES	EST. METAL (Cu, Pb, Zn)	ALTERATION
22'	50'	28'	<1%		Minor chlorite
50'	72'	22'	1%	Pyrrhotite	Minor chlorite
	Bottom				

J.S. Cummings Inc.

C. Mattson

LITHOLOGIC LOG

Project Spring Brook Hole no. SPB-13 Dip -45° Started 9/12/80 Elev. _____

See Sketch

Job no. 275.1 Township T10-R9 Coord. 275-6 Direction 336° Completed 9/13/80

NE 1/4 - N of Spring Brook Hill

Lithotype

0'

Overburden

40'

50'

Black Graphitic Mudstone *

85'

Basalt **

90'

Bottom of hole

100'

150'

200'

250'

300'

350'

400'

Lithotype

400'

450'

500'

550'

600'

650'

700'

750'

800'

Black Graphitic Mudstone * black, well layered, non-fissile, minor greywacke, some sulphide in layers and as layers. Layers range from 10°-20° to core axis to 70°-80° to core axis.

Basalt **
A 6" chilled margin at contact, fine grained

J.S. Cummings Inc.

C. Mattson

SULPHIDE LOG

Project SPRING BROOK Hole no. SPB-13 Dip -45° Started 9/12/80 Elev. ____

See Sketch

Job no. 275.1 Township T10-R9 Coord. 275-6 Direction 336°mag Completed 9/13/80

NE 1/4 - N of Spring Brook Hill

FROM	TO	INTERVAL	EST. % SULPHIDES	EST. METAL (Cu, Pb, Zn)	ALTERATION
40'	85'	45'	2% - 3%		
85'	90'	5'	<1%		
	Bottom				

J.S. Cummings Inc.

C. Mattson

LITHOLOGIC LOG

Project Spring Brook Hole no. SPB-14 Dip -45° Started 9/14/80 Elev. ____

Job no. 275.1 Township T10-R9 Coord. 275-6 Direction 336° Completed 9/14/80

See Sketch

NE 1/4 - N of Spring Brook Hill

Lithotype

0'

Overburden

36'

46' Boulders

50' Black Graphitic Mudstone - same as SPB-13. Angle of bedding varies, minor greywacke, non-fissile, well layered

84' Bottom of hole

100'

150'

200'

250'

300'

350'

400'

Lithotype

400'

450'

500'

550'

600'

650'

700'

750'

800'

J.S. Cummings Inc.

C. Mattson

SULPHIDE LOG

Project SPRING BROOK Hole no. SPB-14 Dip -45° Started 9/14/80 Elev. _____

See Sketch

Job no. 275.1 Township T10-R9 Coord. 275-6 Direction 336°mag Completed 9/14/80

NE 1/4 - N of Spring Brook Hill

FROM	TO	INTERVAL	EST. % SULPHIDES	EST. METAL (Cu, Pb, Zn)	ALTERATION
46'	84'	38'	2% - 3%		
	Bottom				

J.S. Cummings Inc.

C. Mattson

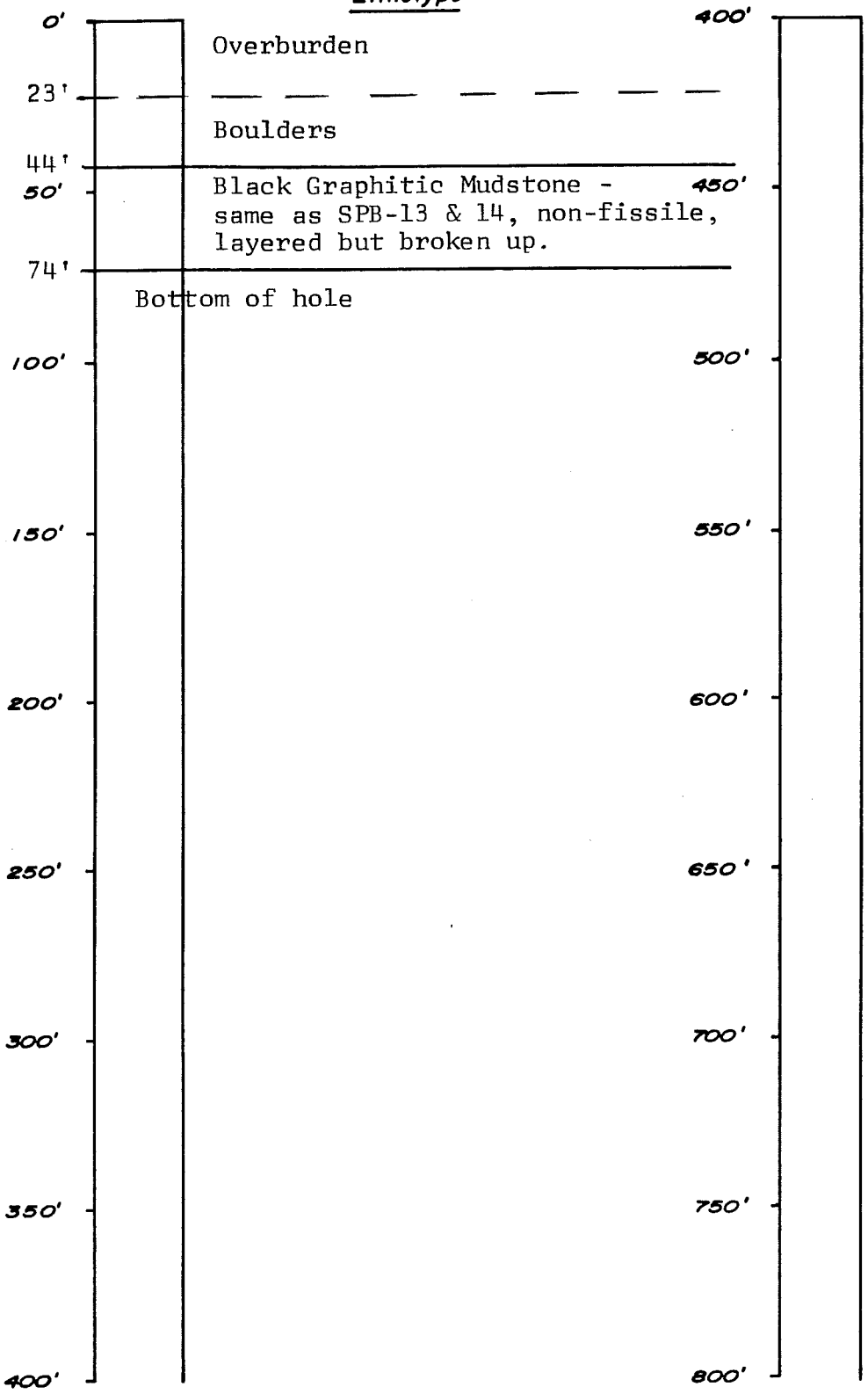
LITHOLOGIC LOG

Project Spring Brook Hole no. SPB-15 Dip -45° Started 9/15/80 Elev. _____

See Sketch

Job no. 275.1 Township T10-R9 Coord. 275-6 Direction 336° Completed 9/16/80

NE 1/4 - N of Spring Brook Hill



J.S. Cummings Inc.

SULPHIDE LOG

C. Mattson

Project SPRING BROOK Hole no. SPB-15 Dip -45° Started 9/15/80 Elev.

See Sketch 275-6

Job no. 275.1 Township T10-R9 Coord. Direction 336°mag Completed 9/16/80

NE 1/4 - N of Spring Brook Hill

FROM	TO	INTERVAL	EST. % SULPHIDES	EST. METAL (Cu, Pb, Zn)	ALTERATION
44'	74'	30'	2% - 3%		
	Bottom				

J.S. Cummings Inc.

C. Mattson

LITHOLOGIC LOG

Project Spring Brook Hole no. SPB-16 Dip -45° Started 9/16/80 Elev. ____

See Sketch

Job no. 275.1 Township T10-R9 Coord. 275-6 Direction 336° Completed 9/17/80

NE 1/4 - N of Spring Brook Hill

Lithotype

0'

Overburden

35'

Black Graphitic Mudstone & Gritty Tuff - well layered, layers ±30° to core axis, gritty sections minor but contain best disseminated sulphide, black sections not heavily graphitic.

50'

86'

Bottom of hole

100'

150'

200'

250'

300'

350'

400'

Lithotype

400'

450'

500'

550'

600'

650'

700'

750'

800'

J.S. Cummings Inc.

C. Mattson

SULPHIDE LOG

Project SPRING BROOK Hole no. SPB-16 Dip -45° Started 9/16/80 Elev. _____

See Sketch

Job no. 275.1 Township T10-R9 Coord. 275-6 Direction 336° mag Completed 9/17/80

NE 1/4 - N of Spring Brook Hill

FROM	TO	INTERVAL	EST. % SULPHIDES	EST. METAL (Cu, Pb, Zn)	ALTERATION
35'	86'	51'	1% - 2%	Pyrite and Pyrrhotite	
	Bottom				

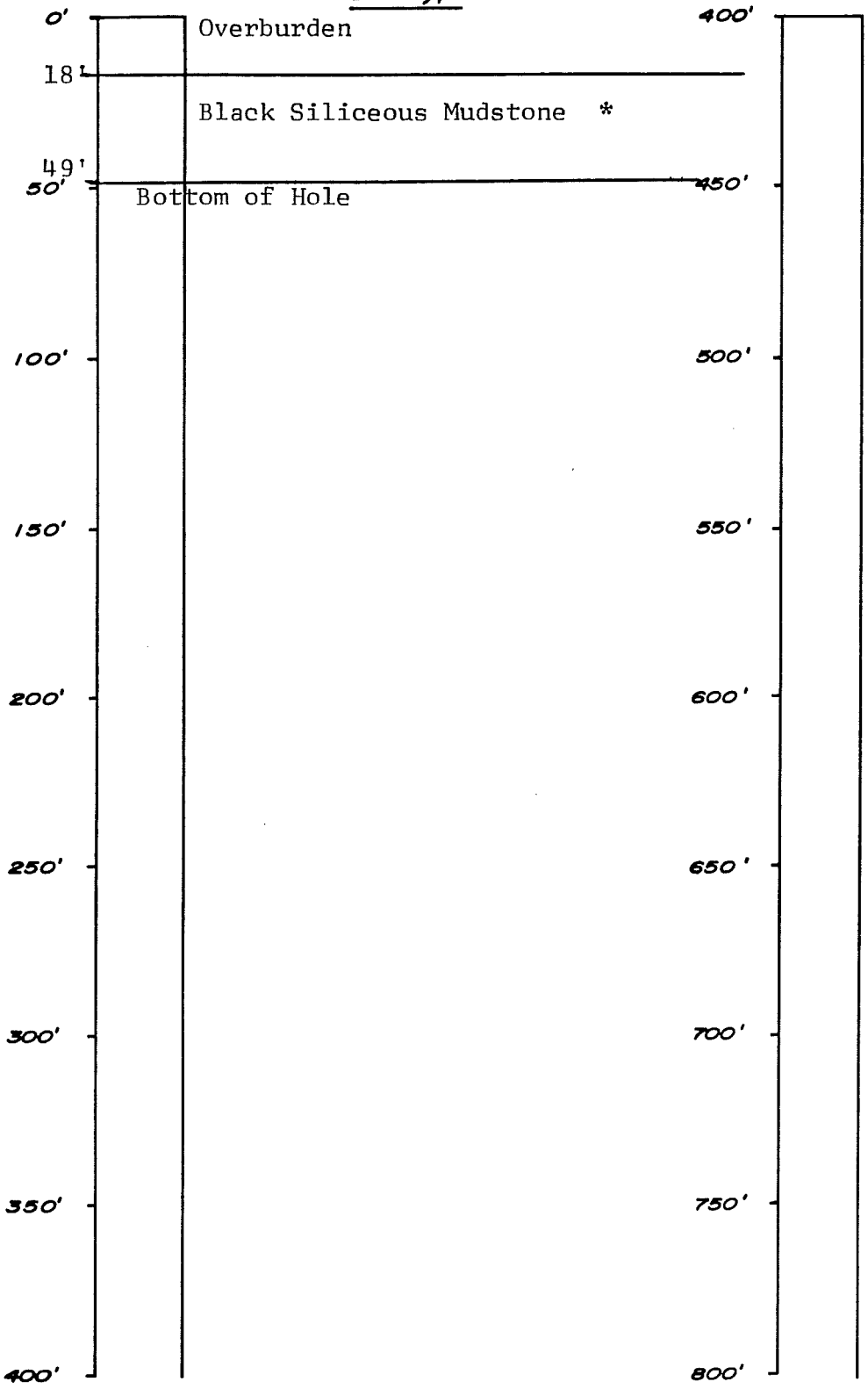
J.S. Cummings Inc. C. Mattson

LITHOLOGIC LOG

Project Spring Brook Hole no. SPB-17A Dip -45° Started 9/23/80 Elev. _____

Job no. 275.1 Township T10-R9 Coord. 275-6 (See Sketch) Direction 336° Completed 9/23/80

NE 1/4 - N of Spring Brook Hill



Black Siliceous Mudstone * minor gritty tuff, rhyolite or chert layers and volcanic sediment. Mudstone and gritty tuff contains high % sulphide (Po), light and dark grey chert and rhyolite layers. Volcanic sediment light and dark grey (dark grey sections slightly magnetic).

J.S. Cummings Inc.

SULPHIDE LOG

C. Mattson

Project SPRING BROOK Hole no. SPB-17A Dip -45° Started 9/23/80 Elev.

See Sketch

Job no. 275.1 Township T10-R9 Coord. 275-6 Direction 336°mag Completed 9/23/80

NE 1/4 - N of Spring Brook Hill

FROM	TO	INTERVAL	EST. % SULPHIDES	EST. METAL (Cu, Pb, Zn)	ALTERATION
18'	26'	8'	5% - 7%	Trace copper (Pyrrhotite, pyrite and chalcopyrite)	
26'	49'	23'	1%	Trace copper (Pyrrhotite, pyrite and chalcopyrite)	
	Bottom				

J. S. Cummings, Inc.

DDH SPB-17A- (Assays for Portion of Hole)

DEPTH (FEET) FROM COLLAR	LENGTH	% Zn	% Cu	% Pb	Oz/Ag	Oz/Au	Approx. % Sulphide
18 - 26	8'	0.05	0.006	Trace	None	Trace	6.6

Bottom of Hole: 49'

J.S. Cummings Inc. C. Mattson

LITHOLOGIC LOG

Project Spring Brook Hole no. SPB-17 Dip -45° Started 9/23/80 Elev. _____

Job no. 275.1 Township T10-R9 Coord. 275-6 Direction 156° Completed 9/25/80

See Sketch

NE 1/4 - N of Spring Brook Hill

Lithotype

0'
Overburden
12'
Fractured Rhyolite or Chert *
50'
65'
Calcareous Basalt -
same as in SPB-10, sections more calcareous than others. Not nearly as strong overall as Pratt Lake core. Veins up to 3" or 4" thick, highly chloritized, also minor calcareous veins and veinlets. Sections slightly magnetic.
100'
150'
175'
Bottom of hole
200'
250'
300'
350'
400'

400'
450'
500'
550'
600'
650'
700'
750'
800'

Lithotype

Fractured Rhyolite or Chert * light grey colored, massive, hard, highly fractured rhyolite interlayered with altered and dark grey colored volcanic sediment - soft, layered (thin). Darker sections are magnetic - some sections have minor lapilli sized fragments. One minor gritty layer at 14'.

J.S. Cummings Inc.

C. Mattson

SULPHIDE LOG

Project SPRING BROOK Hole no. SPB-17 Dip -45° Started 9/23/80 Elev. ____

Job no. 275.1 Township T10-R9 Coord See Sketch 275-6 Direction 156° mag Completed 9/25/80

NE 1/4 - N of Spring Brook Hill

FROM	TO	INTERVAL	EST. % SULPHIDES	EST. METAL (Cu, Pb, Zn)	ALTERATION
12'	18'	6'	2% - 3%	Trace chalcopyrite @ 16'	
18'	65'	47'	<1%		
65'	175'	110'	<1%		Chlorite
	Bottom				

J.S. Cummings Inc.

C. Mattson

LITHOLOGIC LOG

Project Spring Brook Hole no. SPB-18 Dip -45° Started 9/25/80 Elev. ____

Job no. 275.1 Township T10-R9 Coord. 275-6 Direction 156° Completed 9/26/80

See Sketch

NE 1/4 - N of Spring Brook Hill

Lithotype

0'
5' Overburden

Basalt -
medium to fine grained, massive, minor chlorite, minor calcareous veins, green colored. Same as SPB-11.

50'

73'

Black and Grey Cherty Sediment or Rhyolite *

100'
106'

Calcareous Basalt -
grey-green colored, matrix calcareous in sections, chlorite in veins up to 3" thick, calcareous veins and veinlets. Same as SPB-17

150'

200'
Bottom of hole

250'

300'

350'

400'

400'

450'

500'

550'

600'

650'

700'

750'

800'

Lithotype

Acid Test

Depth	Apparent ∢	Actual ∢
200'	51°	45°

Black and Grey Cherty Sediment or Rhyolite *
layered in sections, sulphide occurs as layers and in layers. Calcareous veins, minor soft sediment interlayered. Same as SPB-17.

J.S. Cummings Inc.

C. Mattson

SULPHIDE LOG

Project SPRING BROOK Hole no. SPB-18 Dip -45° Started 9/25/80 Elev. ____

Job no. 275.1 Township T10-R9 Coord. 275-6 Direction 156°mag Completed 9/26/80

See Sketch
NE 1/4 - N of Spring Brook Hill

FROM	TO	INTERVAL	EST. % SULPHIDES	EST. METAL (Cu, Pb, Zn)	ALTERATION
5'	73'	68'	<1%		Minor chlorite
73'	90'	17'	3% - 5%	Trace cu (Py and Po)	
90	106'	16'	1% - 2%	(Po and Py)	
106'	200'	94'	<1%		Chlorite in vei Calcareous

J. S. Cummings, Inc.

DDH SPB-18 - (Assays for Portion of Hole)

DEPTH (FEET) FROM COLLAR	LENGTH	% Zn	% Cu	% Pb	Oz/Ag	Oz/Au	Approx. % Sulphide
73 - 83	10'	0.15	0.012	Trace	None	Trace	7.5
83 - 93	10'	0.10	0.006	Trace	None	None	4.4

Bottom of Hole: 200'

HOLE #	COORDINATES	DATE COLLARED	DATE COMPLETED	DIP	BEARING	DEPTH	DRILLED BY
SPB-1	2527N, 2400W	8/30/79	8/31/79	-45°	NW	123'	
SPB-2	2700N, 3200W	8/31/79	8/31/79	-45°	NW	114'	
SPB-3	2871N, 4000W	9/ 1/79	9/ 2/79	-45°	NW	102'	
SPB-4	2988N, 4500W	9/ 2/79	9/ 2/79	-45°	NW	108'	
SPB-5	3084N, 5000W	9/ 3/79	9/ 3/79	-45°	NW	120'	
SPB-6	See Sketch	8/27/80	8/28/80	-45°	N45W	79'	Kennebec II
SPB-7A	See Sketch	8/18/80	8/19/80	-45°	N45W	57'	Kennebec II (abandoned in overburden)
SPB-7	See Sketch	9/ 3/80	9/ 4/80	-45°	N45W	78'	Kennebec II
SPB-8	See Sketch	8/29/80	9/ 2/80	-45°	N45W	87'	Kennebec II
SPB-9	See Sketch	9/ 4/80	9/ 8/80	-45°	N45W	80'	Kennebec II
SPB-10	See Sketch	9/ 8/80	9/ 9/80	-45°	N45W	66'	Kennebec II
SPB-11	See Sketch	9/ 9/80	9/10/80	-45°	N45W	76'	Kennebec II
SPB-12	See Sketch	9/11/80	9/12/80	-45°	N45W	72'	Kennebec II
SPB-13	See Sketch	9/12/80	9/13/80	-45°	N45W	90'	Kennebec II
SPB-14	See Sketch	9/14/80	9/14/80	-45°	N45W	84'	Kennebec II
SPB-15	See Sketch	9/15/80	9/16/80	-45°	N45W	84'	Kennebec II
SPB-16	See Sketch	9/16/80	9/17/80	-45°	N45W	86'	Kennebec II

SUB TOTAL 1506'

SPRING BROOK (T10-R9) DRILLING

J. S. CUMMINGS, INC.

HOLE #	COORDINATES	DATE COLLARED	DATE COMPLETED	DIP	BEARING	DEPTH	DRILLED BY
SPB-17 (A)	See Sketch	9/22/80	9/23/80	-45°	N45W	49'	Kennebec II
SPB-17	See Sketch	9/23/80	9/24/80	-45°	S45E	175'	Kennebec II
SPB-18	See Sketch	9/25/80	9/26/80	-45°	S45E	200'	Kennebec II
					SUB TOTAL	[illegible]	

SPRING BROOK (T10-R9) DRILLING

J. S. CUMMINGS, INC.