

FROM TO	ROCK TYPE	TEXTURE AND STRUCTURE	ANGLE TO CA	ALTERATION	MINERALIZATION	REMARKS
0.00 TO 7.60	OVERBURDEN	Casing				
7.60 TO 50.30	QTZ WACKES WACKES, SILTSTONES	<p>Colour: medium to dark grey Grain Size: fine grained Monotonous sequence of grey siltstones, wackes and quartz wackes. Bed thickness varies from 1 cm to 30-40 cm. In areas of thin bedding, there is up to 1 m of thin beds in the order of 1-3 cm.</p> <p>Bedding marked by color changes and grain size changes. Colour changes from medium to dark grey reflect variation in composition. Lighter grey siltstones and wackes richer in quartz and containing 5-10% fine biotite. Darker grey rock with up to 20-30% biotite reflecting a dirtier siltstone or wacke. Patchy zones with disseminated muscovite. Patchy < 1m zones with a weak silificied hornfels appearance.</p> <p>Some soft sediment features and erosional contacts</p> <p>Rare white mm laths, possible amphiboles</p> <p>7.6-13.0 -dirty siltstone -fine brown colored muds with diss. biotite</p> <p>13.9-16.7 -fine white speckled appearance with 3-5% <1 mm white specks, possible fsp? -same interval hornfels looking</p> <p>18.1-18.3 -Fault Zone -crushed, rubbly rock -carbonate veinlets in footwall to fault</p> <p>-occasional 10 cm zones with 1-2% 1-2 mm poorly developed irregular pinkish garnets</p>			<p>- <1% disseminated pyrite, rarely occurring along fracture planes</p> <p>9.54-9.60 -3-4% dissem. pyrite Altered pyrite gives a fine dark spotted appearance</p> <p>23.2-23.25</p>	

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		<p>Bedding measurements:</p> <p>128 m 132.7 m 141.3 m 147.3 m 151.5 m 160.7 m 166.4 m 174.6 m 186.3 m 195.2 m</p>	<p>79 78 78 70 70 68 68 68 68 67</p>	and conformable to distorted sediments		
196.30 TO 217.50	SILTSTONE, WACKES, MINOR QTZ WACKE	<p>Colour: medium grey, brown grey, lt green grey Grain Size: fine grained Predominantly med grey, fine grained dirty wackes/siltstones with 20-35% fine diss. biotite and patchey 2-3% 2-4 mm biotite blades. Occasional light grey quartz wackes with 2-4% biotite. Bedding poorly developed, 10-40 cm scale. Rare 2-mm rounded garnets</p>			-trace py, po	
217.50 TO 258.90	DIRTY SILTSTONE, MUDSTONE, PELITIC METASEDS	<p>Colour: brown, dark grey Grain Size: fine grained Similar to previous siltstone/mudstone units. Brown biotitic siltstone and dark grey mudstone/argillite. Well bedded on a scale of <10 cm. Occasional light grey wackes/quartz wackes with 5-10% fine biotite.</p> <p>218.2 -10 cm layered concretion</p> <p>225.7 -10 cm brecciated zone, fault breccia within quartz wacke</p> <p>237.8-237.95 -elongate flattened med grey siltstone fragments</p>			<p>-<1-1% pyrrhotite as f. disseminations and occasional 1 mm single laminations concentrated within mudstone beds where po may reach 5% over <0.5 cm - 1cm -trace chalcopyrite intergrown with pyrrhotite</p>	

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		<p>muscovite and locally <1% chlorite interbedded with med grey and brown grey dirty wackes/siltstone with abundant disseminated biotite and thinner beds and laminations of dark grey biotite mudstone.</p> <p>Light grey quartz wackes vary from 10-50 cm averaging 20-30 cm. Grey and brown wackes and siltstone beds vary from 1-2 cm to 10 cm with accumulated thickness of up to 1-2 m between pulses of quartz wackes.</p> <p>Siltstone/mudstone intervals towards base of unit contain moderately abundant fine muscovite flakes.</p> <p>Rare < 1 cm rounded quartz wacke and wacke frags.</p> <p>89.0 -4 cm rounded quartz wacke fragments</p> <p>90.8-91.3 -dark grey to black mudstone with 2-3% very fine disseminated pyrite</p> <p>97.3-97.35 -black silificied/cherty? mudstone with 2-3% diss pyrite</p> <p>108.9-110.25 -light-med grey quartz wacke and wacke with 2% < 1mm black felted mineral, possible amphibole type mineral</p> <p>-occasional zones towards base of unit with 3-4% poorly developed garnets</p>			<p>84.75-84.9 -1-2% pyrite trace galena?, disseminated and within fractures at 5 deg to c.a. -dark metallic mineral associated with pyrite within fractures</p>	<p>Thin section at 110.0 m</p>
125.00 TO 196.30	PELITIC METASEDIMENTS, DIRTY, SILTSTONE, MUD	<p>Colour: pinkish brown, dark grey Grain Size: fine grained Similar rocks as described, for earlier siltstone/</p>			<p>-<1-1% diss. pyrite and pyrrhotite</p>	<p>Greater pelitic content of this unit</p>

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	STONE	<p>unit. Predominantly pinkish brown biotitic siltstone with thinner beds and laminations of dark grey mudstone/argillite with minor biotite. Brown biotitic siltstone also contain moderately abundant fine muscovite flakes.</p> <p>This unit differs slightly from previous unit by containing moderately abundant creamy white/grey soft clay/sericite mud beds <1-10 cm. Some beds contain 3-4% 1-2 mm white laths = amphiboles? Brown siltstone very biotite rich. Rare x-bedding and soft sed. deformation.</p> <p>130.7-130.9 -subvertical fault x-cutting beds -displacement unknown</p> <p>136.2-138.3 -Moyie Sill -speckeled white medium green, fine to med grained 60-70% green hornblende, 20-25% white fsp/ carbonate? and 10% biotite -conformable lower contact</p> <p>138.5-143.95 -greater abundance of black mudstone/argillite beds</p> <p>167.0-196.3 -occasional 10-40 cm thick fine quartz arenites, wackes with 1-2% and up to 10% biotite</p> <p>177.6-180.0 -weak biot/silica hornfels appearance as halo around quartz vein</p>			<p>Pyrrhotite also concentrated within mudstone beds as <1 mm laminations</p> <p>136.2-138.3 -minor po within subvertical 1 mm quartz veinlet</p> <p>138.5-143.95 -2-3% pyrrhotite and locally 5-7% po mainly disseminated within mudstone/ argillite beds and as mm laminations</p> <p>138.55-138.6 -5% po</p> <p>138.75 -4 x 1 cm massive pyrrhotite fragment</p>	<p>reflected in increase biotite content and fine grain size then wackes and quartz wackes</p> <p>Thin section at 157.8 m</p>
				<p>146.1-146.15 -qtz-carb vein, conformable</p> <p>178.4-179.1 -4-5 cm wide subvertical quartz-carb vein with 1-2% po and minor py</p> <p>193.05-193.7 -thin carbonate? veinlets x-cutting</p>		

FROM TO	ROCK TYPE	TEXTURE AND STRUCTURE	ANGLE TO CA	ALTERATION	MINERALIZATION	REMARKS
		42.8-43.2 -Fault -broken core, blocky, minor fault gouge along fracture surfaces Bedding Measurements: 8.1 m 8.6 m 26.1 m 34.8 m 41.1 m	79 80 72 78 80		-pyrrhotite witin and rimming < 1 cm wacke fragments 26.05-26.15 -1-2% py/po diss and as < 1 mm single laminations	
50.30 TO 68.20	INTERBEDDED SILSTONE & MUDSTONE	Colour: pinkish brown, dark grey Grain Size: fine grained Thinly bedded pinkish brown silstone with 10-15% very fine biotite and dark grey mudstone with fine disseminated biotite and black << 1 mm wispy laminations. Individual siltstone or mudstone beds 1.5-4 cm. Some beds as thin as 0.5 cm with rare 2 mm laminations. Bedding measurements: 50.6 m 56.5 m 63.3 m 65.4 m 67.9 m	78 80 82 80 80		-<1% combined pyrite/pyrrhotite Of interest though py, po more common within dark grey mudstones (diss) and at the top of mudstone beds as 1mm laminations or more concentrated disseminations. -possible very fine chalcopyrite with pyrite and pyrrhotite	
68.20 TO 125.00	QTZ WACKES, WACKES, SILTSTONES	Colour: light to dark grey Grain Size: fine grained Clean, light grey, fine grained quartz wackes with				

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		<p>2 x <0.5 cm within mudstone</p> <p>Bedding measurements:</p> <p>224.9 m 233.6 m 243.4 m 252.3 m</p>	<p>67 67 69 69</p>		<p>252.95 -5 cm fragment with 25% diss po</p> <p>243.05 -2 mm lamination with trace galena, may be remobilization from above fragment</p> <p>255.8 -3 cm fragment of mudstone with 20% po</p>	
258.90 TO 270.36	CLEANER WACKES, QTZ WACKES	<p>Colour: med grey Grain Size: fine grained Poorly bedded f.g. grey wackes and quartz wackes with <10% fine diss. biotite and muscovite. Thin laminations of dark grey mudstone with abundant biotite</p> <p>259.9-261.7 Moyie Sill Amphibolite -90% fine grained green hornblende with up to 10% biotite. -Coarser grained hornblende near upper and lower margins with 20% quartz over a width of 20 cm</p> <p>262.5-263.2 -well laminated zone of biotitic mudstone -may be a Cominco marker horizon?</p> <p>bedding 262.8 m</p> <p>263.9-264.1 -1-1.5 cm rounded wacke fragments</p> <p>267.0 -2 cm fragment</p>	69		<p>-trace py, po, cpy -pyrite fracture coatings</p>	

HOLE NUMBER: 89-ST-1

MINNOVA INC.
DRILL HOLE RECORD

DATE: 6-March-1990

FROM TO	ROCK TYPE	TEXTURE AND STRUCTURE	ANGLE TO CA	ALTERATION	MINERALIZATION	REMARKS
	E.O.H.					

HOLE NUMBER: 89-ST-1

ASSAY SHEET

DATE: 6-March-1990

Sample	From (m)	To (m)	Length (m)	ASSAYS					COMMENTS
				Cu ppm	Zn ppm	Pb ppm	Ag ppm	Au ppb	
BCD17427	138.30	138.75	0.45	105	80	111	1.6	2	
BCD17428	138.75	139.80	1.05	143	56	48	1.8	1	
BCD17429	139.80	140.80	1.00	44	37	24	0.8	4	
BCD17430	140.80	141.80	1.00	48	65	23	0.7	1	
BCD17431	141.80	142.80	1.00	40	84	19	0.8	1	
BCD17432	142.80	143.80	1.00	41	87	21	1.0	2	

FROM TO	ROCK TYPE	TEXTURE AND STRUCTURE	ANGLE TO CA	ALTERATION	MINERALIZATION	REMARKS														
0.00 TO 16.76	CASING																			
16.76 TO 25.30	WACKE, QTZ WACKE	<p>Colour: light to medium grey Grain Size: silty to f. grained -poorly bedded fine grained wackes and quartz wackes with 5-7% very fine disseminated biotite, 1-2% chlorite and trace poorly developed garnets</p> <p>24.2-24.4 -flattened elongate wacke and minor mudstone fragments 1 cm x 0.2 cm</p>		-1-2% bladed chlorite	-trace disseminated pyrite/pyrrhotite															
25.30 TO 88.00	MUDSTONE, DIRTY SILTSTONE, PELITIC METASEDS	<p>Colour: dark grey, brown, med grey Grain Size: silt, mud Dark grey biotitic mudstone interbedded and inter-laminated with brown dirty biotitic siltstone and med grey biotitic siltstone. Bedding thickness varies from <0.3 cm laminations to 20 cm thick beds. Average beds 2-5 cm thick. Rare x-bedding Occasional 1-2 mm white laths, possible altered amphiboles</p> <p style="text-align: center;">Bedding measurements:</p> <table style="margin-left: auto; margin-right: auto;"> <tr><td>28.7 m</td><td>72</td></tr> <tr><td>39.1 m</td><td>72</td></tr> <tr><td>50.6 m</td><td>72</td></tr> <tr><td>60.7 m</td><td>70</td></tr> <tr><td>69.2 m</td><td>70</td></tr> <tr><td>77.9 m</td><td>71</td></tr> <tr><td>86.1 m</td><td>73</td></tr> </table>	28.7 m	72	39.1 m	72	50.6 m	72	60.7 m	70	69.2 m	70	77.9 m	71	86.1 m	73		<p>-<1-1% diss and laminations of pyrrhotite mainly within dark grey mudstone -<1% py intergrown with pyrrhotite and as fracture coatings.</p>		
28.7 m	72																			
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60.7 m	70																			
69.2 m	70																			
77.9 m	71																			
86.1 m	73																			
88.00 TO 95.65	QTZ WACKE, SILTY WACKES	<p>Colour: medium grey Grain Size: silt to fine sand Poorly bedded quartz wackes and silty wackes with 2-7% very fine biotite and minor muscovite</p>			-trace pyrite															

FROM TO	ROCK TYPE	TEXTURE AND STRUCTURE	ANGLE TO CA	ALTERATION	MINERALIZATION	REMARKS
		<p>Bedding measurements:</p> <p>155.9 m 157.2 m 163.7 m 170.8 m 181.8 m 195.1 m 209.6 m 219.4 m</p>	<p>75 77 77 77 75 75 78 77</p>			
224.40 TO 249.00	<p>QTZ WACKES, WACKES, QTZ ARENITE</p> <p>E.O.H.</p>	<p>Colour: med grey, light grey Grain Size: silt to fine sand -medium grey weak to moderately biotitic quartz wackes and wackes with occasional light grey sericite quartz arenites -weakly developed bedding, not as evident as above unit -bedding marked by biotite rich beds -bedding on a scale of 10-40 cm with 3-5 cm biotite rich beds -occasional zones with a silicified biotitic hornfels appearance</p>			<p>-trace - <1% diss pyrhotite/pyrite</p>	

Sample	From (m)	To (m)	Length (m)	SiO2 %	Al2O3 %	CaO %	MgO %	Na2O %	K2O %	Fe2O3 %	MnO2 %	TiO2 %	BaT %	Cu ppm	Zn ppm	Pb ppm	Ag ppm	Au B ppb	tot. ppm	F ppm
BCD17415	20.30	23.30	3.00	68.19	15.64	.19	1.51	1.75	4.1	4.79	.05	.6	.06	20	73	15	0.6	5	37	375
BCD17416	41.50	44.50	3.00	62.36	13.07	6.55	3.06	1.4	3.0	4.73	.16	.47	.04	32	87	40	1.3	5	1	540
BCD17417	60.00	63.00	3.00	62.42	17.27	1.93	2.49	1.39	4.82	5.06	.08	.62	.075	30	88	29	1.0	5	1	530
BCD17418	81.10	84.10	3.00	64.53	16.4	1.16	2.38	2.04	3.97	5.36	.07	.59	.05	32	96	31	0.8	5	2	5209
BCD17419	90.40	93.40	3.00	73.4	12.55	0.67	1.09	2.22	3.16	3.3	.06	.54	.055	14	50	15	0.8	5	1	240
BCD17420	102.60	105.60	3.00	50.04	13.85	10.63	6.27	1.94	0.37	11.8	.19	1.01	.005	27	50	18	1.5	5	1	115
BCD17421	127.00	130.00	3.00	68.91	14.66	1.23	1.08	1.75	3.8	4.13	.07	.58	.06	17	62	15	0.6	10	1	290
BCD17422	148.40	151.50	3.10	72.01	13.11	1.32	1.03	1.78	3.32	3.64	.06	.53	.045	17	54	13	0.7	5	1	285
BCD17423	169.80	172.80	3.00	63.65	13.95	4.86	3.89	1.36	3.57	3.84	.07	.53	.05	22	92	55	1.5	5	3	600
BCD17424	187.91	190.90	2.99	75.15	11.98	0.98	0.96	2.17	2.48	3.01	.04	.49	.045	10	54	17	0.5	5	1	655
BCD17425	212.40	215.40	3.00	66.26	14.42	2.96	2.97	1.41	3.49	4.65	.08	.55	.045	32	109	44	1.5	5	1	590
BCD17426	230.70	233.70	3.00	63.47	18.07	.43	1.72	1.42	5.01	5.61	.07	.65	.07	33	96	28	0.7	5	1	470

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		<p>129.9-133.4 -heavily fractured rock, rubbly core, slickensides along fracture planes</p> <p>139.3-140.2 -vertical fracturing with white clay (Kaolinite?) along fracture planes</p> <p style="text-align: center;">Bedding measurements:</p> <p style="text-align: center;">119.5 m 124.8 m 127.8 m 140.8 m</p>	75 76 80 70		<p>140.6-145.0 -<1% py/po finely disseminated in fine grained biotitic siltstone laminations</p>	<p>130.0-141.0 -possible source of aquifer -hole making 10-15 gal/min</p>
154.50 TO 224.40	PELITIC METASEDS, SILTSTONE, MUDSTONE	<p>Colour: dark grey brown, light grey Grain Size: mud, silt and fine sand -well bedded brown biotitic siltstone and dark grey, brown grey biotitic mudstone -bedding generally < 10 cm -abundant 10 cm zones of interlaminated light grey quartz arenite, biotitic quartz wacke and dark grey muds</p> <p>-2-3% <1-2 mm muscovite flakes -occasional <1-2 mm white laths</p> <p>rare x-bedding, truncations indicating tops up-hole -graded bedding = tops up hole</p> <p>184.6-198.3 -biotite wackes, minor quartz wackes -med grey, patchy light grey, poorly bedded</p> <p>197.8-198.3 -weakly brecciated, minor carbonate veinlets, -1-2% combined py/po blebs</p> <p>Many of the light grey beds contain up to 10% 0.5 mm dark spots. Some look like quartz grains while others are unknown</p>			<p><1-1% combined pyrrhotite and pyrite, diss and weak laminations</p>	

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BCD17401	20.10	23.10	3.00	67.14	15.97	.84	1.17	1.85	4.07	4.53	.06	.64	.07	22	64	9	0.4	10	2	490
BCD17402	41.80	44.80	3.00	65.13	17.37	.44	1.39	1.57	4.73	4.86	.05	.65	.075	21	53	12	0.4	10	15	425
BCD17403	54.00	57.00	3.00	63.28	16.70	2.5	3.07	1.92	4.03	4.99	.05	.58	.06	25	110	41	1.3	5	18	760
BCD17404	75.30	78.30	3.00	71.86	13.94	.63	.98	2.14	3.36	3.59	.04	.55	.055	11	52	10	0.2	5	1	265
BCD17405	99.70	102.70	3.00	70.87	14.48	.72	.99	2.5	3.24	3.6	.04	.64	.055	9	57	9	0.6	5	1	255
BCD17406	118.00	121.00	3.00	65.43	17.57	.43	1.49	1.9	4.6	4.83	.04	.46	.06	18	71	11	0.6	5	13	450
BCD17407	130.10	133.10	3.00	63.33	14.11	4.55	3.62	1.08	4.14	4.86	.12	.57	.055	29	108	43	1.4	5	12	800
BCD17409	157.60	160.60	3.00	62.72	14.95	4.14	3.69	2.01	3.88	4.43	.07	.49	.06	23	104	40	1.5	10	19	700
BCD17410	182.00	185.00	3.00	66.29	13.70	2.7	2.92	1.52	3.9	4.13	.06	.59	.065	27	82	45	0.9	5	13	590
BCD17411	206.30	209.30	3.00	64.53	16.81	1.47	1.9	1.63	4.43	4.66	.06	.58	.065	28	87	30	1	5	1	525
BCD17412	227.70	230.70	3.00	64.39	15.38	2.52	3.34	1.77	4.36	3.89	.07	.58	.07	19	99	40	1.2	5	8	600
BCD17413	249.00	252.00	3.00	64.65	14.39	1.62	3.32	2.64	3.59	6.1	.08	.56	.065	56	113	50	1.2	5	1	670
BCD17414	264.30	267.30	3.00	72.18	12.48	2.19	0.82	1.91	3.22	3.2	.06	.53	.07	16	33	7	6.8	5	1	285

FROM TO	ROCK TYPE	TEXTURE AND STRUCTURE	ANGLE TO CA	ALTERATION	MINERALIZATION	REMARKS
		93.9-95.1 Fault Breccia -brecciated angular wacke fragments in a milled fine groundmass -sharp upper and lower boundaries to zones -minor gouge along lower contact -Fault zone cutting core at 5-10 deg to c.a.				
95.65 TO 111.90	MOYIE SILL	Colour: med to dark green Grain Size: m. to c. grained -massive -60-75% green amphibole (hornblende) and 25-30% quartz/feldspar and minor biotite -occasional subvertical and x-cutting calcite veinlets				
111.90 TO 154.50	QTZ WACKE, WACKE, MINOR, DIRTY SILT-STONE	Colour: light to med grey Grain Size: silt to fine sand -poorly bedded clean quartz wackes (3-7% biotite) and dirtier wackes with up to 25% biotite -occasional thin beds and laminations of biotite rich siltstones -rare < 1 cm rounded wacke and mudstone fragments -rare < 10 cm zones with 1-2% garnet -hornfels appearance near upper contact -moderately abundant subvertical fracturing, some with pyrite fracture coatings 112.9 -subvertical fracture with pink clay mineral on fracture plane 113-141 -moderately fractured with pyrite and limonitic iron stained fracture surfaces -strongest fracturing and iron staining from 130-141.0 m				

HOLE NUMBER: 89-ST-2

ASSAY SHEET

DATE: 6-March-1990

Sample	From (m)	To (m)	Length (m)	ASSAYS					COMMENTS
				Cu ppm	Zn ppm	Pb ppm	Ag ppm	Au ppb	