

Project: FWZ

Hole: NB20-003

Property:	NIDD	Survey Type:	GPS	Logged By:	J.Lewis	Hole Type:	DDH
Prospect:	Boundary	Survey By:	J.Lewis	Date Started:	2020-09-07	Company:	Fireweed Zinc
UTM Grid:	NAD83_09	Date Surveyed:		Date Completed:	2020-09-11	Core Size:	HQ3
UTM East:	421557	Survey Accuracy:	GPS_GLO +/- dm	Drill Company:	NewAge	Casing Status:	Removed
UTM North:	7010456	Grid Convergence:	-1.03	Drill Rig:	A5_1	Casing Depth (m):	9.9
Elev. CGVD28 (m):	1200	Declination:	19.5	Drill Started:	2020-09-04	Reduced (m):	
Hole Status:	Complete	Dip:	-50	Drill Completed:	2020-09-08	Reduced Size:	
Hole Purpose:	EXPL	Length (m):	152	Approved By:		Oriented?:	Oriented
		Comments:				Grouted?:	No

The hole collared into Vampire Fm mudstone/silty sandstone grading into Gull Lake mudstone plus siltstone until 66.29 m downhole, with bioturbation in muddier sections. A silty limestone bed from 55.28-66.29 m within the Gull Lake is strongly veined with one 50 cm section of veining hosting galena. A faulted/chaotic interval continues from 66.29-84.0 m containing sharp faulted beds of both Gull Lake and the underlying Duo Lake black carbonaceous mudstone. Duo Lake black carbonaceous mudstone runs from 84-152 m (EOH) containing possible x-shaped mm-scale linograptus(?) variably replaced by pyrite.

Depth (m)	Survey Method	Survey By	Date Surveyed	Dip	TN Azimuth	Mag. Azimuth	Grid Azimuth	Mag. Field	Roll	Accuracy	Confidence	Accept Values?	Comments
0	COLLAR	J.Lewis	2020-09-04	-50	185	165.5	186.03			Compass +/- degrees	Good	☒	Azimuth/Dip provided by J.Milton prior to lineup
21	DOWNHOLE	Other	2020-09-04	-49.2	181.5	162	182.53	57950		Reflex EZ-trac +/- degrees	Good	☒	No reflex survey sample book at drill, written on piece of paper
51	DOWNHOLE	Other	2020-09-05	-48.6	181.8	162.3	182.83	57888		Reflex EZ-trac +/- degrees	Good	☒	No Reflex book at drill, written on a piece of paper
87	DOWNHOLE	Other	2020-09-06	-47.8	181.6	162.1	182.63	57669		Reflex EZ-trac +/- degrees	Good	☒	No Reflex book at drill, picture taken of drill log book.

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Depth (m)	Survey Method	Survey By	Date Surveyed	Dip	TN Azimuth	Mag. Azimuth	Grid Azimuth	Mag. Field	Roll	Accuracy	Confidence	Accept Values?	Comments
152	DOWNHOLE	Other	2020-09-08	-44.6	182.8	163.3	183.83	57881		Reflex EZ-trac +/- degrees	Good	☒	

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From (m)	To (m)	Rock Type & Description	From (m)	To (m)	Length	Sample #	ZnEquiv pct	Pb Best pct	Zn Best pct	Cu Best ppm	Ag Best ppm
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0.00 9.90 CASE Casing
9.90 16.68 MDST Mudstone Dark Grey VF

Interbedded thin dark grey mudstone, light grey sandstone and grey siltstone. Mudstone is dominant, with beds up to 5 cm sharply contacting thinner, subordinate sandstone or siltstone. All lithologies are scratched by a steel knife; no effervescence evident from HCl. Tops is downhole, evidenced by mm-scale flame structures, pressure escapes, and cross bedding in rare sandstone beds. Rare pyritic nodules are elongated along bedding that is consistent at 34-36 degrees to core axis across all lithologies. Strongly fractured, paralleling bedding planes, with rusty broken surfaces. Sandy beds are very weakly magnetic. Rare mm-scale qtz-fe carb veinlets follow bedding, and an isolated mm-scale qtz vein cuts normal to bedding. Very fine grained pyrite is disseminated throughout sandy beds. Tentatively assigned to Vampire Formation, and the interval is gradational/conformable downhole into tentative Gull Lake silty and bioturbated mudstone. The downhole contact is placed after the deepest light grey sandy bed, but rare bioturbation occurs uphole 50 cm.

<<Struc: 12.78 - 12.78: >> Fluid escape structure noted in silty/sandy laminations, way-up downhole.

<<Struc: 12.92 - 12.92: >> Gouge/flute marks.

<<Struc: 14 - 14: Bedding>>

<<Struc: 16.36 - 16.36: >> Phallic concretion/nodule.

16.68 55.29 MDST Mudstone Dark Grey VF

Meter-scale interbeds of dark grey bioturbated tight bedded mudstone and grey tight bedded silty mudstone. Mudstone beds are sharp and regular between ~25-30 degrees to core axis. Rounded to elongated mm-cm scale nodules and concretions occur within the mudstone aligned with bedding planes, and are commonly pyritic. Silty mudstone beds are tight and regular, also at 25-30 degrees to core access. Rare silty-sandy beds within the silty mudstone are light grey, with isolated flame structures and weak apparent grading in these beds showing tops downhole. Bioturbation is confined to the darker mudstone in cm-dm scale bands of mm-scale grey chaotic tendrils. Veining is minimal as rare thin white quartz veinlets cutting bedding planes or as mm-cm scale shears following bedding. Uncommon cm-scale sandy sections are filled with very fine grained pyrite, which correspond with weak magnetism. The interval terminates sharply into a veined silty limestone unit.

<<Struc: 16.68 - 16.68: Bedding>>

<<Struc: 19.32 - 19.32: >>

<<Struc: 24 - 24: Bedding>>

<<Struc: 30.2 - 30.2: Bedding>>

<<Struc: 32.64 - 32.64: >> Cross-bedding, way-up downhole.

<<Struc: 36.2 - 36.2: >> Bioturbation.

<<Struc: 43.15 - 43.15: Bedding>>

<<Struc: 47.1 - 47.1: Bedding>>

13.00 14.40 1.40 3202631

36.00 38.00 2.00 3202632

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From (m)	To (m)	Rock Type & Description	From (m)	To (m)	Length	Sample #	Zn Equiv pct	Pb Best pct	Zn Best pct	Cu Best ppm	Ag Best ppm
<<Struc: 53.82 - 53.82: Bedding>>											
55.29	66.28	LMDS Lime mudstone	Light Grey	MG	60.68	62.00	1.32	3202633			
Stockworked silty limestone with interbeds of grey mudstone to silty mudstone. Silty limestone is pervasively calcareous, and stockworked through with mm-cm scale ankerite-quartz veins; larger veins carry angular wide-spaced clasts of the silty limestone. Silty mudstone shows tight and regular bedding ~ 30 degrees to core axis, and contains rare elongated mm-scale pyrite nodules stretched along bedding. Veining is less chaotic in the mudstone, but still cuts parallel and normal to bedding throughout each subinterval. Stylolites outline disrupted clasts within the silty limestone, and influence crosscutting quartz veinlets within the silty mudstone. From 64.25 - 64.60, a strongly veined section within the silty limestone carries mm-cm scale wisps and clots of silver galena. the interval terminates sharply into carbonaceous black mudstone.											
<<Min: 65 - 66: 4% Pyrite / 3% Galena>> Blebs/clots of silvery galena to cm-scale in quartz-fe carb vein											
<<Struc: 63.48 - 63.48: Bedding>>											
66.28	82.90	BMST Black mudstone	Black	VF	62.00	63.50	1.50	3202634			
Chaotic faulted interval of mixed black carbonaceous mudstone, grey siltstone and minor silty limestone. Black mudstone is tightly bedded and regular ~ 25-30 degrees to core axis; siltstone beds are slightly steeper at 30-40 degrees to core axis. Mudstone/siltstone runs are m-scale, and changes are abrupt, commonly accompanied by rubble, gouge, or obvious shearing. Veining is common as Fe-carb quartz both cutting and paralleling bedding; veins that cut bedding also cut those veins paralleling bedding. Stockwork veining is common at the boundaries of rubbly/gouge zones. Brassy fine pyrite is contained within these stockworks; the interval is otherwise unmineralized.											
<<Struc: 67.3 - 67.3: Bedding>>											
<<Struc: 70 - 70: Bedding>>											
<<Struc: 70.7 - 70.7: Stylolite>> Associated with Qtz-Fe carb vein parallel to bedding.											
<<Struc: 73.21 - 73.21: >>											
<<Struc: 73.27 - 73.27: Bedding>>											
<<Struc: 80.52 - 80.52: Bedding>>											
66.28	67.50				66.28	67.50	1.22	3202637			
67.50	69.00				67.50	69.00	1.50	3202638			

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From (m)	To (m)	Rock Type & Description	From (m)	To (m)	Length	Sample #	ZnEquiv pct	Pb Best pct	Zn Best pct	Cu Best ppm	Ag Best ppm
82.90	152.00	BMST Black mudstone Black VF	84.05	85.00	0.95	3202639					
Hard black carbonaceous mudstone with uncommon cherty nodules/bands. Tightly bedded, defined by sharp graphite-rich or rare pyrite laminae throughout the interval between 35-40 degrees to core axis. Cherty interbeds up to cm-scale parallel mudstone beds, and are sharp to irregular. All natural fractures are coated to some degree by shiny black graphite. Cherty or pyritic nodules up to cm-scale form in bands paralleling bedding, associated with cherty interbeds, and have common pressure shadows elongated along the bedding plane. Pressure shadows are composed of very fine grey chert, or bright white spft mineral (barite?) when pyritic. At 122.35, regular "X" shapes are visible on broken bedding planes infilled by pyrite...microfossils? Photo taken. Veining is uncommon, forming two distinct sets of quartz-pyrite +/- fe-carb either paralleling or crosscutting bedding planes; hairline quartz stockworks occur at the upper contact. From 84.00 - 87.00 m, nodules/concretions contain varying amounts of orange sphalerite, fine diffuse chalcopyrite and pyrite. Pyritic laminae, bands and nodules continue to the end of the interval from here. Rare sub-mm bright white barite nodules align with bedding, but not in great concentration.											
<<Min: 84 - 89: 3% Pyrite / 1% Sphalerite / 0.5% Chalcopyrite>> Mineral-replaced nodules and cherty concretions			85.00	86.00	1.00	3202641					
<<Struc: 86.82 - 86.82: Bedding>>			86.00	87.00	1.00	3202643					
<<Struc: 87.94 - 87.94: Bedding>>			87.00	88.00	1.00	3202644					
<<Struc: 91.65 - 91.65: Bedding>>			88.00	89.00	1.00	3202645					
<<Struc: 91.77 - 91.77: Bedding>>			89.00	90.00	1.00	3202646					
<<Struc: 94.82 - 94.82: Bedding>>			90.00	91.00	1.00	3202647					
<<Struc: 98.48 - 98.48: Bedding>>			129.00	130.41	1.41	3202648					
<<Struc: 103.31 - 103.31: Bedding>>											
<<Struc: 105.24 - 105.24: Bedding>>											
<<Struc: 106.09 - 106.09: Bedding>>											
<<Struc: 109.08 - 109.08: Bedding>>											
<<Struc: 114.15 - 114.15: Bedding>>											
<<Struc: 119.08 - 119.08: Bedding>> Bedding betas are approximately 180 degrees off from previous measurements uphole. Possibly unreliable bottom mark?											
<<Struc: 121.66 - 121.66: Bedding>>											
<<Struc: 124.95 - 124.95: Bedding>>											
<<Struc: 126.52 - 126.52: Bedding>>											
<<Struc: 129.93 - 129.93: Bedding>>											
<<Struc: 132.64 - 132.64: Bedding>>											
<<Struc: 135.08 - 135.08: Bedding>>											

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From (m)	To (m)	Rock Type & Description	From (m)	To (m)	Length	Sample #	ZnEquiv pct	Pb Best pct	Zn Best pct	Cu Best ppm	Ag Best ppm
<<Struc: 137.1 - 137.1: Bedding>>											
<<Struc: 139.98 - 139.98: Bedding>>											
<<Struc: 141.84 - 141.84: Bedding>>											
<<Struc: 144.19 - 144.19: Bedding>>											
<<Struc: 146.18 - 146.18: Bedding>>											
<<Struc: 148.61 - 148.61: Bedding>>											

Beta angle is approximately 180 off from uphole. Questionable bottom mark?

End of Hole @ 152