

Maine State Library Digital Maine

Maine Geological Survey Core Repository

Geological Survey

1943

U.S. Bureau of Mines: Littleton Ridge Manganese Deposit

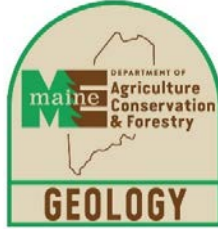
U.S. Bureau of Mines

Follow this and additional works at: https://digitalmaine.com/mgs_core_repository

Recommended Citation

U.S. Bureau of Mines, "U.S. Bureau of Mines: Littleton Ridge Manganese Deposit" (1943). *Maine Geological Survey Core Repository*. 35. https://digitalmaine.com/mgs_core_repository/35

This Text is brought to you for free and open access by the Geological Survey at Digital Maine. It has been accepted for inclusion in Maine Geological Survey Core Repository by an authorized administrator of Digital Maine. For more information, please contact statedocs@maine.gov.



Maine Geological Survey

Core Repository Data Files

Driller: U.S. Bureau of Mines

Project: Littleton Ridge Manganese Deposit

Town(s): Littleton

Contents:

1. Core Repository Intake Form(s)
2. Drill Hole Log(s)
3. Location Map(s)
4. Cross-section Diagram(s)

TABLE 3. - Diamond-drill footage, segregated by bit sizes

Hole	NX casing overburden, feet	NX1/ core, feet	BX2/ core, feet	AX3/ core, feet	Depth of hole, feet
62	0	10	40	200	250
63	1	19	40	200	260
64	12	0	38	300	350
65	19	2	29	353	403
66	54	1	45	340	440
67	50	0	30	371	451
68	30	0	396	-	426

Bit size	Diameter of hole, inches	Diameter of core, inches
1/ NX	3	2-1/8
2/ BX	2-3/8	1-5/8
3/ AX	1-15/16	1-3/16

TABLE 4. - Analyses of diamond-drill cores, Littleton Ridge deposit

Diamond-drill hole 62							Remarks and lithology
Footage		Sample interval, feet	Core assay, percent		Combined core and sludge assays, percent		
From-	To-		Mn	Fe	Mn	Fe	
0.0	10.0	10.0	10.28	17.78			Green, laminated, carbonate rock with thin green slate interbeds.
10.0	20.0	10.0	9.00	17.61			
20.0	30.0	10.0	10.32	19.65			
30.0	33.0	3.0	4.56	21.69			Green slate.
33.0	37.0	4.0	1.46	17.12			
37.0	46.5	9.5	9.68	19.82			Green, laminated carbonate rock.
46.5	48.5	2.0	1.92	18.18			
48.5	50.0	1.5	8.28	21.53			Green, laminated, carbonate rock, with thin green-slate interbeds.
50.0	60.0	10.0	9.80	19.90			
60.0	70.0	10.0	5.64	16.15			Green slate.
70.0	80.0	10.0	9.20	21.04			
80.0	85.5	5.5	5.40	19.08			Green slate.
85.5	90.0	4.5	5.12	18.84			
90.0	100.0	10.0	7.96	20.88			Green slate.
100.0	110.0	10.0	7.88	21.45			
110.0	119.0	9.0	8.76	19.57			Core recovery, 91.1 percent.
Total		119.0	8.07	19.34			
119.0	125.0	6.0	4.24	10.37			Gray-green slate.
125.0	131.0	6.0	2.68	11.92			
131.0	134.0	3.0	2.56	9.39			Green slate.
134.0	140.0	6.0	3.88	12.08			
140.0	149.5	9.5	2.88	10.12			Dark gray-blue slate.
149.5	152.0	2.5	1.84	10.61			
152.0	160.0	8.0	1.24	5.23	2.33	10.41	Green slate.
Total		41.0			3.01	10.79	

Core recovery, 69.3 percent.

TABLE 4. - Analyses of diamond-drill cores, Littleton Ridge deposit (Con.)

Diamond-drill hole 62 (Con.)							
Footage		Sample interval, feet	Core assay, percent		Combined core and sludge assays, percent		Remarks and lithology
From-	To-		Mn	Fe	Mn	Fe	
160.0	170.0	10.0	0.48	5.35	1.07	7.95	Gray-blue slate, with thin, calcareous laminae. Do.
170.0	180.0	10.0	.56	4.78			
180.0	190.0	10.0	.60	4.90			
190.0	200.0	10.0	.32	4.87	.70	6.79	
200.0	210.0	10.0	.40	5.19	.51	6.03	
210.0	220.0	10.0	.44	5.51	.52	6.84	
220.0	230.0	10.0	.40	5.84	.54	6.39	
230.0	240.0	10.0	.36	5.27	1.08	6.74	
240.0	250.0	10.0	.44	3.57	.62	5.42	
Total		90.0			0.68	6.20	
Total core sampled		250.0					Core recovery, 82.0 percent.
Diamond-drill hole 63							
Footage		Sample interval, feet	Core assay, percent		Combined core and sludge assays, percent		Remarks and lithology
From-	To-		Mn	Fe	Mn	Fe	
0.0	1.0						Overburden.
1.0	43.0						Gray and green slate.
43.0	53.0	10.0	1.00	8.56			Green slate.
Total		10.0	1.00	8.56			Core recovery, 100 percent.
53.0	60.0	7.0	9.00	12.88	9.00	12.88	Green, laminated carbonate rock, interbedded with green slate.
60.0	69.0	9.0	7.04	16.88	7.04	16.88	
Total		16.0	7.90	15.13			Core recovery, 100 percent.
69.0	78.5	9.5	1.44	7.91			Green slate.
78.5	81.0	2.5	8.72	15.09			Green laminated carbonate rock.
81.0	90.0	9.0	2.04	8.64	3.13	9.94	Green slate.
90.0	102.0	12.0	1.80	9.30			Do.
Total		33.0			2.58	9.51	Core recovery, 83 percent.
102.0	110.0	8.0	10.00	18.67			Green, laminated carbonate rock.
110.0	120.0	10.0	7.80	22.59			Do.
120.0	123.0	3.0	5.68	17.37			Do.
123.0	130.0	7.0	4.08	12.31			Gray-green slate.
130.0	134.0	4.0	4.76	18.59			Do.
134.0	139.5	5.5	3.48	12.88			Green slate, with green, laminated carbonate interbed.
139.5	143.0	3.5	12.72	14.27			Green, laminated carbonate rock.
143.0	145.5	2.5	1.88	8.15			Green slate.
145.5	150.0	4.5	8.12	18.18			Green, laminated carbonate rock.
150.0	160.0	10.0	9.56	17.78	8.28	17.37	Do.
160.0	170.0	10.0	8.08	18.49	7.02	17.14	Do.
170.0	171.5	1.5	9.60	15.41	9.60	15.41	Do.
171.5	176.0	4.5	4.04	14.76			Gray-green slate.

TABLE 4. - Analyses of diamond-drill cores, Littleton Ridge deposit (Con.)

Diamond-drill hole 63 (Con.)							
Footage		Sample interval, feet	Core assay, percent		Combined core and sludge assays, percent		Remarks and lithology
From-	To-		Mn	Fe	Mn	Fe	
176.0	181.0	5.0	8.44	20.60			Green, laminated carbonate rock.
181.0	188.5	7.5	4.52	14.11			Dark-gray slate.
188.5	192.0	3.5	.84	11.84			Green slate.
192.0	200.0	8.0	8.40	15.41			Green, laminated carbonate rock.
Total		98.0			6.73	16.51	Core recovery, 90.6 percent.
200.0	214.0	14.0	2.88	8.92			Light-green slate.
214.0	221.0	7.0	.84	6.49			Do.
221.0	230.0	9.0	.48	4.95			Dark-gray slate.
230.0	240.5	10.5	.36	5.84			Do.
240.5	250.0	9.5	.40	4.38			Gray-green graywacke.
Total		50.0	1.16	6.36			Core recovery, 65.2 percent.
250.0	260.0						Gray-green graywacke.
Total core sampled		207.0					Core recovery, 82.2 percent.

Diamond-drill hole 64							
Footage		Sample interval, feet	Core assay, percent		Combined core and sludge assays, percent		Remarks and lithology
From-	To-		Mn	Fe	Mn	Fe	
0.0	12.0						Overburden.
12.0	20.0	8.0	0.56	2.86			Gray-green slate.
20.0	30.0	10.0	.52	3.65			Gray-green slate and dark-gray slate.
30.0	40.0	10.0	.68	3.25			Do.
40.0	42.5	2.5	2.76	5.20			Do.
Total		30.5	0.77	3.44			Core recovery, 100 percent.
42.5	44.0	1.5	15.28	14.29			Green, laminated carbonate rock.
44.0	49.5	5.5	8.00	15.18			Dark-green slate.
49.5	60.0	10.5	8.72	19.81	8.61	19.74	Green, laminated carbonate rock.
60.0	70.0	10.0	7.04	22.65			Do.
70.0	77.5	7.5	8.28	20.70			Do.
77.5	80.0	2.5	2.16	14.29			Dark-green slate.
80.0	90.0	10.0	3.04	12.34	3.81	14.20	Do.
90.0	100.0	10.0	4.32	14.45			Do.
100.0	103.0	3.0	2.04	12.83			Do.
103.0	111.0	8.0	6.76	21.53			Light-green, laminated carbonate rock.
111.0	120.0	9.0	2.32	14.94			Dark-green slate.
120.0	124.0	4.0	1.08	12.91	2.16	14.75	Do.
124.0	130.0	6.0	7.44	18.03	6.93	18.59	Green, laminated carbonate rock.
130.0	136.0	6.0	6.56	16.81	5.44	20.03	interbedded with green slate.
136.0	140.0	4.0	3.92	17.46			Dark-green slate with thin,
140.0	150.0	10.0	3.72	18.35	3.97	17.98	laminated, carbonate-rock
150.0	152.0	2.0	5.40	15.18	5.99	15.08	interbeds.
152.0	160.0	8.0	6.88	16.48	6.94	16.05	Do.

TABLE 4. - Analyses of diamond-drill cores, Littleton Ridge deposit (Con.)

Diamond-drill hole 64 (Con.)							
Footage		Sample interval, feet	Core assay, percent		Combined core and sludge assays, percent		Remarks and lithology
From-	To-		Mn	Fe	Mn	Fe	
160.0	170.0	10.0	7.52	15.71			Dark-green slate, with thin, laminated carbonate rock interbeds.
170.0	172.0	2.0	6.12	17.01			
172.0	177.0	5.0	2.64	16.28			Do.
177.0	180.0	3.0	6.80	16.36			Do.
180.0	182.8	2.8	7.28	16.12			Do.
182.8	190.0	7.2	4.52	18.15			Do.
190.0	200.0	10.0	3.64	17.26			Do.
200.0	210.0	10.0	5.56	17.91			Do.
210.0	218.0	8.0	1.52	14.81			Do.
218.0	220.0	2.0	8.80	19.45			Do.
220.0	230.0	10.0	7.96	16.36	7.26	16.06	Do.
230.0	235.0	5.0	4.76	14.65			Do.
235.0	240.0	5.0	7.84	21.82			Do.
240.0	250.0	10.0	6.88	22.79			Do.
250.0	260.0	10.0	5.40	19.13			Do.
260.0	270.0	10.0	4.84	16.28			Do.
270.0	280.0	10.0	5.24	14.33			Do.
280.0	287.5	7.5	4.24	17.74			Do.
287.5	290.0	2.5	8.00	20.51			Do.
290.0	298.6	8.6	8.24	19.37			Do.
298.6	300.0	1.4	5.88	21.49			Do.
300.0	310.0	10.0	6.84	19.29			Do.
310.0	314.0	4.0	5.64	14.65			Do.
Total		271.5			5.67	17.56	Core recovery, 90.1 percent.
314.0	320.0	6.0	0.48	4.07			Dark-gray slate.
320.0	330.0	10.0	.84	4.72			
Total		16.0	0.71	4.48			Core recovery, 81.3 percent.
330.0	350.0						Dark-gray slate.
Total core sampled		318.0					Core recovery, 90.7 percent.

Diamond-drill hole 65							
Footage		Sample interval, feet	Core assay, percent		Combined core and sludge assays, percent		Remarks and lithology
From-	To-		Mn	Fe	Mn	Fe	
0.0	19.0						Overburden.
19.0	180.0						Gray slate.
180.0	190.0	10.0	0.64	5.13			Do.
190.0	200.0	10.0	.72	5.86			Do.
200.0	205.0	5.5	.84	7.49			
Total		25.5	0.71	5.93			Core recovery, 98.0 percent.
205.5	210.0	4.5	4.64	8.71			Green slate, with green, laminated carbonate-rock interbeds.
210.0	220.0	10.0	6.56	14.65	7.41	13.03	
220.0	230.0	10.0	5.64	11.15			
230.0	240.0	10.0	1.84	8.95			

TABLE 4. - Analyses of diamond-drill cores, Littleton Ridge deposit (Con.)

Diamond-drill hole 65 (Con.)							
Footage		Sample interval, feet	Core assay, percent		Combined core and sludge assays, percent		Remarks and lithology
From-	To-		Mn	Fe	Mn	Fe	
240.0	250.0	10.0	6.00	10.91			
250.0	255.5	5.5	3.52	13.43			
255.5	260.0	4.5	6.92	23.12			Green, laminated carbonate rock.
260.0	264.5	4.5	8.80	19.22			Dark-green slate, with thin, green, laminated carbonate rock.
264.5	270.0	5.5	3.80	14.73			
270.0	280.0	10.0	3.79	16.44			
280.0	290.0	10.0	6.00	14.81			
290.0	297.0	7.0	8.40	12.45			
297.0	300.0	3.0	9.32	15.63			Do.
300.0	303.0	3.0	7.60	13.35			
303.0	310.0	7.0	1.64	12.94			
310.0	320.0	10.0	4.60	15.79			Do.
320.0	330.0	10.0	2.20	13.76			Do.
330.0	332.5	2.5	4.36	19.86			Do.
332.5	339.0	6.5	9.64	19.21			Green, laminated carbonate rock.
339.0	345.0	6.0	7.68	25.88			
345.0	350.0	5.0	6.48	16.77			
350.0	360.0	10.0	12.28	16.61			Do.
360.0	370.0	10.0	10.04	17.58			Do.
370.0	373.5	3.5	15.52	6.19			Do.
373.5	375.5	2.0	1.56	4.07			Green slate.
375.5	381.5	6.0	13.24	6.35			Green slate with green, laminated carbonate interbeds.
381.5	390.0	8.5	9.08	5.13			Green slate, with dark-green, patchy areas.
390.0	400.0	10.0	5.84	4.31			
Total		194.5			6.56	13.41	Core recovery, 92.9 percent.
400.0	403.0						Green slate with dark-green, patchy areas.
Total core sampled		220.0					Core recovery, 93.5 percent.

Diamond-drill hole 66							
Footage		Sample interval, feet	Core assay, percent		Combined core and sludge assays, percent		Remarks and lithology
From-	To-		Mn	Fe	Mn	Fe	
0.0	54.0						Overburden.
54.0	137.0						Gray-blue calcareous slate.
137.0	192.0						Green and gray-blue slate.
192.0	215.8						Green slate.
215.8	220.0	4.2	2.56	11.54			Dark-green graywacke.
							Core recovery, 88.7 percent.
220.0	229.0	9.0	5.88	18.25			Dark-green graywacke.
229.0	240.0	11.0	10.20	23.74			Laminated hematitic carbonate rock, which in places has recrystallized to a magnetite rich type.
240.0	250.0	10.0	6.84	22.93			
250.0	260.0	10.0	9.64	21.88			
260.0	270.0	10.0	8.94	22.69			

TABLE 4. - Analyses of diamond-drill cores, Littleton Ridge deposit (Con.)

Diamond-drill hole 66 (Con.)							
Footage		Sample interval, feet	Core assay, percent		Combined core and sludge assays, percent		Remarks and lithology
From-	To-		Mn	Fe	Mn	Fe	
270.0	280.0	10.0	8.28	27.62			Laminated hematitic carbonate rock, which in places has recrystallized to a magnetite rich type.
280.0	290.0	10.0	7.80	22.13			Do.
290.0	300.0	10.0	9.22	26.49			Do.
300.0	310.0	10.0	9.14	25.19			Dark-green slate with interbeds of laminated hematitic carbonate.
310.0	320.0	10.0	8.90	20.75			
320.0	325.0	5.0	8.22	22.21			
325.0	330.0	5.0	5.62	13.48			
330.0	340.0	10.0	5.86	15.83			
Total		120.0	8.10	22.16			Core recovery, 96.5 percent.
340.0	345.2	5.2	4.82	18.65			Dark-green slate with interbeds of laminated hematitic carbonate.
							Core recovery, 100 percent.
345.2	347.0						Dark-green slate.
347.0	370.0						Green calcareous slate, fossiliferous.
370.0	371.0						Purple slate, calcareous laminae, fossiliferous.
371.0	372.5						Green, calcareous slate, fossiliferous.
372.5	389.0						Purple slate, calcareous, fossiliferous.
389.0	392.5						Green slate, calcareous.
392.5	395.5						Purple slate, calcareous laminae.
395.5	396.5						Green slate, calcareous laminae.
396.5	397.0						Purple slate.
397.0	401.0						Green slate, calcareous laminae.
401.0	405.0						Purplish green slate, calcareous laminae.
405.0	440.0						Green calcareous slate, fossiliferous.
Total core sampled		129.4					Core recovery, 96.3 percent.

TABLE 4. - Analyses of diamond-drill cores, Littleton Ridge deposit (Con.)

Diamond-drill hole 68							Remarks and lithology
Footage		Sample interval, feet	Core assay, percent		Combined core and sludge assays, percent		
From-	To-		Mn	Fe	Mn	Fe	
0.0	30.0						Overburden.
30.0	80.5						Gray-blue, calcareous slate.
80.5	87.0						Graywacke.
87.0	134.0						Gray-blue calcareous slate.
134.0	144.0	10.0	0.40	4.12			Gray-blue calcareous slate. Core recovery, 80.0 percent.
144.0	150.0	6.0	5.44	10.17			Green slate, with interbeds of green, laminated carbonate rock.
150.0	152.0	2.0	4.40	9.85			
152.0	154.0	2.0	4.08	6.86			
154.0	160.0	6.0	4.08	11.95			
Total		16.0	4.63	10.38			Core recovery, 78.1 percent.
160.0	169.0	9.0	2.88	7.43			Green slate, with interbeds of green, laminated carbonate rock.
169.0	180.0	11.0	0.92	5.49			
180.0	190.0	10.0	2.96	8.48			Green slate with hematitic interbeds, in part recrystallized to magnetite.
190.0	193.0	3.0	1.68	4.52			
Total		33.0	2.14	6.84			Core recovery, 97.6 percent.
193.0	194.0	1.5	5.28	12.11			Green slate, with hematitic interbeds in part recrystallized to magnetite.
194.5	200.0	5.5	3.56	6.14			
200.0	206.0	6.0	7.12	15.02			
206.0	210.0	4.0	3.52	8.64			
210.0	220.0	10.0	4.76	11.30			
220.0	228.0	8.0	5.60	12.92			
228.0	230.0	2.0	8.68	15.50			
230.0	240.0	10.0	8.36	15.02			
240.0	250.0	10.0	4.16	12.60			
250.0	252.5	2.5	8.44	11.38			
252.5	260.0	7.5	9.44	26.81			
260.0	264.0	4.0	8.12	20.67			
264.0	273.5	9.5	11.32	29.23			
273.5	280.0	6.5	6.08	16.23			
280.0	290.0	10.0	6.16	21.72			
290.0	294.0	4.0	8.52	17.60			
294.0	301.0	7.0	5.00	12.92			
301.0	303.5	2.5	8.16	14.13			
303.5	311.0	7.5	6.68	12.27			
Total		118.0	6.71	16.11			Core recovery, 93.9 percent.
311.0	320.0	9.0			1.00	7.59	Green slate.
320.0	426.0						Do.
Total core sampled		177.0					Core recovery, 96.7 percent.

Composite samples of the ore sections in each drill hole were prepared in the laboratory by grouping pulp from single samples on the basis of 10 grams of pulp for each linear foot of core. The resulting assays are found in table 5, and the corresponding calculated average assays for total manganese and total iron from table 4 are included for comparison.

These composite samples were assayed by standard laboratory methods for:

Manganese	(fusion method)
Iron	(hydrofluoric method)
Silica	(fusion and hydrofluoric method)
Phosphorus	(fusion method)
Alumina	Do.
Lime	
Magnesia	
Sulfur	
Soluble manganese in hydrochloric acid	
Soluble iron in hydrochloric acid	

The samples were also subjected to heat treatment to determine loss of weight on ignition.

Spectrographic analyses of composite samples made especially to determine the presence of minor constituents are shown in table 5A.

Hole 67, drilled to an inclined depth of 451 feet under a weak anomaly thought to have some bearing on the deposit, intersected only gray and green slates, with some black slate interbedded.

Hole 68 was drilled on an anomaly found east of the south limb of the deposit mapped on the Abernethy farm. Because of the wide range in magnetic attraction exhibited in the Littleton Ridge deposit, it is reasonable to assume that the manganese zone intersected in hole 68 may extend southwest under the more widespread anomaly as mapped on the Milford H. Clark farm.

As it was apparent from diamond-drill-core samples that the deposit would average not more than 7 percent manganese, drilling was discontinued, and beneficiation tests were conducted with the samples already obtained.

The deposit was not completely outlined by diamond drilling.

Boulders found in a gravel pit on the Back Ridge Road, on the north bank of "B" stream, 0.8 mile southwest of the Littleton Ridge deposit, are similar to the portion of the deposit found on the Haggerty farm. No conclusion is made as to the source of these boulders, and a trial magnetometer traverse over the area did not detect the presence of a magnetic anomaly.

Diamond-drill-hole markers consisting of 1-1/2-inch pipe (5 to 10 feet long) were cemented in all holes. These markers extend a few feet above ground level and coincide with the direction and inclination of each hole. Brass identification plates are cemented into the upper ends of the pipe.

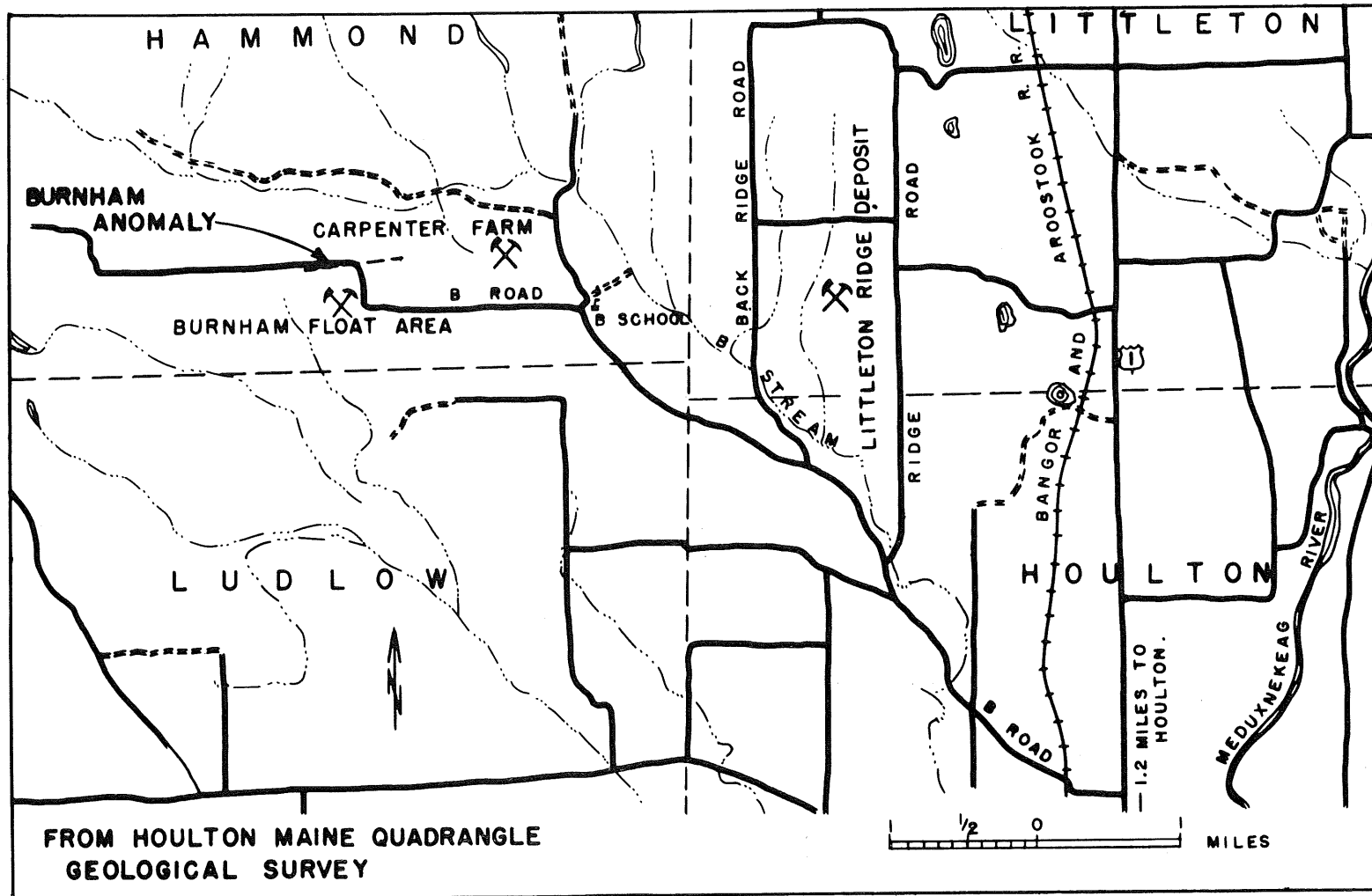
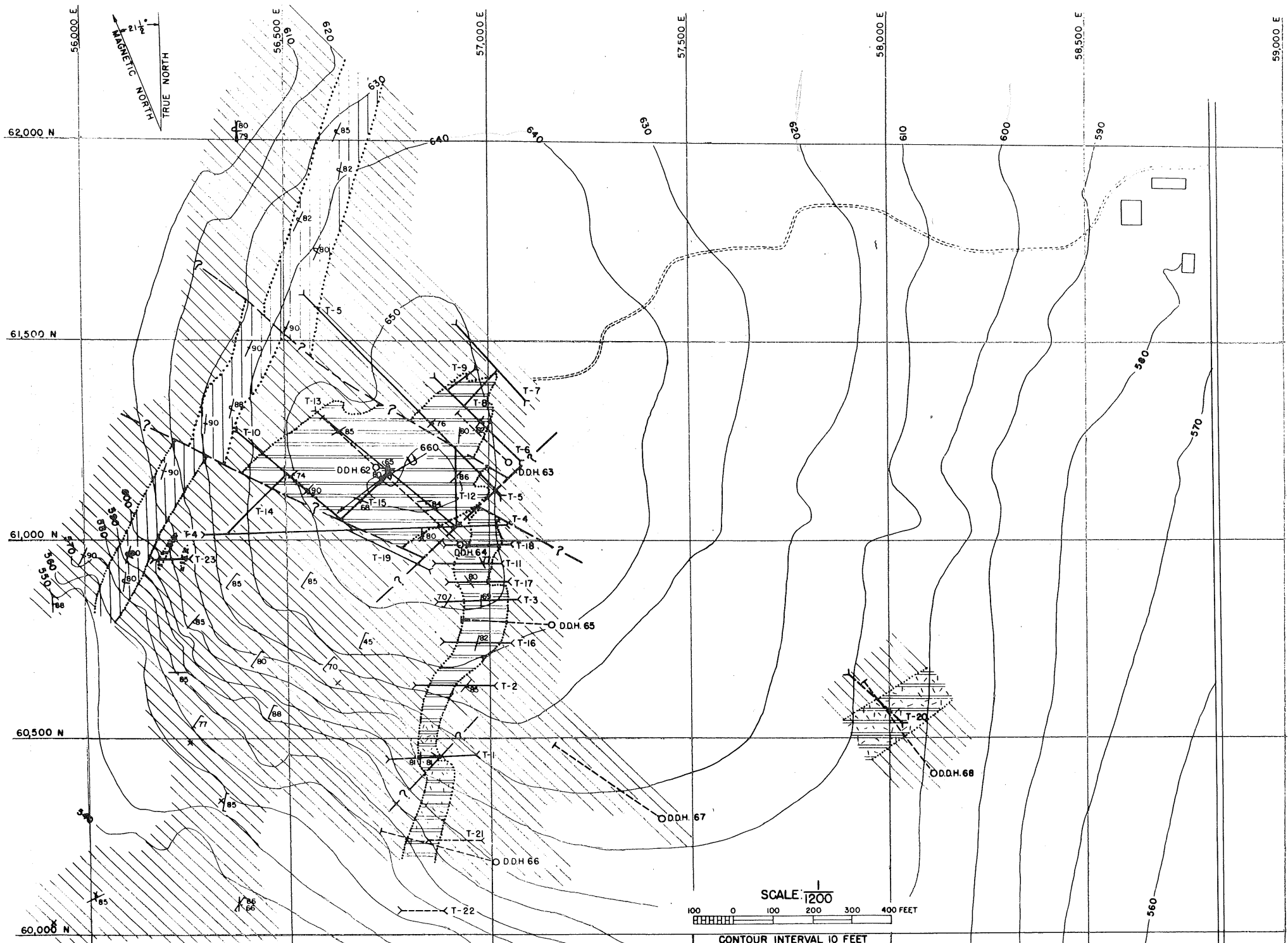


Figure 2. - Location map, Littleton Ridge manganese deposit and vicinity, southern district, Aroostook County, Maine.





EXPLANATION


 UPPER ORDOVICIAN (?)
- SILURIAN (?)


LOWER AROOSTOOK SLATE (DIAGONAL LINES)
BELIEVED TO ENCLOSE LENSES OF MANGANIFEROUS
SILICEOUS CARBONATE ROCK (DOUBLE HORIZONTAL
LINES) AND GRAYWACKE (VERTICAL LINES)
HACHURES INDICATE RECRYSTALLIZATION.

 CONTACT
CONCEALED EXCEPT WHERE UNCOVERED IN TRENCHES


 FAULT
PROBABLE FAULT, CONCEALED EXCEPT WHERE
UNCOVERED IN TRENCHES

 OVERTURNED SYNCLINE

 STRIKE AND DIP OF BEDS

 STRIKE AND DIP OF OVERTURNED BEDS

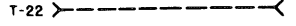
 STRIKE OF VERTICAL BEDS

 STRIKE AND DIP OF CLEAVAGE

 STRIKE OF VERTICAL CLEAVAGE

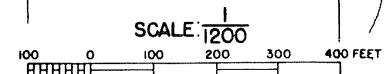
 FOSSIL LOCALITY

T-5  TRENCH
BUREAU OF MINES, EXPOSED BEDROCK

T-22  TRENCH
BUREAU OF MINES, DID NOT EXPOSE BEDROCK

DDH.68  INCLINED DIAMOND DRILL HOLE

U.S. BUREAU OF MINES, SHOWING THE NUMBER OF
THE HOLE AND ITS HORIZONTAL PROJECTION.
D.D.H. 68 SHOWS THE LITHOLOGY INTERCEPTED
IN THE HOLE AND PROJECTED TO THE SURFACE.



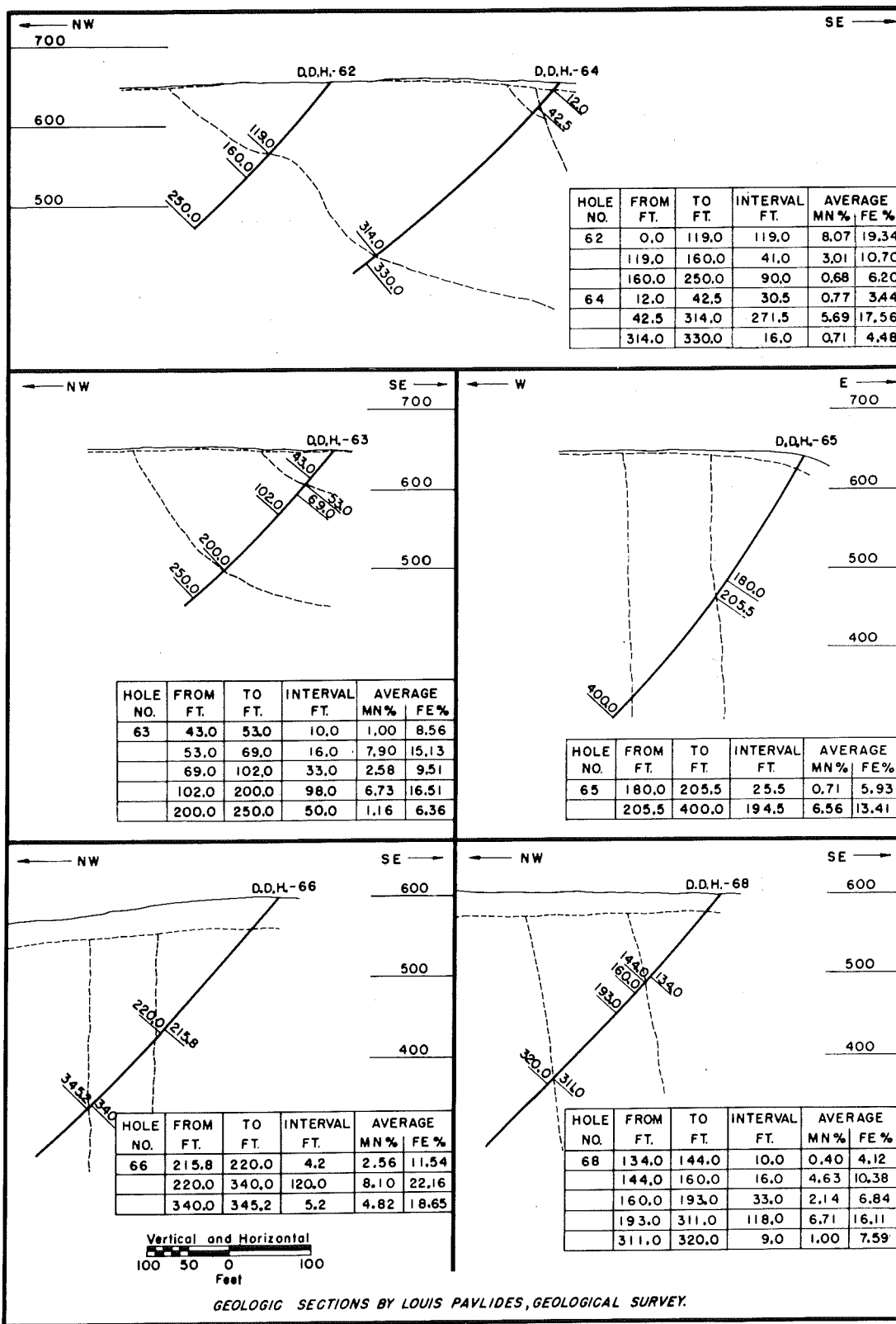


Figure 8. - Vertical assay sections through drill holes, 62, 63, 64, 65, 66, and 68.