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Finish Logging of Duluth Complex Drill Core

by

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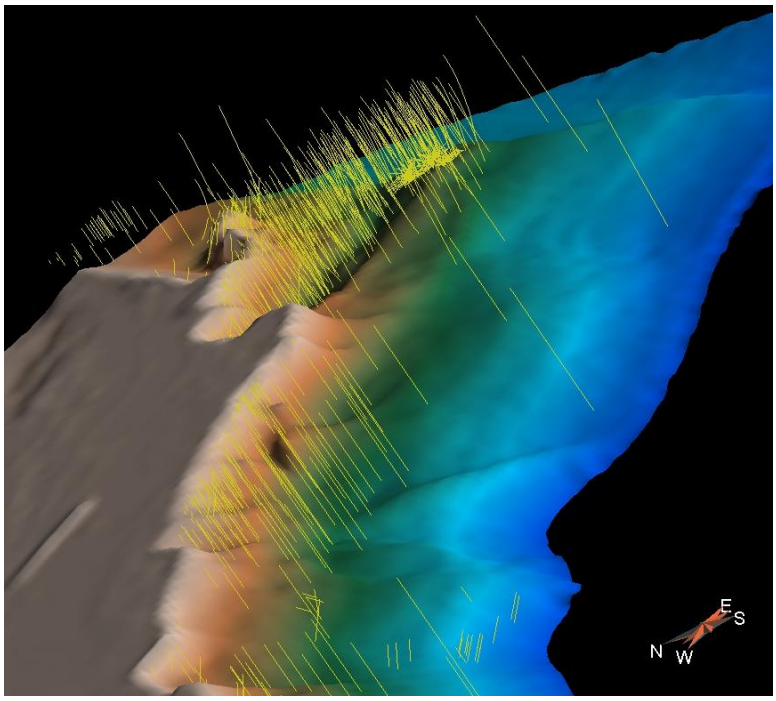

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INTRODUCTION

Introduction

From 1988 through 2005, NRRI personnel had logged 955 drill holes from the basal zone of the Duluth Complex. The major result of all this effort was the establishment of igneous stratigraphic packages, which in turn, were used to improve our understanding of the mineralization controls on the Cu-Ni deposits and the distribution of Platinum Group Elements (PGE). However, at the beginning of the biennium there were still over 220 drill holes (226,000 feet of core) that remained to be re-logged from portions of the Partridge River and South Kawishiwi intrusions. The main objective of this proposal was to complete a logging campaign of these remaining holes and establish a complete stratigraphic section for these two intrusions of the Duluth Complex.

To date, 224 holes have been relogged for this project totaling 198,979 feet of drill core. This total includes several holes that were recently drilled in the Maturi Extension/Nokomis deposit by Duluth Metals, and several recently found drill cores from the Dunka Pit deposit. All of the newly logged holes, see appendix, are located in eight deposits within the Partridge River and South Kawishiwi intrusions; including a few scattered holes in the Cloquet Lake and Tuscarora intrusions. The vast majority of relogged holes were from the Babbitt/Mesaba deposit due to the incredibly large number of drill holes drilled there in the first place. While this project made a significant dent in the total amount of holes logged at the Babbitt deposit, there are still about 20 holes that yet remain to be logged. In an addendum to this report, these drill holes at the Babbitt deposit will be logged, and an unknown number of additional drill holes at the Maturi Extension will be logged.

Drill Hole Lithologic Logs

The lithologic logs for each of the holes logged for this project have been scanned and are currently being uploaded to the Economic Geology Group's (EGG) website (www.nrri.umn.edu/egg) for downloading by interested mining company personnel. These scans are also included on the CD that accompanies this report. In addition to these newly logged holes, all of the previous 955 holes have been scanned and will also be available on the EGG website.

Cross-Sections

As many of the holes have been relogged, they have been added to previously-constructed and recently-constructed AutoCad-based cross-sections. To date, 36 cross-sections have been created or updated for ALL of the holes at the Babbitt/Mesaba deposit.

Future Plans

As mentioned above, an addendum reported funded from NRRI's Permanent University Trust Fund will be published. These funds will be used to log the outstanding 20 holes from the Babbitt deposit and finalize the cross-sections. These additional cross-sections will then be used to revise our geologic interpretation of this immense low-grade Cu-Ni deposit. Preliminary results indicate that most of the Babbitt deposit does not have a stratigraphic package that has been recognized within the nearby Partridge River intrusion. This change in stratigraphy suggests that the Babbitt deposit is almost wholly contained within a smaller sub-intrusion, informally called the Babbitt intrusion, that appears to have been fed by a vent in the Grano Fault area (on the east side of the Babbitt deposit). This recognition of a new intrusion could have ramifications on the recognition of PGE-enriched zones. Previous sampling

campaigns have been structured to look for stratabound PGE-enriched horizons associated with ultramafic horizons located well above the basal contact. Also, massive sulfide occurrences are fairly common near the basal contact at Babbitt. This relationship suggests that sulfide-settling may have played a more important role in this deposit. Thus, it may be possible that PGE-enriched horizons could be located much closer to the basal contact than at other Cu-Ni-PGE deposits of the Duluth Complex.

Cross-sections (to be included in the addendum report) will also be constructed for the newly logged holes at the Maturi Extension/Nokomis deposit, South Filson Creek, Dunka Pit, Water Hen, and Longnose deposits. These data will then be used to more fully understand many aspects of Cu-Ni±PGE and Fe-Ti mineralization controls and to further define horizons that could potentially contain significant PGE enrichments. Lastly, the cross-sections will be used to further define controls on Cu-Ni grade, and to a lesser extent, define any controls on PGE distribution.

APPENDICES

APPENDIX 1: Listing of Drill Holes Logged in 2006-2007

Dunka Pit

NM-1	703’
NM-2	1677’
NM-12	829’
NM-13	657’
NM-14	285’
NM-15	745’
NM-16	754’
NM-18	548’
NM-19	614’
NM-20	568’
NM-24	658’
NM-27	640’
NM-28	513’
NM-29	400’
NM-31	163’
NM-32	298’
NM-44	400’
NM-45	280’
NM-46	400’
NM-47	387’
NM-50	466’
NM-51	401’
NM-60	543’
NM-64	213’
8004	272’
8005	203’
8010	411’
8011	291’
8012	149’
8014	340’
8016	272’
8020	318’
8021	260’
8032	425’
8035	332’
8040	401’
8042	271’
8043	39’
8045	151’
8051	350’
8070	191’
8395	100’
8423B	194’
8424	30’
B2-6	323’
B2-8	405’
B2-14	482’
BF-1	199’
BF-2	852’
BF-3	700’
Total	20,103’/50 holes

South Filson Creek

K-5	307’
K-6	300’
K-9	300’
K-10	100’
K-11	362’
K-12	214’
K-13	100’
K-14	100’
K-15	100’
K-16	265’
K-17	189’
K-18	200’
K-19	200’
K-20	250’
K-21	150’
K-22	200’
K-23	200’
K-24	100’
K-25	166’
K-26	186’
K-27	200’
K-28	100’
K-29	494’
SFC-01	668’
SFC-02	539’
SFC-03	538’
SFC-04	717’
SFC-05	358’
SFC-06	206’
Total	7,809’/29 holes

Water Hen

CN-4	695’
CN-5	589’
SL-4	673’
SL-5	670’
SL-15	721’
SL-21	606’
SL-22	124’
SL-23	131’
SL-24	262’
SL-25	429’
Total	4,900’/10 holes

Longnose

LN-1	634’
LN-2	570’
LN-3	502’
LN-4	612’
LN-5	602’
LN-6	595’
LN-7	602’
LN-8	402’
LN-9	400’
LN-10	330’
Total	5,249’/10 holes

Babbitt/Mesaba

B1-3	932’
B1-4	1018’
B1-5	795’
B1-7	1004’
B1-9	460’
B1-10	692’
B1-14	566’
B1-17	576’
B1-18	686’
B1-23	977’
B1-24	1590’
B1-25	512’
B1-26	434’
B1-27	1187’
B1-28	1234’
B1-29	1703’
B1-36	929’
B1-37	600’
B1-40	1226’
B1-42	1649’
B1-59	794’
B1-61	2088’
B1-69	2024’
B1-78	1675’
B1-78A	871’
B1-94	1625’
B1-97	1675’
B1-98	1317’
B1-104	2181’
B1-107	232’
B1-111	573’
B1-114	1163’
B1-118	1834’
B1-118A	333’
B1-143	2082’
B1-144	900’
B1-149	2055’
B1-151	1945’
B1-155	2086’
B1-173	2028’
B1-184	1780’
B1-184A	685’
B1-184B	315’
B1-188	611’
B1-191	1066’
B1-195	1415’
B1-196	1266’
B1-197	1920’
B1-198	691’
B1-200	317’
B1-202	1516’
B1-209	1965’
B1-217	2028’
B1-218	1645’
B1-222	2062’
B1-223	2065’
B1-224	1479’
B1-234	1994’
B1-237	1598’
B1-239	2025’
B1-241	1963’
B1-244	1108’
B1-248	1933’
B1-249/249A	1159’
B1-253	1955’
B1-254	370’
B1-262	670’
B1-267	1225’
B1-268	2100’

B1-274	425’
B1-275	543’
B1-292	1127’
B1-310	517’
B1-319	1375’
B1-322	795’
B1-323	825’
B1-325	1212’
B1-326	593’
B1-328	425’
B1-329	747’
B1-333	805’
B1-336	20’
B1-337	697’
B1-339	403’
B1-341	843’
B1-342	965’
B1-346	510’
B1-349	331’
B1-366	626’
B1-367	1661’
B1-372	1013’
B1-375	365’
B1-377	348’
B1-378	965’
B1-379	1100’
B1-381	1113’
B1-382	945’
B1-383	1194’
B1-385	1485’
B1-394	1795’
B1-396	1294’
B1-397	1347’
B1-400	1018’
B1-403	595’
B1-408	1305’
B1-413	525’
B1-421	1935’
B1-426	62’
66305	236’
66315	1001’
Total	124,263’/110 holes

Maturi Extension/Nokomis deposit

MEX-1	3975’
MEX-2	2547’
MEX-3	4084’
MEX-4	3177’
MEX-5	3477’
MEX-6	2396’
MEX-7	2964’
MEX-17	2736’
Total	25,356’/8 holes

Spruce Road

WM-2	2300’

Cloquet Lake intrusion

STP-1	474’
STP-2	480’
STP-3	300’
Total	1,254’/3 holes

Tuscarora intrusion

ON-1	510’

Dunka Road South

BA-3	3588’
BA-4	3647’

GRAND TOTAL OF HOLES LOGGED AND FOOTAGE

224 holes/198,979’

Mark Severson – 198 holes/167,047’
Steve Hauck – 26 holes/31,932’