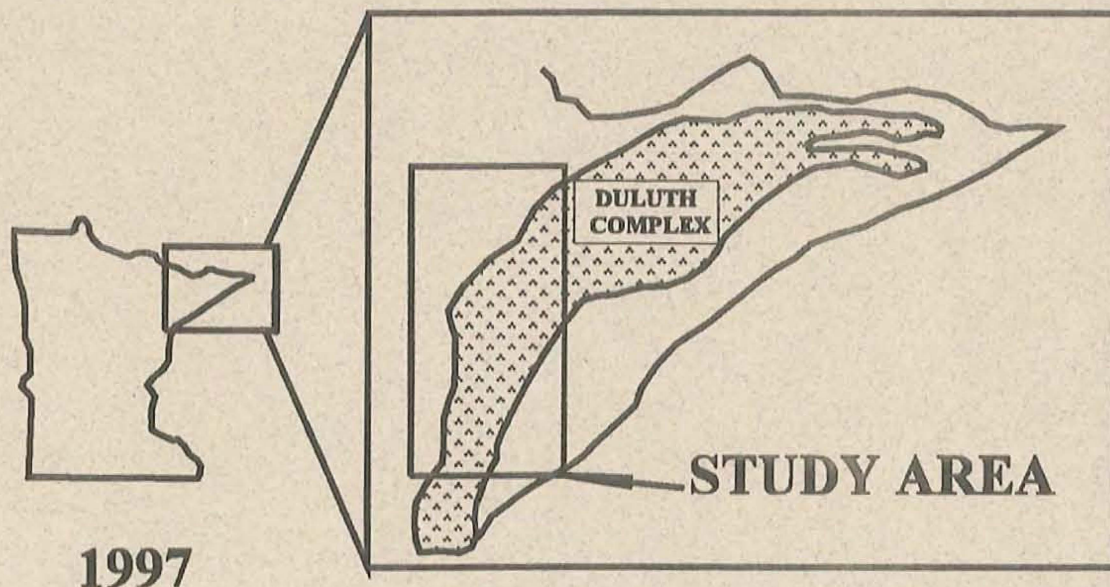


**Ore Deposit Modeling and Mineral Exploration Criteria
for Footwall Copper-Platinum Group
Element Mineralization in the
Duluth Complex**



REPORT 317



Minnesota Department of Natural Resources
Division of Minerals

**Ore Deposit Modeling and Mineral Exploration Criteria
for Footwall Copper-Platinum Group
Element Mineralization in the
Duluth Complex:**

**Minnesota Department of Natural resources
Division of Minerals
William C. Brice, Director**

*By:
Dean M. Peterson
Department of Geology
University of Minnesota, Duluth
May, 1997*

Project 317

Table of Contents

List of Figures	ii
List of Tables	iii
List of Plates	iii
Disclaimer	vi
Acknowledgments	vi
I. Introduction	1
Project Initiation	2
II. Ore Deposit models	3
Empirical Models	3
Genetic Models	4
III. The Sudbury Nickel-Copper Mining Camp	5
Geological Setting	5
Ore Deposits of the Sudbury mining Camp	9
1) South Range Contact Type Ore	9
2) North Range Contact Type Ore	9
3) Offset Type Ore Zones	9
4) Fault Related Type Ore Zones	9
5) Footwall Copper Vein Type	9
IV. Genetic Model for Footwall Cu-PGE Deposits	10
Introduction	10
Genetic Ore Deposit Model	13
Stage 1 - Define Deposit Type	13
Stage 2 - Determine Analog Deposits	14
Stage 3 - Identify Formation Process	15
Stage 4 - Select Diagnostic Criteria	15
V. The Duluth Complex	16
Introduction	16
Geologic Compilation	18
Geochemical Compilation	21
Data Visualization	22
Interpretations	27
Spruce Road Deposit	29

	Dunka Road Deposit	29
	Maturi Deposit	29
	Babbitt Deposit	30
	Dunka Pit Deposit	30
VI.	Recommendations	31
VII.	Conclusions	31
VIII.	Bibliography	33
Appendix A Duluth Complex Drill Hole Data Sheets		
Appendix B Mass Balance Calculations for Copper Migration		
Appendix C Enclosed Digital Data Files		

List of Figures

1)	Geologic Map of the Sudbury Mining Camp	6
2)	Photograph of Xenolith-rich Sublayer Gabbro-norite	7
3)	Photograph of Shatter Cones in Quartzite	8
4)	Photograph of Sudbury Breccia	8
5)	Schematic Section of Typical Sudbury Cu-PGE Footwall Morphology	11
6)	Photograph of Thin Chalcopyrite Footwall Veins	12
7)	Photograph of Massive Chalcopyrite Vein	12
8)	Schematic 3-D View of Footwall Veins	14
9)	Duluth Complex Cu-Ni deposit location Map	17
10)	Standardized lithologic Legend	20
11)	Detailed Deposit Location Map	21

12)	Downhole Assay Location Methodology	22
13)	Weighted Averaging of Cu-Ni Data	24
14)	Geochemical data Visualization Zones	26
15)	Spruce Road Footwall Assay and Copper Migration Correlation Map	27

List of Tables

1)	Compositions of Typical Sudbury Ores	10
2)	Ore forming Processes, Diagnostic Criteria, and Detection Methods	16
3)	Data Transformation	24

List of Plates

1)	Geologic Map of the Duluth Complex (1:100,000)
2)	Residual Magnetics Map of the Duluth Complex (1:100:000)
3)	Spruce Road Deposit, Image of all Zones (1:24,000)
4)	Dunka Road Deposit, Image of all Zones (1:24,000)
5)	Spruce Road Deposit, Copper Migration Image of Zone 8
6)	Spruce Road Deposit, Copper Migration Image of Zone 7
7)	Spruce Road Deposit, Copper Migration Image of Zone 6
8)	Spruce Road Deposit, Copper Migration Image of Zone 5
9)	Spruce Road Deposit, Copper Migration Image of Zone 4
10)	Spruce Road Deposit, Copper Migration Image of Zone 3
11)	Spruce Road Deposit, Copper Migration Image of Zone 2

- 12) Spruce Road Deposit, Copper Migration Image of Zone 1
- 13) Spruce Road Deposit, Summation of Copper Migration Images and Footwall Assays
- 14) Dunka Road Deposit, Copper Migration Image of Zone 8
- 15) Dunka Road Deposit, Copper Migration Image of Zone 7
- 16) Dunka Road Deposit, Copper Migration Image of Zone 6
- 17) Dunka Road Deposit, Copper Migration Image of Zone 5
- 18) Dunka Road Deposit, Copper Migration Image of Zone 4
- 19) Dunka Road Deposit, Copper Migration Image of Zone 3
- 20) Dunka Road Deposit, Copper Migration Image of Zone 2
- 21) Dunka Road Deposit, Copper Migration Image of Zone 1
- 22) Maturi Deposit, Copper Migration Image of Zone 8
- 23) Maturi Deposit, Copper Migration Image of Zone 7
- 24) Maturi Deposit, Copper Migration Image of Zone 6
- 25) Maturi Deposit, Copper Migration Image of Zone 5
- 26) Maturi Deposit, Copper Migration Image of Zone 4
- 27) Maturi Deposit, Copper Migration Image of Zone 3
- 28) Maturi Deposit, Copper Migration Image of Zone 2
- 29) Maturi Deposit, Copper Migration Image of Zone 1
- 30) Babbitt Deposit, Copper Migration Image of Zone 8
- 31) Babbitt Deposit, Copper Migration Image of Zone 7
- 32) Babbitt Deposit, Copper Migration Image of Zone 6

- 33) Babbitt Deposit, Copper Migration Image of Zone 5
- 34) Babbitt Deposit, Copper Migration Image of Zone 4
- 35) Babbitt Deposit, Copper Migration Image of Zone 3
- 36) Babbitt Deposit, Copper Migration Image of Zone 2
- 37) Babbitt Deposit, Copper Migration Image of Zone 1
- 38) Babbitt Deposit, Summation of all Copper Migration Images and Footwall Assays
- 39) Dunka Pit Deposit, Copper Migration Image of Zone 8
- 40) Dunka Pit Deposit, Copper Migration Image of Zone 7
- 41) Dunka Pit Deposit, Copper Migration Image of Zone 6
- 42) Dunka Pit Deposit, Copper Migration Image of Zone 5
- 43) Dunka Pit Deposit, Copper Migration Image of Zone 4
- 44) Dunka Pit Deposit, Copper Migration Image of Zone 3
- 45) Dunka Pit Deposit, Copper Migration Image of Zone 2
- 46) Dunka Pit Deposit, Copper Migration Image of Zone 1

Disclaimer

All reasonable attempts have been made to ensure that the compiled geochemistry in the enclosed database files is accurate. Much of the data was entered directly into the database by the author, and no further checking of the accuracy of that data has been attempted. Due to the large amount of data (there are approximately 1,616,500 individual data points enclosed in the database tables), there are without a doubt some errors. Users should notify the MNDNR if they discover errors so that the archived database files can be corrected. The methods and techniques on ore deposit modeling are strictly those of the author that have been developed over the last decade during the author's search for ore deposits throughout North America.

Acknowledgments

Many people and companies should be thanked for their insight, discussions, and releasing confidential data to the author for this project. Henk Dahlberg was the driving force in initiating the project, and thankfully kept at me to finish. Mark Severson, Steve Hauck, Richard Patelke, and Larry Zanko of the NRRI must be thanked for their time and insight, and allowing me to purge their data on the Duluth Complex. Special thanks must be extended to INCO, LTV Steel, Lehmann and Associates, and American Shield Co. for releasing vast quantities of confidential drill hole assay data. Ron Regal of the University of Minnesota - Duluth mathematics department must be thanked for his time and contribution to the mathematical aspects of the "copper migration" equation. I'd like to thank Ron Morton, my Ph.D. advisor, for allowing me to work on an interesting research project that has nothing to do with Archean gold

and massive sulfide deposits. Special thanks must be extended to Penny Morton for opening her library to me, her comments and questions, and her critical review of this report, And finally, I'd like to thank my wife Deborah and daughter Elizabeth, for their patience and understanding while I was holed up with the computer.

I. Introduction

Mining of high-grade Copper (Cu)-Platinum Group Element (PGE) ore bodies in the footwall rocks beneath the Sudbury Igneous Complex (SIC) has led, over the last fifteen years, to many geological and geochemical studies of these deposits. The Cu-PGE deposits are characterized by massive chalcopyrite veins, pods, and stringers with thin chloritic alteration halos. The footwall ore zones are spatially associated with contact type Ni-Cu ores and extend hundreds to thousands of meters into the footwall rocks beneath these contact deposits. Vein grades of 30% Cu, 3% Ni, and 0.30 oz/ton precious metals (Au, Ag, Pt, Pd) are typical of the footwall ore bodies (INCO personal communication). The most fundamental geologic process associated with the footwall deposits of the Sudbury Mining Camp is the migration of the ore metals from the Sudbury Igneous Complex into the footwall environment. The footwall ores formed by migration of a fractionated, copper-PGE-rich residual sulfide liquid away from the early crystallizing monosulphide solid solution (mss), into and along footwall structural zones. The discovery of similar ore deposits beneath the Duluth Complex could lead to a renewed interest in the exploration for, and mining of, various Cu-Ni ore types within the Duluth Complex. This research project, funded by the State of Minnesota, was initiated to create a method of detecting areas beneath the Duluth Complex that are favorable for hosting high-grade footwall deposits.

The objective of mineral exploration is to discover ore before funding is exhausted or management loses confidence in the exploration team. Mineral exploration tends to use the simplest, least expensive, and lowest risk criteria and methods available. These criteria and methods are generally part of an empirical exploration model. As long as the exploration program is successful, generally during the first stages of exploration in an area, these methods

and models are completely appropriate. As exploration matures, however, deposits become more difficult to discover, risks increase, and the amount of data applicable to exploration increases.

Drilling for mineral deposits in the Duluth Complex has spanned over forty-five years. More than six-billion tons of low-grade Cu-Ni mineralization have been found (Listerud et al., (1977), but no currently economic deposits have been discovered. A compilation of geological and geochemical data has been integrated with new ideas into an ore deposit and exploration model. This model is applicable to future exploration for footwall Cu-PGE ore bodies beneath the Duluth Complex. The goal of this work is to help exploration companies visualize the distribution of Cu-Ni in the Duluth Complex, and to generate new ideas that may lead to subsequent mineral exploration for footwall Cu-PGE deposits. The new ore deposit model is based upon analog Cu-PGE rich ore bodies currently mined in the footwall rocks beneath the Sudbury Igneous Complex, Sudbury, Ontario.

Project Initiation

Among the 1994 recommendations of the Governor of Minnesota's Task Force on Mining and Minerals was the following: *Parties having an economic interest or technical expertise in the development of Minnesota's copper-nickel deposits should form a working group to determine the obstacles to the development of this large resource and report its findings and recommendations.* The Working Group was chaired by Bill Ulland, with technical and environmental subcommittees chaired by Dave Meineke and Ernest K. Lehmann, respectively. A premise of the Working Group was that it be industry supported so the findings and recommendations have industry support. The Working Group reviewed five areas of potential action, namely: 1) Metallurgical Research, 2) Geological Research, 3) Environmental Research,

4) Mine Permitting and 5) Taxes and Incentives.

The technical subcommittee reviewed two distinct areas of geological research: 1) the possibility of discovering high-grade footwall Cu-PGE deposits, and 2) work to increase the understanding of the known deposits. The following approach has been used to develop an ore deposit model and mineral exploration criteria to target footwall Cu-PGE mineralization beneath the Duluth Complex. The genetic ore deposit model is based on published characteristics of analog footwall deposits of the Sudbury Mining Camp, Ontario.

II. Ore Deposit Models

An ore deposit model is an assemblage of geologic data, with or without genetic or process interpretations, employed for predicting the locations of undiscovered mineral deposits. Different types of models use geologic characteristics in different ways; thus it is important that any model be explicitly defined so it is clear how it was made and what it contains. Successful exploration requires that models be as simple as possible and yet provide desired results. Two major types of ore deposit models are used by the mineral industry in the exploration for mineral deposits; these include *Empirical* and *Genetic* models. These types of ore deposit models and their application to exploration in the Duluth Complex are briefly described below.

Empirical Models

An *Empirical Ore Deposit Model* is based almost entirely on data. The model may be as simple as those used in the past by prospectors, who sampled quartz veins and panned for gold in stream gravels. An empirical model avoids the risk of inaccurate genetic interpretations that may lead to costly and misguided exploration programs. However, empirical models still require that

geologists make judgements and the models are generally influenced to some extent by individual interpretations. These types of models are generally used in the early stages of an exploration program when geologic information is scarce and/or exploration competition is intense. The giant but low-grade Cu-Ni deposits of the Duluth Complex were discovered by geologists that used a simple empirical ore deposit model. The model that was centered upon the fact that Cu-Ni mineralization is found in outcrop along the western margin of the Duluth Complex. Therefore, drilling programs that were concentrated on penetrating the basal margin of the Duluth Complex led to the discovery of large tonnages of Cu-Ni mineralization.

Genetic Models

In mature exploration areas (such as the Duluth Complex today), the more obvious discoveries have been made, and purely empirical models are less able to provide additional discoveries. At this point, the exploration may be terminated or a *Genetic Ore Deposit Model* developed. Genetic models are based on geologic data interpretations and are only attempted when well described analogs are available. If a genetic model is to be undertaken, the user must take into account the following limitations:

- a) existing data and understanding may not be sufficient to construct a reliable model,
- b) the resulting model may have only limited predictive capabilities and reliability,
- c) flawed models commonly result because incomplete modeling methods are used, and
- d) we can rarely prove anything in geology; at best we can only consider the reasonable alternatives, test them, eliminate the less tenable hypotheses, and develop strong inferences that the remaining hypotheses are correct.

Development of reliable genetic models for exploration requires, in addition to sufficient and accurate geologic data, modeling methods that protect against our individual biases and the natural tendencies to:

- a) be satisfied with explanations rather than accuracy in interpreting geologic observations,
- b) accept the first or most familiar geologic processes to explain geologic observations,
- c) defend interpretations and models once they have been developed, even in the face of conflicting data, and
- d) consider only one or a few plausible interpretations for geologic observations, thereby decreasing the likelihood that we will have included the correct interpretation.

III. The Sudbury Nickel-Copper Mining Camp

Geological Setting

The geology of the Sudbury mining camp is comprehensively explained in the volume edited by Pye et al. (1984). The following discussion of the geological setting is largely taken from that volume. The SIC and its nickel-copper ores occurs at the southern edge of the Archean Superior Province at the contact with the overlying Proterozoic Huronian Supergroup. The SIC outcrops as an oval, northeast trending basin or funnel-shaped intrusion about 65 km long and 25 km across (Figure 1). The northern margin of the SIC dips about 30° to the south and cuts Archean granitic intrusions and gneisses. The southern margin of the SIC dips 45 to 60° to the north and cuts lower Huronian mafic and felsic metavolcanic rocks and felsic stocks.

The complex consists of two main layer-like units (Naldrett and Hewins, 1984), the Lower Zone and the Upper Zone. The Lower Zone (0.5-2.5 km thick) consists mainly of norite and gabbro-norite that grades upward into a quartz- and oxide-rich gabbro. At the base of the Lower Zone is the "Sublayer", the host rock for most of the nickel-copper mineralization in the camp. The Sublayer is characterized by the presence of nickel-copper sulfides and xenoliths of wall rock and mafic and ultramafic rocks of non-local origin (Figure 2). The Upper Zone

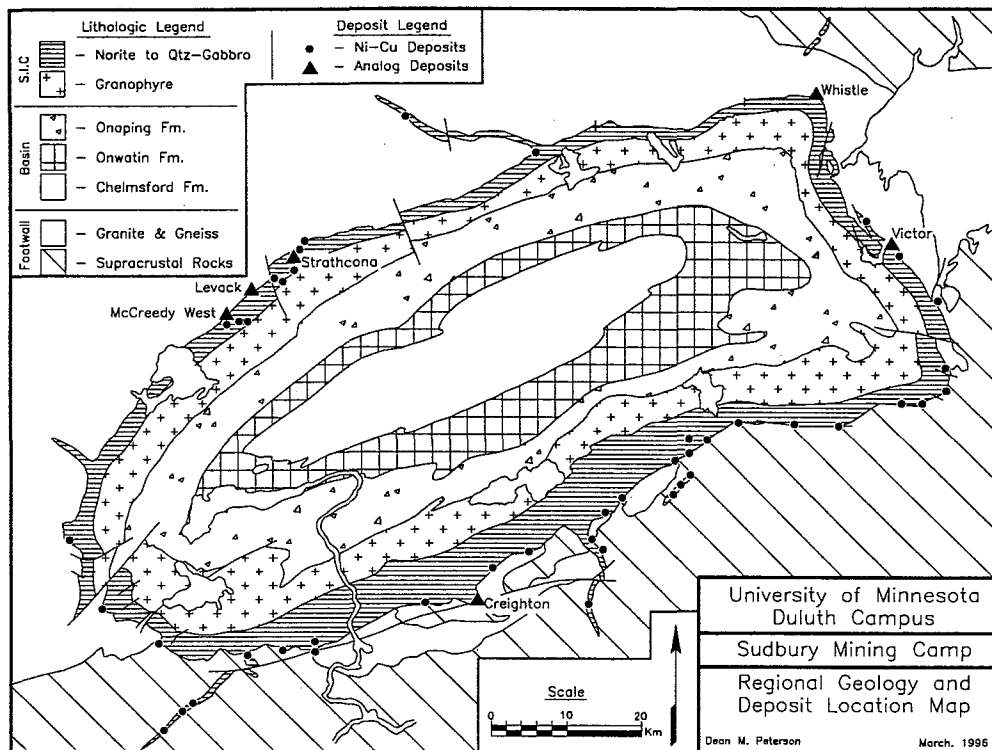


Figure 1. Geological map of the Sudbury Mining Camp, modified from Pye, (1984)

(1-2.5 km thick), consists of granophyre and has an abrupt transitional contact with the underlying quartz-rich gabbro.

The complex is overlain by the basin shaped Proterozoic Whitewater Group. The Whitewater Group consists of a conformable sequence of basal heterolithic breccia (Onaping Formation), carbonaceous and pyritic sediments (Onwatin Formation), and is capped by a proximal turbidite sequence (Chelmsford Formation). The base of the Onaping Formation has been intruded by the underlying granophyre of the top of the SIC. Numerous geologic features that are related to the intrusion of the Sudbury Igneous Complex can be seen throughout the footwall rocks around the complex. These features include a ~1 km contact metamorphic halo,

and a set of shock-induced structures attributed to a meteoritic impact.

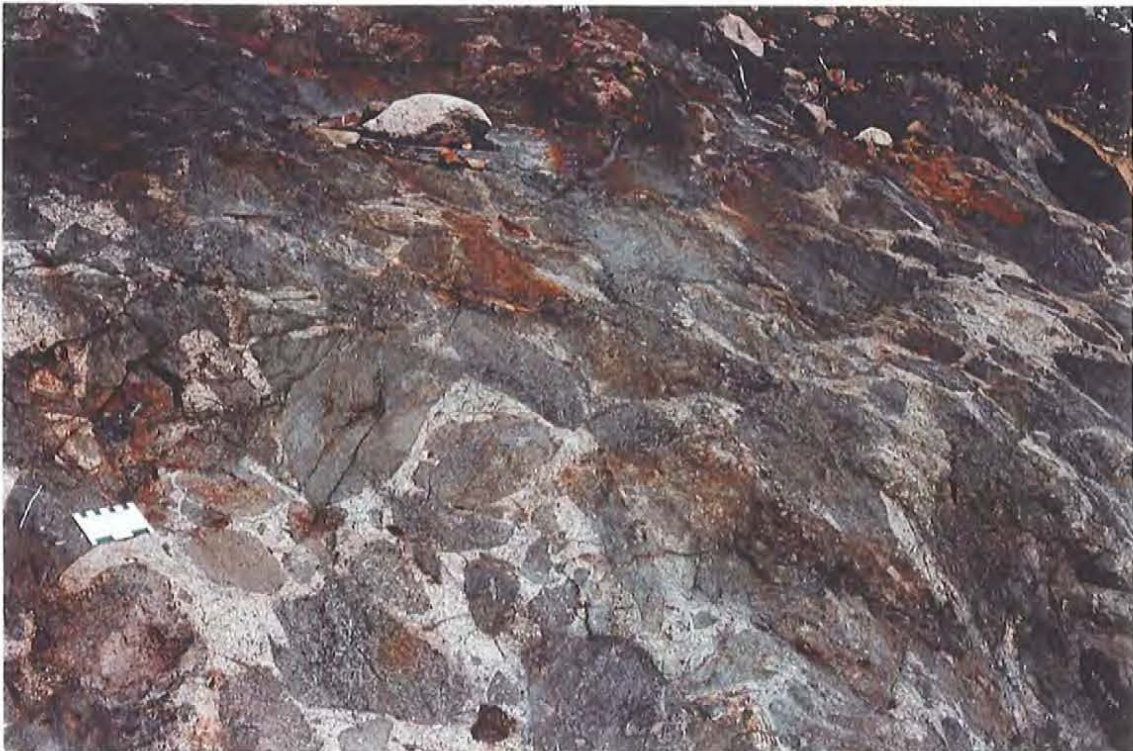


Figure 2. Xenolith-rich Sublayer gabbronorite. Strathcona mine, North Range.

The shock features include shatter cones (Figure 3), and planar dislocations in certain rock forming minerals. In addition, the complex is underlain by a zone of “Footwall Breccia” and irregular veins and masses of Sudbury Breccia (Figure 4). The Sudbury Breccia is found around the entire SIC and occurs up to 80 km outward from the complex.



Figure 3. Shatter cone in quartzites of the Huronian Supergroup, South Range.



Figure 4. Sudbury Breccia in quartzites of the Huronian Supergroup, South Range.

Ore Deposits of the Sudbury Mining Camp

Five types of Ni-Cu-PGE ore zones have been distinguished based on host rocks, controlling structures, and ore composition. The ore zone types include:

1) South Range Contact Type Ore (Souck et al., 1969)

The ore typically occurs in noritic Sublayer within depressions in the base of the SIC. The ores are zoned, with massive sulfide ore that contains angular wall rock fragments grading upward into a sulfide-matrix breccia and upward into disseminated blebs of sulfide in the inclusion-rich sublayer. The ores are high in arsenic with Niccolite-Maucherite-Gersdorffite and Cobaltite along with the typical Pyrrhotite>>Pentlandite>Chalcopyrite>Pyrite-Magnetite (Cu:Ni <1) (ex. Creighton, Murray, Little Stobie 1)

2) North Range Contact Type Ore (Pattison, 1979)

The ore typically occurs in noritic Sublayer and the underlying Footwall Breccia that together occupy embayments along the base of the SIC. The ores are hosted mainly in the Footwall Breccia and consist of massive stringers and lenses of Ni-Cu sulfides. Ore mineralogy consists of Pyrrhotite>>Pentlandite>Chalcopyrite>Pyrite-Magnetite. The ores are generally zoned with increasing Cu:Ni ratios downward from the SIC-Footwall Breccia contact. (Cu:Ni <1) (ex. Levack, Strathcona)

3) Offset Type Ore Zones (Pattison, 1979)

The ore zones are hosted in quartz diorite "offsets", dike-like intrusions of Sublayer that project outward from the SIC. The offsets are steeply dipping and typically follow zones of Sudbury Breccia. Ores occur as disseminated sulfide blebs in lenticular zones of inclusion-rich quartz-diorite centrally located in the offsets, or as sulfide-matrix breccia and blebs along the margins of the offsets. Ore mineralogy consists of Pyrrhotite>>Pentlandite>Chalcopyrite>Pyrite-Magnetite. (Cu:Ni = 1) (ex. North, South, Worthington)

4) Fault Related Type Ore Zones (Owen and Coats, 1984)

The ore zones are related to near vertical faults that cut the Lower Zone norite and the footwall Huronian metavolcanics. Ore zones consist of contorted schist inclusion sulfide within shear zones and discontinuous lenses of inclusion-rich massive sulfide. Ore mineralogy consists of Pyrrhotite>>Pentlandite>Chalcopyrite>Pyrite-Magnetite. (Cu:Ni <1) (ex. Garson, Falconbridge)

5) Footwall Copper Vein Type (Morrison, 1994)

The ore zones consist of anastomosing veins and stringers of copper-rich massive sulfide within

thermally metamorphosed and brecciated footwall rocks. Ore mineralogy includes Chalcopyrite>>Cubanite with minor Pentlandite-Magnetite-Millerite and Pyrrhotite. Platinum, Palladium and Gold are more highly enriched than in any other type of ore at Sudbury. (Cu:Ni >>1) (ex. West McCreedy, Victor, Strathcona Deep Copper Zone)

Deposit	no*	Type	Ni	Cu	Au	Pt	Pd	Ni:Cu	Cu:Ni
Levack West	21	NR	5.73	3.72	150	1150	1250	1.54	0.65
Strathcona Deep Cu	32	FW	1.97	28.27	296	4719	5213	0.07	14.35
Little Stobie 1	23	SR	3.83	4.41	862	1930	2120	0.87	1.15
Falconbridge	23	FR	5.35	1.52	174	546	381	3.52	0.28

no* - Number of Samples
NR - North Range Contact Deposit
FW - Footwall Copper-PGE Deposit
SR - South Range Contact Deposit
FR - Fault Related Deposit
Note - Ni-Cu in Wt%, and Au-Pt and Pd in ppb

Table 1. Compositions of Typical Sudbury Ores (Eckstrand, 1996)

IV. Genetic Model for Footwall Cu-PGE Deposits

Introduction

Many workers have studied the genesis of the footwall Cu-PGE mineralization in the Sudbury Mining Camp. These studies have shown many relationships characteristic of the mineralized footwall ore bodies (Figure 5). Naldrett et al. (1982) suggested that the ores are attributable to the fractional crystallization of the sulfide liquid responsible for the formation of the contact Ni-Cu deposits. The footwall ores are believed to have formed by migration of the fractionated, copper-rich residual liquid away from the early crystallizing monosulphide solid solution (mss), into and along dilatant footwall structural zones (Figures 6 and 7). Subsequent

geological studies have largely confirmed and refined the early ore deposit model. Morrison et al., (1994) describe how the host rocks surrounding the footwall veins have undergone thermal metamorphic recrystallization ranging from poikoblastic biotite and/or amphibole growth up to host rock anatexis. Naldrett et al., (1994) describe pronounced zonation of Cu-Ni and PGE ratios that change from the sublayer contact Ni-Cu ores down to the footwall Cu-PGE ores. Jago et al., (1994) present metal zonation, textural, and mineralogical evidence for the role that alkali- and halogen-rich fluids played in the genesis of the footwall orebodies. Farrow et al., (1994) describe saline fluid inclusions from sulfides in the footwall ores, and speculate on a hydrothermal origin for some mineralization.

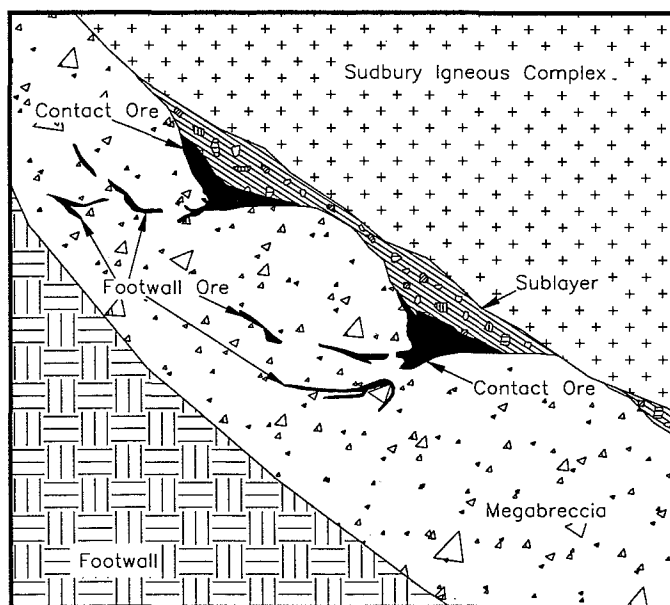


Figure 5. Schematic section of typical footwall Cu-PGE ore morphology within the Sudbury Mining Camp (modified from INCO cross sections).



Figure 6. Thin chalcopyrite veins cutting the Levack Gneiss, West McCreedy Mine.



Figure 7. Massive chalcopyrite vein in Sudbury Breccia, West McCreedy Mine.

Genetic Ore Deposit Model

The following approach has been used to develop a *Data-Process-Criteria Ore Deposit Model* for the exploration for footwall Cu-PGE mineralization beneath the Duluth Complex.

The model is based on discussion with Ontario Geological Survey (OGS) and INCO geologists, an underground tour of INCO's West McCreedy mine, and literature review of numerous analog footwall Cu-PGE deposits of the Sudbury Mining Camp. The development of the data-process-criteria ore deposit model occurred in four stages, namely:

Stage 1 - *Define Deposit Type*

Stage 2 - *Determine Analog Deposits*

Stage 3 - *Identify Formation Processes*

Stage 4 - *Select Diagnostic Criteria*

Descriptions of each stage of the model are characterized below:

Stage 1 - Define Deposit Type

Footwall Cu-PGE ore deposits occur as veins and lenses of massive Cu-rich sulfides that occur beneath large accumulations of massive magmatic Ni-Cu sulfides (Figure 8). The Cu-PGE ore bodies of the Sudbury Mining Camp typically are 1-10 million tons in size (INCO, personal communication) and have grades of 5-30% Cu, 1-3% Ni, and ~0.30 oz/st precious metals (Pt-Pd-Au). Ore mineralogy includes Chalcopyrite>>Cubanite, with minor Pentlandite-Magnetite-Millerite and Pyrrhotite. Copper and the precious metals (Pt-Pd-Au) are highly enriched whereas Rh-Ir and Os are depleted compared to the overlying magmatic sulfide deposit. The footwall ores occur in structural zones in anomalously high, thermally metamorphosed areas of the footwall rocks. The footwall massive sulfides occur generally as sharp-walled dilatant vein

fillings (Figures 6 and 7) with thin chloritic halos.

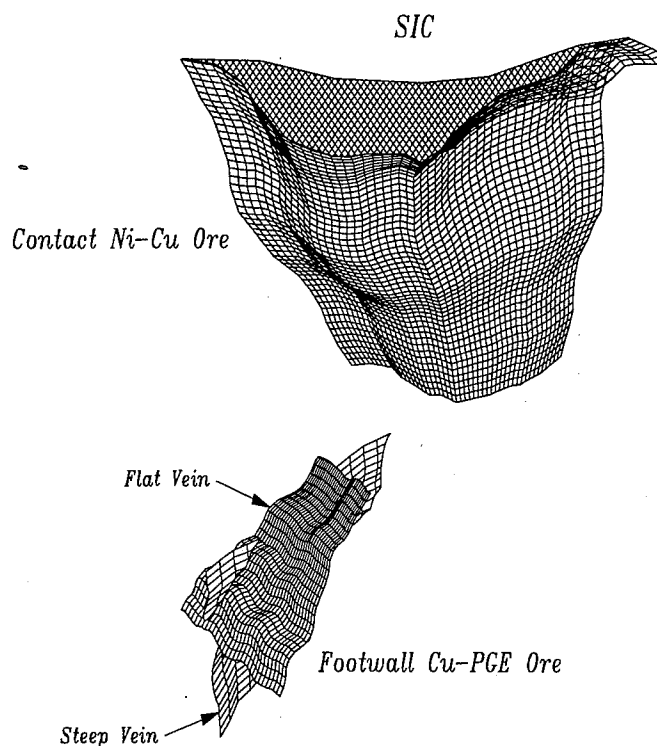


Figure 8. Schematic 3-D view of the relationship between contact & footwall ore

Stage 2: Determine Analog Deposits

A representative suite of analog deposits from the Sudbury Mining Camp includes deposits from the South, East, and North Ranges of the Sudbury Igneous Complex is listed below (see Figure 1). The suite of representative analog footwall ore zones in Sudbury deposits have been determined by through personal discussions with Sudbury Basin INCO geologists.

- | | |
|--------------------|--------------------------------|
| a) Creighton #126 | e) Victor Deep |
| b) Creighton #9810 | f) Whistle |
| c) Levack West | g) West McCreedy |
| d) Levack #153 | h) Strathcona Deep Copper Zone |

Stage 3: Identify Formation Processes

Geologic process identification is important in the development of a sound genetic ore deposit model. In ore deposit modeling, all plausible geologic processes that may have led to the geologic characteristics of the analog deposits are listed as the initial step in identifying the *essential processes* for the formation of the analog deposits. Many processes may have played some role in the development and redistribution of an ore deposit, but only the essential processes are needed to form an ore deposit.

Previous workers (Naldrett, 1984; Naldrett et al., 1984; Morrison et al., 1994) have identified several processes that have played essential roles in the development of the footwall Cu-PGE ore bodies in the Sudbury Mining Camp. The four essential processes are listed below:

- 1) Accumulation of large quantities of PGE-bearing Cu-Ni sulfides at or near the base of a large mafic intrusion.*
- 2) Presence or development of footwall structural zones within 1-2 km of the accumulating magmatic Cu-Ni sulfides.*
- 3) Fractional crystallization of the magmatic sulfide liquid and migration of the fractionated Cu-PGE-rich liquid away from the early crystallizing monosulfide solid solution (mss).*
- 4) Concentration of the residual Cu-PGE liquid into restricted areas of footwall structural zones.*

Stage 4: Select Diagnostic Criteria

The final stage in the development of a sound genetic ore deposit model is determining easily identifiable diagnostic criteria that show that the essential ore forming processes took place. One or more geologic characteristics that would be formed by each essential process must

be determined in order to identify whether or not the essential processes operated. Because all essential processes must have operated for a deposit to have formed, the more diagnostic criteria that can be identified in an area, the greater the likelihood that a deposit is present. The diagnostic criteria for the four essential processes are listed in Table 2 below:

Essential Process	Diagnostic Criteria	Detection Method
Accumulation of Cu-Ni-PGE sulfides in the source	Large quantities of Cu/Ni sulfides in a mafic intrusion	Drilling, mapping
Footwall Structures	Identification of footwall structures	Drilling, mapping, Geophysics
Fractional Crystallization	Systematic variation in the Cu:Ni ratio of the source rock	Geochemical visualization within the source rock
Concentration	Thick veins of Cu-PGE sulfides in the footwall	Drilling, geophysics

Table 2. Correlation of the essential ore forming processes, diagnostic criteria and detection methods.

V. The Duluth Complex

Introduction

Drilling over the last forty years in the Duluth Complex has outlined many large-tonnage, low-grade Cu-Ni deposits. Listerud and Meineke (1977) estimated the grade and tonnage of Cu-Ni ores of the Duluth Complex to be 4.4 billion tons @ 0.70% Cu, 0.2% Ni. These estimates include the Spruce Road (700 million tons), Maturi (2.3 billion tons), Dunka Pit (300 million tons), Babbitt (800 million tons), and the Dunka Road (300 million tons) deposits (Figure 9).

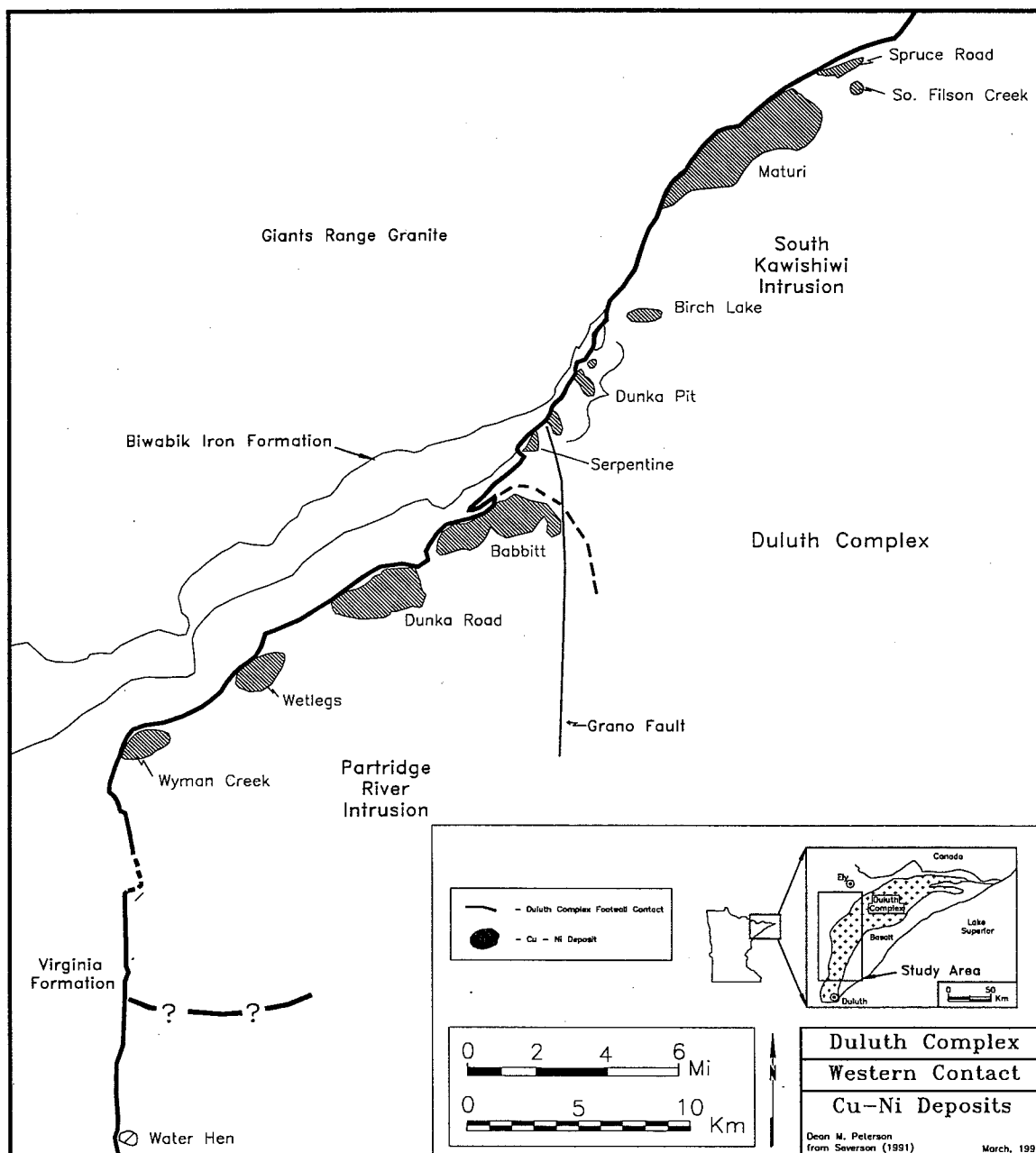


Figure 9. Duluth Complex Cu-Ni deposit location map (after Severson, 1991)

Low-grade Cu-Ni mineralization is largely confined to heterogeneous troctolitic rocks

situated along the basal contact of the Duluth Complex. The huge tonnages of these low-grade Cu-Ni resources (largest in the world) have kept industry mildly interested in these deposits to this day. However, without higher-grade zones to mine, the deposits may continue to be regarded as only mineral resources far into the future. Without a metallurgical breakthrough or large increase in metal prices, the discovery of high-grade zones is essential to the development of the Cu-Ni resources of the Duluth Complex.

Geologic Compilation

Two goals were set to begin modeling the likelihood of footwall Cu-PGE mineralization beneath the Duluth Complex. These goals include: 1) A digital geological and geochemical framework for the Duluth Complex, and 2) the ability to visualize in 3-dimensions the distribution of Cu-Ni in the Duluth Complex. Industry standard software programs were used to compile all of the geological and geochemical compilations. The computer programs that were used in the compilation include: Autocad, Paradox, Quattro Pro, Excel, Surfer, and WordPerfect. All attempts have been made to ensure that the compiled data will be compatible with other computer programs used by the interested parties. All data are georeferenced into the Universal Transverse Mercator (UTM) Projection, Zone 15.

Compilation of an integrated digital geological and geochemical data base for the western basal portion of the Duluth Complex has been completed. This compilation was focused on including data useful in identifying diagnostic criteria (Stage 4, page 15-16) needed for the formation of Cu-PGE footwall deposits in the Duluth Complex. Standardization of lithologic units was used to integrate the various geologic maps used in the compilation into a single digital

geologic database. The first order geology (baseline geology) was compiled from Green et al. (1966), Bonnichsen (1971), Meineke et al. (1993), Meints et al. (1993), and the author's personal interpretations. The standardized legend for the Duluth Complex rocks is presented in Figure 10.

Recent publications by the Natural Resources Research Institute (NRRI) (Severson (1988, 1991, 1994, 1996), Severson et al. (1990,91), Geerts (1991), Geerts et al. (1990), Hauck et al. (1989,92), Patelke (1994), Kuhns et al. (1990), Strommer et al., (1990) and Zanko et al., (1994)) over the last decade provide a sound geologic framework for the western portion of the Duluth Complex. These recent studies have been digitally integrated with the baseline geologic compilation, and the State of Minnesota 1/4 mile spaced aeromagnetic data, into a new 1:100,000 scale, geologic compilation (Plate 1) and residual magnetic maps (Plate 2) of the Duluth Complex. Four 1:24,000 scale geologic maps have also been generated for the Cu-Ni deposit areas of the Duluth Complex (Appendix C). The location and description of new geological map data generated from this project are presented in Figure 11.

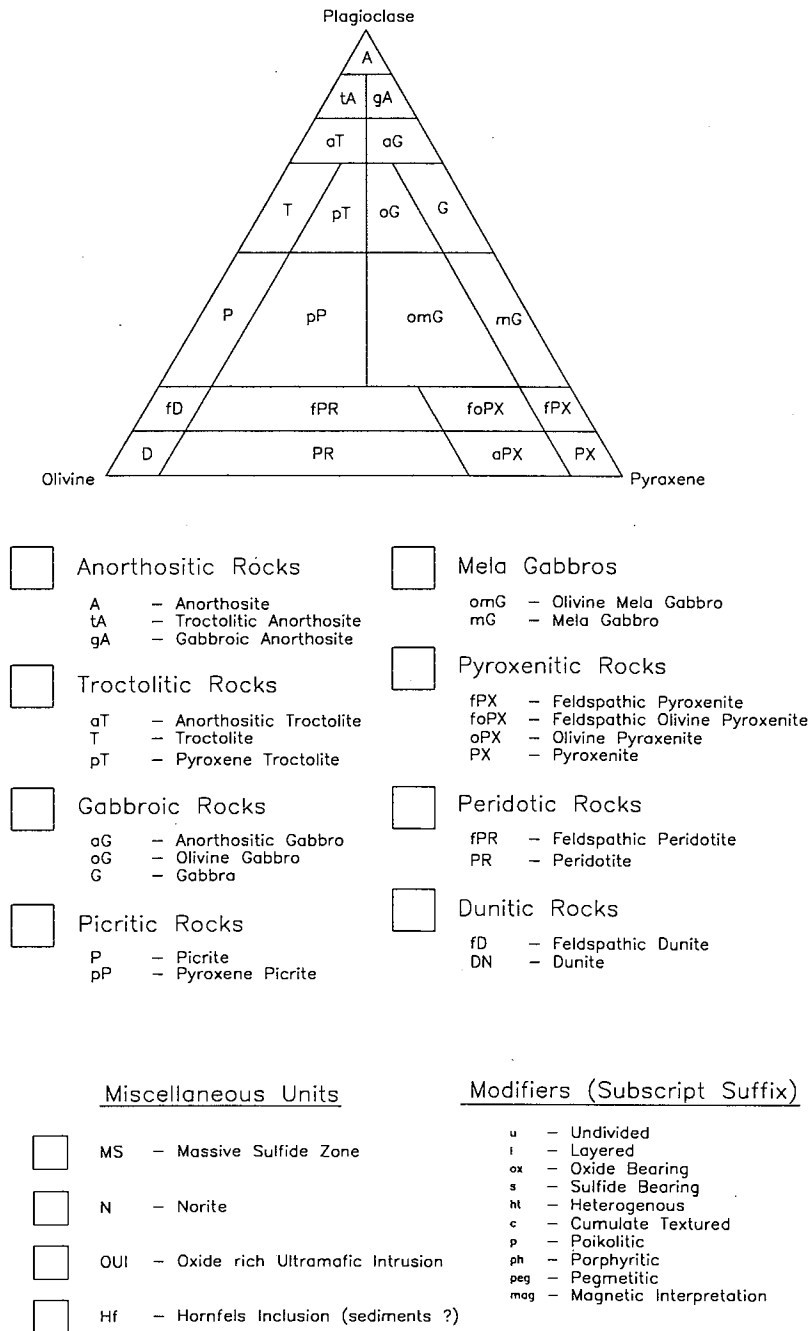


Figure 10. Standardized lithologic units used in the compilation of the Duluth Complex, modified after Phinney, (1972).

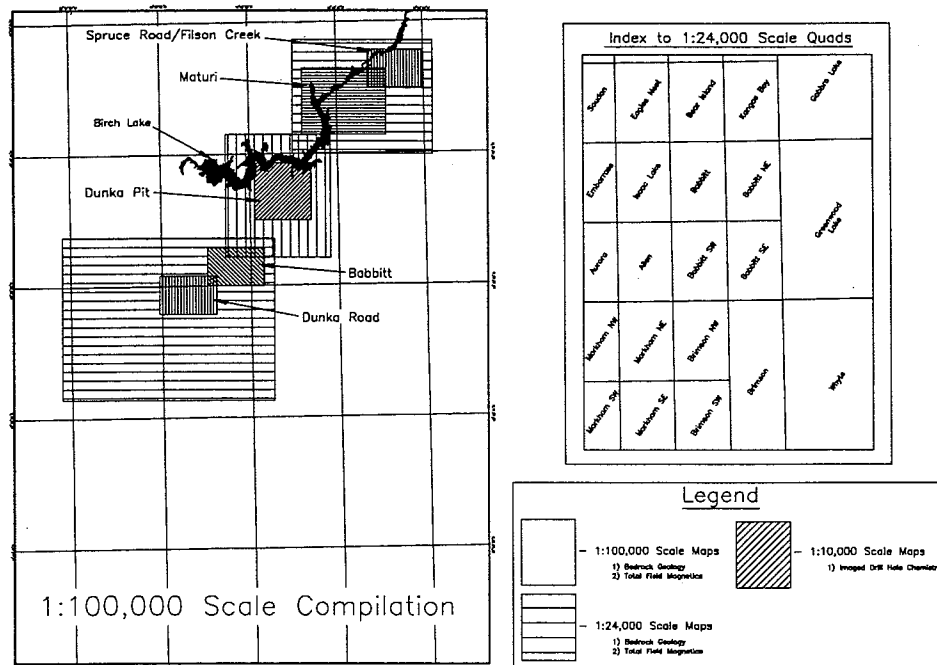


Figure 11. Location map of the detailed deposit areas within the Duluth Complex

Geochemical Compilation

The targeting of mineralization beneath the Duluth Complex must first be based on the fundamental geologic process (migration of fractionated metals into the footwall) associated with deposit formation. The diagnostic criterion that show copper fractionation and migration is the spatial variation of Cu-Ni grades and the lowering of the Cu/Ni ratio in the source rock. Determination of copper depletion in mineralized basal troctolites of the Duluth Complex is the first step in the generation of footwall exploration targets.

The distribution of Cu-Ni in the Duluth Complex has been determined from a comprehensive compilation of all available drill hole chemistry. The drill hole chemistry

database (Cu, Ni, S, Au, Ag, Pt, Pd, Rh, Ir, Os, V, Cr, and Co) includes 61,526 assays (249,629 individual analyses) from 1435 drill holes (Appendix A and file Chembase.db in Appendix C). Assays were compiled from digital archives (Patelke, (1994), Strommer et al., (1990), Geerts et al., (1990), Geerts, (1991), Severson et al., (1991), and Severson et al., (1990), Dahlberg, (1987), Dahlberg et al., (1989), confidential industry assay tables (INCO, LTV Steel, American Shield, and Lehmann and Associates), and by compilation throughout the terminated lease files of the MNDNR. Individual analyses are located in three-dimensions (UTM east, UTM north, elevation/feet above basal contact) from DDH collar azimuth/dip and basal piercing points (Figure 12). Approximately 95% of all known drill hole assays are in the database.

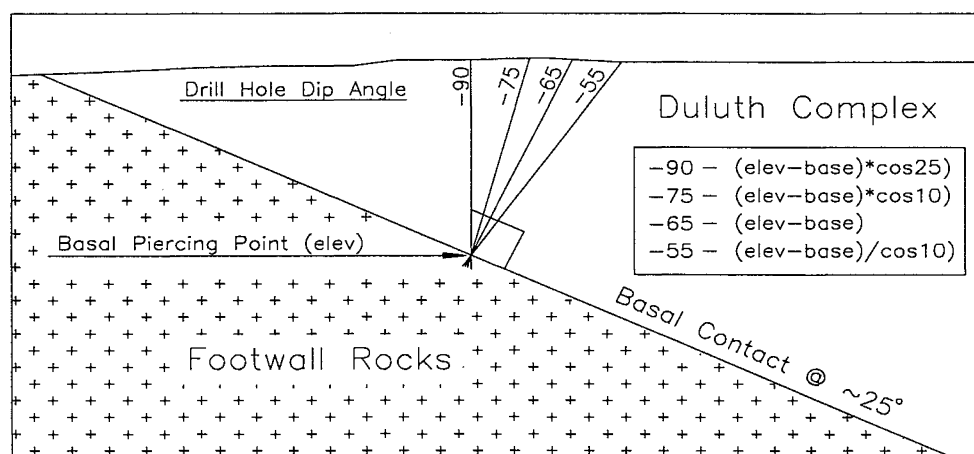


Figure 12. Downhole assay location methodology for xyz location

Data Visualization

An approach has been developed that quantitatively shows the variations in the Cu:Ni ratios of the basal troctolites of the Duluth Complex that can be visually linked to drill hole assays in the underlying footwall rocks. The likelihood of footwall Cu-PGE mineralization

beneath the Duluth Complex has been modeled from the three-dimensional distribution of Cu-Ni in the basal 500 feet of the Duluth Complex.

A new method has been developed that quantitatively describes the migration of copper within individual zones, the equation that describes the migration is listed below:

$$Ni_{ddh} \times [(Cu/Ni_{ave}) - (Cu/Ni_{ddh})] = \pm Cu_{ddh}$$

- | | |
|---------------|---|
| Ni_{ddh} | - Weighted average Ni wt% assay from individual drill hole |
| Cu_{ddh} | - Cu wt% depleted (+), added (-) for individual drill holes |
| Cu/Ni_{ave} | - Average Cu/Ni ratio from all drill holes in the zone |
| Cu/Ni_{ddh} | - Weighted average Cu/Ni ratio for individual drill holes |

Two assumptions must be valid in order for this equation to be valid. The assumptions are:

- 1) Ni is essentially immobile (compared to Cu).
- 2) The average Cu/Ni ratio calculated for individual zones within deposits is valid.

The term Ni_{ddh} is a grade control variable in that assay intervals with very low Ni values would equal approximately zero ($0 \times (\text{any number}) = 0$). An example of how to calculate weighted average drill hole chemistry data is presented in Figure 13, and a worksheet showing the data transformation using the equation above is presented in Table 3.

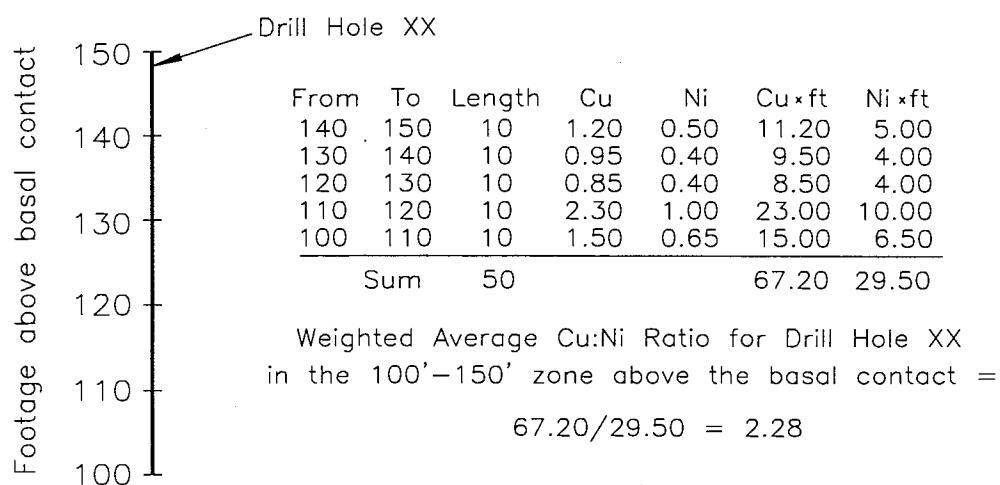


Figure 13. Weighted averaging of Cu-Ni data from drill hole assays.

DDH	Ni _(ddh)	Cu:Ni _(ave)	Cu:Ni _(ddh)	Cu _(ddh) Added (+) or Depleted (-)
X-1	0.05	2.50	4.00	-0.075 wt% Cu added to interval
X-2	0.25	2.50	3.10	-0.150 wt% Cu added to interval
X-3	0.55	2.50	2.50	0.000 No Cu added or depleted from interval
X-4	0.95	2.50	2.00	0.475 wt% Cu depleted from the interval
X-5	1.15	2.50	1.50	1.150 wt% Cu depleted from the interval

Table 3. Data transformation example for copper migration equation

For example, look at hypothetical drill hole X-5 above. The weighted average Ni value of that interval is equal to 1.15 wt%, and the Cu:Ni ratio is equal to 1.50. Therefore, the weighted average Cu value is equal to $1.15 \times 1.50 = 1.725$ wt% Cu. However, the average Cu:Ni ratio of all of the drill holes in the area, at that interval above the basal contact, is equal to 2.50.

Therefore, an "average drill hole" in the area should have a value of $1.15 \times 2.50 = 2.875$ wt% Cu. Backtracking to Table 3, the Copper depletion value of 1.150 wt% for DDH X-5 is just the "average copper value" for rocks in the area with a nickel grade of 1.15 (2.875), minus the true copper value calculated from weighted average assay data for DDH X-5 (which is equal to 1.725). In a less wordy fashion; $2.875 - 1.725 = 1.150$ wt% Cu depleted from the assay interval.

The compiled drill hole assay data have been used to create a weighted average database (Appendix C, file wt_avg.db) for the basal 500 ft (50-100 ft zones above the basal contact) of the five main Cu-Ni deposits of the Duluth Complex. The deposit areas in the database include Spruce Road, Maturi, Dunka Pit, Babbitt, and the Dunka Road deposit. The drill hole weighted average data has been imaged using the Cu depletion/addition variable for zones above the basal contact of the deposit areas (Plates 3-46). Eight zones have been used to define the distribution of Cu-Ni in the basal 500 ft of the main deposits of the Duluth Complex. The zones include 0-50', 50-100', 100-150', 150-200', 200-250', 250-300', 300-400' and 400-500' above the basal contact (Figure 13) of the Duluth Complex. The maps reflect the distribution of the ore-metals in relation to the basal contact of the Duluth Complex.

All of the image maps were created using Minimum Curvature gridding techniques in the computer program Surfer (by Golden Software). Many data sets were initially gridded using Kriging techniques, but the output images using minimum curvature were nearly identical and many orders of magnitude faster. The image maps depict colored surface meshes of the Cu depletion/addition variable described above. Because the data is gridded, volumes can be easily calculated above and below the zero line. Simplistic mass balance conversion of wt% copper into pounds from the maps are presented in Appendix B. Results are encouraging, with large zones of

copper depletion and discrete areas of addition of copper identified in each of the deposit areas.

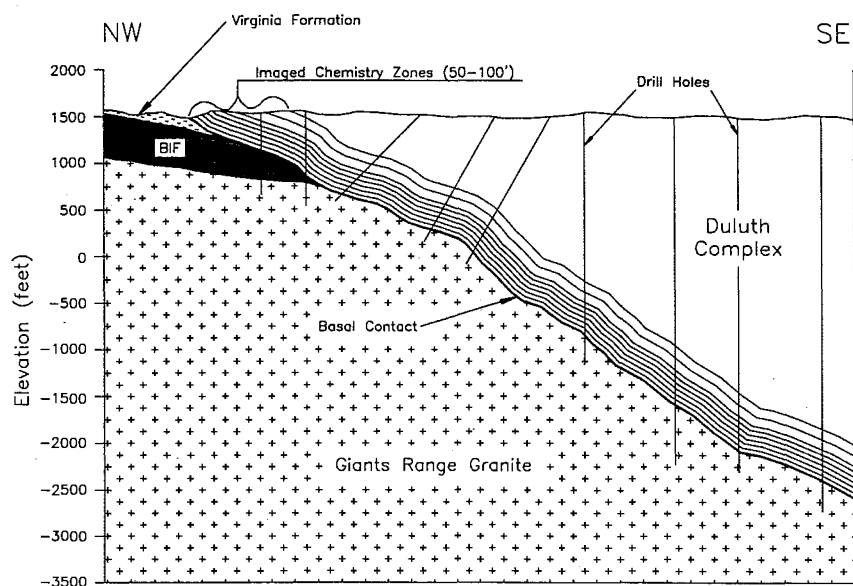


Figure 14. Geochemical zones used in data visualization along the basal Duluth Complex

An example of a composite image, depicting modeled copper migration in the basal 500' of the Spruce Road Deposit is presented in Figure 15. The image was generated by simple addition of the gridded data sets for each of the geochemical zones. Posted within the image are dots representing locations of drill hole assay samples, beneath the Duluth Complex, in the underlying Giants Range Granite. As can be seen in the map (also see Plate 13 for colored version), the east half of the Spruce Road deposit is depleted in copper. The copper depleted zone is spatially correlative with high copper drill hole assay in the footwall Giants Range Granite.

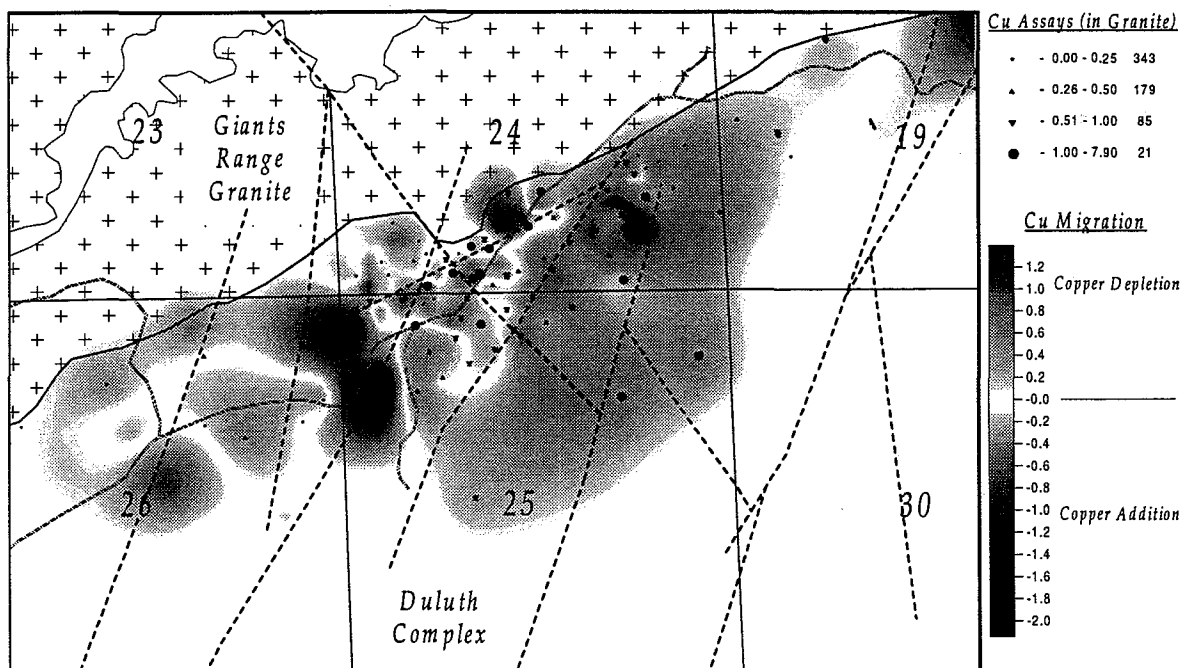


Figure 15. Correlation of modeled copper migration in the basal 500' of the Duluth Complex and known mineralization in the footwall Giants Range Granite, Spruce Road Deposit.

Interpretations

The following discussion pertains to the methodology and interpretation of the copper migration image maps presented on Plates 3 - 46. All of the maps were created in the computer program Surfer, by using the tabulated weighted average assay tables enclosed in the data file *wt_avg.db* (Appendix C). The data were separated out into the individual 50-100 ft zones above the basal contact of the Duluth Complex, and additional null values were included into the data prior to gridding. These null values were placed to the northwest of the drill hole data within the

footwall rocks, and approximately 200 meters outside the drilling areas to the southeast. In this way, the image maps are clipped to the edge of the real weighted average data. The data points were transformed using the minimum curvature gridding technique and then imaged. The same gridded data could easily be contoured or converted to shaded relief maps.

In any technique that requires data gridding, the more points originally present in the data, the more reliable the gridding. Grid spacing varied for each of the deposits due to drill hole spacing. Grid spacing for the deposit areas are presented below:

- | | | |
|----|----------------------------|------------------|
| 1) | <i>Spruce Road Deposit</i> | <i>50 meter</i> |
| 2) | <i>Babbitt Deposit</i> | <i>50 meter</i> |
| 3) | <i>Dunka Road Deposit</i> | <i>75 meter</i> |
| 4) | <i>Dunka Pit Deposit</i> | <i>75 meter</i> |
| 5) | <i>Maturi Deposit</i> | <i>100 meter</i> |

All of the geological and cultural information on the maps were imported into Surfer from the digital geologic compilation. Simplistic mass balance calculations (Appendix B) are included in some of the interpretations below. A density of 3.0 g/cm^3 was used for the mass balance calculations. Listerud and Meineke (1977) calculated that the ore reserves of Cu-Ni in the Duluth Complex is 4.4 billion tons grading 0.70% Cu, and 0.20% Ni. Using these numbers, there is 61.6 billion pounds of Cu, and 17.6 billion pounds of Ni in the ore reserves. However, the image maps (Plates 3 - 46) cover areas much larger than those defined as ore reserves by Listerud and Meineke (1977), and the total contained Cu-Ni metal in the Duluth Complex is much larger.

There are a few ways to interpret and visualize the copper migration image maps. Brief descriptions of the data are presented below:

Spruce Road Deposit

Image maps of the Spruce Road Deposit are presented in Plates 3 and 5 - 13. The maps show a pronounced systematic variation in the distribution of Cu-Ni in the deposit. A large Cu-depleted zone occurs in SE 1/4 of section 24, and the NE 1/4 of section 25. Some of the copper appears to have migrated to the west, but there still is over 500,000,000 pounds of copper missing in the system (Appendix B). Footwall assay values greater than 1% Cu occur within or very near the depleted Cu zone (Plate 13).

Dunka Road Deposit

Image maps of the Dunka Road deposit are presented in Plates 4 and 14 - 21. A strong spatial correlation exists between zones of Cu depletion and Cu addition and two northeast trending fault zones. The rocks to the southeast of the fault zone are depleted in copper, and rocks to the northwest of the fault zone have had copper added to them. Very few drill hole intervals have been assayed from drill holes in the footwall rocks beneath the Dunka Road deposit. The simplistic mass balance calculations presented in Appendix B indicate that almost 4,500,000,000 pounds of copper is missing from the deposit. The northeast trending fault zone is a good candidate for concentration of this missing copper and exploration for footwall Cu-PGE deposits.

Maturi Deposit

Image maps of the Maturi deposit are presented in Plates 22 - 29. No good systematic variation in the distribution of Cu-Ni exists with the available data. The large area and wide spacing of the drill holes probably precludes the usefulness of the "copper migration" technique.

However, more than 50 drill hole intervals have been assayed that contain > 0.50 wt% Cu in the footwall Giants Range Granite beneath the deposit.

Babbitt Deposit

Image maps of the Babbitt deposit are presented in Plates 30 - 38. The majority of the deposit area consists of a wavy pattern of Cu depletion and addition. The pattern is probably reflecting the heterogenous nature of the mineralized basal troctolites of the deposit. However, the area at the intersection of sections 28, 29, 32, and 33 displays a strong addition in copper. The footwall Local Boy ore body is situated directly beneath this highly copper enriched zone. Simplistic mass balance calculations presented in Appendix B indicate that approximately 2,250,000,000 pounds of copper is missing from the basal troctolites of the Babbitt deposit.

Dunka Pit

Image maps of the Dunka Pit deposit are presented in Plates 39 - 46. The distribution of Cu-Ni from 250 to 500 feet above the basal contact of the Duluth Complex appears to be essentially homogenous, with single drill hole spikes of anomalous Cu-Ni geochemistry. Below the 250 foot zone, wide variations in the distribution of Cu-Ni are evident. A strong Cu depletion is evident in the SW part of section 2. Simplistic mass balance calculations presented in Appendix B indicate that approximately 3,400,000,000 pounds of copper is missing from the basal zone of the Dunka Pit deposit. Detailed examination of the footwall fault zones exposed in the Peter Mitchell mine and their correlation with the imaged Cu migration could lead to good exploration targets.

VI. Recommendations

The integration of detailed subsurface stratigraphy and the compiled geochemistry was not a part of this report due to budgetary and time constraints. However, detailed examination of these factors should be studied by other workers because they could play an important role in the final definition of drilling targets beneath the Duluth Complex. No mention of the distribution of precious metals (Pt-Pd-Au) in the Duluth Complex has been included in this report. The paucity of assay data on the distribution of precious metals in mineralized footwall samples precludes any interpretation at the current time.

Future research could be focused on the following fronts:

- 1) Critical examination of the methodology and interpretations of the enclosed Plates (3-46).
- 2) Review of the database files for omissions and/or errors.
- 3) Drill core assaying for PGE's in drill core samples of mineralized footwall rocks.
- 4) Geologic mapping and prospecting programs in the footwall rocks near the western margin of the Duluth Complex. These programs should concentrate on locating the presence of copper mineralization and footwall structures.
- 4) Compilation of all available geophysical data (esp. Electromagnetic (EM) conductors) for the rocks in the immediate footwall of the western portion of the Duluth Complex.
- 5) Down hole geophysical methods could be used to determine the presence of, and location of footwall conductors.

VII. Conclusions

Digital geological and geochemical compilations of the Duluth Complex are completed and included in this report. Interested parties are encouraged to look at the hard copy images and the digital data sets provided in Appendix C. Footwall Cu-PGE deposits of the Sudbury mining

camp formed by migration of a fractionated, copper-rich liquid out of the Sudbury Igneous Complex into footwall structural zones. By simple analogy, similar deposits may have formed beneath the Cu-Ni deposits of the Duluth Complex.

The four essential ore-forming processes that must take place in order to form a footwall Cu-PGE deposits includes:

- 1) Accumulation of large quantities of Cu-Ni sulfides in a mafic intrusion
- 2) The presence or development of footwall structural zones
- 3) Fractional crystallization of the sulfide melt and migration of the residual Cu-rich liquid
- 4) Concentration of the Cu-rich liquid into discrete footwall structural zone

All of these ore-forming processes are present in localized areas within and below the Duluth Complex. However, the essential processes must all have taken place within a specific area in order to form a large concentration of Cu-PGE sulfides in the footwall rocks below the Duluth Complex. It is important that we recognize the geologic features that are formed as a result of these essential geologic processes. Diagnostic criteria have been described (page 16) for use in the determination if the essential ore-forming processes took place within and beneath the Duluth Complex.

A huge quantity of Cu-Ni sulfides have accumulated in the basal portions of the western margin of the Duluth Complex. Systematic variations in the distribution of the Cu-Ni have been identified and are presented in Plates 3 - 46, and large quantities of copper appear to have left the system (Appendix B). More geological and geophysical study is needed on determining the location of footwall structural zones that could be hosts for Cu-PGE deposits.

VIII. Bibliography

- Bonnichsen, B., (1971): Outcrop map of the southern part of the Duluth Complex and associated Keweenawan rocks, St. Louis and Lake Counties, Minnesota: Minnesota Geological Survey Miscellaneous Map M-11.
- Dahlberg, EH, (1987); Drill core evaluation for platinum group mineral potential of the basal zone of the Duluth Complex. Minnesota Department of Natural Resources, Div. Of Minerals, Report 255.
- Dahlberg, EH, Peterson, DM, and Frey, BA (1989): 1988-1989 Drill core repository sampling projects. Minnesota Department of Natural Resources, Div of Minerals, Report 255-1.
- Eckstrand, OR, (1996): Magmatic nickel-copper-platinum group elements; in *Geology of Canadian Mineral Deposit Types*, (ed.) O.R. Eckstrand, W.D. Sinclair, and R.I. Thorpe: Geological Survey of Canada, *Geology of Canada*, no. 8, p. 583-614.
- Farrow, C.E.G., Watkinson, D.H., and Jones, P.C., (1994): Fluid Inclusions in Sulfides from North and South Range Cu-Ni-PGE Deposits, Sudbury Structure, Ontario, *Economic Geology*, v. 89, p. 647-655.
- Geerts, SD (1991): Geology, stratigraphy, and mineralization of the Dunka Road Cu-Ni prospect, northeastern Minnesota. (Technical Report NRRI/TR-91/14) Natural Resources Research Institute, University of Minnesota, Duluth, 59 pages.
- Geerts, SD; Barnes, RJ; Hauck, SA (1990): Geology and mineralization in the Dunka Road copper-nickel mineral deposit, St. Louis County, Minnesota. (Technical Report NRRI/GMIN-TR-89-16) Natural Resources Research Institute, University of Minnesota, Duluth, 89 pages.
- Green, J.C., Phinney, W.C., and Weiblen, P.W., (1966): Gabbro lake quadrangle, Lake County, Minnesota: Minnesota Geological Survey, Miscellaneous Map M2.
- Hauck, SA; Barnes, RJ (1989): Precious metals (Pt-Pd-Au-Ag) in three copper-nickel deposits in the Duluth Complex. (Technical Summary Report, NRRI/GMIN-TSR-1) Natural Resources Research Institute, University of Minnesota, Duluth, 19 pages.
- Hauck, S; Severson, M; Zanko, L; Morton, P; Alminas, H; Dahlberg, H (1992): A review of sulfide, platinum group elements, and oxide mineralization along the western contact of the Duluth Complex: As related to structural development [abs.]. (10th International Conference on Basement Tectonics, Duluth, MN, p. 183-185)

- Jago, B.C., Morrison, G.G., and Little, T.L., 1994, Metal Zonation Patterns and Microtextural Evidence for Alkali- and Halogen-Rich Fluids in the Genesis of the Victor Deep and McCreedy East Footwall Copper Orebodies, Sudbury Igneous Complex, in: Proceedings of the Sudbury - Noril'sk Symposium, Ontario Geological Survey Special Paper 5, p. 65-75.
- Kuhns, MJ; Hauck, SA; Barnes, RJ (1990): Origin and occurrence of platinum group metals, gold, and silver in the South Filson Creek copper-nickel mineral deposit, Lake County, Minnesota. (Natural Resources Research Institute, Tech. Rept. NRRI/GMIN-TR-89-15, 60 pages)
- Listerud, WH; Meineke, DG (1977): Mineral resources of a portion of the Duluth Complex and adjacent rocks in St. Louis and Lake Counties, northeastern Minnesota. (Report 93) Minnesota Department of Natural Resources, Division of Minerals, Hibbing, MN.
- Meints, G.P., and others, (1993); Scientific core drilling in parts of Itasca, St. Louis, and Lake Counties, Northeast Minnesota 1989-1991: Summary of lithologic, geochemical, and geophysical results. Minnesota Geological Survey Information Circular 37, 195 pages.
- Meineke, D.G., Bucheit, R.L., Dahlberg, E.H., Morey, G.B., and Warren, L.E., (1993): Geologic map of the Mesabi Iron Range, Minnesota. Hibbing, Mesabi Range Geological Society, Scale 1:62,500, 1 plate.
- Morrison, GG, Jago, B.C., and White, T.L., (1994), Footwall Mineralization of the Sudbury Igneous Complex, in: Proceedings of the Sudbury - Noril'sk Symposium, Ontario Geological Survey Special Paper 5, p. 57-64.
- Naldrett, AJ., Innes, DG., Sowa, J. And Gorton, M, (1982): Compositional variation within and between 5 Sudbury ore deposits; *Economic Geology*, v. 77, p. 1519-1534.
- Naldrett, AJ and Hewins, RH, (1984): The main mass of the Sudbury Igneous Complex. in The geology and ore deposits of the Sudbury Structure, (ed) E.G. Pye, A.J. Naldrett, and P.E Giblin; Ontario Geological Survey, Special Volume 1, p. 235-251.
- Naldrett, AJ, (1984): Summary, discussion, and synthesis: in The geology and ore deposits of the Sudbury Structure, (ed) E.G. Pye, A.J. Naldrett, and P.E Giblin; Ontario Geological Survey, Special Volume 1, p. 533-569.
- Naldrett, AJ., Pessaran, R., Asif, M., and Li, C, (1994): Compositional Variation in the Sudbury Ores and Prediction of the Proximity of Footwall Copper-PGE Orebodies, in: Proceedings of the Sudbury - Noril'sk Symposium, Ontario Geological Survey Special Paper 5, p. 133-143.

- Owen, DL and Coats, CJA, (1984): Falconbridge and East mines. *in* The geology and ore deposits of the Sudbury Structure, (ed) E.G. Pye, A.J. Naldrett, and P.E Giblin; Ontario Geological Survey, Special Volume 1, p. 371-378.
- Patelke, RL, (1994): The Babbitt copper-nickel deposit, Part A: Digital drill hole data files for the Babbitt and Serpentine copper-nickel deposits. (Technical Report NRRI/TR-94/21a) Natural resources research Institute, University of Minnesota, Duluth, 48 pages.
- Pattison, EF, (1979), The Sudbury sublayer; its characteristics and relationships with the main mass of the Sudbury Irruptive; Canadian Mineralogist, v. 17, p. 257-274.
- Phinney, W.C., (1972), Duluth Complex, history and nomenclature: *in* Sims, P.K., and Morey, G.B., eds., Geology of Minnesota: A Centennial Volume, Minnesota Geological Survey, pp. 333-334.
- Pye, EG, Naldrett, AJ, and Giblin, PE (ed), (1984), The geology and ore deposits of the Sudbury Structure, (ed) E.G. Pye, A.J. Naldrett, and P.E Giblin; Ontario Geological Survey, Special Volume 1, 603 pages.
- Severson,M (1988): Geology and structure of a portion of the Partridge River intrusion: A progress report. (Technical Report NRRI/GMIN-TR-88-08) Natural Resources Research Institute, University of Minnesota, Duluth, 78 pages.
- Severson,MJ (1991): Geology, mineralization, and geostatistics of the Minnamax/Babbitt Cu-Ni deposit (Local Boy area), Minnesota, Part I: Geology. (Technical Report NRRI/TR- 91/ 13a) Natural Resources Research Institute, University of Minnesota, Duluth, 96 pages.
- Severson,MJ (1994): Igneous stratigraphy of the South Kawishiwi Intrusion, Duluth Complex, northeastern Minnesota. (Technical Report NRRI/TR-93/34) Natural Resources Research Institute, University of Minnesota, Duluth, Duluth. 210 pages.
- Severson,MJ (1996): Geology of the southern portion of the Duluth Complex. (Technical Report NRRI/TR-95/26) Natural Resources Research Institute, University of Minnesota, Duluth, Duluth. 210 pages.
- Severson,MJ; Barnes,RJ (1991): Geology, mineralization, and geostatistics of the Minnamax/Babbitt Cu-Ni deposit (Local Boy area), Minnesota, Part II: Mineralization and geostatistics. (Technical Report NRRI/TR-91/13b) Natural Resources Research Institute, University of Minnesota, Duluth, . 221 pages.
- Severson,M; Hauck,S (1990): Geology, geochemistry and stratigraphy of a portion of the Partridge River intrusion. (Technical Report NRRI/GMIN-TR-89-11) Natural Resources Research Institute, University of Minnesota, Duluth, 230 pages.

- Souch, BE, Podolsky, T., and Geological Staff, (1969), The sulfide ores of Sudbury; their particular relationship to a distinctive inclusion-bearing facies of the Nickel Irruptive; in Magmatic Ore Deposits, (ed) H.D.B. Wilson; Economic Geology Monograph 4, Economic Geology Publishing Company, p. 252-261.
- Strommer, J, Morton, P, Hauck, SA, and Barnes, RJ, (1990) Geology and mineralization of a cyclic layered series, Water hen intrusion, St. Louis County, Minnesota: (Technical Report NRRI/GMIN-TR-89-17) Natural Resources Research Institute, University of Minnesota, Duluth, 17 pages.
- Zanko, LM, Severson, MJ, and Ripley, EM, (1994) Geology and mineralization of the Serpentine copper-nickel deposit, Duluth Complex, Minnesota: (Technical Report NRRI/GMIN - TR-93-52) Natural Resources Research Institute, University of Minnesota, Duluth, 90 pages.

Appendix A

Duluth Complex Drill Hole Data Sheets

(Printed copy of the enclosed file DDHDATA>XLS)

DDH #	Chem	Date	Elevation Collar (ft)	County	Lessee	Twp	Rng	Sec	Total Depth (ft)	UTME Collar	UTMN Collar	Collar Azi	Collar Dip	Deposit	Intrusion DDH is in	UTME DC Base	UTMN DC Base	Elevation DC Base (ft)	Footwall
235			1611	St. Louis	Reserve Mining	60	12	20		583954	5280088		-90	Serpentine	South Kawishiwi			980	
10001	X	1977	-87	St. Louis	Kennecott	60	12	28	252	584244	5277242		-90	Babbitt	Partridge River			-280	
10002	X	1977	-86	St. Louis	Kennecott	60	12	28	383	584245	5277241	147	-45	Babbitt	Partridge River			-280	
10003	X	1977	-86	St. Louis	Kennecott	60	12	28	549	584245	5277241	147	-26	Babbitt	Partridge River			-280	
10004	X	1977	-84	St. Louis	Kennecott	60	12	28	395	584246	5277240	147	0	Babbitt	Partridge River			-280	
10005	X	1977	-84	St. Louis	Kennecott	60	12	28	509	584243	5277244	327	5	Babbitt	Partridge River			-280	
10006	X	1978	-87	St. Louis	Kennecott	60	12	28	504	584243	5277243	327	-21	Babbitt	Partridge River			-280	
10007	X	1978	-87	St. Louis	Kennecott	60	12	28	306	584243	5277243	327	-40	Babbitt	Partridge River			-280	
10008	X	1978	-80	St. Louis	Kennecott	60	12	28	324	584243	5277243	327	+53	Babbitt	Partridge River			-280	
10009	X	1978	-77	St. Louis	Kennecott	60	12	28	354	584245	5277242		+90	Babbitt	Partridge River			-280	
10010	X	1978	-80	St. Louis	Kennecott	60	12	28	409	584245	5277241	147	+46	Babbitt	Partridge River			-280	
10011	X	1978	-84	St. Louis	Kennecott	60	12	28	299	584248	5277244	57	0	Babbitt	Partridge River			-280	
10012	X	1978	-87	St. Louis	Kennecott	60	12	28	384	584248	5277244	57	-36.5	Babbitt	Partridge River			-280	
10013	X	1978	-77	St. Louis	Kennecott	60	12	28	301	584248	5277244	57	+27	Babbitt	Partridge River			-280	
10014	X	1978	-87	St. Louis	Kennecott	60	12	28	303	584247	5277243	57	-60	Babbitt	Partridge River			-280	
10015	X	1978	-86	St. Louis	Kennecott	60	12	32	153	584094	5276749		-90	Babbitt	Partridge River			-175	
10016	X	1978	-83	St. Louis	Kennecott	60	12	32	169	584093	5276751	327	-7	Babbitt	Partridge River			-175	
10017	X	1978	-81	St. Louis	Kennecott	60	12	32	194	584093	5276751	327	+12	Babbitt	Partridge River			-175	
10018	X	1978	-76	St. Louis	Kennecott	60	12	32	130	584093	5276751	327	+42	Babbitt	Partridge River			-175	
10019	X	1978	-80	St. Louis	Kennecott	60	12	32	165	584095	5276747	147	+13	Babbitt	Partridge River			-175	
10020	X	1978	-75	St. Louis	Kennecott	60	12	32	99	584095	5276747	147	+56	Babbitt	Partridge River			-175	
10021	X	1978	-83	St. Louis	Kennecott	60	12	32	150	584095	5276747	147	-13	Babbitt	Partridge River			-175	
10022	X	1978	-84	St. Louis	Kennecott	60	12	32	294	584092	5276749	237	-7	Babbitt	Partridge River			-175	
10023	X	1978	-83	St. Louis	Kennecott	60	12	32	184	584092	5276749	237	-22	Babbitt	Partridge River			-175	
10024	X	1978	-80	St. Louis	Kennecott	60	12	32	289	584092	5276749	237	+11	Babbitt	Partridge River			-175	
10025	X	1978	-76	St. Louis	Kennecott	60	12	32	95	584092	5276749	237	+35	Babbitt	Partridge River			-175	
10026	X	1978	-89	St. Louis	Kennecott	60	12	28	82	584194	5277210		-90	Babbitt	Partridge River			-175	
10026A	X	1978	-89	St. Louis	Kennecott	60	12	28	202	584194	5277210		-90	Babbitt	Partridge River			-175	
10027	X	1978	-89	St. Louis	Kennecott	60	12	28	293	584193	5277212	327	-46	Babbitt	Partridge River			-260	
10028	X	1978	-89	St. Louis	Kennecott	60	12	28	261	584195	5277209	147	-46.5	Babbitt	Partridge River			-260	
10029	X	1978	-89	St. Louis	Kennecott	60	12	28	329	584195	5277209	147	-26	Babbitt	Partridge River			-260	
10030	X	1978	-86	St. Louis	Kennecott	60	12	28	400	584195	5277209	147	0	Babbitt	Partridge River			-260	
10031	X	1978	-86	St. Louis	Kennecott	60	12	28	500	584193	5277213	327	0	Babbitt	Partridge River			-260	
10032	X	1978	-89	St. Louis	Kennecott	60	12	28	519	584193	5277213	327	-26	Babbitt	Partridge River			-260	
10033	X	1978	-80	St. Louis	Kennecott	60	12	28	421	584193	5277212	327	+40	Babbitt	Partridge River			-260	
10034	X	1978	-80	St. Louis	Kennecott	60	12	28	350	584195	5277209	147	+41	Babbitt	Partridge River			-260	
10035	X	1978	-78	St. Louis	Kennecott	60	12	28	350	584194	5277210		90	Babbitt	Partridge River			-260	
10036	X	1978	-86	St. Louis	Kennecott	60	12	32	120	584093	5276746	147	-65	Babbitt	Partridge River			-175	
10037	X	1978	-85	St. Louis	Kennecott	60	12	32	145	584119	5276765		-90	Babbitt	Partridge River			-175	
10038	X	1978	-84	St. Louis	Kennecott	60	12	32	173	584120	5276764	147	-24	Babbitt	Partridge River			-175	
10039	X	1978	-81	St. Louis	Kennecott	60	12	32	200	584120	5276764	147	0	Babbitt	Partridge River			-175	
10040	X	1978	-82	St. Louis	Kennecott	60	12	32	149	584117	5276767	327	-7	Babbitt	Partridge River			-175	
10041	X	1978	-74	St. Louis	Kennecott	60	12	32	147	584117	5276767	327	+42	Babbitt	Partridge River			-175	
10042	X	1978	-74	St. Louis	Kennecott	60	12	32	115	584119	5276765	147	+53	Babbitt	Partridge River			-175	
10043	X	1978	-87	St. Louis	Kennecott	60	12	32	128	584144	5276782		-90	Babbitt	Partridge River			-175	
10044	X	1978	-86	St. Louis	Kennecott	60	12	32	249	584145	5276780	147	-30	Babbitt	Partridge River			-175	
10045	X	1978	-84	St. Louis	Kennecott	60	12	32	149	584145	5276780	147	0	Babbitt	Partridge River			-175	
10046	X	1978	-84	St. Louis	Kennecott	60	12	32	210	584143	5276784	327	0	Babbitt	Partridge River			-175	
10047	X	1978	-77	St. Louis	Kennecott	60	12	32	165	584143	5276783	327	+41	Babbitt	Partridge River			-175	
10048	X	1978	-76	St. Louis	Kennecott	60	12	32	120	584145	5276782	147	+67	Babbitt	Partridge River			-175	

DDH #	Chem	Date	Elevation Collar (ft)	County	Lessee	Twp	Rng	Sec	Total Depth (ft)	UTME Collar	UTMN Collar	Collar Azi	Collar Dip	Deposit	Intrusion DDH is in	UTME DC Base	UTMN DC Base	Elevation DC Base (ft)	Footwall
10049	X	1978	-88	St. Louis	Kennecott	60	12	32	227	584171	5276797	147	-57	Babbitt	Partridge River			-175	
10050	X	1978	-87	St. Louis	Kennecott	60	12	32	315	584171	5276797	147	-36	Babbitt	Partridge River			-175	
10051	X	1978	-87	St. Louis	Kennecott	60	12	32	160	584169	5276800	327	-56	Babbitt	Partridge River			-175	
10052	X	1978	-84	St. Louis	Kennecott	60	12	32	225	584168	5276801	327	0	Babbitt	Partridge River			-175	
10053	X	1978	-84	St. Louis	Kennecott	60	12	32	210	584171	5276797	147	0	Babbitt	Partridge River			-175	
10054	X	1978	-81	St. Louis	Kennecott	60	12	32	105	584159	5276815	327	+32	Babbitt	Partridge River			-175	
10055	X	1978	-78	St. Louis	Kennecott	60	12	32	49	584170	5276799	147	+87	Babbitt	Partridge River			-175	
10056	X	1978	-87	St. Louis	Kennecott	60	12	33	175	584194	5276817	327	-18	Babbitt	Partridge River			-175	
10057	X	1978	-89	St. Louis	Kennecott	60	12	33	132	584195	5276816	327	-74	Babbitt	Partridge River			-175	
10058	X	1978	-89	St. Louis	Kennecott	60	12	33	237	584196	5276814	147	-58	Babbitt	Partridge River			-175	
10059	X	1978	-88	St. Louis	Kennecott	60	12	33	364	584196	5276814	147	-36	Babbitt	Partridge River			-175	
10060	X	1978	-92	St. Louis	Kennecott	60	12	29	485	584142	5277178		-90	Babbitt	Partridge River			-205	
10061	X	1978	-92	St. Louis	Kennecott	60	12	29	292	584143	5277177	147	-31	Babbitt	Partridge River			-205	
10062	X	1978	-90	St. Louis	Kennecott	60	12	29	419	584143	5277177	147	-21	Babbitt	Partridge River			-205	
10063	X	1978	-92	St. Louis	Kennecott	60	12	29	250	584141	5277180	327	-37	Babbitt	Partridge River			-205	
10064	X	1978	-91	St. Louis	Kennecott	60	12	29	460	584141	5277180	327	-28	Babbitt	Partridge River			-205	
10065	X	1978	-88	St. Louis	Kennecott	60	12	29	495	584141	5277180	327	0	Babbitt	Partridge River			-205	
10066	X	1978	-88	St. Louis	Kennecott	60	12	29	400	584143	5277177	147	0	Babbitt	Partridge River			-205	
10067	X	1978	-84	St. Louis	Kennecott	60	12	29	500	584143	5277177	147	+40.5	Babbitt	Partridge River			-205	
10068	X	1978	-84	St. Louis	Kennecott	60	12	29	300	584141	5277180	327	+32	Babbitt	Partridge River			-205	
10069	X	1978	-82	St. Louis	Kennecott	60	12	29	275	584142	5277178	147	+88	Babbitt	Partridge River			-205	
10070	X	1978	-86	St. Louis	Kennecott	60	12	33	215	584288	5276730	147	-88	Babbitt	Partridge River			-215	
10071	X	1978	-85	St. Louis	Kennecott	60	12	33	325	584286	5276729	237	-25	Babbitt	Partridge River			-215	
10072	X	1978	-86	St. Louis	Kennecott	60	12	33	253	584286	5276729	237	-65	Babbitt	Partridge River			-215	
10073	X	1978	-85	St. Louis	Kennecott	60	12	33	261	584286	5276729	237	-38	Babbitt	Partridge River			-215	
10074	X	1978	-86	St. Louis	Kennecott	60	12	33	450	584289	5276731	57	-34	Babbitt	Partridge River			-215	
10075	X	1978	-86	St. Louis	Kennecott	60	12	33	295	584289	5276731	57	-51	Babbitt	Partridge River			-215	
10076	X	1978	-86	St. Louis	Kennecott	60	12	33	250	584289	5276730	147	-70	Babbitt	Partridge River			-215	
10077	X	1978	-86	St. Louis	Kennecott	60	12	33	250	584289	5276729	147	-53	Babbitt	Partridge River			-215	
10078	X	1978	-86	St. Louis	Kennecott	60	12	33	320	584289	5276728	147	-44	Babbitt	Partridge River			-215	
10079	X	1978	-86	St. Louis	Kennecott	60	12	33	230	584279	5276742		-90	Babbitt	Partridge River			-205	
10080	X	1978	-75	St. Louis	Kennecott	60	12	33	350	584375	5277045	57	+45	Babbitt	Partridge River			-175	
10081	X	1978	-81	St. Louis	Kennecott	60	12	33	300	584375	5277044	57	+1.5	Babbitt	Partridge River			-175	
10082	X	1978	-86	St. Louis	Kennecott	60	12	33	235	584375	5277042		-90	Babbitt	Partridge River			-175	
10083	X	1978	-86	St. Louis	Kennecott	60	12	33	487	584375	5277043	327	-29	Babbitt	Partridge River			-175	
10084	X	1978	-85	St. Louis	Kennecott	60	12	33	398	584376	5277040	147	-30	Babbitt	Partridge River			-175	
10085	X	1978	-82	St. Louis	Kennecott	60	12	33	408	584376	5277041	147	-8	Babbitt	Partridge River			-175	
10086	X	1978	-80	St. Louis	Kennecott	60	12	33	500	584376	5277041	147	+12	Babbitt	Partridge River			-175	
10087	X	1978	-75	St. Louis	Kennecott	60	12	33	300	584376	5277041	147	+38	Babbitt	Partridge River			-175	
10088	X	1978	-86	St. Louis	Kennecott	60	12	33	333	584374	5277044	327	-47	Babbitt	Partridge River			-175	
10089	X	1978	-85	St. Louis	Kennecott	60	12	33	475	584376	5277043	57	-30	Babbitt	Partridge River			-175	
10090	X	1978	-82	St. Louis	Kennecott	60	12	33	476	584377	5277041	12	0	Babbitt	Partridge River			-175	
10091	X	1978	-82	St. Louis	Kennecott	60	12	33	350	584375	5277044	315	0	Babbitt	Partridge River			-175	
10092	X	1978	-94	St. Louis	Kennecott	60	12	29	151	584085	5277142		-90	Babbitt	Partridge River			-175	
10093	X	1978	-89	St. Louis	Kennecott	60	12	29	395	584086	5277140	147	-0.5	Babbitt	Partridge River			-175	
10094	X	1978	-89	St. Louis	Kennecott	60	12	29	595	584084	5277144	327	0.5	Babbitt	Partridge River			-175	
10095	X	1978	-94	St. Louis	Kennecott	60	12	29	312	584084	5277144	327	-36	Babbitt	Partridge River			-175	
10096	X	1978	-91	St. Louis	Kennecott	60	12	29	600	584084	5277144	327	-14.5	Babbitt	Partridge River			-175	
10097	X	1978	-94	St. Louis	Kennecott	60	12	29	205	584086	5277140	147	-50	Babbitt	Partridge River			-175	
10098	X	1978	-92	St. Louis	Kennecott	60	12	29	276	584086	5277140	147	-16.5	Babbitt	Partridge River			-175	

DDH #	Chem	Date	Elevation Collar (ft)	County	Lessee	Twp	Rng	Sec	Total Depth (ft)	UTME Collar	UTMN Collar	Collar Azi	Collar Dip	Deposit	Intrusion DDH is in	UTME DC Base	UTMN DC Base	Elevation DC Base (ft)	Footwall
10099	X	1978	-93	St. Louis	Kennecott	60	12	29	248	584087	5277141	12	-25	Babbitt	Partridge River			-175	
10100	X	1978	-93	St. Louis	Kennecott	60	12	29	270	584084	5277144	22	-25	Babbitt	Partridge River			-175	
10101	X	1978	-94	St. Louis	Kennecott	60	12	29	200	584086	5277143	57	-35	Babbitt	Partridge River			-175	
10102	X	1978	-85	St. Louis	Kennecott	60	12	29	500	584086	5277140	147	+39.5	Babbitt	Partridge River			-175	
10103	X	1978	-85	St. Louis	Kennecott	60	12	29	289	584084	5277143	327	+33	Babbitt	Partridge River			-175	
10104	X	1978	-84	St. Louis	Kennecott	60	12	29	300	584085	5277143	327	+88	Babbitt	Partridge River			-265	
10105	X	1978	-82	St. Louis	Kennecott	60	12	33	400	584374	5277044	327	0	Babbitt	Partridge River			-265	
10106	X	1978	-76	St. Louis	Kennecott	60	12	33	396	584374	5277044	327	+44.5	Babbitt	Partridge River			-265	
10107	X	1978	-76	St. Louis	Kennecott	60	12	33	300	584375	5277043	237	+89	Babbitt	Partridge River			-175	
10108	X	1978	-96	St. Louis	Kennecott	60	12	32	95	584069	5277067		-90	Babbitt	Partridge River			-175	
10109	X	1978	-96	St. Louis	Kennecott	60	12	29	190	584068	5277069	327	-30	Babbitt	Partridge River			-175	
10110	X	1978	-94	St. Louis	Kennecott	60	12	29	400	584068	5277069	327	-13.5	Babbitt	Partridge River			-175	
10111	X	1978	-93	St. Louis	Kennecott	60	12	32	600	584068	5277069	327	+1	Babbitt	Partridge River			-175	
10112	X	1978	-93	St. Louis	Kennecott	60	12	32	250	584070	5277066	147	+1	Babbitt	Partridge River			-175	
10113	X	1978	-88	St. Louis	Kennecott	60	12	32	50	584068	5277069	327	+42	Babbitt	Partridge River			-175	
10113-1	X	1978	-88	St. Louis	Kennecott	60	12	32	300	584068	5277069	327	+42	Babbitt	Partridge River			-175	
10114	X	1978	-86	St. Louis	Kennecott	60	12	32	85	584069	5277067		+90	Babbitt	Partridge River			-175	
10114-1	X	1978	-86	St. Louis	Kennecott	60	12	32	450	584069	5277067	0	+90	Babbitt	Partridge River			-175	
10115	X	1978	-87	St. Louis	Kennecott	60	12	32	442	584070	5277066	147	+51	Babbitt	Partridge River			-175	
10116	X	1978	-81	St. Louis	Kennecott	60	12	33	40	584375	5277044	57	0	Babbitt	Partridge River			-265	
10117	X	1978	-88	St. Louis	Kennecott	60	12	33	165	584325	5277008		-90	Babbitt	Partridge River			-237	
10118	X	1978	-87	St. Louis	Kennecott	60	12	33	302	584324	5277011	327	-49	Babbitt	Partridge River			-237	
10119	X	1978	-87	St. Louis	Kennecott	60	12	33	250	584327	5277007	147	-31	Babbitt	Partridge River			-237	
10120	X	1978	-84	St. Louis	Kennecott	60	12	33	450	584327	5277007	147	0	Babbitt	Partridge River			-237	
10121	X	1978	-85	St. Louis	Kennecott	60	12	33	400	584324	5277011	327	-0.5	Babbitt	Partridge River			-237	
10122	X	1978	-87	St. Louis	Kennecott	60	12	33	445	584324	5277011	327	-28.5	Babbitt	Partridge River			-237	
10123	X	1978	-77	St. Louis	Kennecott	60	12	33	399	584324	5277011	327	+44	Babbitt	Partridge River			-237	
10124	X	1978	-78	St. Louis	Kennecott	60	12	33	350	584327	5277007	147	+44	Babbitt	Partridge River			-237	
10125	X	1978	-75	St. Louis	Kennecott	60	12	33	300	584325	5277009	57	+88	Babbitt	Partridge River			-237	
10126	X	1978	-87	St. Louis	Kennecott	60	12	33	200	584271	5276754		-90	Babbitt	Partridge River			-202	
10127	X	1978	-87	St. Louis	Kennecott	60	12	33	200	584273	5276755	57	-58	Babbitt	Partridge River			-202	
10128	X	1978	-86	St. Louis	Kennecott	60	12	33	380	584273	5276755	57	-36	Babbitt	Partridge River			-202	
10129	X	1978	-87	St. Louis	Kennecott	60	12	33	250	584270	5276753	237	-46	Babbitt	Partridge River			-202	
10130	X	1978	-77	St. Louis	Kennecott	60	12	33	100	584271	5276754	327	+89.5	Babbitt	Partridge River			-202	
10131	X	1978	-90	St. Louis	Kennecott	60	12	33	35	584299	5276992		-90	Babbitt	Partridge River			-220	
10132	X	1978	-90	St. Louis	Kennecott	60	12	33	150	584292	5276988		-90	Babbitt	Partridge River			-217	
10133	X	1978	-89	St. Louis	Kennecott	60	12	33	275	584292	5276990	327	-38.5	Babbitt	Partridge River			-217	
10134	X	1978	-87	St. Louis	Kennecott	60	12	33	295	584274	5276974	147	+1	Babbitt	Partridge River			-205	
10135	X	1978	-87	St. Louis	Kennecott	60	12	33	395	584272	5276977	327	0	Babbitt	Partridge River			-205	
10136	X	1978	-90	St. Louis	Kennecott	60	12	33	350	584272	5276977	327	-30	Babbitt	Partridge River			-205	
10137	X	1978	-90	St. Louis	Kennecott	60	12	33	218	584274	5276974	147	-23	Babbitt	Partridge River			-205	
10138	X	1978	-80	St. Louis	Kennecott	60	12	33	395	584274	5276974	147	+50	Babbitt	Partridge River			-205	
10139	X	1978	-80	St. Louis	Kennecott	60	12	33	400	584273	5276976	327	+57	Babbitt	Partridge River			-205	
10140	X	1978	-80	St. Louis	Kennecott	60	12	33	195	584274	5276976		+90	Babbitt	Partridge River			-205	
10141	X	1978	-91	St. Louis	Kennecott	60	12	33	539	584274	5276975	327	-88	Babbitt	Partridge River			-205	
10142	X	1978	-87	St. Louis	Kennecott	60	12	33	200	584262	5276768		-90	Babbitt	Partridge River			-295	
10143	X	1978	-87	St. Louis	Kennecott	60	12	33	300	584261	5276767	237	-34	Babbitt	Partridge River			-295	
10144	X	1978	-87	St. Louis	Kennecott	60	12	33	260	584264	5276770	57	-35	Babbitt	Partridge River			-295	
10145	X	1978	-86	St. Louis	Kennecott	60	12	33	408	584256	5276782	57	-27	Babbitt	Partridge River			-190	
10146	X	1978	-87	St. Louis	Kennecott	60	12	33	320	584255	5276782	57	-39	Babbitt	Partridge River			-190	

DDH #	Chem	Date	Elevation Collar (ft)	County	Lessee	Twp	Rng	Sec	Total Depth (ft)	UTME Collar	UTMN Collar	Collar Azi	Collar Dip	Deposit	Intrusion DDH is in	UTME DC Base	UTMN DC Base	Elevation DC Base (ft)	Footwall
10147	X	1978	-87	St. Louis	Kennecott	60	12	33	300	584255	5276782	57	-56	Babbitt	Partridge River			-190	
10148	X	1978	-87	St. Louis	Kennecott	60	12	33	200	584254	5276781		-90	Babbitt	Partridge River			-190	
10149	X	1978	-87	St. Louis	Kennecott	60	12	33	315	584252	5276780	237	-35	Babbitt	Partridge River			-190	
10150	X	1978	-78	St. Louis	Kennecott	60	12	33	200	584254	5276781		+90	Babbitt	Partridge River			-190	
10151	X	1978	-88	St. Louis	Kennecott	60	12	33	190	584246	5276795		-90	Babbitt	Partridge River			-185	
10152	X	1978	-87	St. Louis	Kennecott	60	12	33	295	584243	5276793	237	-35	Babbitt	Partridge River			-185	
10153	X	1978	-87	St. Louis	Kennecott	60	12	33	270	584247	5276796	57	-35	Babbitt	Partridge River			-185	
10154	X	1978	-80	St. Louis	Kennecott	60	12	33	400	584274	5276976	57	+80.5	Babbitt	Partridge River			-205	
10155	X	1978	-89	St. Louis	Kennecott	60	12	33	557	584237	5276806		-90	Babbitt	Partridge River			-180	
10156	X	1978	-88	St. Louis	Kennecott	60	12	33	270	584235	5276805	237	-35.5	Babbitt	Partridge River			-180	
10157	X	1978	-89	St. Louis	Kennecott	60	12	33	205	584239	5276807	57	-51	Babbitt	Partridge River			-180	
10158	X	1978	-87	St. Louis	Kennecott	60	12	33	335	584239	5276807	57	-24.5	Babbitt	Partridge River			-180	
10159	X	1978	-88	St. Louis	Kennecott	60	12	33	265	584239	5276807	57	-33.5	Babbitt	Partridge River			-180	
10160	X	1978	-80	St. Louis	Kennecott	60	12	33	250	584238	5276807	57	+45	Babbitt	Partridge River			-180	
10161	X	1978	-78	St. Louis	Kennecott	60	12	33	195	584237	5276806		+90	Babbitt	Partridge River			-180	
10162	X	1978	-92	St. Louis	Kennecott	60	12	33	130	584249	5276959		-90	Babbitt	Partridge River			-195	
10163	X	1978	-90	St. Louis	Kennecott	60	12	33	345	584248	5276961	327	-39	Babbitt	Partridge River			-195	
10164	X	1978	-90	St. Louis	Kennecott	60	12	33	194	584249	5276958	147	-22	Babbitt	Partridge River			-195	
10165	X	1978	-82	St. Louis	Kennecott	60	12	33	260	584282	5276908	147	+60	Babbitt	Partridge River			-198	
10166	X	1978	-82	St. Louis	Kennecott	60	12	33	300	584249	5276959	327	+58	Babbitt	Partridge River			-195	
10167	X	1978	-82	St. Louis	Kennecott	60	12	33	252	584249	5276960		+90	Babbitt	Partridge River			-195	
10168	X	1978	-93	St. Louis	Kennecott	60	12	33	97	584222	5276943		-90	Babbitt	Partridge River			-185	
10169	X	1978	-91	St. Louis	Kennecott	60	12	33	125	584223	5276941	147	-15	Babbitt	Partridge River			-185	
10170	X	1978	-91	St. Louis	Kennecott	60	12	33	205	584222	5276943	327	-23	Babbitt	Partridge River			-185	
10171	X	1978	-89	St. Louis	Kennecott	60	12	33	400	584222	5276943	327	0	Babbitt	Partridge River			-185	
10172	X	1978	-90	St. Louis	Kennecott	60	12	33	402	584224	5276941	147	+1	Babbitt	Partridge River			-185	
10173	X	1978	-84	St. Louis	Kennecott	60	12	33	352	584223	5276941	147	+35	Babbitt	Partridge River			-185	
10174	X	1978	-83	St. Louis	Kennecott	60	12	33	400	584223	5276943	327	+42	Babbitt	Partridge River			-185	
10175	X	1978	-83	St. Louis	Kennecott	60	12	33	300	584224	5276942	12	+84	Babbitt	Partridge River			-185	
10176	X	1978	-89	St. Louis	Kennecott	60	12	33	185	584227	5276821		-90	Babbitt	Partridge River			-175	
10177	X	1978	-77	St. Louis	Kennecott	60	12	33	180	584227	5276821		+90	Babbitt	Partridge River			-175	
10178	X	1978	-86	St. Louis	Kennecott	60	12	33	255	584220	5276829	32	-2	Babbitt	Partridge River			-175	
10179	X	1978	-90	St. Louis	Kennecott	60	12	33	146	584219	5276833		-90	Babbitt	Partridge River			-175	
10180	X	1978	-89	St. Louis	Kennecott	60	12	33	200	584221	5276834	57	-33	Babbitt	Partridge River			-265	
10181	X	1978	-87	St. Louis	Kennecott	60	12	33	245	584221	5276834	57	-17	Babbitt	Partridge River			-265	
10182	X	1978	-86	St. Louis	Kennecott	60	12	33	340	584221	5276834	57	-9	Babbitt	Partridge River			-265	
10183	X	1978	-85	St. Louis	Kennecott	60	12	33	369	584221	5276834	57	0.5	Babbitt	Partridge River			-265	
10184	X	1978	-77	St. Louis	Kennecott	60	12	33	50	584219	5276833		-90	Babbitt	Partridge River			-265	
10185	X	1978	-91	St. Louis	Kennecott	60	12	33	95	584212	5276845		-90	Babbitt	Partridge River			-265	
10186	X	1978	-81	St. Louis	Kennecott	60	12	33	170	584212	5276845		-90	Babbitt	Partridge River			-265	
10187	X	1978	-93	St. Louis	Kennecott	60	12	33	106	584199	5276926	147	-54	Babbitt	Partridge River			-265	
10188	X	1978	-84	St. Louis	Kennecott	60	12	33	585	584198	5276927	327	+48	Babbitt	Partridge River			-265	
10189	X	1978	-84	St. Louis	Kennecott	60	12	33	405	584199	5276927	147	+57	Babbitt	Partridge River			-265	
10190	X	1978	-84	St. Louis	Kennecott	60	12	33	410	584199	5276927	327	+88	Babbitt	Partridge River			-265	
10191	X	1978	-92	St. Louis	Kennecott	60	12	33	100	584204	5276858		-90	Babbitt	Partridge River			-265	
10192	X	1978	-91	St. Louis	Kennecott	60	12	33	95	584206	5276859	57	-41.5	Babbitt	Partridge River			-175	
10193	X	1978	-88	St. Louis	Kennecott	60	12	33	122	584206	5276859	57	-11	Babbitt	Partridge River			-175	
10194	X	1978	-86	St. Louis	Kennecott	60	12	33	190	584206	5276859	57	+30	Babbitt	Partridge River			-175	
10195	X	1978	-81	St. Louis	Kennecott	60	12	33	150	584204	5276858		-90	Babbitt	Partridge River			-175	
10196	X	1978	-93	St. Louis	Kennecott	60	12	33	75	584187	5276883		-90	Babbitt	Partridge River			-175	

DDH #	Chem	Date	Elevation Collar (ft)	County	Lessee	Twp	Rng	Sec	Total Depth (ft)	UTME Collar	UTMN Collar	Collar Azi	Collar Dip	Deposit	Intrusion DDH is in	UTME DC Base	UTMN DC Base	Elevation DC Base (ft)	Footwall
10197	X	1978	-92	St. Louis	Kennecott	60	12	33	120	584186	5276882	237	-44	Babbitt	Partridge River			-175	
10198	X	1978	-89	St. Louis	Kennecott	60	12	33	300	584186	5276882	237	0	Babbitt	Partridge River			-175	
10199	X	1978	-84	St. Louis	Kennecott	60	12	33	100	584186	5276883	237	+45	Babbitt	Partridge River			-175	
10200	X	1978	-84	St. Louis	Kennecott	60	12	33	180	584189	5276884	57	+46	Babbitt	Partridge River			-175	
10201	X	1978	-97	St. Louis	Kennecott	60	12	32	100	584048	5276979		-90	Babbitt	Partridge River			-155	
10202	X	1978	-93	St. Louis	Kennecott	60	12	32	225	584049	5276977	147	0	Babbitt	Partridge River			-155	
10203	X	1978	-93	St. Louis	Kennecott	60	12	32	350	584047	5276980	327	-1	Babbitt	Partridge River			-155	
10204	X	1978	-89	St. Louis	Kennecott	60	12	32	500	584049	5276978	147	+40	Babbitt	Partridge River			-155	
10205	X	1978	-88	St. Louis	Kennecott	60	12	32	400	584048	5276979		+90	Babbitt	Partridge River			-155	
10206	X	1978	-89	St. Louis	Kennecott	60	12	32	500	584048	5276980	327	+35	Babbitt	Partridge River			-155	
10207	X	1978	-93	St. Louis	Kennecott	60	12	33	125	584198	5276928	327	-40.5	Babbitt	Partridge River			-175	
10208	X	1978	-94	St. Louis	Kennecott	60	12	32	96	584177	5276912	315	-89	Babbitt	Partridge River			-175	
10209	X	1978	-94	St. Louis	Kennecott	60	12	32	110	584177	5276911	147	-49	Babbitt	Partridge River			-175	
10210	X	1978	-92	St. Louis	Kennecott	60	12	32	195	584176	5276914	327	-16	Babbitt	Partridge River			-175	
10211	X	1978	-90	St. Louis	Kennecott	60	12	32	334	584176	5276914	327	+1.5	Babbitt	Partridge River			-175	
10212	X	1978	-88	St. Louis	Kennecott	60	12	32	450	584176	5276914	327	+24	Babbitt	Partridge River			-175	
10213	X	1978	-85	St. Louis	Kennecott	60	12	32	495	584176	5276913	327	+47	Babbitt	Partridge River			-175	
10214	X	1978	-83	St. Louis	Kennecott	60	12	32	327	584177	5276912	147	+58	Babbitt	Partridge River			-175	
10215	X	1978	-84	St. Louis	Kennecott	60	12	32	293	584176	5276913	57	+89	Babbitt	Partridge River			-175	
10216	X	1978	-90	St. Louis	Kennecott	60	12	32	345	584170	5276908	237	+1	Babbitt	Partridge River			-175	
10217	X	1978	-89	St. Louis	Kennecott	60	12	32	315	584170	5276908	237	+14	Babbitt	Partridge River			-175	
10218	X	1978	-85	St. Louis	Kennecott	60	12	32	320	584170	5276908	237	+48	Babbitt	Partridge River			-175	
10219	X	1978	-91	St. Louis	Kennecott	60	12	32	285	584168	5276910	237	-12	Babbitt	Partridge River			-175	
11503	X	1954	1450	Lake	INCO	62	11	24	727	599422	5298689	334	-60	Spruce Road	South Kawishiwi	599291	5298959	930	Giants Range
11504	X	1954	1460	Lake	INCO	61	11	5	628	593015	5294900	325	-60	Maturi	South Kawishiwi	592849	5295137	959	Giants Range
11505	X	1954	1440	Lake	INCO	61	11	5	626	592980	5294945	325	-60	Maturi	South Kawishiwi	592870	5295103	1107	Giants Range
11506	X	1954	1530	Lake	INCO	62	11	25	1311	599582	5298395	334	-55	Spruce Road	South Kawishiwi	599274	5299026	527	Giants Range
11507	X	1954	1445	Lake	INCO	61	11	5	735	592480	5294385	325	-60	Maturi	South Kawishiwi	592328	5294602	986	Giants Range
11508	X	1954	1480	Lake	INCO	61	11	5	643	592220	5294115	325	-60	Maturi	South Kawishiwi	592066	5294335	1016	Giants Range
11509	X	1954	1455	Lake	INCO	61	11	5	735	593330	5295080	325	-60	Maturi	South Kawishiwi	593134	5295359	864	Giants Range
11510	X	1954	1500	Lake	INCO	62	11	25	1221	598848	5298215	334	-55	Spruce Road	South Kawishiwi			380	Still in D.C.
11511	X	1954	1435	Lake	INCO	62	11	33	524	593950	5295605	325	-60	Maturi	South Kawishiwi	593828	5295780	1065	Giants Range
11512	X	1954	1472	Lake	INCO	62	11	19	1055	600883	5299066	334	-58	Spruce Road	South Kawishiwi	600734	5299371	928	Giants Range
11513	X	1954	1503	Lake	INCO	62	11	19	2066	601259	5299140	334	-55	Spruce Road	South Kawishiwi	600749	5300185	-157	Giants Range
11514	X	1954	1487	Lake	INCO	62	11	25	1308	599181	5298368	334	-55	Spruce Road	South Kawishiwi	598866	5299014	461	Giants Range
11515	X	1954	1450	Lake	INCO	61	11	5	758	592800	5294580	325	-55	Maturi	South Kawishiwi	592561	5294921	856	Giants Range
11516	X	1954	1472	Lake	INCO	62	11	24	869	599809	5298743	334	-70	Spruce Road	South Kawishiwi	599702	5298962	803	Giants Range
11517	X	1954	1453	Lake	INCO	62	11	32	793	593680	5295355	325	-50	Maturi	South Kawishiwi	593428	5295715	930	Giants Range
11518	X	1954	1500	Lake	INCO	62	11	19	855	600452	5299092	334	-70	Spruce Road	South Kawishiwi	600354	5299294	883	Giants Range
11519	X	1954	1499	Lake	INCO	62	11	26	1334	598523	5298045		-90	Spruce Road	South Kawishiwi	598523	5298045	187	Giants Range
11520	X	1954	1423	Lake	INCO	62	11	32	564	594280	5295750	325	-60	Maturi	South Kawishiwi	594163	5295917	1070	Giants Range
11521	X	1954	1486	Lake	INCO	62	11	19	953	600176	5298834		-90	Spruce Road	South Kawishiwi	600176	5298834	656	Giants Range
11522	X	1954	1486	Lake	INCO	62	11	25	1364	599047	5298231	334	-55	Spruce Road	South Kawishiwi	598709	5298924	385	BIF
11524	X	1954	1485	Lake	INCO	62	11	25	1298	599376	5298391	334	-59	Spruce Road	South Kawishiwi	599107	5298944	462	Giants Range
11525	X	1954	1465	Lake	INCO	62	11	25	1364	599779	5298416	334	-55	Spruce Road	South Kawishiwi	599447	5299097	384	Giants Range
11526	X	1954	1459	Lake	INCO	61	11	5	1169	593120	5294760	325	-72	Maturi	South Kawishiwi	592933	5295027	457	Giants Range
11527	X	1954	1431	Lake	INCO	61	11	5	1175	592620	5294175	325	-70	Maturi	South Kawishiwi	592435	5294440	543	Giants Range
11528	X	1954	1453	Lake	INCO	61	11	5	1158	592865	5294475	325	-70	Maturi	South Kawishiwi	592659	5294770	464	Giants Range
11529	X	1954	1456	Lake	INCO	61	11	5	1582	593250	5294570	325	-78	Maturi	South Kawishiwi	593079	5294814	56	Giants Range
11530	X	1954	1468	Lake	INCO	61	11	5	1513	593475	5294880	325	-80	Maturi	South Kawishiwi	593336	5295079	91	Giants Range

DDH #	Chem	Date	Elevation Collar (ft)	County	Lessee	Twp	Rng	Sec	Total Depth (ft)	UTME Collar	UTMN Collar	Collar Azi	Collar Dip	Deposit	Intrusion DDH is in	UTME DC Base	UTMN DC Base	Elevation DC Base (ft)	Footwall
11531	X	1955	1451	Lake	INCO	61	11	5	1505	592895	5294435		-90	Maturi	South Kawishiwi	592895	5294435	106	Giants Range
11532	X	1955	1436	Lake	INCO	61	11	5	1850	592440	5293815		-90	Maturi	South Kawishiwi	592440	5293815	-393	Giants Range
11533	X	1955	1444	Lake	INCO	61	11	5	1319	593810	5295175		-90	Maturi	South Kawishiwi	593810	5295175	230	Giants Range
11534	X	1955	1461	Lake	INCO	61	11	5	1246	594135	5295330		-90	Maturi	South Kawishiwi	594135	5295330	286	Giants Range
11535	X	1955	1485	Lake	INCO	61	11	5	1302	594445	5295525		-90	Maturi	South Kawishiwi	594445	5295525	201	Giants Range
11536	X	1955	1460	Lake	INCO	61	11	5	1993	593310	5294475		-90	Maturi	South Kawishiwi	593310	5294475	-410	Giants Range
11537	X	1955	1480	Lake	INCO	61	11	5	2204	593585	5294725		-90	Maturi	South Kawishiwi	593585	5294725	-650	Giants Range
11538	X	1955	1439	Lake	INCO	62	11	24	597	599219	5298680		-90	Spruce Road	South Kawishiwi	599219	5298680	976	Giants Range
11539	X	1955	1430	Lake	INCO	62	11	24	1039	599067	5298577		-90	Spruce Road	South Kawishiwi	599067	5298577	555	Giants Range
11540	X	1955	1434	Lake	INCO	62	11	24	253	599009	5298684		-90	Spruce Road	South Kawishiwi	599009	5298684	1341	Giants Range
11541	X	1955	1435	Lake	INCO	62	11	19	315	600628	5299535	334	-70	Spruce Road	South Kawishiwi	600609	5299574	1317	Giants Range
11542	X	1956	1485	Lake	INCO	61	12	25	1210	588529	5286966		-90	Dunka Pit	South Kawishiwi	588529	5286966	362	Giants Range
11543		1956	1555	St Louis	INCO	59	14	24		571193	5269549			Wetlegs	Partridge River			560	
11544		1956	1579	St Louis	INCO	59	13	17		574156	5271044			Section 17	Partridge River			-915	
11545		1956	1555	St Louis	INCO	59	14	24		571188	5269807			Wetlegs	Partridge River			870	
11546		1956	1641	St Louis	INCO	59	13	8		573890	5272550			Wetlegs	Partridge River			1450	
11547	X	1956	1510	St Louis	INCO	57	14	34	485	567143	5256869	270	-60	Skibo	South Complex	567587	5256869	1208	Virginia Fm
11548		1956	1659	St Louis	INCO	59	13	8		574077	5272460			Wetlegs	Partridge River			1050	
11549	X	1956	1510	St Louis	INCO	57	14	34	955	567490	5256829	270	-60	Skibo	South Complex			700	Still in D.C.
11550		1956	1628	St Louis	INCO	59	13	9		574624	5272781			Wetlegs	Partridge River			740	
13601		1956	1600	St Louis	INCO	59	13	17		573261	5271904			Wetlegs	Partridge River			1650	
13602		1956	1565	St Louis	INCO	59	13	19		571910	5270218			Wetlegs	Partridge River			1010	
13603	none	1956	1490	St Louis	INCO	57	14	34	375	566619	5256919		-90	Skibo	South Complex			670	Collared in VF
13604		1956	1570	St Louis	INCO	59	13	19		572110	5269990			Wetlegs	Partridge River			285	
13605	X	1956	1510	St Louis	INCO	57	14	34	953	566943	5256860		-90	Skibo	South Complex	566943	5256860	716	Virginia Fm
13606		1956	1597	St Louis	INCO	59	13	17		573583	5271896			Wetlegs	Partridge River			1360	
13607		1956	1581	St Louis	INCO	59	13	17		573660	5271344			Wetlegs	Partridge River			410	
13608	none	1957	1510	St Louis	INCO	57	14	34	744	566946	5256844	270	-45	Skibo	South Complex	566973	5256844	1043	Virginia Fm
13609		1957	1561	St Louis	INCO	59	13	19		571638	5269851			Wetlegs	Partridge River			520	
13610	X	1957	1510	St Louis	INCO	57	14	34	535	567105	5256889	270	-55	Skibo	South Complex			550	Still in D.C.
13611		1957	1552	St Louis	INCO	59	14	24		570847	5269172			Wetlegs	Partridge River			795	
13612	X	1957	1510	St Louis	INCO	57	14	34	1054	566991	5256775		-90	Skibo	South Complex	566991	5256775	622	Virginia Fm
13613		1957	1612	St Louis	INCO	59	13	17		573829	5272121			Wetlegs	Partridge River			1190	
13614		1957	1640	St Louis	INCO	59	13	8		574095	5272403			Wetlegs	Partridge River			970	
13615	X	1957	1510	St Louis	INCO	57	14	34	1450	567167	5256746		-90	Skibo	South Complex	567167	5256746	273	Virginia Fm
13616	X	1957	1510	St Louis	INCO	57	14	34	447	567214	5256958		-90	Skibo	South Complex			300	Still in D.C.
13617	X	1957	1510	St Louis	INCO	57	14	34	787	567616	5256939		-90	Skibo	South Complex			1100	Still in D.C.
13618	X	1957	1510	St Louis	INCO	57	14	3	1585	567041	5256485		-90	Skibo	South Complex	567041	5256485	-20	Virginia Fm
13619	X	1957	1520	St Louis	INCO	57	14	34	1209	567060	5257186		-90	Skibo	South Complex	567060	5257186	436	Virginia Fm
13620		1957	1619	St Louis	INCO	59	13	8		574231	5272839			Wetlegs	Partridge River			1620	Collared in VF
13621	X	1957	1520	St Louis	INCO	57	14	34	1185	567106	5257542		-90	Skibo	South Complex	567106	5257542	395	Virginia Fm
13622	X	1957	1525	St Louis	INCO	60	12	10	1207	586477	5282475		-90	Dunka Pit	South Kawishiwi	586477	5282475	560	Giants Range
13623		1957	1622	St Louis	INCO	59	13	8		574384	5272727			Wetlegs	Partridge River			1620	Collared in VF
13624		1957	1529	St Louis	INCO	58	14	34	389	567640	5257950		-90	Skibo	South Complex			395	Still in D.C.
13625		1957	1490	St Louis	INCO	58	14	27	2295	567566	5258901		-90	Skibo	South Complex	567566	5258901	-746	Virginia Fm
13626	X	1957	1490	Lake	INCO	62	11	26	536	597105	5297590		-90	Mat-S.Rd	South Kawishiwi	597105	5297590	1145	Giants Range
13627	X	1957	1500	Lake	INCO	62	11	27	628	596490	5297185		-90	Mat-S.Rd	South Kawishiwi	596490	5297185	962	Giants Range
13628	none	1957	1500	Lake	INCO	62	11	26	836	597195	5297425		-90	Mat-S.Rd	South Kawishiwi	597195	5297425	692	Giants Range
13629	X	1957	1435	Lake	INCO	62	11	34	1155	595910	5296730		-90	Mat-S.Rd	South Kawishiwi	595910	5296730	316	Giants Range
13630	X	1957	1520	Lake	INCO	61	11	7	731	591221	5293366		-90	Maturi	South Kawishiwi	591221	5293366	814	Giants Range

DDH #	Chem	Date	Elevation Collar (ft)	County	Lessee	Twp	Rng	Sec	Total Depth (ft)	UTME Collar	UTMN Collar	Collar Azi	Collar Dip	Deposit	Intrusion DDH is in	UTME DC Base	UTMN DC Base	Elevation DC Base (ft)	Footwall
13631	X	1957	1480	Lake	INCO	61	11	7	950	590794	5292743		-90	Maturi	South Kawishiwi	590794	5292743	558	Giants Range
13632	X	1957	1490	Lake	INCO	61	11	7	455	590433	5292101		-90	Maturi	South Kawishiwi	590433	5292101	1085	Giants Range
13633	X	1957	1480	Lake	INCO	61	11	18	671	590291	5292927		-90	Maturi	South Kawishiwi	590291	5292927	895	Giants Range
13634	X	1957	1500	Lake	INCO	61	11	18	723	590020	5290615		-90	Birch Lake	South Kawishiwi	590020	5290615	830	Giants Range
13646	X	1966	1490	Lake	INCO	62	11	25	31	598984	5298347		-90	Spruce Road	South Kawishiwi			505	Still in D.C.
13647	X	1966	1462	Lake	INCO	62	11	25	1305	599246	5298437	334	-65	Spruce Road	South Kawishiwi	599037	5298865	442	Giants Range
13648	X	1966	1492	Lake	INCO	62	11	25	1445	599183	5298362		-90	Spruce Road	South Kawishiwi	599183	5298362	259	Giants Range
13649	X	1967	1496	Lake	INCO	62	11	25	1524	599077	5298303		-90	Spruce Road	South Kawishiwi	599077	5298303	238	Giants Range
13650	X	1967	1478	Lake	INCO	62	11	25	1786	599135	5298197		-90	Spruce Road	South Kawishiwi	599135	5298197	98	Giants Range
16324				St Louis		57	14	34		567479	5258165			Skibo	South Complex			50	
17700			1523	St Louis		59	14	34		567070	5267098			Wyman Creek	Partridge River			970	
17701			1524	St Louis		59	14	34		566988	5267258			Wyman Creek	Partridge River			1130	
17702			1520	St Louis		59	14	34		567023	5267183			Wyman Creek	Partridge River			1060	
17703			1520	St Louis		59	14	34		567047	5267136			Wyman Creek	Partridge River			1005	
17704			1519	St Louis		59	14	34		567094	5267052			Wyman Creek	Partridge River			900	
17705			1504	St Louis		59	14	34		567017	5266707			Wyman Creek	Partridge River			700	
25083	X	1960's	1607	St Louis	USX					575869	5273251		-90	Dunka Road	Partridge River			1000	Still in DC
26000	X	1960's	1560	St Louis	USX	55	14	34	730	568565	5228350	250	-46	Section 34	South Complex				Still in D.C.
26001	X	1960's	1585	St Louis	USX	54	14	3	552	567962	5227270		-90	Section 34	South Complex				Still in D.C.
26002		1960's	1555	St Louis	USX	55	14	34	901	568125	5228110		-90	Section 34	South Complex				Still in D.C.
26003		1960's	1590	St Louis	USX	55	14	34	466	567839	5227351		-90	Section 34	South Complex				Still in D.C.
26004		1960's	1560	St Louis	USX	56	15	31	557	572392	5238460		-90	Harris Lake	South Complex				Still in D.C.
26005		1960's	1590	St Louis	USX	56	15	31	400	572346	5238643		-90	Harris Lake	South Complex				Still in D.C.
26006	X	1960's	1580	St Louis	USX	56	15	31	697	572441	5238581		-90	Harris Lake	South Complex				Still in D.C.
26007		1960's	1560	St Louis	USX	55	14	34	587	568273	5228120		-90	Section 34	South Complex				Still in D.C.
26008		1960's	1560	St Louis	USX	55	14	34	607	568175	5227978		-90	Section 34	South Complex				Still in D.C.
26009	X	1960's	1520	St Louis	USX	56	14	2	1294	568839	5245276	270	-56	Whiteface Reservoir	South Complex				Still in D.C.
26010	X	1960's	1602	St Louis	USX	59	13	3	620	576884	5273928	315	-50	Dunka Road	Partridge River	576706	5274106	618	Virginia Fm
26011	X	1960's	1602	St Louis	USX	59	13	3	455	576882	5273927	333	-50	Dunka Road	Partridge River	576656	5274129	716	Virginia Fm
26012		1960's	1495	St Louis	USX	56	14	23	764	569319	5240927	50	-45	Linwood Lake	South Complex				Still in D.C.
26013	X	1960's	1610	St Louis	USX	59	13	3	740	577502	5274386		-90	Dunka Road	Partridge River	577502	5274386	1148	VF into BIF
26014	X	1960's	1590	St Louis	USX	59	13	17	894	573777	5272080	315	-50	Wetlegs	Partridge River			1240	Still in D.C.
26015	X	1960's	1603.9	St Louis	USX	59	13	3	893	577200	5274134	330	-50	Dunka Road	Partridge River	577087	5274329	724	VF into BIF
26016	X	1960's	1580	St Louis	USX	59	13	17	645	574208	5271103		-90	Section 17	Partridge River			-825	Still in DC
26017	X	1960's	1605	St Louis	USX	59	13	3	861	577200	5274134		-90	Dunka Road	Partridge River	577200	5274134	812	Virginia Fm
26018	X	1960's	1580	St Louis	USX	59	13	17	418	574210	5271089	150	-50	Section 17	Partridge River			-900	Still in DC
26019	X	1960's	1580	St Louis	USX	59	13	17	351	574129	5271093	150	-50	Section 17	Partridge River			-800	Still in DC
26020	X	1960's	1580	St Louis	USX	59	13	17	293	574312	5271288	150	-50	Section 17	Partridge River			-700	Still in DC
26021	X	1960's	1605	St Louis	USX	59	13	3	608	576909	5273877		-90	Dunka Road	Partridge River			800	Still in DC
26022	X	1960's	1605	St Louis	USX	59	13	10	606	576199	5273721		-90	Dunka Road	Partridge River	576199	5273721	1121	Virginia Fm
26023	X	1960's	1605	St Louis	USX	59	13	10	725	576255	5273619		-90	Dunka Road	Partridge River	576255	5273619	1008	Virginia Fm
26024	X	1960's	1605	St Louis	USX	59	13	3	586	576147	5273836		-90	Dunka Road	Partridge River			1210	Collared in VF
26025	X	1960's	1613	St Louis	USX	59	13	9	1042	575263	5272716		-90	Dunka Road	Partridge River	575263	5272716	596	Virginia Fm
26026	X	1960's	1614	St Louis	USX	59	13	10	715	576533	5273727		-90	Dunka Road	Partridge River	576533	5273727	922	Virginia Fm
26027	X	1960's	1606	St Louis	USX	59	13	10	910	576116	5273237		-90	Dunka Road	Partridge River	576116	5273237	728	Virginia Fm
26028	X	1960's	1606	St Louis	USX	59	13	3	381	576116	5273237	327	-50	Dunka Road	Partridge River	576077	5273298	1347	Virginia Fm
26029	none	1960's	1630	St Louis	USX	59	13	9	1181	575193	5272835		-90	Dunka Road	Partridge River	575193	5272835	549	VF into BIF
26030	X	1960's	1622	St Louis	USX	59	13	10	1094	577013	5273712		-90	Dunka Road	Partridge River	577013	5273712	591	Virginia Fm
26031	X	1960's	1693.22	St Louis	USX	59	13	3	1116	577295	5273987		-90	Dunka Road	Partridge River	577295	5273987	634	Virginia Fm
26032	X	1960's	1610	St Louis	USX	59	13	2	690	577913	5274532		-90	Dunka Road	Partridge River	577913	5274532	1013	Virginia Fm

DDH #	Chem	Date	Elevation Collar (ft)	County	Lessee	Twp	Rng	Sec	Total Depth (ft)	UTME Collar	UTMN Collar	Collar Azi	Collar Dip	Deposit	Intrusion DDH is in	UTME DC Base	UTMN DC Base	Elevation DC Base (ft)	Footwall
26033	X	1960's	1614	St Louis	USX	59	13	2	1104	577593	5274241		-90	Dunka Road	Partridge River	577593	5274241	582	VF into BIF
26034	X	1960's	1600	St Louis	USX	59	13	2	1375	578788	5274591		-90	Dunka Road	Partridge River	578788	5274591	259	VF into BIF
26035	none	1960's	1600	St Louis	USX	59	13	1	915	579188	5275062		-90	Dunka Road	Partridge River			1620	Collared in VF
26036	X	1960's	1596	St Louis	USX	59	13	1	1237	579300	5274893		-90	Dunka Road	Partridge River	579300	5274893	456	VF into BIF
26037	X	1960's	1605	St Louis	USX	59	13	3	301	577219	5274457		-90	Dunka Road	Partridge River	577219	5274457	1546	Virginia Fm
26038	X	1960's	1613	St Louis	USX	59	13	3	405	577262	5274386		-90	Dunka Road	Partridge River	577262	5274386	1332	Virginia Fm
26039	X	1960's	1606	St Louis	USX	59	13	3	956	577100	5273901		-90	Dunka Road	Partridge River	577100	5273901	804	Virginia Fm
26040	none	1960's	1596	St Louis	USX	59	13	1	679	579601	5274037		-90	Dunka Road	Partridge River			1620	Collared in VF
26041	X	1960's	1613	St Louis	USX	59	13	3	387	577101	5274284		-90	Dunka Road	Partridge River	577101	5274284	1307	Virginia Fm
26042	X	1960's	1594	St Louis	USX	59	13	10	1946	577122	5273540		-90	Dunka Road	Partridge River	577122	5273540	-279	VF into BIF
26043	X	1960's	1606	St Louis	USX	59	13	2	1559	577704	5274074		-90	Dunka Road	Partridge River	577704	5274074	53	Virginia Fm
26044	X	1960's	1612	St Louis	USX	59	13	3	205	577283	5274357		-90	Dunka Road	Partridge River			1100	Still in DC
26045	X	1960's	1598	St Louis	USX	59	13	10	926	576767	5273663		-90	Dunka Road	Partridge River	576767	5273663	790	Virginia Fm
26046	X	1960's	1603	St Louis	USX	59	13	3	945	577286	5274197		-90	Dunka Road	Partridge River	577286	5274197	735	Virginia Fm
26047	X	1960's	1609	St Louis	USX	59	13	2	800	577751	5274367		-90	Dunka Road	Partridge River	577751	5274367	873	Virginia Fm
26048	X	1960's	1598	St Louis	USX	59	13	10	1902	577422	5273778		-90	Dunka Road	Partridge River	577422	5273778	-237	VF into BIF
26049	X	1960's	1705.02	St Louis	USX	59	13	2	1207	578033	5274366		-90	Dunka Road	Partridge River	578033	5274366	544	VF into BIF
26050	X	1960's	1599	St Louis	USX	59	13	2	2005	577817	5273911		-90	Dunka Road	Partridge River	577817	5273911	-347	VF into BIF
26051	X	1960's	1699.34	St Louis	USX	59	13	2	1454	577854	5274220		-90	Dunka Road	Partridge River	577854	5274220	302	VF into BIF
26052	X	1960's	1689.45	St Louis	USX	59	13	2	1866	578220	5274091		-90	Dunka Road	Partridge River	578220	5274091	-117	VF into BIF
26053	X	1960's	1595	St Louis	USX	59	13	10	1018	576639	5273567		-90	Dunka Road	Partridge River	576639	5273567	591	Virginia Fm
26054	X	1960's	1598	St Louis	USX	59	13	10	776	576331	5273288		-90	Dunka Road	Partridge River	576331	5273288	946	Virginia Fm
26055	X	1960's	1595	St Louis	USX	59	13	10	1672	576747	5273390		-90	Dunka Road	Partridge River	576747	5273390	-21	VF into BIF
26056	X	1960's	1592	St Louis	USX	59	13	10	1693	576414	5273140		-90	Dunka Road	Partridge River	576414	5273140	-60	Virginia Fm
26057	X	1960's	1598	St Louis	USX	59	13	3	608	576662	5273854		-90	Dunka Road	Partridge River	576662	5273854	1044	Virginia Fm
26058	X	1960's	1612	St Louis	USX	59	13	10	817	576434	5273483		-90	Dunka Road	Partridge River	576434	5273483	858	Virginia Fm
26059	X	1960's	1603	St Louis	USX	59	13	3	608	577001	5274093		-90	Dunka Road	Partridge River	577001	5274093	1106	Virginia Fm
26060	X	1960's	1610	St Louis	USX	59	13	3	812	577502	5274386		-90	Dunka Road	Partridge River	577502	5274386	1018	Virginia Fm
26061	none	1960's	1602	St Louis	USX	59	13	10	1277	577491	5274034		-90	Dunka Road	Partridge River	577491	5274034	329	Virginia Fm
26062	X	1960's	1593	St Louis	USX	59	13	10	1477	576868	5273532		-90	Dunka Road	Partridge River	576868	5273532	167	VF into BIF
26063	X	1960's	1594	St Louis	USX	59	13	2	1957	577954	5274058		-90	Dunka Road	Partridge River	577954	5274058	-303	Virginia Fm
26064	X	1960's	1595	St Louis	USX	59	13	10	1496	577198	5273746		-90	Dunka Road	Partridge River	577198	5273746	123	VF into BIF
26065	X	1960's	1592	St Louis	USX	59	13	11	2466	578450	5273771		-90	Dunka Road	Partridge River	578450	5273771	-742	VF into BIF
26066	X	1960's	1701.47	St Louis	USX	59	13	2	1677	578134	5274207		-90	Dunka Road	Partridge River	578134	5274207	94	VF into BIF
26067	X	1960's	1598	St Louis	USX	59	13	2	2147	578730	5273943		-90	Dunka Road	Partridge River	578730	5273943	-455	VF into BIF
26068	X	1960's	1600	St Louis	USX	59	13	2	1458	578617	5274382		-90	Dunka Road	Partridge River	578617	5274382	150	Virginia Fm
26069	X	1960's	1604	St Louis	USX	59	13	2	2006	579004	5274259		-90	Dunka Road	Partridge River	579004	5274259	-365	VF into BIF
26070	X	1960's	1510	St Louis	USX	56	14	3	809	568709	5245270	270	-55	Whiteface Reservoir	South Complex				Still in D.C.
26071		1960's	1510	St Louis	USX	56	14	2	1019	569286	5246362	123	-50	Whiteface Reservoir	South Complex				Still in D.C.
26072		1960's	1530	St Louis	USX	56	14	2	800	569361	5246639	90	-50	Whiteface Reservoir	South Complex				Still in D.C.
26073	X	1960's	1603	St Louis	USX	59	13	10	2395	577333	5273202		-90	Dunka Road	Partridge River	577333	5273202	-773	VF into BIF
26074	X	1960's	1598	St Louis	USX	59	13	1	2095	579465	5274342		-90	Dunka Road	Partridge River	579465	5274342	-432	VF into BIF
26075	X	1960's	1597	St Louis	USX	59	13	2/11	2505	578032	5273586		-90	Dunka Road	Partridge River	578032	5273586	-870	VF into BIF
26076	X	1960's	1610	St Louis	USX	59	13	2	810	578428	5274795		-90	Dunka Road	Partridge River	578428	5274795	1154	VF into BIF
26077	X	1960's	1609	St Louis	USX	59	13	3	374	576895	5274258		-90	Dunka Road	Partridge River	576895	5274258	1438	Virginia Fm
26078	X	1970	1613	St Louis	USX	59	13	10	904	576457	5273639		-90	Dunka Road	Partridge River	576457	5273639	809	VF into BIF
26079	X	1970	1597	St Louis	USX	59	13	10	864	576667	5273687		-90	Dunka Road	Partridge River	576667	5273687	819	VF into BIF
26080	X	1971	1597	St Louis	USX	59	13	9	1925	575040	5272630		-90	Dunka Road	Partridge River	575040	5272630	83	VF into BIF
26081	X	1971	1578	St Louis	USX	59	13	10	2345	576640	5272807		-90	Dunka Road	Partridge River	576640	5272807	-664	VF into BIF
26082	X	1971	1607	St Louis	USX	59	13	10	935	576202	5273472		-90	Dunka Road	Partridge River	576202	5273472	1008	VF into BIF

DDH #	Chem	Date	Elevation Collar (ft)	County	Lessee	Twp	Rng	Sec	Total Depth (ft)	UTME Collar	UTMN Collar	Collar Azi	Collar Dip	Deposit	Intrusion DDH is in	UTME DC Base	UTMN DC Base	Elevation DC Base (ft)	Footwall
26083	X	1971	1607	St Louis	USX	59	13	9	644	575040	5273251		-90	Dunka Road	Partridge River	575040	5273251	1037	Virginia Fm
26084	X	1971	1613	St Louis	USX	59	13	9	1354	575537	5273107		-90	Dunka Road	Partridge River	575537	5273107	987	VF into BIF
26085	X	1971	1606	St Louis	USX	59	13	3	535	576419	5273896		-90	Dunka Road	Partridge River	576419	5273896	1127	Virginia Fm
26086	X	1971	1617	St Louis	USX	59	13	2	574	578810	5274902		-90	Dunka Road	Partridge River	578810	5274902	1119	Virginia Fm
26087	X	1971	1595	St Louis	USX	59	13	1	1675	579400	5274727		-90	Dunka Road	Partridge River	579400	5274727	-51	VF into BIF
26088	none	1971	1610	St Louis	USX	59	13	4	885	575551	5274145		-90	Dunka Road	Partridge River			1620	Collared in VF
26089	none	1971	1605	St Louis	USX	59	13	3	837	577009	5274883		-90	Dunka Road	Partridge River			1620	Collared in VF
26090	X	1971	1595	St Louis	USX	59	13	10	1775	576549	5273308		-90	Dunka Road	Partridge River	576549	5273308	-148	VF into BIF
26091	X	1971	1609	St Louis	USX	59	13	3	231	576770	5274099		-90	Dunka Road	Partridge River	576770	5274099	1453	Virginia Fm
26092	X	1971	1613	St Louis	USX	59	13	3	376	576550	5274024		-90	Dunka Road	Partridge River	576550	5274024	1330	Virginia Fm
26093	X	1971	1613	St Louis	USX	59	13	9	1085	575976	5273092		-90	Dunka Road	Partridge River	575976	5273092	600	Virginia Fm
26094	X	1971	1582	St Louis	USX	59	13	10	2515	576982	5273040		-90	Dunka Road	Partridge River	576982	5273040	-886	VF into BIF
26095	X	1971	1605	St Louis	USX	59	13	3	425	576947	5274178		-90	Dunka Road	Partridge River	576947	5274178	1356	Virginia Fm
26096	X	1971	1625	St Louis	USX	59	13	2	883	578673	5274774		-90	Dunka Road	Partridge River	578673	5274774	830	Virginia Fm
26097	none	1971	1606	St Louis	USX	59	13	10	787	576049	5273332		-90	Dunka Road	Partridge River	576049	5273332	877	Virginia Fm
26098	X	1971	1604	St Louis	USX	59	13	10	755	576406	5273728		-90	Dunka Road	Partridge River	576406	5273728	902	VF into BIF
26099	X	1971	1623	St Louis	USX	59	13	2	564	579054	5274974		-90	Dunka Road	Partridge River	579054	5274974	1135	Virginia Fm
26100	X	1971	1613	St Louis	USX	59	13	3	465	576603	5273936		-90	Dunka Road	Partridge River	576603	5273936	1201	Virginia Fm
26101	X	1971	1607	St Louis	USX	59	13	10	655	576475	5273809		-90	Dunka Road	Partridge River	576475	5273809	1006	Virginia Fm
26102	none	1971	1598	St Louis	USX	59	13	1	1112	579601	5274037		-90	Dunka Road	Partridge River			1620	Collared in VF
26103	X	1971	1612	St Louis	USX	59	13	2	965	576510	5273561		-90	Dunka Road	Partridge River	576510	5273561	703	Virginia Fm
26104	X	1971	1612	St Louis	USX	59	13	11	2445	577647	5273447		-90	Dunka Road	Partridge River	577647	5273447	-811	VF into BIF
26105	X	1971	1617	St Louis	USX	59	13	2	212	578760	5274996	325	-45	Dunka Road	Partridge River	578750	5275011	1557	Virginia Fm
26106	X	1971	1601	St Louis	USX	59	13	1	1875	579890	5274703		-90	Dunka Road	Partridge River	579890	5274703	-195	VF into BIF
26107	X	1971	1579	St Louis	USX	59	13	12	2431	579240	5273896		-90	Dunka Road	Partridge River	579240	5273896	-795	VF into BIF
26108	X	1971	1616.7	St Louis	USX	59	13	2	167	578675	5274943	325	-45	Dunka Road	Partridge River	578663	5274960	1547	Virginia Fm
26109	X	1971	1612	St Louis	USX	59	13	2	242	578593	5274893	335	-45	Dunka Road	Partridge River	578566	5274915	1459	Virginia Fm
26110	X	1971	1621	St Louis	USX	59	13	2	162	578621	5274855	340	-45	Dunka Road	Partridge River			1135	Still in DC
26111	X	1971	1613.3	St Louis	USX	59	13	2	162	578709	5274903	340	-45	Dunka Road	Partridge River			1200	Virginia Fm
26112	X	1971	1614	St Louis	USX	59	13	2	222	578792	5274943	325	-45	Dunka Road	Partridge River	578766	5274980	1466	Virginia Fm
26113	X	1971	1621	St Louis	USX	59	13	2	214	578899	5275008	340	-45	Dunka Road	Partridge River	578875	5275042	1484	Virginia Fm
26114	X	1971	1617	St Louis	USX	59	13	2	293	579023	5275023	345	-40	Dunka Road	Partridge River	579008	5275079	1443	Virginia Fm
26115	X	1972	1592	St Louis	USX	59	13	10	2180	577207	5273421		-90	Dunka Road	Partridge River	577207	5273421	-520	VF into BIF
26116	X	1972	1610	St Louis	USX	59	13	10	2245	577451	5273394		-90	Dunka Road	Partridge River			-805	Still in DC
26117	X	1972	1586	St Louis	USX	59	13	11	2594	577810	5273210		-90	Dunka Road	Partridge River	577810	5273210	-980	VF into BIF
26118	X	1972	1618	St Louis	USX	59	13	2	1145	578347	5274621		-90	Dunka Road	Partridge River	578347	5274621	517	VF into BIF
26119	X	1972	1568	St Louis	USX	59	13	11	2647	578140	5273411		-90	Dunka Road	Partridge River	578140	5273411	-989	VF into BIF
26120	X	1972	1597	St Louis	USX	59	13	2	1080	578451	5274467		-90	Dunka Road	Partridge River	578451	5274467	997	VF into BIF
26121	X	1972	1594	St Louis	USX	59	13	10	2151	576668	5273117		-90	Dunka Road	Partridge River	576668	5273117	-522	VF into BIF
26122	X	1972	1607	St Louis	USX	59	13	11	2242	577731	5273689		-90	Dunka Road	Partridge River	577731	5273689	-584	VF into BIF
26123	X	1972	1597	St Louis	USX	59	13	2	2253	576863	5273223		-90	Dunka Road	Partridge River	576863	5273223	-591	VF into BIF
26124	X	1972	1593	St Louis	USX	59	13	10	2415	576991	5273354		-90	Dunka Road	Partridge River	576991	5273354	760	VF into BIF
26125	X	1972	1597	St Louis	USX	59	13	11	2504	577841	5273531		-90	Dunka Road	Partridge River	577841	5273531	-883	VF into BIF
26126	X	1972	1490	St Louis	USX	59	14	34	1393	567340	5266380		-90	Wyman Creek	Partridge River	567340	5266380	159	VF into BIF
26127	X	1972	1629	St Louis	USX	59	13	2	918	578956	5274927		-90	Dunka Road	Partridge River			1180	Still in D.C.
26128	X	1972	1632	St Louis	USX	59	13		1008	578762	5274824		-90	Dunka Road	Partridge River	578762	5274824	798	VF into BIF
26129	none	1972		St Louis	USX	59	13	29	493			225	-45	Longnose East	Partridge River				Still in D.C.
26130	X	1972	1495	St Louis	USX	59	14	34	1555	567492	5266228		-90	Wyman Creek	Partridge River	567492	5266228	-20	VF into BIF
26131	X	1972	1506	St Louis	USX	59	14	34	1505	567852	5266564		-90	Wyman Creek	Partridge River	567852	5266564	61	VF into BIF
26132	X	1973	1496	St Louis	USX	59	14	34	1496	567170	5266579		-90	Wyman Creek	Partridge River	567170	5266579	343	Virginia Fm

DDH #	Chem	Date	Elevation Collar (ft)	County	Lessee	Twp	Rng	Sec	Total Depth (ft)	UTME Collar	UTMN Collar	Collar Azi	Collar Dip	Deposit	Intrusion DDH is in	UTME DC Base	UTMN DC Base	Elevation DC Base (ft)	Footwall
26133	X	1973	1478	St Louis	USX	59	14	34	1646	567144	5265892		-90	Wyman Creek	Partridge River	567144	5265892	-111	VF into BIF
26134	X	1973	1501	St Louis	USX	59	14	34	1240	567463	5266677		-90	Wyman Creek	Partridge River	567463	5266677	426	VF into BIF
26135	X	1973	1511	St Louis	USX	59	14	34	1375	568004	5266922		-90	Wyman Creek	Partridge River	568004	5266922	233	VF into BIF
26136	X	1973	1504	St Louis	USX	59	14	34	1105	567115	5266710		-90	Wyman Creek	Partridge River	567115	5266710	725	VF into BIF
26137	X	1973	1516	St Louis	USX	59	14	35	1535	568346	5266792		-90	Wyman Creek	Partridge River	568346	5266792	46	VF into BIF
26138	X	1973	1490	St Louis	USX	59	14	34	1353	567006	5266219		-90	Wyman Creek	Partridge River	567006	5266219	182	VF into BIF
26139	X	1973	1500	St Louis	USX	59	14	34	475	567237	5266802		-90	Wyman Creek	Partridge River			600	Still in DC
26140	X	1973	1501	St Louis	USX	59	14	34	535	567400	5266836		-90	Wyman Creek	Partridge River			540	Still in DC
26141	X	1974	1592	St Louis	USX	59	13	10	1585	576230	5273062		-90	Dunka Road	Partridge River	576230	5273062	160	VF into BIF
26142	X	1974	1593	St Louis	USX	59	13	10	2118	576334	5272907		-90	Dunka Road	Partridge River	576334	5272907	-495	VF into BIF
26143	X	1974	1592	St Louis	USX	59	13	10	2125	576197	5272751		-90	Dunka Road	Partridge River	576197	5272751	-522	VF into BIF
26144	X	1974	1498	St Louis	USX	59	14	34	1095	567141	5266634		-90	Wyman Creek	Partridge River	567141	5266634	656	VF into BIF
26145	X	1974	1509	St Louis	USX	59	14	34	500	567071	5266772		-90	Wyman Creek	Partridge River			700	Still in DC
26146	X	1974	1505	St Louis	USX	59	14	34	1075	566836	5266574		-90	Wyman Creek	Partridge River	566836	5266574	767	VF into BIF
26147	X	1974	1508	St Louis	USX	59	14	34	525	566981	5266629		-90	Wyman Creek	Partridge River			650	Still in DC
26148	X	1974	1514	St Louis	USX	59	14	34	500	566944	5266714		-90	Wyman Creek	Partridge River			750	Still in DC
26149	X	1974	1501	St Louis	USX	59	14	34	1337	567525	5266543		-90	Wyman Creek	Partridge River	567525	5266543	218	VF into BIF
26150	X	1974	1578	St Louis	USX	59	13	17	954	573970	5271008	315	-50	Wetlegs/Sec 17	Partridge River			-760	Still in DC
26151	X	1974	1501	St Louis	USX	59	14	34	1297	567349	5266573		-90	Wyman Creek	Partridge River	567349	5266573	313	
26152	X	1974	1518	St Louis	USX	59	14	35	1725	568577	5266897		-90	Wyman Creek	Partridge River	568577	5266897	-167	VF into BIF
26153	X	1974	1489	St Louis	USX	59	14	34	1445	567338	5266198		-90	Wyman Creek	Partridge River	567338	5266198	96	VF into BIF
27016	X	1974	1510	St Louis	USX	58	14	34	1605	567326	5256996		-90	Skibo	South Complex	567326	5256996	-70	Virginia Fm
32701	X	1966	1435	Lake	INCO	61	11	5	820	592645	5294475		-90	Maturi	South Kawishiwi	592645	5294475	688	Giants Range
32702	X	1966	1436	Lake	INCO	62	11	25	1767	599241	5298255		-90	Spruce Road	South Kawishiwi	599241	5298255	36	Giants Range
32703	X	1966	1499	Lake	INCO	62	11	25	1825	599026	5298138		-90	Spruce Road	South Kawishiwi	599026	5298138	46	Giants Range
32704	X	1966	1498	Lake	INCO	62	11	25	1509	598968	5298245		-90	Spruce Road	South Kawishiwi	598968	5298245	179	Giants Range
32705	X	1966	1452	Lake	INCO	62	11	25	1162	599291	5298420		-90	Spruce Road	South Kawishiwi	599291	5298420	340	Giants Range
32706	X	1966	1495	Lake	INCO	62	11	25	1378	598862	5298188		-90	Spruce Road	South Kawishiwi	598862	5298188	200	Giants Range
32707	X	1966	1444	Lake	INCO	62	11	33	916	592780	5294600		-90	Maturi	South Kawishiwi	592780	5294600	625	Giants Range
32708	X	1966	1486	Lake	INCO	62	11	25	985	598853	5298460		-90	Spruce Road	South Kawishiwi	598853	5298460	653	Giants Range
32709	X	1966	1498	Lake	INCO	62	11	25	1625	598920	5298081		-90	Spruce Road	South Kawishiwi	598920	5298081	3	Giants Range
32710	X	1966	1441	Lake	INCO	61	11	5	600	594210	5295535	325	-45	Maturi	South Kawishiwi			800	Still in D.C.
32711	X	1966	1461	Lake	INCO	62	11	25	808	598960	5298518		-90	Spruce Road	South Kawishiwi			885	Still in D.C.
32712	X	1966	1491	Lake	INCO	62	11	25	1335	598911	5298353		-90	Spruce Road	South Kawishiwi	598911	5298353	308	Giants Range
32713	X	1966	1500	Lake	INCO	62	11	25	499	599018	5298411		-90	Spruce Road	South Kawishiwi			600	Still in D.C.
32714	X	1966	1462	Lake	INCO	61	11	5	1045	593410	5294980		-90	Maturi	South Kawishiwi	593410	5294980	515	Giants Range
32715	X	1966	1488	Lake	INCO	62	11	25	705	598804	5298295		-90	Spruce Road	South Kawishiwi			605	Still in D.C.
32716	X	1966	1473	Lake	INCO	62	11	25	1422	599126	5298469		-90	Spruce Road	South Kawishiwi	599126	5298469	358	Giants Range
32717	X	1966	1450	Lake	INCO	62	11	24	562	599331	5298858		-90	Spruce Road	South Kawishiwi	599331	5298858	1120	Giants Range
32718	X	1966	1455	Lake	INCO	61	11	5	725	593260	5294885		-90	Maturi	South Kawishiwi			360	Still in D.C.
32719	X	1966	1447	Lake	INCO	62	11	24	832	599286	5298685		-90	Spruce Road	South Kawishiwi	599286	5298685	742	Giants Range
32720	X	1966	1501	Lake	INCO	62	11	24	1197	598697	5298237		-90	Spruce Road	South Kawishiwi	598697	5298237	311	Giants Range
32721	X	1966	1452	Lake	INCO	62	11	33	895	594440	5295860	325	-45	Maturi	South Kawishiwi	594370	5295960	883	Giants Range
32722	X	1966	1447	Lake	INCO	62	11	33	835	594510	5295745	325	-50	Maturi	South Kawishiwi	594425	5295866	691	Giants Range
32723	X	1966	1478	Lake	INCO	62	11	33	763	594330	5295675	325	-50	Maturi	South Kawishiwi	594257	5295779	828	Giants Range
32724	X	1966	1441	Lake	INCO	62	11	33	650	594130	5295640		-90	Maturi	South Kawishiwi	594130	5295640	962	Giants Range
32725	X	1966	1436	Lake	INCO	62	11	24	975	599340	5298586		-90	Spruce Road	South Kawishiwi	599340	5298586	526	Giants Range
32726	X	1966	1461	Lake	INCO	61	11	5	1025	593050	5294860		-90	Maturi	South Kawishiwi	593050	5294860	561	Giants Range
32727		1966	1460	Lake	INCO	61	11	5	425	592375	5294230		-90	Maturi	South Kawishiwi			770	Still in D.C.
32727A		1966	1460	Lake	INCO	61	11	5	925	592375	5294230		-90	Maturi	South Kawishiwi	592375	5294230	806	Giants Range

DDH #	Chem	Date	Elevation Collar (ft)	County	Lessee	Twp	Rng	Sec	Total Depth (ft)	UTME Collar	UTMN Collar	Collar Azi	Collar Dip	Deposit	Intrusion DDH is in	UTME DC Base	UTMN DC Base	Elevation DC Base (ft)	Footwall
32728	X	1966	1432	Lake	INCO	62	11	24	1000	599176	5298632		-90	Spruce Road	South Kawishiwi	599176	5298632	592	Giants Range
32729	none	1966	1431	Lake	INCO	62	11	24	275	599116	5298742		-90	Spruce Road	South Kawishiwi			1440	collared in granite
32730	X	1966	1460	Lake	INCO	61	11	5	1136	592945	5294685		-90	Maturi	South Kawishiwi	592945	5294685	380	Giants Range
32731	X	1966	1434	Lake	INCO	62	11	24	1401	599233	5298528		-90	Spruce Road	South Kawishiwi	599233	5298528	474	Giants Range
32732	X	1967	1434	Lake	INCO	62	11	24	335	599223	5298800		-90	Spruce Road	South Kawishiwi	599223	5298800	1229	Giants Range
32733	X	1967	1484	Lake	INCO	62	11	24	675	598795	5298567		-90	Spruce Road	South Kawishiwi	598795	5298567	957	Giants Range
32734	X	1967	1462	Lake	INCO	62	11	24	357	598837	5298717		-90	Spruce Road	South Kawishiwi	598837	5298717	1292	Giants Range
32735	X	1967	1438	Lake	INCO	62	11	24	1293	599447	5298644		-90	Spruce Road	South Kawishiwi	599447	5298644	438	Giants Range
32736	X	1967	1456	Lake	INCO	61	11	5	1794	593000	5294285		-90	Maturi	South Kawishiwi	593000	5294285	-269	Giants Range
32736	X	1967	1456	Lake	INCO	62	11	26	1794	598376	5297549		-90	Spruce Road	South Kawishiwi	598376	5297549	-269	Giants Range
32737	X	1967	1475	Lake	INCO	62	11	24	559	598737	5298675		-90	Spruce Road	South Kawishiwi	598737	5298675	1180	Giants Range
32738	X	1967	1493	Lake	INCO	62	11	25	987	598746	5298402		-90	Spruce Road	South Kawishiwi	598746	5298402	594	Giants Range
32739	X	1967	1467	Lake	INCO	62	11	24	273	598679	5298782		-90	Spruce Road	South Kawishiwi	598679	5298782	1423	Giants Range
32740	X	1967	1490	Lake	INCO	62	11	25	1235	598755	5298130		-90	Spruce Road	South Kawishiwi			250	Still in D.C.
32741	X	1967	1444	Lake	INCO	62	11	24	452	598902	5298626		-90	Spruce Road	South Kawishiwi	598902	5298626	1180	Giants Range
32742	X	1967	1500	Lake	INCO	62	11	24	757	598688	5298509		-90	Spruce Road	South Kawishiwi	598688	5298509	856	Giants Range
32743	X	1967	1437	Lake	INCO	62	11	24	1055	599554	5298702		-90	Spruce Road	South Kawishiwi	599554	5298702	620	Giants Range
32744	X	1967	1501	Lake	INCO	62	11	25	978	598639	5298344		-90	Spruce Road	South Kawishiwi	598639	5298344	631	Giants Range
32745	X	1967	1464	Lake	INCO	62	11	24	929	599487	5298810		-90	Spruce Road	South Kawishiwi	599487	5298810	974	Giants Range
32746	X	1967	1486	Lake	INCO	62	11	27	976	596120	5296850		-90	Mat-S.Rd	South Kawishiwi	596120	5296850	736	Giants Range
32747	X	1967	1468	Lake	INCO	62	11	24	1115	599827	5298711		-90	Spruce Road	South Kawishiwi	599827	5298711	598	Giants Range
32748	X	1967	1467	Lake	INCO	62	11	24	1050	599664	5298755		-90	Spruce Road	South Kawishiwi	599664	5298755	807	Giants Range
32749	X	1967	1437	Lake	INCO	62	11	24	601	599603	5298867		-90	Spruce Road	South Kawishiwi	599603	5298867	1046	Giants Range
32750	X	1967	1463	Lake	INCO	62	11	24	1061	599608	5298594		-90	Spruce Road	South Kawishiwi	599608	5298594	445	Giants Range
32751	X	1967	1439	Lake	INCO	62	11	24	530	599823	5298987		-90	Spruce Road	South Kawishiwi	599823	5298987	1164	Giants Range
32752	X	1967	1449	Lake	INCO	62	11	24	887	599870	5298894		-90	Spruce Road	South Kawishiwi	599870	5298894	933	Giants Range
32753	X	1967	1496	Lake	INCO	62	11	24	1416	599719	5298653		-90	Spruce Road	South Kawishiwi	599719	5298653	448	Giants Range
32754	X	1967	1479	Lake	INCO	62	11	34	1277	595605	5296730		-90	Mat-S.Rd	South Kawishiwi	595605	5296730	344	Giants Range
32755	X	1967	1443	Lake	INCO	62	11	24	557	599925	5299042		-90	Spruce Road	South Kawishiwi	599925	5299042	1174	Giants Range
32756	X	1967	1508	Lake	INCO	62	11	24	937	599986	5298929		-90	Spruce Road	South Kawishiwi	599986	5298929	893	Giants Range
32757	X	1967	1478	Lake	INCO	62	11	24	456	600035	5299107		-90	Spruce Road	South Kawishiwi	600035	5299107	1193	Giants Range
32758	X	1967	1507	Lake	INCO	62	11	34	1250	595800	5296670		-90	Mat-S.Rd	South Kawishiwi	595800	5296670	347	Giants Range
32759	X	1967	1485	Lake	INCO	62	11	24	973	599768	5298818		-90	Spruce Road	South Kawishiwi	599768	5298818	945	Giants Range
32760	X	1967	1436	Lake	INCO	62	11	25	1361	599398	5298479		-90	Spruce Road	South Kawishiwi	599398	5298479	121	Giants Range
32761	X	1967	1517	Lake	INCO	62	10	19	936	600475	5299063		-90	Spruce Road	South Kawishiwi	600475	5299063	756	Giants Range
32762	X	1967	1480	Lake	INCO	62	10	19	687	600250	5299219		-90	Spruce Road	South Kawishiwi	600250	5299219	1100	Giants Range
32763	none	1967	1491	Lake	INCO	62	10	19	1347	601314	5299549		-90	Spruce Road	South Kawishiwi				Still in D.C.
32764	none	1967	1492	Lake	INCO	62	10	19	1017	601489	5299738		-90	Spruce Road	South Kawishiwi				Still in D.C.
32765	none	1967	1461	Lake	INCO	61	11	5	845	593430	5294320		-90	Maturi	South Kawishiwi			-1004	Still in D.C.
32765-1	none	1967	1461	Lake	INCO	61	11	5	935	593430	5294320		-90	Maturi	South Kawishiwi			1004	Still in D.C.
32765-2	X	1967	1461	Lake	INCO	61	11	5	2644	593430	5294320		-90	Maturi	South Kawishiwi	593430	5294320	-1004	Giants Range
32766	X	1967	1459	Lake	INCO	62	11	25	1931	599456	5298371		-90	Spruce Road	South Kawishiwi	599456	5298371	-196	Giants Range
32767	X	1967	1475	Lake	INCO	62	11	25	2030	599563	5298430		-90	Spruce Road	South Kawishiwi	599563	5298430	-73	Giants Range
32768	X	1967	1441	Lake	INCO	62	11	25	1675	599349	5298313		-90	Spruce Road	South Kawishiwi	599349	5298313	16	Giants Range
32769	none	1967	1467	Lake	INCO	62	11	25	525	599617	5298459		-90	Spruce Road	South Kawishiwi			165	Still in D.C.
32770	X	1967	1467	Lake	INCO	62	11	24	1284	599778	5298546		-90	Spruce Road	South Kawishiwi			320	Still in D.C.
32771	X	1967	1502	Lake	INCO	62	11	25	250	598726	5298183		-90	Spruce Road	South Kawishiwi			355	Still in D.C.
32772	X	1967		Lake	INCO	62	11	25	250	598702	5298100		-90	Spruce Road	South Kawishiwi			195	Still in D.C.
32773	X	1967	1495	Lake	INCO	62	11	25	250	598775	5298348		-90	Spruce Road	South Kawishiwi			715	Still in D.C.
32774	X	1967	1496	Lake	INCO	62	11	25	250	598717	5298456		-90	Spruce Road	South Kawishiwi	598717	5298456	1496	BIF

DDH #	Chem	Date	Elevation Collar (ft)	County	Lessee	Twp	Rng	Sec	Total Depth (ft)	UTME Collar	UTMN Collar	Collar Azi	Collar Dip	Deposit	Intrusion DDH is in	UTME DC Base	UTMN DC Base	Elevation DC Base (ft)	Footwall
32775	X	1967	1486	Lake	INCO	62	11	24	653	598659	5298563	-90	-90	Spruce Road	South Kawishiwi	598659	5298563	930	Giants Range
32776	X	1967	1490	Lake	INCO	62	11	25	735	599047	5298358	-90	-90	Spruce Road	South Kawishiwi			465	Still in D.C.
32777	X	1967	1439	Lake	INCO	62	11	24	479	599253	5298746	-90	-90	Spruce Road	South Kawishiwi	599253	5298746	1052	Giants Range
32778	X	1967	1498	Lake	INCO	62	11	24	250	598605	5298534	-90	-90	Spruce Road	South Kawishiwi			895	Still in D.C.
32779	X	1967	1459	Lake	INCO	62	11	24	450	599467	5298863	-90	-90	Spruce Road	South Kawishiwi	599467	5298863	1084	Giants Range
32780	X	1967	1492	Lake	INCO	62	11	25	250	598634	5298480	-90	-90	Spruce Road	South Kawishiwi			845	Still in D.C.
32781	X	1967	1450	Lake	INCO	62	11	24	475	599360	5298805	-90	-90	Spruce Road	South Kawishiwi	599360	5298805	1025	Giants Range
32782	X	1967	1507	Lake	INCO	62	11	25	250	598610	5298397	-90	-90	Spruce Road	South Kawishiwi			730	Still in D.C.
32783	X	1967	1440	Lake	INCO	62	11	24	251	599302	5298912	-90	-90	Spruce Road	South Kawishiwi	599302	5298912	1315	Giants Range
32784	X	1967	1491	Lake	INCO	62	11	24	250	598741	5298538	-90	-90	Spruce Road	South Kawishiwi			975	Still in D.C.
32785	X	1967	1440	Lake	INCO	62	11	24	250	599257	5298610	-90	-90	Spruce Road	South Kawishiwi			805	Still in D.C.
32786	X	1967	1449	Lake	INCO	62	11	24	371	599438	5298916	-90	-90	Spruce Road	South Kawishiwi	599438	5298916	1202	Giants Range
32787	X	1967	1435	Lake	INCO	62	11	24	250	599286	5298557	-90	-90	Spruce Road	South Kawishiwi			650	Still in D.C.
32788	X	1967	1484	Lake	INCO	62	11	24	250	598712	5298592	-90	-90	Spruce Road	South Kawishiwi			1030	Still in D.C.
32789	X	1967	1441	Lake	INCO	62	11	24	250	599583	5298649	-90	-90	Spruce Road	South Kawishiwi			645	Still in D.C.
32790	X	1967	1485	Lake	INCO	62	11	24	584	598766	5298621	-90	-90	Spruce Road	South Kawishiwi	598766	5298621	1040	Giants Range
32791	X	1967	1441	Lake	INCO	62	11	24	253	599384	5298887	-90	-90	Spruce Road	South Kawishiwi			920	Still in D.C.
32792	X	1967	1500	Lake	INCO	62	11	25	250	599106	5298251	-90	-90	Spruce Road	South Kawishiwi			270	Still in D.C.
32793	X	1967	1487	Lake	INCO	62	11	24	250	599690	5298707	-90	-90	Spruce Road	South Kawishiwi			695	Still in D.C.
32794	none	1967	1478	Lake	INCO	62	11	25	250	599081	5298168	-90	-90	Spruce Road	South Kawishiwi			180	Still in D.C.
32795	X	1967	1447	Lake	INCO	62	11	24	250	599413	5298834	-90	-90	Spruce Road	South Kawishiwi			885	Still in D.C.
32796	X	1967	1495	Lake	INCO	62	11	24	250	599749	5298600	-90	-90	Spruce Road	South Kawishiwi			445	Still in D.C.
32797	X	1967	1497	Lake	INCO	62	11	25	250	598891	5298134	-90	-90	Spruce Road	South Kawishiwi			195	Still in D.C.
32798	X	1967	1456	Lake	INCO	62	11	24	250	598873	5298679	-90	-90	Spruce Road	South Kawishiwi	598873	5298679	1244	Giants Range
32799	X	1967	1481	Lake	INCO	62	11	24	250	599442	5298780	-90	-90	Spruce Road	South Kawishiwi			860	Still in D.C.
32800	X	1967	1487	Lake	INCO	62	11	24	567	599739	5298872	-90	-90	Spruce Road	South Kawishiwi	599739	5298872	1007	Giants Range
34801	X	1967	1451	Lake	INCO	62	11	24	515	599306	5298776	-90	-90	Spruce Road	South Kawishiwi	599306	5298776	1070	Giants Range
34802	X	1967	1505	Lake	INCO	62	11	25	250	598940	5298299	-90	-90	Spruce Road	South Kawishiwi			465	Still in D.C.
34803	X	1967	1465	Lake	INCO	62	11	24	204	598815	5298786	-90	-90	Spruce Road	South Kawishiwi	598815	5298786	1426	Giants Range
34804	X	1967	1507	Lake	INCO	62	11	25	250	598887	5298270	-90	-90	Spruce Road	South Kawishiwi			465	Still in D.C.
34805	X	1967	1466	Lake	INCO	62	11	24	250	598790	5298704	-90	-90	Spruce Road	South Kawishiwi			1105	Still in D.C.
34806	X	1967	1480	Lake	INCO	62	11	24	250	599096	5298523	-90	-90	Spruce Road	South Kawishiwi			765	Still in D.C.
34807	X	1967	1480	Lake	INCO	62	11	24	250	599715	5298789	-90	-90	Spruce Road	South Kawishiwi			805	Still in D.C.
34808	X	1967	1484	Lake	INCO	62	11	25	450	598882	5298407	-90	-90	Spruce Road	South Kawishiwi			760	Still in D.C.
34809	X	1967	1471	Lake	INCO	62	11	24	250	598819	5298650	-90	-90	Spruce Road	South Kawishiwi			1150	Still in D.C.
34810	X	1967	1495	Lake	INCO	62	11	25	250	599043	5298494	-90	-90	Spruce Road	South Kawishiwi			860	Still in D.C.
34811	X	1967	1455	Lake	INCO	62	11	24	250	599686	5298843	-90	-90	Spruce Road	South Kawishiwi			900	Still in D.C.
34812	X	1967	1446	Lake	INCO	62	11	24	250	598931	5298572	-90	-90	Spruce Road	South Kawishiwi			990	Still in D.C.
34813	X	1967	1488	Lake	INCO	62	11	25	250	599072	5298440	-90	-90	Spruce Road	South Kawishiwi			600	Still in D.C.
34814	X	1967	1479	Lake	INCO	62	11	24	250	599744	5298736	-90	-90	Spruce Road	South Kawishiwi			725	Still in D.C.
34815	X	1967	1481	Lake	INCO	62	11	24	250	598824	5298514	-90	-90	Spruce Road	South Kawishiwi			965	Still in D.C.
34816	X	1967	1470	Lake	INCO	62	11	25	1104	598989	5298465	-90	-90	Spruce Road	South Kawishiwi	598989	5298465	436	Giants Range
34816A	X	1967	1470	Lake	INCO	62	11	25	220	598989	5298465	-90	-90	Spruce Road	South Kawishiwi			436	Still in D.C.
34817	X	1967	1486	Lake	INCO	62	11	24	250	599637	5298678	-90	-90	Spruce Road	South Kawishiwi			670	Still in D.C.
34818	X	1967	1484	Lake	INCO	62	11	25	250	599101	5298387	-90	-90	Spruce Road	South Kawishiwi	599101	5298387	1484	
34819	X	1967	1465	Lake	INCO	62	11	24	250	598878	5298543	-90	-90	Spruce Road	South Kawishiwi			975	Still in D.C.
34820	X	1967	1494	Lake	INCO	62	11	24	250	599666	5298624	-90	-90	Spruce Road	South Kawishiwi			540	Still in D.C.
34821	X	1967	1491	Lake	INCO	62	11	25	250	599130	5298333	-90	-90	Spruce Road	South Kawishiwi			345	Still in D.C.
34822	X	1967	1446	Lake	INCO	62	11	24	250	599014	5298547	-90	-90	Spruce Road	South Kawishiwi			890	Still in D.C.
34823	X	1967	1465	Lake	INCO	62	11	24	250	598848	5298596	-90	-90	Spruce Road	South Kawishiwi			1075	Still in D.C.

DDH #	Chem	Date	Elevation Collar (ft)	County	Lessee	Twp	Rng	Sec	Total Depth (ft)	UTME Collar	UTMN Collar	Collar Azi	Collar Dip	Deposit	Intrusion DDH is in	UTME DC Base	UTMN DC Base	Elevation DC Base (ft)	Footwall
34824	X	1967	1493	Lake	INCO	62	11	24	250	599695	5298570	-90	-90	Spruce Road	South Kawishiwi			395	Still in D.C.
34825	X	1967	1500	Lake	INCO	62	11	25	250	598945	5298163	-90	-90	Spruce Road	South Kawishiwi			225	Still in D.C.
34826	X	1967	1494	Lake	INCO	62	11	25	250	598916	5298217	-90	-90	Spruce Road	South Kawishiwi			335	Still in D.C.
34827	X	1967	1473	Lake	INCO	62	11	24	250	599773	5298682	-90	-90	Spruce Road	South Kawishiwi			625	Still in D.C.
34828	X	1967	1434	Lake	INCO	62	11	24	250	598985	5298601	-90	-90	Spruce Road	South Kawishiwi			1002	Still in D.C.
34829	X	1967	1506	Lake	INCO	62	11	25	250	598809	5298159	-90	-90	Spruce Road	South Kawishiwi			298	Still in D.C.
34830	X	1967	1473	Lake	INCO	62	11	25	250	598907	5298489	-90	-90	Spruce Road	South Kawishiwi			870	Still in D.C.
34831	X	1967	1477	Lake	INCO	62	11	24	250	599802	5298629	-90	-90	Spruce Road	South Kawishiwi			500	Still in D.C.
34832	X	1967	1511	Lake	INCO	62	11	25	250	598838	5298105	-90	-90	Spruce Road	South Kawishiwi			150	Still in D.C.
34833	X	1967	1476	Lake	INCO	62	11	25	250	598936	5298436	-90	-90	Spruce Road	South Kawishiwi			755	Still in D.C.
34834	X	1967	1435	Lake	INCO	62	11	24	544	599038	5298630	-90	-90	Spruce Road	South Kawishiwi	599038	5298630	1135	
34835	X	1967	1436	Lake	INCO	62	11	24	250	599579	5298785	-90	-90	Spruce Road	South Kawishiwi			845	Still in D.C.
34836	X	1967	1494	Lake	INCO	62	11	25	250	598750	5298266	-90	-90	Spruce Road	South Kawishiwi			535	Still in D.C.
34837	X	1967	1444	Lake	INCO	62	11	24	250	599608	5298731	-90	-90	Spruce Road	South Kawishiwi			775	Still in D.C.
34838	X	1967	1495	Lake	INCO	62	11	25	250	598829	5298378	-90	-90	Spruce Road	South Kawishiwi			760	Still in D.C.
34839	X	1967	1487	Lake	INCO	62	11	25	250	598780	5298212	-90	-90	Spruce Road	South Kawishiwi			410	Still in D.C.
34840	X	1967	1437	Lake	INCO	62	11	24	250	599657	5298897	-90	-90	Spruce Road	South Kawishiwi			970	Still in D.C.
34841	X	1967	1490	Lake	INCO	62	11	25	250	598799	5298431	-90	-90	Spruce Road	South Kawishiwi			855	Still in D.C.
34842	X	1967	1494	Lake	INCO	62	11	25	255	598770	5298485	-90	-90	Spruce Road	South Kawishiwi			920	Still in D.C.
34843	X	1967	1438	Lake	INCO	62	11	24	250	599530	5298619	-90	-90	Spruce Road	South Kawishiwi			600	Still in D.C.
34844	X	1967	1440	Lake	INCO	62	11	24	250	599092	5298659	-90	-90	Spruce Road	South Kawishiwi	599092	5298659	1221	
34845	X	1967	1499	Lake	INCO	62	11	25	250	598668	5298290	-90	-90	Spruce Road	South Kawishiwi			555	Still in D.C.
34846	X	1967	1438	Lake	INCO	62	11	25	250	599452	5298508	-90	-90	Spruce Road	South Kawishiwi			375	Still in D.C.
34847	X	1967	1503	Lake	INCO	62	11	25	250	598663	5298427	-90	-90	Spruce Road	South Kawishiwi	598663	5298427	1333	
34848	X	1967	1432	Lake	INCO	62	11	24	450	599145	5298688	-90	-90	Spruce Road	South Kawishiwi	599145	5298688	1293	
34849	X	1967	1434	Lake	INCO	62	11	24	180	598927	5298708	-90	-90	Spruce Road	South Kawishiwi	598927	5298708	1315	
34850	X	1967	1435	Lake	INCO	62	11	24	250	599425	5298556	-90	-90	Spruce Road	South Kawishiwi			500	Still in D.C.
34851	X	1967	1502	Lake	INCO	62	11	25	250	598692	5298373	-90	-90	Spruce Road	South Kawishiwi			730	Still in D.C.
34852	X	1967	1434	Lake	INCO	62	11	24	250	598956	5298655	-90	-90	Spruce Road	South Kawishiwi	598956	5298655	1268	
34853	X	1967	1437	Lake	INCO	62	11	24	250	599476	5298590	-90	-90	Spruce Road	South Kawishiwi			565	Still in D.C.
34854	X	1967	1441	Lake	INCO	62	11	25	250	599179	5298498	-90	-90	Spruce Road	South Kawishiwi			615	Still in D.C.
34855	X	1967	1499	Lake	INCO	62	11	25	250	598721	5298319	-90	-90	Spruce Road	South Kawishiwi			640	Still in D.C.
34856	X	1967	1440	Lake	INCO	62	11	24	252	599121	5298606	-90	-90	Spruce Road	South Kawishiwi			900	Still in D.C.
34857	X	1967	1435	Lake	INCO	62	11	25	250	599315	5298503	-90	-90	Spruce Road	South Kawishiwi			490	Still in D.C.
34858	X	1967	1503	Lake	INCO	62	11	25	250	598994	5298329	-90	-90	Spruce Road	South Kawishiwi			465	Still in D.C.
34859	X	1967	1436	Lake	INCO	62	11	24	746	599150	5298552	-90	-90	Spruce Road	South Kawishiwi			770	Still in D.C.
34860	X	1967	1434	Lake	INCO	62	11	24	250	599248	5298883	-90	-90	Spruce Road	South Kawishiwi	599248	5298883	1336	
34861	X	1967	1495	Lake	INCO	62	11	25	250	598965	5298382	-90	-90	Spruce Road	South Kawishiwi			600	Still in D.C.
34862	X	1967	1436	Lake	INCO	62	11	24	475	599578	5298913	-90	-90	Spruce Road	South Kawishiwi	599578	5298913	1129	
34863	X	1967	1432	Lake	INCO	62	11	24	325	599199	5298717	-90	-90	Spruce Road	South Kawishiwi	599199	5298717	1183	
34864	X	1967	1439	Lake	INCO	62	11	24	455	599871	5299013	-90	-90	Spruce Road	South Kawishiwi	599871	5299013	1164	
34865	X	1967	1438	Lake	INCO	62	11	24	614	599788	5299037	-90	-90	Spruce Road	South Kawishiwi	599788	5299037	1301	
34866	X	1968	1439	Lake	INCO	62	11	24	545	599842	5299066	-90	-90	Spruce Road	South Kawishiwi	599842	5299066	1281	
34867	X	1968	1465	Lake	INCO	62	11	25	616	599680	5298215	-90	-90	Spruce Road	South Kawishiwi			-285	Still in D.C.
34868	X	1968	1460	Lake	INCO	62	11	24	642	599713	5298920	-90	-90	Spruce Road	South Kawishiwi	599713	5298920	1058	
34869	X	1968	1488	Lake	INCO	62	11	25	775	599767	5298055	-90	-90	Spruce Road	South Kawishiwi			-510	Still in D.C.
34870	X	1968	1488	Lake	INCO	62	11	25	775	599770	5298058	-90	-90	Spruce Road	South Kawishiwi			-505	Still in D.C.
34870A	X	1968	1487	Lake	INCO	62	11	25	2425	599767	5298055	-90	-90	Spruce Road	South Kawishiwi	599767	5298055	-475	Giants Range
34871	X	1968	1466	Lake	INCO	61	11	5	1115	593440	5294925	-90	-90	Maturi	South Kawishiwi	593440	5294925	441	Giants Range
34872	X	1968	1512	Lake	INCO	62	11	25	3145	600088	5298229	-90	-90	Spruce Road	South Kawishiwi			-275	Still in D.C.

DDH #	Chem	Date	Elevation Collar (ft)	County	Lessee	Twp	Rng	Sec	Total Depth (ft)	UTME Collar	UTMN Collar	Collar Azi	Collar Dip	Deposit	Intrusion DDH is in	UTME DC Base	UTMN DC Base	Elevation DC Base (ft)	Footwall
34873		1968	1590	St. Louis	INCO	59	12	5	2954										Still in D.C.
34879		1968		St. Louis	INCO	59	12	5		582599	5275480							-340	Still in DC
34887	X	1968	1498	Lake	INCO	62	11	34	1525	595965	5296620		-90	Maturi/Spruce Road	South Kawishiwi	595965	5296620	165	Giants Range
34888	X	1968	1524	Lake	INCO	62	11	26	1145	598025	5297941		-90	Spruce Road	South Kawishiwi	598025	5297941	535	Giants Range
34889	X	1968	1525	Lake	INCO	62	11	26	1285	597869	5297718		-90	Spruce Road	South Kawishiwi	597869	5297718	349	Giants Range
34890	X	1968	1533	Lake	INCO	62	11	26	1485	598434	5297955		-90	Spruce Road	South Kawishiwi	598434	5297955	204	Giants Range
34891	X	1968	1444	Lake	INCO	62	10	19	421	601268	5299633	334	-45	Spruce Road	South Kawishiwi	601199	5299775	1286	Giants Range
34892	X	1968	1523	Lake	INCO	62	11	26	1385	598190	5297892		-90	Spruce Road	South Kawishiwi	598190	5297892	294	Giants Range
34893	X	1969	1475	Lake	INCO	61	11	7	835	590835	5293100		-90	Birch Lake	South Kawishiwi	590835	5293100	737	Giants Range
34984	X	1969	1475	Lake	INCO	61	11	7	1465	591035	5293005		-90	Birch Lake	South Kawishiwi	591035	5293005	148	Giants Range
34895	X	1969	1490	Lake	INCO	62	11	27	565	596950	5297495		-90	Maturi/Spruce Road	South Kawishiwi	596950	5297495	1079	Giants Range
34896	X	1969	1456	Lake	INCO	62	11	33	1095	594835	5296235		-90	Maturi	South Kawishiwi	594835	5296235	655	Giants Range
34897	X	1969	1510	Lake	INCO	62	11	34	2215	596815	5296595		-90	Maturi/Spruce Road	South Kawishiwi	596815	5296595	-474	Giants Range
34898	X	1969	1510	St. Louis	INCO	57	14	34	1475	567216	5256862		-90	Skibo	South Complex	567216	5256862	95	567216
40901	X	1969	1510	St. Louis	INCO	58	14	34	1141	567358	5256737	270	-80	Skibo	South Complex			400	Still in D.C.
40902	X	1969	1510	St. Louis	INCO	57	14	3	925	567346	5256508	270	-80	Skibo	South Complex			300	Still in D.C.
40904	X	1969	1510	St. Louis	INCO	57	14	3	707	567333	5256582	270	-80	Skibo	South Complex			300	Still in D.C.
40905	X	1969	1500	St. Louis	INCO	60	12	3	705	586720	5283810		-90	Dunka Pit	South Kawishiwi	586720	5283810	1012	BIF
40906	X	1969	1535	St. Louis	INCO	60	12	11	2365	587186	5282953		-90	Dunka Pit	South Kawishiwi	587186	5282953	-568	Giants Range
40907	X	1969	1530	St. Louis	INCO	60	12	16	1525	585797	5281345		-90	Serpentine	South Kawishiwi	585797	5281345	535	BIF
40908	X	1969	1580	St. Louis	INCO	60	12	21	1545	584751	5279605		-90	Serpentine	South Kawishiwi	584751	5279605	420	BIF
40909	X	1970	1565	St. Louis	INCO	60	12	11	2355	587637	5283393		-90	Dunka Pit	South Kawishiwi	587637	5283393	-524	BIF
40910	X	1970	1540	St. Louis	INCO	60	12	10	2135	586996	5282791		-90	Dunka Pit	South Kawishiwi	586996	5282791	-346	Giants Range
40911	X	1970	1454	Lake	INCO	62	11	33	646	594725	5296055		-90	Maturi	South Kawishiwi			550	
40912	X	1970	1480	Lake	INCO	62	11	33	1755	594880	5295840		-90	Maturi	South Kawishiwi	594880	5295840	5	Giants Range
40913	X	1970	1480	Lake	INCO	62	11	33	2795	595170	5295450		-90	Maturi	South Kawishiwi	595170	5295450	-1095	Giants Range
40914			1670	Lake	INCO	60	10	3	205	605480	5284680		-90	Robin Lake	South Kawishiwi				
40915			1630	Lake	INCO	60	10	3	240	605920	5284700		-90	Robin Lake	South Kawishiwi				
40916			1595	Lake	INCO	60	10	3	205	606310	5285120		-90	Robin Lake	South Kawishiwi				
40923	none	1971	1500	Lake	INCO	62	10	19	50	601102	5299428		-90	Spruce Road	South Kawishiwi				
40924	none	1971	1500	Lake	INCO	62	10	19	50	601102	5299429		-90	Spruce Road	South Kawishiwi				
59029		1959	1602.6	St. Louis	Reserve Mining	60	13	36	630	580597	5276626		-90	Babbitt	Partridge River			840	
61094			1612	St. Louis	Reserve Mining	60	12	16	186	584401	5280978		-90	Serpentine	South Kawishiwi	584401	5280978	1485	Virginia Fm
61097			1611.3	St. Louis	Reserve Mining	60	12	16	197	584629	5281328		-90	Babbitt	Virginia Fm.			1620	
64040			1630	St. Louis	Reserve Mining	60	12	20	465	582819	5278721		-90	Serpentine	South Kawishiwi			840	
64046	X		1603	St. Louis	Reserve Mining	60	12	16	191	584116	5280571		-90	Serpentine	South Kawishiwi	584116	5280571	1467	Virginia Fm
64048	X		1602	St. Louis	Reserve Mining	60	12	16	227	584247	5280653		-90	Serpentine	South Kawishiwi	584247	5280653	1492	Virginia Fm
64052			1607	St. Louis	Reserve Mining	60	12	16		584273	5280884		-90	Serpentine	South Kawishiwi	584273	5280884	1570	Virginia Fm
65223			1609.2	St. Louis	Reserve Mining	60	12	16	216	584713	5281474		-90	Babbitt	Virginia Fm.			1620	Collared in VF
65246			1595	St. Louis	Reserve Mining	60	12	30	400	582099	5277837		-90	Babbitt	Virginia Fm.			1620	Collared in VF
65260			1593	St. Louis	Reserve Mining	60	12	16	415	584488	5281197		-90	Serpentine	South Kawishiwi	584488	5281197	1518	Virginia Fm
66010	X		1608	St. Louis	Reserve Mining	60	12	16	177	583993	5280476		-90	Serpentine	Virginia Fm.			1350	Collared in VF
66012	X		1612	St. Louis	Reserve Mining	60	12	16	112	584298	5280997		-90	Serpentine	South Kawishiwi	584298	5280997	1587	Virginia Fm
66014	X	1967	1608	St. Louis	Reserve Mining	60	12	16	470	584196	5280439		-90	Serpentine	South Kawishiwi	584196	5280439	1218	Virginia Fm
66017	X	1967	1596	St. Louis	Reserve Mining	60	12	16	380	584476	5280852		-90	Serpentine	South Kawishiwi	584476	5280852	1308	Virginia Fm
66225	X	1967	1600.1	St. Louis	Reserve Mining	60	12	31	1164	581065	5276621		-90	Babbitt	South Kawishiwi			405	Virginia Fm
66305		1967	1586	St. Louis	Reserve Mining	60	12	30	234	582319	5277461		-90	Babbitt	Partridge River			1590	
66313		1967	1587	St. Louis	Reserve Mining	60	12	30	997	582465	5277245		-90	Babbitt	Partridge River			700	
67034			1602	St. Louis	Reserve Mining	60	12	16		584560	5281293		-90	Serpentine	South Kawishiwi	584560	5281293	1548	Virginia Fm
67037			1609	St. Louis	Reserve Mining	60	12	16	420	584672	5281402		-90	Serpentine	South Kawishiwi	584672	5281402	1565	Virginia Fm

DDH #	Chem	Date	Elevation Collar (ft)	County	Lessee	Twp	Rng	Sec	Total Depth (ft)	UTME Collar	UTMN Collar	Collar Azi	Collar Dip	Deposit	Intrusion DDH is in	UTME DC Base	UTMN DC Base	Elevation DC Base (ft)	Footwall
67042			1602	St. Louis	Reserve Mining	60	12	16	335	584774	5281527		-90	Babbitt	Virginia Fm.			1620	Collared in VF
67046			1573	St. Louis	Reserve Mining	60	12	16		584987	5281751		-90	Serpentine	South Kawishiwi	584987	5281751	1555	Virginia Fm
70163			1587	St. Louis	Reserve Mining	60	12	16		585056	5281802		-90	Serpentine	South Kawishiwi	585056	5281802	1480	Virginia Fm
8004	none	1961	1585	St. Louis	Erie Mining	60	12	3	272	586531	5284122		-90	Dunka Pit	South Kawishiwi	586531	5284122	1339	Virginia Fm
8005	X	1961	1570	St. Louis	Erie Mining	60	12	3	203	586603	5284524		-90	Dunka Pit	South Kawishiwi			1440	Still in D.C.
8008	none	1961	1567	St. Louis	Erie Mining	60	12	3	364	586494	5284378		-90	Dunka Pit	South Kawishiwi	586494	5284378	1383	Virginia Fm
8009	X	1961	1588	St. Louis	Erie Mining	60	12	3	323	586676	5284926		-90	Dunka Pit	South Kawishiwi	586676	5284926	1525	Virginia Fm
8010	X	1961	1578	St. Louis	Erie Mining	60	12	3	411	586664	5284707		-90	Dunka Pit	South Kawishiwi	586664	5284707	1448	Virginia Fm
8011	X	1961	1535	St. Louis	Erie Mining	60	12	3	291	586323	5284049		-90	Dunka Pit	South Kawishiwi	586323	5284049	1295	Virginia Fm
8012	none	1961	1535	St. Louis	Erie Mining	60	12	3	372	586311	5283829		-90	Dunka Pit	South Kawishiwi	586311	5283829	1387	Virginia Fm
8014	X	1961	1530	St. Louis	Erie Mining	60	12	10	340	586141	5283500		-90	Dunka Pit	South Kawishiwi	586141	5283500	1386	Virginia Fm
8016	none	1961	1518	St. Louis	Erie Mining	60	12	10	272	586080	5283317		-90	Dunka Pit	South Kawishiwi	586080	5283317	1432	Virginia Fm
8020	X	1962	1535	St. Louis	Erie Mining	60	12	3	318	586153	5283719		-90	Dunka Pit	South Kawishiwi	586153	5283719	1454	Virginia Fm
8021	none	1962	1542	St. Louis	Erie Mining	60	12	3	269	586275	5284085		-90	Dunka Pit	South Kawishiwi	586275	5284085	1428	Virginia Fm
8024	X	1962	1550	St. Louis	Erie Mining	60	12	3	319	586823	5284817		-90	Dunka Pit	South Kawishiwi	586823	5284817	1479	Virginia Fm
8032	none	1962	1527	St. Louis	Erie Mining	61	12	35	425	587237	5285192		-90	Dunka Pit	South Kawishiwi	587237	5285192	1378	Virginia Fm
8035	X	1962	1553	St. Louis	Erie Mining	60	12	2	332	586937	5284960		-90	Dunka Pit	South Kawishiwi	586937	5284960	1495	Virginia Fm
8040	X	1962	1588	St. Louis	Erie Mining	60	12	3	401	586532	5284577		-90	Dunka Pit	South Kawishiwi	586532	5284577	1416	Virginia Fm
8043	none	1962	1512	St. Louis	Erie Mining	61	12	35	242	587614	5286280		-90	Dunka Pit	South Kawishiwi			1210	Still in D.C.
8045	none	1962	1537	St. Louis	Erie Mining	61	12	35	151	587763	5286626		-90	Dunka Pit	South Kawishiwi			1225	Still in D.C.
8051	none	1962	1506	St. Louis	Erie Mining	60	12	10	350	585561	5282567		-90	Dunka Pit	South Kawishiwi	585561	5282567	1481	Virginia Fm
8070	none	1963	1515	St. Louis	Erie Mining	60	12	10	428	585515	5282369		-90	Dunka Pit	South Kawishiwi	585515	5282369	1327	Virginia Fm
8073	none	1964	1550	St. Louis	Erie Mining	60	12	3	284	586439	5284305		-90	Dunka Pit	South Kawishiwi	586439	5284305	1469	Virginia Fm
8074	none	1964	1508	St. Louis	Erie Mining	60	12	10	348	585691	5282695		-90	Dunka Pit	South Kawishiwi	585691	5282695	1433	Virginia Fm
8084	none	1964	1577	St. Louis	Erie Mining	60	12	3	324	586749	5284872		-90	Dunka Pit	South Kawishiwi	586749	5284872	1510	Virginia Fm
8085	none	1964	1507	St. Louis	Erie Mining	61	12	35	269	587504	5286134		-90	Dunka Pit	South Kawishiwi	587504	5286134	1412	Virginia Fm
8086	none	1964	1528	St. Louis	Erie Mining	61	12	35	122	587650	5286481		-90	Dunka Pit	South Kawishiwi			1225	Still in D.C.
8111	none	1964	1513	St. Louis	Erie Mining	61	12	35	273	587322	5285585		-90	Dunka Pit	South Kawishiwi			1449	Virginia Fm
8121	none	1964	1531	St. Louis	Erie Mining	61	12	35	173	587340	5285914		-90	Dunka Pit	South Kawishiwi	587340	5285914	1477	Virginia Fm
8140	none	1965	1531	St. Louis	Erie Mining	60	12	3	203	586220	5284012		-90	Dunka Pit	South Kawishiwi	586220	5284012	1490	BIF
8160	none	1965	1508	St. Louis	Erie Mining	61	12	35	240	587377	5285658		-90	Dunka Pit	South Kawishiwi	587377	5285658	1439	Virginia Fm
8170	none	1966	1591	St. Louis	Erie Mining	60	12	3	294	586512	5284707		-90	Dunka Pit	South Kawishiwi	586512	5284707	1567	Virginia Fm
8174	none	1966	1596	St. Louis	Erie Mining	60	12	3	250	586573	5284890		-90	Dunka Pit	South Kawishiwi	586573	5284890	1529	Virginia Fm
8184	none	1966	1515	St. Louis	Erie Mining	61	12	35	147	587577	5286308		-90	Dunka Pit	South Kawishiwi			1250	Still in D.C.
8189	none	1966	1521	St. Louis	Erie Mining	61	12	35	133	587612	5286396		-90	Dunka Pit	South Kawishiwi			1235	Still in D.C.
8197	none	1966	1534	St. Louis	Erie Mining	60	12	3	240	586329	5284158		-90	Dunka Pit	South Kawishiwi	586329	5284158	1465	Virginia Fm
8204	none	1966	1505	St. Louis	Erie Mining	61	12	35	195	587529	5286116		-90	Dunka Pit	South Kawishiwi	587529	5286116	1346	BIF
8206	none	1966	1508	St. Louis	Erie Mining	61	12	35	220	587385	5285880		-90	Dunka Pit	South Kawishiwi	587385	5285880	1439	BIF
8209	none	1966	1527	St. Louis	Erie Mining	61	12	35	25	587595	5286408		-90	Dunka Pit	South Kawishiwi			1250	Still in D.C.
8221	none	1966	1528	St. Louis	Erie Mining	61	12	35	160	587626	5286500		-90	Dunka Pit	South Kawishiwi	587626	5286500	1420	BIF
8222	none	1966	1505	St. Louis	Erie Mining	60	12	10	235	586086	5283427		-90	Dunka Pit	South Kawishiwi	586086	5283427	1435	Virginia Fm
8223	none	1966	1514	St. Louis	Erie Mining	60	12	3	281	586263	5283866		-90	Dunka Pit	South Kawishiwi	586263	5283866	1467	Virginia Fm
8239B	none	1966	1531	St. Louis	Erie Mining	61	12	35	125	587666	5286584		-90	Dunka Pit	South Kawishiwi	587666	5286584	1245	BIF
8243	none	1966	1589	St. Louis	Erie Mining	60	12	3	125	586554	5284789		-90	Dunka Pit	South Kawishiwi	586554	5284789	1489	Virginia Fm
8245	none	1966		St. Louis	Erie Mining	60	12	3	62	586573	5284814		-90	Dunka Pit	South Kawishiwi			1498	Still in D.C.
8246	none	1966		St. Louis	Erie Mining	60	12	3	48	586567	5284856		-90	Dunka Pit	South Kawishiwi	586567	5284856	1510	Virginia Fm
8247	none	1966		St. Louis	Erie Mining	60	12	3	43	586591	5284838		-90	Dunka Pit	South Kawishiwi			1490	Still in D.C.
8248	none	1966	1552	St. Louis	Erie Mining	60	12	3	48	586585	5284881		-90	Dunka Pit	South Kawishiwi			1500	Still in D.C.
8249	none	1966	1585	St. Louis	Erie Mining	60	12	3	142	586609	5284862		-90	Dunka Pit	South Kawishiwi	586609	5284862	1473	Virginia Fm
8258	X	1968	1515	St. Louis	Erie Mining	60	12	3	250	586269	5283975		-90	Dunka Pit	South Kawishiwi	586269	5283975	1428	Virginia Fm

DDH #	Chem	Date	Elevation Collar (ft)	County	Lessee	Twp	Rng	Sec	Total Depth (ft)	UTME Collar	UTMN Collar	Collar Azi	Collar Dip	Deposit	Intrusion DDH is in	UTME DC Base	UTMN DC Base	Elevation DC Base (ft)	Footwall
8262	none	1968	1510	St. Louis	Erie Mining	61	12	35	473	587626	5286042	-90		Dunka Pit	South Kawishiwi	587626	5286042	1097	BIF
8264	none	1968	1502	St. Louis	Erie Mining	61	12	35	284	587437	5285841	-90		Dunka Pit	South Kawishiwi	587437	5285841	1429	BIF
8268	X	1968	1505	St. Louis	Erie Mining	61	12	35	244	587431	5285732	-90		Dunka Pit	South Kawishiwi	587431	5285732	1422	
8269	X	1968	1525	St. Louis	Erie Mining	61	12	26	164	587950	5287112	-90		Dunka Pit	South Kawishiwi			1315	Still in D.C.
8270	X	1968	1530	St. Louis	Erie Mining	61	12	26	90	587945	5287205	-90		Dunka Pit	South Kawishiwi	587945	5287205	1485	BIF
8271	none	1968	1506	St. Louis	Erie Mining	60	12	10	420	586751	5283500	-90		Dunka Pit	South Kawishiwi			650	Still in DC
8272	none	1968	1492	St. Louis	Erie Mining	60	12	10	354	586013	5283024	-90		Dunka Pit	South Kawishiwi	586013	5283024	1388	Virginia Fm
8273	X	1968	1487	St. Louis	Erie Mining	60	12	3	294	586147	5283610	-90		Dunka Pit	South Kawishiwi	586147	5283610	1427	Virginia Fm
8274	X	1968	1539	St. Louis	Erie Mining	60	12	3	364	586502	5284257	-90		Dunka Pit	South Kawishiwi	586502	5284257	1341	Virginia Fm
8278	none	1968	1519	St. Louis	Erie Mining	60	12	10	255	586092	5283536	-90		Dunka Pit	South Kawishiwi	586092	5283536	1507	Virginia Fm
8279	none	1968	1531	St. Louis	Erie Mining	60	12	3	220	586208	5283792	-90		Dunka Pit	South Kawishiwi	586208	5283792	1502	Virginia Fm
8281	X	1968	1589	St. Louis	Erie Mining	60	12	3	258	586567	5284780	-90		Dunka Pit	South Kawishiwi	586567	5284780	1504	BIF
8285	none	1968	1476	St. Louis	Erie Mining	61	12	35	220	587267	5285512	-90		Dunka Pit	South Kawishiwi	587267	5285512	1469	Virginia Fm
8286	none	1968	1484	St. Louis	Erie Mining	61	12	35	195	587328	5285695	-90		Dunka Pit	South Kawishiwi	587328	5285695	1412	BIF
8288	none	1968	1509	St. Louis	Erie Mining	61	12	35	325	587559	5286207	-90		Dunka Pit	South Kawishiwi	587559	5286207	1497	BIF
8290	none	1968	1535	St. Louis	Erie Mining	60	12	3	54	586305	5284176	-90		Dunka Pit	South Kawishiwi	586305	5284176	1500	BIF
8291	X	1968	1499	St. Louis	Erie Mining	61	12	35	400	587924	5286048	-90		Dunka Pit	South Kawishiwi			1000	Still in D.C.
8292	none	1969	1523	St. Louis	Erie Mining	61	12	26	154	587909	5287030	-90		Dunka Pit	South Kawishiwi			1298	Still in D.C.
8293	none	1969	1520	St. Louis	Erie Mining	61	12	26	154	587978	5287264	-90		Dunka Pit	South Kawishiwi			1330	Still in D.C.
8294	none	1969	1518	St. Louis	Erie Mining	61	12	26	165	588008	5287356	-90		Dunka Pit	South Kawishiwi	588008	5287356	1414	Giants Range
8295	X	1970	1614	St. Louis	Erie Mining	60	12	3	234	586536	5284689	-90		Dunka Pit	South Kawishiwi	586536	5284689	1570	Virginia Fm
8298	X	1970	1510	St. Louis	Erie Mining	61	12	35	300	587425	5285622	-90		Dunka Pit	South Kawishiwi	587425	5285622	1398	
8299	X	1970	1518	St. Louis	Erie Mining	61	12	35	324	587316	5285475	-90		Dunka Pit	South Kawishiwi	587316	5285475	1420	Virginia Fm
8300	none	1970	1523	St. Louis	Erie Mining	61	12	35	390	587255	5285293	-90		Dunka Pit	South Kawishiwi	587255	5285293	1374	Virginia Fm
8301	X	1970	1541	St. Louis	Erie Mining	60	12	3	384	586257	5283756	-90		Dunka Pit	South Kawishiwi	586257	5283756	1376	Virginia Fm
8304	none	1970	1534	St. Louis	Erie Mining	60	12	2	331	587036	5285000	-90		Dunka Pit	South Kawishiwi	587036	5285000	1476	Virginia Fm
8305	X	1970	1551	St. Louis	Erie Mining	60	12	2	404	587030	5284890	-90		Dunka Pit	South Kawishiwi	587030	5284890	1391	Virginia Fm
8306	none	1970	1565	St. Louis	Erie Mining	60	12	3	291	586829	5284927	-90		Dunka Pit	South Kawishiwi	586829	5284927	1505	Virginia Fm
8307	X	1970	1556	St. Louis	Erie Mining	60	12	3	361	586926	5284853	-90		Dunka Pit	South Kawishiwi	586926	5284853	1390	Virginia Fm
8309	X	1970	1523	St. Louis	Erie Mining	60	12	3	274	586670	5284817	-90		Dunka Pit	South Kawishiwi	586670	5284817	1465	Virginia Fm
8310	X	1970	1530	St. Louis	Erie Mining	60	12	3	268	586445	5284414	-90		Dunka Pit	South Kawishiwi	586445	5284414	1487	Virginia Fm
8311	none	1970	1516	St. Louis	Erie Mining	60	12	3	310	586378	5284122	-90		Dunka Pit	South Kawishiwi	586378	5284122	1474	Virginia Fm
8312	X	1970	1502	St. Louis	Erie Mining	61	12	35	254	587468	5285933	-90		Dunka Pit	South Kawishiwi	587468	5285933	1428	BIF
8313	none	1970	1525	St. Louis	Erie Mining	60	12	10	374	586123	5283171	-90		Dunka Pit	South Kawishiwi	586123	5283171	1333	BIF
8317	none	1970	1518	St. Louis	Erie Mining	60	12	10	322	586129	5283280	-90		Dunka Pit	South Kawishiwi	586129	5283280	1425	Virginia Fm
8318	none	1970	1501	St. Louis	Erie Mining	61	12	35	264	587553	5286097	-90		Dunka Pit	South Kawishiwi	587553	5286097	1371	BIF
8319	X	1971	1532	St. Louis	Erie Mining	60	12	2	344	587145	5285146	-90		Dunka Pit	South Kawishiwi	587145	5285146	1431	Virginia Fm
8321	X	1971	1504	St. Louis	Erie Mining	61	12	35	355	587480	5285695	-90		Dunka Pit	South Kawishiwi			1178	Still in D.C.
8322	X	1971	1500	St. Louis	Erie Mining	61	12	35	234	587486	5285805	-90		Dunka Pit	South Kawishiwi			1205	Still in D.C.
8323	X	1971	1502	St. Louis	Erie Mining	61	12	35	304	587492	5285914	-90		Dunka Pit	South Kawishiwi	587492	5285914	1404	Virginia Fm
8324	X	1971	1507	St. Louis	Erie Mining	61	12	35	295	587498	5286024	-90		Dunka Pit	South Kawishiwi	587498	5286024	1491	Virginia Fm
8325	X	1971	1513	St. Louis	Erie Mining	61	12	35	235	587602	5286061	-90		Dunka Pit	South Kawishiwi			1165	Still in D.C.
8326	X	1971	1545	St. Louis	Erie Mining	60	12	3	314	586719	5284780	-90		Dunka Pit	South Kawishiwi	586719	5284780	1463	Virginia Fm
8327	X	1971	1542	St. Louis	Erie Mining	60	12	3	335	586492	5284494	-90		Dunka Pit	South Kawishiwi	586492	5284494	1463	Virginia Fm
8329	X	1971	1513	St. Louis	Erie Mining	60	12	3	336	586202	5283683	-90		Dunka Pit	South Kawishiwi	586202	5283683	1413	Virginia Fm
8330	X	1971	1515	St. Louis	Erie Mining	60	12	3	354	586317	5283939	-90		Dunka Pit	South Kawishiwi	586317	5283939	1353	Virginia Fm
8331	X	1971	1532	St. Louis	Erie Mining	60	12	3	424	586427	5284085	-90		Dunka Pit	South Kawishiwi	586427	5284085	1272	Virginia Fm
8333	X	1971	1528	St. Louis	Erie Mining	61	12	26	105	587887	5287103	-90		Dunka Pit	South Kawishiwi	587887	5287103	1491	BIF
8334	X	1971	1510	St. Louis	Erie Mining	61	12	26	154	588088	5287524	-90		Dunka Pit	South Kawishiwi			1320	Still in D.C.
8335	X	1971	1499	St. Louis	Erie Mining	61	12	26	145	588158	5287643	-90		Dunka Pit	South Kawishiwi			1260	Still in D.C.

DDH #	Chem	Date	Elevation Collar (ft)	County	Lessee	Twp	Rng	Sec	Total Depth (ft)	UTME Collar	UTMN Collar	Collar Azi	Collar Dip	Deposit	Intrusion DDH is in	UTME DC Base	UTMN DC Base	Elevation DC Base (ft)	Footwall
8336	none	1972	1523	St. Louis	Erie Mining	60	12	2	405	587133	5284927	-90		Dunka Pit	South Kawishiwi	587133	5284927	1398	Virginia Fm
8342	X	1972	1522	St. Louis	Erie Mining	60	12	2	415	587188	5285000	-90		Dunka Pit	South Kawishiwi	587188	5285000	1388	Virginia Fm
8343	none	1972	1533	St. Louis	Erie Mining	60	12	2	435	587194	5285110	-90		Dunka Pit	South Kawishiwi	587194	5285110	1458	Virginia Fm
8344	X	1972	1517	St. Louis	Erie Mining	61	12	35	355	587365	5285439	-90		Dunka Pit	South Kawishiwi	587365	5285439	1412	Virginia Fm
8345	X	1972	1502	St. Louis	Erie Mining	61	12	35	305	587547	5285988	-90		Dunka Pit	South Kawishiwi	587547	5285988	1326	BIF
8346	X	1972	1525	St. Louis	Erie Mining	60	12	9	395	585411	5282219	-90		Dunka Pit	South Kawishiwi	585411	5282219	1353	Virginia Fm
8351	none	1972	1503	St. Louis	Erie Mining	60	12	10	315	585745	5282768	-90		Dunka Pit	South Kawishiwi	585745	5282768	1424	Virginia Fm
8357	X	1973	1531	St. Louis	Erie Mining	60	12	10	366	585605	5282530	-90		Dunka Pit	South Kawishiwi	585605	5282530	1403	Virginia Fm
8358	none	1973	1520	St. Louis	Erie Mining	60	12	10	356	585636	5282622	-90		Dunka Pit	South Kawishiwi	585636	5282622	1389	Virginia Fm
8359	none	1973	1532	St. Louis	Erie Mining	60	12	10	406	585739	5282658	-90		Dunka Pit	South Kawishiwi	585739	5282658	1350	Virginia Fm
8360	none	1973	1517	St. Louis	Erie Mining	60	12	10	370	585794	5282732	-90		Dunka Pit	South Kawishiwi	585794	5282732	1370	Virginia Fm
8362	none	1973	1512	St. Louis	Erie Mining	60	12	10	475	585899	5282767	-90		Dunka Pit	South Kawishiwi	585899	5282767	1358	Virginia Fm
8364	X	1973	1509	St. Louis	Erie Mining	60	12	10	376	585940	5282851	-90		Dunka Pit	South Kawishiwi	585940	5282851	1349	Virginia Fm
8365	none	1973	1482	St. Louis	Erie Mining	60	12	10	355	586007	5282915	-90		Dunka Pit	South Kawishiwi	586007	5282915	1422	Virginia Fm
8366	none	1973	1490	St. Louis	Erie Mining	60	12	10	405	586062	5282988	-90		Dunka Pit	South Kawishiwi	586062	5282988	1300	Virginia Fm
8367	none	1973	1508	St. Louis	Erie Mining	60	12	10	420	586115	5283059	-90		Dunka Pit	South Kawishiwi	586115	5283059	1398	Virginia Fm
8368	none	1973	1523	St. Louis	Erie Mining	60	12	10	450	586196	5283116	-90		Dunka Pit	South Kawishiwi	586196	5283116	1373	Virginia Fm
8369	none	1973	1475	St. Louis	Erie Mining	60	12	10	336	586178	5283244	-90		Dunka Pit	South Kawishiwi	586178	5283244	1448	Virginia Fm
8370	X	1973	1562	St. Louis	Erie Mining	60	12	3	346	586768	5284744	-90		Dunka Pit	South Kawishiwi	586768	5284744	1429	Virginia Fm
8371	X	1973	1552	St. Louis	Erie Mining	60	12	3	350	586871	5284780	-90		Dunka Pit	South Kawishiwi	586871	5284780	1393	Virginia Fm
8372	X	1973	1527	St. Louis	Erie Mining	61	12	35	258	587474	5285585	-90		Dunka Pit	South Kawishiwi			1160	Still in D.C.
8373	none	1973	1493	St. Louis	Erie Mining	60	12	10	216	585956	5282896	-90		Dunka Pit	South Kawishiwi	585956	5282896	1426	Virginia Fm
8374	none	1974	1520	St. Louis	Erie Mining	61	12	26	50	587878	5286939	-90		Dunka Pit	South Kawishiwi			1275	Still in D.C.
8375	none	1974	1515	St. Louis	Erie Mining	61	12	26	100	587915	5286911	-90		Dunka Pit	South Kawishiwi			1275	Still in D.C.
8376	X	1974	1525	St. Louis	Erie Mining	61	12	26	100	587881	5286993	-90		Dunka Pit	South Kawishiwi			1280	Still in D.C.
8377	none	1974	1515	St. Louis	Erie Mining	61	12	26	90	587918	5286966	-90		Dunka Pit	South Kawishiwi			1280	Still in D.C.
8378	X	1974	1511	St. Louis	Erie Mining	61	12	26	155	587945	5287003	-90		Dunka Pit	South Kawishiwi	587945	5287003	1372	Giants Range
8379	none	1974	1525	St. Louis	Erie Mining	61	12	26	100	587914	5287083	-90		Dunka Pit	South Kawishiwi	587914	5287083	1480	BIF
8380	none	1974	1520	St. Louis	Erie Mining	61	12	26	100	587948	5287058	-90		Dunka Pit	South Kawishiwi			1310	Still in D.C.
8381	X	1974	1520	St. Louis	Erie Mining	61	12	26	115	587976	5287094	-90		Dunka Pit	South Kawishiwi	587976	5287094	1409	BIF
8382	X	1974	1528	St. Louis	Erie Mining	61	12	26	95	587915	5287140	-90		Dunka Pit	South Kawishiwi			1320	Still in D.C.
8383	X	1974	1530	St. Louis	Erie Mining	61	12	26	45	587878	5287167	-90		Dunka Pit	South Kawishiwi	587878	5287167	1492	BIF
8384	X	1974	1530	St. Louis	Erie Mining	61	12	26	60	587906	5287204	-90		Dunka Pit	South Kawishiwi	587906	5287204	1488	BIF
8385	X	1974	1530	St. Louis	Erie Mining	61	12	26	60			-90		Dunka Pit	South Kawishiwi			1550	BIF
8386	X	1974	1515	St. Louis	Erie Mining	61	12	26	115	587982	5287204	-90		Dunka Pit	South Kawishiwi	587982	5287204	1403	Giants Range
8389	none	1974	1502	St. Louis	Erie Mining	61	12	35	255	587556	5286152	-90		Dunka Pit	South Kawishiwi	587556	5286152	1447	BIF
8390	X	1974	1506	St. Louis	Erie Mining	61	12	35	295	587542	5286083	-90		Dunka Pit	South Kawishiwi	587542	5286083	1339	Virginia Fm
8391	none	1974	1528	St. Louis	Erie Mining	61	12	26	90	587946	5286888	-90		Dunka Pit	South Kawishiwi	587946	5286888	1446	BIF
8392	X	1974	1530	St. Louis	Erie Mining	61	12	26	82	587854	5287071	-90		Dunka Pit	South Kawishiwi	587854	5287071	1471	BIF
8393	none	1974	1519	St. Louis	Erie Mining	61	12	26	65	587984	5287374	-90		Dunka Pit	South Kawishiwi			1360	Still in D.C.
8394	X	1974	1518	St. Louis	Erie Mining	61	12	26	165	587881	5287051	-90		Dunka Pit	South Kawishiwi	587881	5287051	1414	Giants Range
8395	X	1976	1445	St. Louis	Erie Mining	60	12	3	435	586707	5284561	-90		Dunka Pit	South Kawishiwi	586707	5284561	1222	Virginia Fm
8396	X	1976	1529	St. Louis	Erie Mining	60	12	2	455	587018	5284671	-90		Dunka Pit	South Kawishiwi	587018	5284671	1350	Virginia Fm
8397	X	1976	1515	St. Louis	Erie Mining	60	12	2	425	587152	5284799	-90		Dunka Pit	South Kawishiwi	587152	5284799	1292	Virginia Fm
8398	none	1977	1476	St. Louis	Erie Mining	60	12	3	204	586880	5285002	-90		Dunka Pit	South Kawishiwi			1430	Still in D.C.
8399	none	1977	1468	St. Louis	Erie Mining	60	12	2	214	586987	5285036	-90		Dunka Pit	South Kawishiwi			1410	Still in D.C.
8400	none	1977	1405	St. Louis	Erie Mining	61	12	35	184	587164	5285247	-90		Dunka Pit	South Kawishiwi			1375	Still in D.C.
8401	X	1978	1556	St. Louis	Erie Mining	60	12	2	434	586981	5284927	-90		Dunka Pit	South Kawishiwi	586981	5284927	1449	Virginia Fm
8402	X	1978	1518	St. Louis	Erie Mining	60	12	2	384	587091	5284844	-90		Dunka Pit	South Kawishiwi	587091	5284844	1393	Virginia Fm
8403	none	1978	1534	St. Louis	Erie Mining	60	12	2	463	587082	5284957	-90		Dunka Pit	South Kawishiwi			1345	Still in D.C.

DDH #	Chem	Date	Elevation Collar (ft)	County	Lessee	Twp	Rng	Sec	Total Depth (ft)	UTME Collar	UTMN Collar	Collar Azi	Collar Dip	Deposit	Intrusion DDH is in	UTME DC Base	UTMN DC Base	Elevation DC Base (ft)	Footwall
8404	none	1978	1519	St. Louis	Erie Mining	60	12	2	404	587182	5284890		-90	Dunka Pit	South Kawishiwi	587182	5284890	1340	Virginia Fm
8405	none	1978	1485	St. Louis	Erie Mining	60	12	2	344	587139	5285036		-90	Dunka Pit	South Kawishiwi	587139	5285036	1427	Virginia Fm
8406	none	1978	1527	St. Louis	Erie Mining	61	12	35	413	587413	5285402		-90	Dunka Pit	South Kawishiwi	587413	5285402	1268	BIF
8407	none	1978	1518	St. Louis	Erie Mining	60	12	2	444	587243	5285073		-90	Dunka Pit	South Kawishiwi	587243	5285073	1310	Virginia Fm
8408	none	1978	1525	St. Louis	Erie Mining	61	12	35	404	587383	5285309		-90	Dunka Pit	South Kawishiwi	587383	5285309	1351	Virginia Fm
8409	none	1979	1445	St. Louis	Erie Mining	60	12	3	160	586621	5284853		-90	Dunka Pit	South Kawishiwi			1491	Still in D.C.
8411	none	1979	1478	St. Louis	Erie Mining	60	12	3	199	586713	5284899		-90	Dunka Pit	South Kawishiwi			1462	Still in D.C.
8412	none	1979	1518	St. Louis	Erie Mining	60	12	3	275	586786	5284844		-90	Dunka Pit	South Kawishiwi	586786	5284844	1498	Virginia Fm
8413	none	1979	1516	St. Louis	Erie Mining	60	12	2	415	587456	5285409		-90	Dunka Pit	South Kawishiwi	587456	5285409	1308	Virginia Fm
8415	none	1980	1455	St. Louis	Erie Mining	60	12	3	183	586780	5284963		-90	Dunka Pit	South Kawishiwi			1455	Still in D.C.
8416	none	1980	1493	St. Louis	Erie Mining	60	12	3	233	586877	5284890		-90	Dunka Pit	South Kawishiwi	586877	5284890	1441	Virginia Fm
8417	none	1980	1510	St. Louis	Erie Mining	60	12	2	413	587237	5284963		-90	Dunka Pit	South Kawishiwi	587237	5284963	1294	BIF
8418	none	1980	1395	St. Louis	Erie Mining	61	12	35	213				-90	Dunka Pit	South Kawishiwi	?	?	1380	BIF
8420	none	1980	1476	St. Louis	Erie Mining	61	12	35	273	587358	5285558		-90	Dunka Pit	South Kawishiwi	587358	5285558	1404	BIF
8421	none	1984	1412	St. Louis	Erie Mining	61	12	35	104	587554	5286180		-90	Dunka Pit	South Kawishiwi			1245	Still in D.C.
8423A	none	1984	1395	St. Louis	Erie Mining	61	12	35	161	587458	5285844		-90	Dunka Pit	South Kawishiwi	587458	5285844	1358	BIF
8423B	none	1984	1395	St. Louis	Erie Mining	61	12	35	194	587458	5285845		-90	Dunka Pit	South Kawishiwi	587458	5285845	1358	BIF
8424	none	1984	1386	St. Louis	Erie Mining	61	12	35	285	587447	5285777		-90	Dunka Pit	South Kawishiwi			1290	Still in D.C.
8425	none	1985	1524	St. Louis	Erie Mining	61	12	35	384	587328	5285238		-90	Dunka Pit	South Kawishiwi	587328	5285238	1344	Virginia Fm
8426	none	1985	1401	St. Louis	Erie Mining	61	12	35	174	587484	5286005		-90	Dunka Pit	South Kawishiwi			1390	Still in D.C.
8427	none	1985	1411	St. Louis	Erie Mining	61	12	35	144	587568	5286122		-90	Dunka Pit	South Kawishiwi			1215	Still in D.C.
8428	none	1985	1348	St. Louis	Erie Mining	61	12	35	164	587298	5285375		-90	Dunka Pit	South Kawishiwi				Still in D.C.
A-1	X	1968	1435	St. Louis	Humble Oil	58	14	21	563	566802	5260057		-90	Section 22	Partridge River	566802	5260057	1003	Virginia Fm
A-2	X	1969	1520	St. Louis	Humble Oil	58	14	22	1611	567291	5260056	320	-60	Section 22	Partridge River	567138	5260238	85	Virginia Fm
A-3	X	1970	1530	St. Louis	Humble Oil	58	14	22	405	567395	5260716		-90	Section 22	Partridge River	567395	5260716	1251	Virginia Fm
A-4	X	1970	1525	St. Louis	Humble Oil	58	14	22	829	567521	5259836		-90	Section 22	Partridge River			-180	Still in D.C.
A-5	none	1973	1530	St. Louis	Humble Oil	58	14	22	509	567874	5260419		-90	Section 22	Partridge River			-480	Still in D.C.
A-6	X	1974	1530	St. Louis	Humble Oil	58	14	22	692	567521	5259935	288	-45	Section 22	Partridge River			-90	Still in D.C.
A1-1	X	1958	1528	St. Louis	Bear Creek	59	13	30	416	572016	5268407		-90	Longnose	Partridge River			-1850	Still in DC
A2-1	X	1958	1470	St. Louis	Bear Creek	58	14	9	232	566783	5263619	250	-63	Allen	Partridge River			1620	Collared in VF
A2-2	X	1958	1470	St. Louis	Bear Creek	58	14	9	304	566403	5264113		-90	Allen	Partridge River			1620	Collared in VF
A2-3	none	1959	1470	St. Louis	Bear Creek	58	14	9	1535	566733	5264410		-90	Allen	Partridge River	566733	5264410	-37	Virginia Fm
A2-4	X	1959	1488	St. Louis	Bear Creek	58	14	9	593	566525	5264252	250	-60	Allen	Partridge River	566451	5264225	1038	Virginia Fm
A2-5	none	1959	1480	St. Louis	Bear Creek	58	14	9	324	566628	5263470	250	-60	Allen	Partridge River	566601	5263443	1314	Virginia Fm
A2-6	X	1959	1460	St. Louis	Bear Creek	58	14	4	2570	566545	5264641	287	-55	Allen	Partridge River	566126	5264769	-594	Virginia Fm
A2-7	none	1960	1448	St. Louis	Bear Creek	58	14	4	1224	566181	5264380	355	-50	Allen	Partridge River			200	
A3-1	none	1959	1440	St. Louis	Bear Creek	58	14	4	300	565730	5264659	250	-60	Allen	Partridge River			1620	Collared in VF
A3-2	none	1959	1440	St. Louis	Bear Creek	58	14	4	345	565870	5264577	250	-60	Allen	Partridge River			1620	Collared in VF
A3-3	none	1959	1477	St. Louis	Bear Creek	59	14	33	115	566224	5266256	310	-45	Wyman Creek	Partridge River			1620	Collared in VF
A3-4	X	1959	1500	St. Louis	Bear Creek	59	14	34	514	566524	5266149	310	-60	Wyman Creek	Partridge River	566481	5266185	-1179	Virginia Fm
A3-5	X	1959	1480	St. Louis	Bear Creek	59	14	34	1321	566802	5266004	310	-85	Wyman Creek	Partridge River	566777	5266025	253.7	VF into BIF
A4-01	X	1958	1570	St. Louis	Bear Creek	59	13	18	565	572289	5270764	315	-60	Wetlegs	Partridge River			1620	Collared in VF
A4-02	X	1958	1588	St. Louis	Bear Creek	59	13	18	600	572646	5271127	315	-60	Wetlegs	Partridge River			1620	Collared in VF
A4-03	X	1958	1580	St. Louis	Bear Creek	59	13	18	400	572882	5271115	315	-60	Wetlegs	Partridge River	572873	5271124	1509	Virginia Fm
A4-04	X	1958	1580	St. Louis	Bear Creek	59	13	18	733	572952	5270902	315	-60	Wetlegs	Partridge River	572877	5270977	978	Virginia Fm
A4-05	X	1958	1580	St. Louis	Bear Creek	59	13	17	533	573065	5271133	315	-60	Wetlegs	Partridge River	573017	5271181	1195	Virginia Fm
A4-06	X	1959	1580	St. Louis	Bear Creek	59	13	18	385	572511	5270607	315	-60	Wetlegs	Partridge River	572490	5270628	1411	Virginia Fm
A4-07	X	1959	1590	St. Louis	Bear Creek	59	13	18	304	572727	5271055	315	-60	Wetlegs	Partridge River	572714	5271068	1488	Virginia Fm
A4-08	X	1959	1590	St. Louis	Bear Creek	59	13	17	775	573164	5271208	315	-60	Wetlegs	Partridge River	573092	5271280	1004	Virginia Fm
A4-09	X	1960	1590	St. Louis	Bear Creek	59	13	17	279	573238	5271567	315	-65	Wetlegs	Partridge River	573220	5271585	1435	Virginia Fm

DDH #	Chem	Date	Elevation Collar (ft)	County	Lessee	Twp	Rng	Sec	Total Depth (ft)	UTME Collar	UTMN Collar	Collar Azi	Collar Dip	Deposit	Intrusion DDH is in	UTME DC Base	UTMN DC Base	Elevation DC Base (ft)	Footwall
A4-10	X	1967	1570	St. Louis	Kennecott	59	13	17	2112.5	573714	5270951		-90	Wetlegs	Partridge River	573714	5270951	-370	VF into BIF
A4-11	X	1968	1610	St. Louis	Bear Creek	59	13	16	2214	575145	5272037	315	-60	Wetlegs	Partridge River	574932	5272291	-274	VF into BIF
A4-12	X	1968	1590	St. Louis	Bear Creek	59	14	25	2655	571174	5268284		-90	Wetlegs/Wyman Crl	Partridge River	571174	5268284	-1014	VF into BIF
A4-13	X	1968	1555	St. Louis	Kennecott	59	13	19	2465	572916	5270150		-90	Wetlegs	Partridge River	572916	5270150	-720	VF into BIF
A4-14	X	1971	1470	St. Louis	Bear Creek	59	13	20	3464	573835	5270054		-90	Wetlegs/Section 17	Partridge River	573835	5270054	-1954	VF into BIF
A4-15		1971	1605	St. Louis	Kennecott	59	13	17	664	573223	5272001		-90	Wetlegs	Partridge River			1650	
A4-16		1971	1620	St. Louis	Kennecott	59	13	17	310	573203	5272070		-90	Wetlegs	Partridge River			1650	
A4-17		1971	1600	St. Louis	Kennecott	59	13	17	350	573090	5272075		-90	Wetlegs	Partridge River			1650	
A4-18	X	1971	1585	St. Louis	Kennecott	59	13	17	923	572948	5271271		-90	Wetlegs	Partridge River	572948	5271271	1398	VF into BIF
AD-1	X	1957	1500	Lake	Bear Creek	62	11	26	673	597479	5297721	320	-60	Spruce Road	South Kawishiwi	597317	5297952	1011	Giants Range
AD-2	X	1957	1510	Lake	Bear Creek	62	11	26	675	597758	5297845	330	-60	Spruce Road	South Kawishiwi	597595	5298127	946	Giants Range
AD-3	X	1957	1520	Lake	Bear Creek	62	11	26	660	598064	5298150	330	-60	Spruce Road	South Kawishiwi	597908	5298421	977	Giants Range
AD-4	X	1957	1490	Lake	Bear Creek	62	11	26	306	597962	5298337	332	-60	Spruce Road	South Kawishiwi	597912	5298425	1314	Giants Range
AD-5	X	1957	1510	Lake	Bear Creek	62	11	26	830	598477	5298169	336	-60	Spruce Road	South Kawishiwi	598272	5298523	802	Giants Range
AD-6	X	1957	1510	Lake	Bear Creek	62	11	26	571	598527	5298422	344	-60	Spruce Road	South Kawishiwi	598387	5298665	1024	Giants Range
ARG-1	X	1983	1592	Lake	Lehmann	60	11	18	502	591095	5281060	300	-55		South Kawishiwi				Still in D.C.
B-3	X	1967	1570	St. Louis	Kennecott	59	14	36	2477	569911	5267166		-90	Wyman Creek	Partridge River			-900	Still in DC
B1-001	X	1958	1620.9	St. Louis	Kennecott	60	12	30	520	582121	5277388	327	-60	Babbitt	Partridge River	582096	5277413	1449	Virginia Fm
B1-002	X	1958	1553	St. Louis	Kennecott	60	12	29	906	582921	5277947	327	-60	Babbitt	Partridge River	582829	5278038	930	Virginia Fm
B1-003	X	1959	1565	St. Louis	Kennecott	60	12	29	932	583242	5278346	327	-45	Babbitt	Partridge River	583110	5278478	1050	Virginia Fm
B1-004	X	1959	1544	St. Louis	Kennecott	60	12	29	1018	583538	5278562	327	-60	Babbitt	Partridge River	583425	5278675	782	Virginia Fm
B1-005	X	1959	1528	St. Louis	Kennecott	60	12	29	795	583652	5278387	328	-60	Babbitt	Partridge River	583595	5278444	1143	Virginia Fm
B1-006	X	1959	1584.8	St. Louis	Kennecott	60	12	29	700	582804	5277679	328	-60	Babbitt	Partridge River	582771	5277712	1361	Virginia Fm
B1-007	X	1959	1545	St. Louis	Kennecott	60	12	29	1004	583767	5278207	328	-60	Babbitt	Partridge River	583653	5278322	769	Virginia Fm
B1-008	X	1959	1535.5	St. Louis	Kennecott	60	12	29	756	583532	5278347	0	-90	Babbitt	Partridge River	583532	5278347	884	Virginia Fm
B1-009	X	1959	1531.4	St. Louis	Kennecott	60	12	29	465	583738	5278479	0	-90	Babbitt	Partridge River	583738	5278479	1112	Virginia Fm
B1-010	X	1959	1542.3	St. Louis	Kennecott	60	12	29	692	583327	5278215	0	-90	Babbitt	Partridge River	583327	5278215	901	Virginia Fm
B1-011	X	1959	1575.3	St. Louis	Kennecott	60	12	29	275	583123	5278082	0	-90	Babbitt	Partridge River	583123	5278082	1504	Virginia Fm
B1-012	X	1959	1557.2	St. Louis	Kennecott	60	12	29	486	583189	5277979	0	-90	Babbitt	Partridge River	583189	5277979	1191	Virginia Fm
B1-013	X	1959	1573.7	St. Louis	Kennecott	60	12	29	456	582985	5277847	0	-90	Babbitt	Partridge River	582985	5277847	1273	Virginia Fm
B1-014	X	1959	1578.2	St. Louis	Kennecott	60	12	29	566	582846	5277614	0	-90	Babbitt	Partridge River	582846	5277614	1175	Virginia Fm
B1-015	X	1959	1579.6	St. Louis	Kennecott	60	12	29	126	582575	5277583	0	-90	Babbitt	Partridge River			1580	Collared in VF
B1-016	none	1959	1585.7	St. Louis	Kennecott	60	12	30	93	582371	5277449	0	-90	Babbitt	Partridge River			1580	Collared in VF
B1-017	X	1959	1585.9	St. Louis	Kennecott	60	12	29	576	582641	5277481	0	-90	Babbitt	Partridge River	582641	5277481	1052	Virginia Fm
B1-018	X	1959	1583.9	St. Louis	Kennecott	60	12	30	685	582432	5277355	0	-90	Babbitt	Partridge River	582432	5277355	936	Virginia Fm
B1-019	X	1959	1612.3	St. Louis	Kennecott	60	12	30	512	582164	5277320	0	-90	Babbitt	Partridge River	582164	5277320	1140	Virginia Fm
B1-020	X	1959	1607.3	St. Louis	Kennecott	60	12	30	249	581894	5277290	0	-90	Babbitt	Partridge River	581894	5277290	1389	Virginia Fm
B1-021	X	1959	1613.9	St. Louis	Kennecott	60	12	30	831	581960	5277186	0	-90	Babbitt	Partridge River	581960	5277186	821	Virginia Fm
B1-022	X	1959	1608.8	St. Louis	Kennecott	60	12	30	1055	582026	5277086	0	-90	Babbitt	Partridge River	582026	5277086	705	Virginia Fm
B1-023	X	1959	1592.2	St. Louis	Kennecott	60	12	30	977	582231	5277218	0	-90	Babbitt	Partridge River	582231	5277218	672	Virginia Fm
B1-024	X	1959	1590.4	St. Louis	Kennecott	60	12	30	1590	582364	5277014	0	-90	Babbitt	Partridge River	582364	5277014	75	Virginia Fm
B1-025	X	1959	1606.5	St. Louis	Kennecott	60	12	31	511	581397	5276931	0	-90	Babbitt	Partridge River	581397	5276931	1194	Virginia Fm
B1-026	X	1959	1617	St. Louis	Kennecott	60	12	30	433	581688	5277158	0	-90	Babbitt	Partridge River	581688	5277158	1276	Virginia Fm
B1-027	X	1959	1543.4	St. Louis	Kennecott	60	12	29	1186	583519	5277919	0	-90	Babbitt	Partridge River	583519	5277919	396	Virginia Fm
B1-028	X	1959	1608.5	St. Louis	Kennecott	60	12	31	1234	581822	5276951	0	-90	Babbitt	Partridge River	581822	5276951	506	Virginia Fm
B1-029	X	1959	1591.9	St. Louis	Kennecott	60	12	31	1703	581958	5276752	0	-90	Babbitt	Partridge River	581958	5276752	-60	Virginia Fm
B1-030	X	1959	1563.2	St. Louis	Kennecott	60	12	29	1248	583181	5277546	0	-90	Babbitt	Partridge River	583181	5277546	556	Virginia Fm
B1-031	X	1959	1607	St. Louis	Kennecott	60	12	31	608	581391	5276939	327	-45	Babbitt	Partridge River	581352	5276978	1456	Virginia Fm
B1-032	X	1959	1630	St. Louis	Kennecott	60	12	29	589	583371	5277699	327	-60	Babbitt	Partridge River	583310	5277759	1218	Virginia Fm
B1-033	X	1960	1567.2	St. Louis	Kennecott	60	12	29	1726	584005	5278067	0	-90	Babbitt	Partridge River	584005	5278067	-85	Virginia Fm

DDH #	Chem	Date	Elevation Collar (ft)	County	Lessee	Twp	Rng	Sec	Total Depth (ft)	UTME Collar	UTMN Collar	Collar Azi	Collar Dip	Deposit	Intrusion DDH is in	UTME DC Base	UTMN DC Base	Elevation DC Base (ft)	Footwall
B1-034	X	1960	1597.9	St. Louis	Kennecott	60	12	31	1921	581446	5276167	327	-48	Babbitt	Partridge River	581118	5276495	313	Virginia Fm
B1-035	X	1959	1529.5	St. Louis	Kennecott	60	12	29	800	583755	5278453	327	-45	Babbitt	Partridge River	583694	5278514	1290	Virginia Fm
B1-036	X	1959	1548	St. Louis	Kennecott	60	12	29	929	583671	5278582	325	-45	Babbitt	Partridge River			865	Still in DC
B1-037	none	1960	1556	St. Louis	Kennecott	60	12	29	600	583611	5278675	327	-45	Babbitt	Partridge River			850	Still in DC
B1-038	X	1959	1528	St. Louis	Kennecott	60	12	21	1103	584385	5278725	327	-60	Babbitt	Partridge River			415	Still in DC
B1-039	X	1960	1593.1	St. Louis	Kennecott	60	12	31	1800	582088	5276540	0	-90	Babbitt	Partridge River	582088	5276540	-2	Virginia Fm
B1-040	X	1960	1604.2	St. Louis	Kennecott	60	12	31	1226	581614	5276818	0	-90	Babbitt	Partridge River	581614	5276818	412	Virginia Fm
B1-041	X	1960	1599.4	St. Louis	Kennecott	60	12	31	1606	581413	5276217	0	-90	Babbitt	Partridge River	581413	5276217	83	Virginia Fm
B1-042	X	1960	1598	St. Louis	Kennecott	60	12	31	1649	581671	5276276	0	-88	Babbitt	Partridge River	581671	5276276	208	Virginia Fm
B1-043	X	1960	1531	St. Louis	Kennecott	60	12	29	1043	584009	5278509	0	-90	Babbitt	Partridge River	584009	5278509	542	Virginia Fm
B1-044	X	1960	1530	St. Louis	Kennecott	60	12	29	308	583805	5278377	327	-45	Babbitt	Partridge River	583759	5278423	1329	Virginia Fm
B1-045	X	1960	1540	St. Louis	Kennecott	60	12	29	351	583499	5278398	327	-45	Babbitt	Partridge River	583437	5278460	1297	Virginia Fm
B1-046	X	1968	1558	St. Louis	Kennecott	60	12	29	474	583450	5278474	327	-45	Babbitt	Partridge River	583406	5278518	1385	Virginia Fm
B1-047	X	1960	1538	St. Louis	Kennecott	60	12	29	348	583598	5278244	327	-45	Babbitt	Partridge River			700	Still in DC
B1-048	X	1960	1538.7	St. Louis	Kennecott	60	12	29	350	583395	5278110	327	-45	Babbitt	Partridge River			835	Still in DC
B1-049	X	1960	1535.4	St. Louis	Kennecott	60	12	29	350	583944	5278613	327	-45	Babbitt	Partridge River			785	Still in DC
B1-050	X	1960	1528.8	St. Louis	Kennecott	60	12	29	350	584077	5278409	327	-45	Babbitt	Partridge River			340	Still in DC
B1-051	X	1960	1624	St. Louis	Kennecott	60	12	31	893	580914	5276545	327	-50	Babbitt	Partridge River	580775	5276684	1081	Virginia Fm
B1-052	none	1960	1609	St. Louis	Kennecott	60	12	30	165	582433	5278253	327	-45	Babbitt	Partridge River			1620	Collared in VF
B1-053	none	1960	1606	St. Louis	Kennecott	60	12	30	101	581726	5277326	327	-45	Babbitt	Partridge River			1620	Collared in VF
B1-054	X	1960	1602	St. Louis	Kennecott	60	12	29	405	582515	5278125	327	-45	Babbitt	Partridge River	582447	5278193	1336	Virginia Fm
B1-055	none	1960	1600	St. Louis	Kennecott	60	12	30	479	582208	5277716	327	-45	Babbitt	Partridge River	582147	5277777	1363	Virginia Fm
B1-056	X	1967	1602	St. Louis	Bear Creek	60	12	31	1430	581428	5275771	0	-90	Babbitt	Partridge River	581428	5275771	271	Virginia Fm
B1-057	X	1967	1596	St. Louis	Kennecott	60	13	36	964	580916	5275922	0	-90	Babbitt	Partridge River	580916	5275922	916	Virginia Fm
B1-058	X	1967	1596	St. Louis	Kennecott	60	12	31	1962	582307	5276287	0	-90	Babbitt	Partridge River	582307	5276287	107	Virginia Fm
B1-059	X	1967	1613	St. Louis	Kennecott	60	13	36	794	580681	5276144	0	-90	Babbitt	Partridge River	580681	5276144	937	Virginia Fm
B1-060	X	1967	1601	St. Louis	Kennecott	60	12	32	1851	583117	5276792	0	-90	Babbitt	Partridge River	583117	5276792	-133	Virginia Fm
B1-061	X	1967	1589	St. Louis	Kennecott	60	12	29	2088	583813	5277400	0	-90	Babbitt	Partridge River	583813	5277400	-398	Virginia Fm
B1-062	X	1967	1557	St. Louis	Bear Creek	60	12	16	634	584921	5280870	0	-90	Serpentine	South Kawishiwi	584921	5280870	971	Virginia Fm
B1-063	X	1967	1537	St. Louis	Bear Creek	60	12	16	997	585171	5280329	0	-90	Serpentine	South Kawishiwi	585171	5280329	589	Virginia Fm
B1-064	X	1967	1531	St. Louis	Kennecott	60	12	21	2083	585574	5279353	0	-90	Serpentine	South Kawishiwi			-270	Still in DC
B1-065	X	1967	1547.1	St. Louis	Kennecott	60	12	28	2320	584892	5278053	0	-90	Babbitt	Partridge River	584892	5278053	-732	BIF
B1-066	X	1967	1600	St. Louis	Kennecott	59	12	6	2344	582034	5275324	0	-90	Babbitt	Partridge River	582034	5275324	-691	Virginia Fm
B1-067	X	1967	1543	St. Louis	Bear Creek	60	12	16	835	585491	5281114	0	-90	Serpentine	South Kawishiwi	585491	5281114	726	Virginia Fm
B1-068	X	1967	1553	St. Louis	Bear Creek	60	12	15	2534	586234	5280823	0	-90	Serpentine	South Kawishiwi	586234	5280823	-606	Virginia Fm
B1-069	X	1967	1609	St. Louis	Kennecott	60	12	32	2024	583066	5276049	0	-90	Babbitt	Partridge River	583066	5276049	-369	Virginia Fm
B1-070	X	1967	1561	St. Louis	Bear Creek	60	12	16	674	585181	5281134	0	-90	Serpentine	South Kawishiwi	585181	5281134	999	Virginia Fm
B1-071	X	1967	1540	St. Louis	Bear Creek	60	12	16	674	584891	5280662	0	-90	Serpentine	South Kawishiwi	584891	5280662	906	Virginia Fm
B1-072	X	1967	1540	St. Louis	Bear Creek	60	12	16	722	585110	5280769	0	-90	Serpentine	South Kawishiwi	585110	5280769	953	Virginia Fm
B1-073	X	1967	1595.3	St. Louis	Bear Creek	60	12	31	1675	582426	5276926	0	-90	Babbitt	Partridge River	582426	5276926	-10	Virginia Fm
B1-073A	X	1988	1595.3	St. Louis	Kennecott	60	12	31	0	582426	5276926	0	-90	Babbitt	Partridge River	582426	5276926	-5	Virginia Fm
B1-074	X	1967	1589	St. Louis	Bear Creek	60	12	16	505	584824	5281058	0	-90	Serpentine	South Kawishiwi	584824	5281058	1135	Virginia Fm
B1-075	X	1967	1557	St. Louis	Bear Creek	60	12	16	554	585050	5281108	0	-90	Serpentine	South Kawishiwi	585050	5281108	1069	Virginia Fm
B1-076	X	1967	1552	St. Louis	Kennecott	60	12	20	1214	584042	5278749	0	-90	Babbitt	Partridge River	584042	5278749	430	Virginia Fm
B1-077	X	1968	1544	St. Louis	Bear Creek	60	12	16	724	584803	5280377	0	-90	Serpentine	South Kawishiwi	584803	5280377	993	Virginia Fm
B1-078	X	1968	1592.5	St. Louis	Kennecott	60	12	31	1675	582018	5276644	0	-90	Babbitt	Partridge River	582018	5276644	-22	Virginia Fm
B1-078A	X	1968	1592.5	St. Louis	Kennecott	60	12	31	0	582018	5276644	0	-90	Babbitt	Partridge River	582018	5276644	-19	Virginia Fm
B1-079	X	1968	1570	St. Louis	Bear Creek	60	12	16	582	584805	5280882	0	-90	Serpentine	South Kawishiwi	584805	5280882	1095	Virginia Fm
B1-080	X	1968	1550	St. Louis	Bear Creek	60	12	16	685	585052	5280894	0	-90	Serpentine	South Kawishiwi	585052	5280894	924	Virginia Fm
B1-081	X	1968	1601	St. Louis	Kennecott	60	12	31	1436	581147	5276409	0	-90	Babbitt	Partridge River	581147	5276409	210	Virginia Fm

DDH #	Chem	Date	Elevation Collar (ft)	County	Lessee	Twp	Rng	Sec	Total Depth (ft)	UTME Collar	UTMN Collar	Collar Azi	Collar Dip	Deposit	Intrusion DDH is in	UTME DC Base	UTMN DC Base	Elevation DC Base (ft)	Footwall
B1-082	X	1968	1591.8	St. Louis	Kennecott	60	12	31	1701	582221	5276775	0	-90	Babbitt	Partridge River	582221	5276775	-53	Virginia Fm
B1-083	X	1968	1565	St. Louis	Bear Creek	60	12	16	605	584838	5280771	0	-90	Babbitt	South Kawishiwi	584838	5280771	1000	Virginia Fm
B1-084	X	1968	1567	St. Louis	Bear Creek	60	12	16	515	584873	5280976	0	-90	Babbitt	South Kawishiwi	584873	5280976	1250	Virginia Fm
B1-085	X	1968	1597.7	St. Louis	Kennecott	60	12	31	1676	582478	5276804	0	-90	Babbitt	Partridge River	582478	5276804	-21	Virginia Fm
B1-086	X	1968	1560	St. Louis	Bear Creek	60	12	16	605	584988	5280984	0	-90	Serpentine	South Kawishiwi	584988	5280984	1003	Virginia Fm
B1-087	X	1968	1542	St. Louis	Bear Creek	60	12	16	635	584966	5280758	0	-90	Serpentine	South Kawishiwi	584966	5280758	938	Virginia Fm
B1-088	X	1968	1593.1	St. Louis	Kennecott	60	12	31	1437	581682	5276713	0	-90	Babbitt	Partridge River	581682	5276713	200	Virginia Fm
B1-089	X	1968	1549	St. Louis	Bear Creek	60	12	16	715	584834	5280500	0	-90	Serpentine	South Kawishiwi	584834	5280500	956	Virginia Fm
B1-090	X	1968	1591.1	St. Louis	Kennecott	60	12	31	1680	582160	5276877	0	-90	Babbitt	Partridge River	582160	5276877	-36	Virginia Fm
B1-091	X	1968	1601.5	St. Louis	Kennecott	60	12	31	1609	581741	5276608	0	-90	Babbitt	Partridge River	581741	5276608	16	Virginia Fm
B1-092	X	1968	1591.9	St. Louis	Kennecott	60	12	31	1678	582290	5276666	0	-90	Babbitt	Partridge River	582290	5276666	17	Virginia Fm
B1-093	X	1968	1553	St. Louis	Bear Creek	60	12	16	662	585134	5280991	0	-90	Serpentine	South Kawishiwi	585134	5280991	996	Virginia Fm
B1-094	X	1968	1601.5	St. Louis	Kennecott	60	12	31	1625	581872	5276404	0	-90	Babbitt	Partridge River	581872	5276404	27	Virginia Fm
B1-095	X	1968	1597	St. Louis	Kennecott	60	12	31	1535	582472	5276336	0	-90	Babbitt	Partridge River	582472	5276336	117	Virginia Fm
B1-096	X	1968	1597.3	St. Louis	Kennecott	60	12	32	1635	582661	5276481	0	-90	Babbitt	Partridge River	582661	5276481	59	Virginia Fm
B1-097	X	1968	1594.9	St. Louis	Kennecott	60	12	32	1675	582692	5276944	0	-90	Babbitt	Partridge River	582692	5276944	-66	Virginia Fm
B1-098	X	1968	1595.2	St. Louis	Kennecott	60	12	29	1317	582564	5277158	0	-90	Babbitt	Partridge River	582564	5277158	300	Virginia Fm
B1-099	X	1968	1604.6	St. Louis	Kennecott	60	12	31	1465	581475	5276583	0	-90	Babbitt	Partridge River	581475	5276583	188	Virginia Fm
B1-100	X	1968	1589	St. Louis	Kennecott	60	12	32	1785	582933	5277089	0	-90	Babbitt	Partridge River	582933	5277089	-172	BIF
B1-100A	X	1974	735	St. Louis	Kennecott	60	12	32	938	582933	5277089	0	-85	Babbitt	Partridge River			-20	Virginia Fm
B1-100B	X	1974	765	St. Louis	Kennecott	60	12	32	941	582933	5277089	0	-77	Babbitt	Partridge River			-20	Virginia Fm
B1-101	X	1968	1597.9	St. Louis	Kennecott	60	12	32	1595	582622	5277053	0	-90	Babbitt	Partridge River	582622	5277053	70	Virginia Fm
B1-102	X	1968	1609.4	St. Louis	Kennecott	60	12	32	1685	582532	5276697	0	-90	Babbitt	Partridge River	582532	5276697	93	Virginia Fm
B1-103	X	1968	1611.2	St. Louis	Kennecott	60	12	31	1617	584001	5278081	0	-90	Babbitt	Partridge River	584001	5278081	43	Virginia Fm
B1-104	X	1968	1597	St. Louis	Kennecott	60	12	28	2181	584269	5277698	0	-90	Babbitt	Partridge River	584269	5277698	-545	Virginia Fm
B1-105	X	1968	1611	St. Louis	Kennecott	60	12	33	1921	582595	5275378	0	-90	Babbitt	Partridge River	582595	5275378	-228	Virginia Fm
B1-106	X	1968	1603	St. Louis	Kennecott	60	12	31	1301	584484	5278421	0	-90	Babbitt	Partridge River	584484	5278421	315	Virginia Fm
B1-107	X	1968	1535	St. Louis	Kennecott	60	12	29	232	583637	5278523	0	-90	Babbitt	Partridge River	583637	5278553	1436	Virginia Fm
B1-108	X	1968	1535	St. Louis	Kennecott	60	12	29	324	583792	5278511	0	-90	Babbitt	Partridge River	583792	5278531	1471	Virginia Fm
B1-109	X	1968	1581	St. Louis	Kennecott	60	12	29	1525	583346	5277257	0	-90	Babbitt	Partridge River	583346	5277257	133	Virginia Fm
B1-110	X	1968	1533	St. Louis	Kennecott	60	12	29	354	583537	5278451	0	-90	Babbitt	Partridge River	583537	5278505	1356	Virginia Fm
B1-111	X	1968	1557	St. Louis	Kennecott	60	12	29	573	583397	5278331	0	-90	Babbitt	Partridge River	583397	5278441	1198	Virginia Fm
B1-112	X	1968	1590	St. Louis	Kennecott	60	12	21	1197	584227	5279520	0	-90	Serpentine	South Kawishiwi	584227	5279520	420	Virginia Fm
B1-113	X	1968	1531	St. Louis	Kennecott	60	12	29	973	583502	5278168	327	-45	Babbitt	Partridge River	583361	5278309	981	Virginia Fm
B1-114	X	1968	1551.4	St. Louis	Kennecott	60	12	29	1163	583284	5278065	327	-45	Babbitt	Partridge River	583168	5278181	1100	Virginia Fm
B1-115	X	1968	1588.8	St. Louis	Kennecott	60	12	29	933	582570	5277344	327	-45	Babbitt	Partridge River	582463	5277451	1171	Virginia Fm
B1-116	X	1968	1604	St. Louis	Kennecott	60	12	33	1805	584188	5276797	0	-90	Babbitt	Partridge River	584188	5276797	-94	Virginia Fm
B1-117	X	1968	1598	St. Louis	Bear Creek	60	12	32	1837	583656	5276747	0	-90	Babbitt	Partridge River	583656	5276747	-193	Virginia Fm
B1-118	X	1968	1613	St. Louis	Kennecott	60	12	32	1817	584027	5276228	0	-90	Babbitt	Partridge River	584027	5276228	-192	Virginia Fm
B1-118A	X	1968	117	St. Louis	Kennecott	60	12	32	333	584027	5276228	0	-89	Babbitt	Partridge River			-395	Still in DC
B1-119	X	1968	1588	St. Louis	Bear Creek	60	12	33	2043	584645	5277074	0	-90	Babbitt	Partridge River	584645	5277074	-357	Virginia Fm
B1-120	X	1969	1624	St. Louis	Bear Creek	60	12	33	2095	584571	5276725	0	-90	Babbitt	Partridge River	584571	5276725	-380	Virginia Fm
B1-121	X	1969	1589	St. Louis	Kennecott	60	12	32	1844	584119	5277140	0	-90	Babbitt	Partridge River	584119	5277140	-204	Virginia Fm
B1-122	X	1969	1564	St. Louis	Kennecott	60	12	28	2525	584850	5277192	0	-90	Babbitt	Partridge River	584850	5277192	-915	Giants Range
B1-123	X	1969	1597	St. Louis	Kennecott	60	13	36	930	580852	5276024	0	-90	Babbitt	Partridge River	580852	5276024	729	Virginia Fm
B1-124	X	1969	1590	St. Louis	Kennecott	60	12	33	1934	584384	5277050	0	-90	Babbitt	Partridge River	584384	5277050	-257	Virginia Fm
B1-125	X	1969	1596	St. Louis	Bear Creek	60	13	36	981	580815	5275856	0	-90	Babbitt	Partridge River	580815	5275856	804	Virginia Fm
B1-126	X	1969	1600	St. Louis	Bear Creek	60	12	31	1054	580980	5275831	0	-90	Babbitt	Partridge River	580980	5275831	838	Virginia Fm
B1-127	X	1969	1602	St. Louis	Kennecott	60	12	33	1895	584448	5276944	0	-90	Babbitt	Partridge River	584448	5276944	-215	Virginia Fm
B1-128	X	1969	1586	St. Louis	Kennecott	60	12	33	2995	585120	5277016	0	-90	Babbitt	Partridge River	585120	5277016	-1397	Giants Range

DDH #	Chem	Date	Elevation Collar (ft)	County	Lessee	Twp	Rng	Sec	Total Depth (ft)	UTME Collar	UTMN Collar	Collar Azi	Collar Dip	Deposit	Intrusion DDH is in	UTME DC Base	UTMN DC Base	Elevation DC Base (ft)	Footwall
B1-129	X	1969	1615	St. Louis	Bear Creek	60	12	33	1985	584309	5276711	0	-90	Babbitt	Partridge River	584309	5276711	-296	Virginia Fm
B1-130	X	1969	1605	St. Louis	Kennecott	60	12	32	1827	584040	5276676	0	-90	Babbitt	Partridge River	584040	5276676	-32	Virginia Fm
B1-131	X	1969	1606	St. Louis	Kennecott	60	12	33	1945	584515	5276843	0	-90	Babbitt	Partridge River	584515	5276843	-219	Virginia Fm
B1-132	X	1969	1602	St. Louis	Kennecott	60	12	32	1820	584177	5276913	0	-90	Babbitt	Partridge River	584177	5276913	-141	Virginia Fm
B1-133	X	1969	1596.6	St. Louis	Kennecott	60	12	32	1813	583974	5276778	0	-90	Babbitt	Partridge River	583974	5276778	-100	Virginia Fm
B1-134	X	1969	1616	St. Louis	Bear Creek	60	12	33	1906	584209	5276641	0	-90	Babbitt	Partridge River	584209	5276641	-130	Virginia Fm
B1-135	X	1969	1601	St. Louis	Kennecott	60	12	33	1779	584347	5276879	0	-90	Babbitt	Partridge River	584347	5276879	-101	Virginia Fm
B1-136	X	1969	1602	St. Louis	Kennecott	60	12	33	1855	584279	5276979	0	-90	Babbitt	Partridge River	584279	5276979	-191	Virginia Fm
B1-137	X	1969	1610	St. Louis	Kennecott	60	12	33	1996	584414	5276775	0	-90	Babbitt	Partridge River	584414	5276775	-325	Virginia Fm
B1-138	X	1969	1587	St. Louis	Kennecott	60	12	33	1843	584213	5277080	0	-90	Babbitt	Partridge River	584213	5277080	-204	Virginia Fm
B1-139	X	1969	1605	St. Louis	Kennecott	60	12	32	1828	584142	5276743	0	-90	Babbitt	Partridge River	584142	5276743	-140	Virginia Fm
B1-140	X	1969	1621	St. Louis	Bear Creek	60	12	33	1993	584380	5276608	0	-90	Babbitt	Partridge River	584380	5276608	-198	Virginia Fm
B1-141	X	1969	1613	St. Louis	Kennecott	60	12	32	1997	584106	5276575	0	-90	Babbitt	Partridge River	584106	5276575	-314	Virginia Fm
B1-142	X	1970	1587	St. Louis	Kennecott	60	12	32	1765	584112	5277012	0	-90	Babbitt	Partridge River	584112	5277012	-131	Virginia Fm
B1-143	X	1970	1574	St. Louis	Kennecott	60	12	28	2082	584585	5277178	0	-90	Babbitt	Partridge River	584585	5277178	-418	Virginia Fm
B1-144	X	1970	1588.2	St. Louis	Bear Creek	60	12	32	1825	583773	5277083	0	-90	Babbitt	Partridge River	583773	5277083	-164	Virginia Fm
B1-145	X	1970	1566	St. Louis	Kennecott	60	12	28	2105	584752	5277144	0	-90	Babbitt	Partridge River	584752	5277144	-519	BIF
B1-146	X	1970	1585	St. Louis	Kennecott	60	12	28	1949	584314	5277147	0	-90	Babbitt	Partridge River	584314	5277147	-312	Virginia Fm
B1-147	X	1970	1585	St. Louis	Bear Creek	60	12	32	1931	583502	5277052	0	-90	Babbitt	Partridge River	583502	5277052	-287	Virginia Fm
B1-148	X	1970	1584.1	St. Louis	Kennecott	60	12	33	2016	584547	5277016	0	-90	Babbitt	Partridge River	584547	5277016	-370	Virginia Fm
B1-149	X	1970	1584	St. Louis	Kennecott	60	12	29	2055	583810	5277250	0	-90	Babbitt	Partridge River	583810	5277250	-357	Virginia Fm
B1-150	X	1970	1577.7	St. Louis	Kennecott	60	12	33	1985	584484	5277113	0	-90	Babbitt	Partridge River	584484	5277113	-345	Virginia Fm
B1-151	X	1970	1597.2	St. Louis	Kennecott	60	12	32	1945	583234	5277023	0	-90	Babbitt	Partridge River	583234	5277023	-297	Virginia Fm
B1-152	X	1970	1594.3	St. Louis	Kennecott	60	12	28	2008	584417	5277215	0	-90	Babbitt	Partridge River	584417	5277215	-195	Virginia Fm
B1-153	X	1970	1599	St. Louis	Bear Creek	60	12	33	1975	584622	5276913	0	-90	Babbitt	Partridge River	584622	5276913	-296	Virginia Fm
B1-154	X	1970	1589	St. Louis	Kennecott	60	12	28	1939	584245	5277247	0	-90	Babbitt	Partridge River	584245	5277247	-291	Virginia Fm
B1-155	X	1970	1579.6	St. Louis	Bear Creek	60	12	33	2085	584701	5277002	0	-90	Babbitt	Partridge River	584701	5277002	-467	BIF
B1-156	X	1970	1586	St. Louis	Kennecott	60	12	29	1875	584173	5277204	0	-90	Babbitt	Partridge River	584173	5277204	-201	Virginia Fm
B1-157	X	1970	1586	St. Louis	Bear Creek	60	12	33	2203	584748	5277068	0	-90	Babbitt	Partridge River	584748	5277068	-559	BIF
B1-158	X	1970	1584	St. Louis	Kennecott	60	12	28	1907	584280	5277198	0	-90	Babbitt	Partridge River	584280	5277198	-235	Virginia Fm
B1-159	X	1970	1584	St. Louis	Kennecott	60	12	33	1955	584347	5277099	0	-90	Babbitt	Partridge River	584347	5277099	-320	Virginia Fm
B1-160	X	1970	1604	St. Louis	Kennecott	60	12	33	1875	584279	5276869	0	-90	Babbitt	Partridge River	584279	5276869	-71	Virginia Fm
B1-161	X	1970	1594.8	St. Louis	Kennecott	60	12	32	1795	584077	5276845	0	-90	Babbitt	Partridge River	584077	5276845	-107	Virginia Fm
B1-162	X	1970	1588.9	St. Louis	Kennecott	60	12	32	1762	584010	5276947	0	-90	Babbitt	Partridge River	584010	5276947	-131	Virginia Fm
B1-163	X	1970	1633	St. Louis	Bear Creek	60	12	33	2050	584460	5276690	0	-90	Babbitt	Partridge River	584460	5276690	-288	Virginia Fm
B1-164	X	1971	1595.5	St. Louis	Kennecott	60	12	31	1125	581019	5275987	0	-90	Babbitt	Partridge River	581019	5275987	519	Virginia Fm
B1-165	X	1971	1603.6	St. Louis	Kennecott	60	12	31	1010	581085	5275885	0	-90	Babbitt	Partridge River	581085	5275885	825	Virginia Fm
B1-166	none	1971	1604.9	St. Louis	Kennecott	60	12	31	46	582136	5276024	0	-90	Babbitt	Partridge River			-25	Still in DC
B1-167	X	1971	1596	St. Louis	Kennecott	60	13	36	831	580746	5275958	0	-90	Babbitt	Partridge River	580746	5275958	1092	Virginia Fm
B1-168	X	1971	1576	St. Louis	Kennecott	60	12	21	1080	584471	5279935	0	-90	Serpentine	South Kawishiwi	584471	5279935	580	Virginia Fm
B1-169	X	1971	1532.5	St. Louis	Bear Creek	60	12	21	1185	585025	5279603	0	-90	Serpentine	South Kawishiwi	585025	5279603	441	Virginia Fm
B1-170	X	1971	1554	St. Louis	Bear Creek	60	12	16	675	585090	5281056	0	-90	Serpentine	South Kawishiwi	585090	5281056	1064	Virginia Fm
B1-171	X	1971	1566	St. Louis	Bear Creek	60	12	16	654	585167	5281232	0	-90	Serpentine	South Kawishiwi	585167	5281232	1015	Virginia Fm
B1-172	X	1971	1560	St. Louis	Bear Creek	60	12	16	592	584909	5280946	0	-90	Serpentine	South Kawishiwi	584909	5280946	1166	Virginia Fm
B1-173	X	1971	1602.9	St. Louis	Kennecott	60	12	32	2028	583594	5276472	0	-90	Babbitt	Partridge River	583594	5276472	-158	Virginia Fm
B1-174	X	1971	1554	St. Louis	Bear Creek	60	12	16	654	584982	5280912	0	-90	Serpentine	South Kawishiwi	584982	5280912	957	Virginia Fm
B1-175	X	1971	1566	St. Louis	Bear Creek	60	12	16	617	584866	5280908	0	-90	Serpentine	South Kawishiwi	584866	5280908	981	Virginia Fm
B1-176	X	1971	1574	St. Louis	Bear Creek	60	12	16	556	584779	5280953	0	-90	Serpentine	South Kawishiwi	584779	5280953	1105	Virginia Fm
B1-177	X	1971	1562	St. Louis	Bear Creek	60	12	16	758	585306	5281133	0	-90	Serpentine	South Kawishiwi	585306	5281133	854	Virginia Fm
B1-178	X	1971	1562	St. Louis	Bear Creek	60	12	16	586	584858	5280837	0	-90	Serpentine	South Kawishiwi	584858	5280837	1152	Virginia Fm

DDH #	Chem	Date	Elevation Collar (ft)	County	Lessee	Twp	Rng	Sec	Total Depth (ft)	UTME Collar	UTMN Collar	Collar Azi	Collar Dip	Deposit	Intrusion DDH is in	UTME DC Base	UTMN DC Base	Elevation DC Base (ft)	Footwall
B1-179	X	1971	1561	St. Louis	Bear Creek	60	12	16	802	585379	5281113	0	-90	Serpentine	South Kawishiwi	585379	5281113	836	Virginia Fm
B1-180	X	1971	1593.1	St. Louis	Kennecott	60	12	32	1710	582953	5276359	0	-90	Babbitt	Partridge River	582953	5276359	49	Virginia Fm
B1-181	X	1971	1536	St. Louis	Bear Creek	60	12	16	771	585525	5281491	0	-90	Serpentine	South Kawishiwi	585525	5281491	814	Virginia Fm
B1-182	X	1971	1542	St. Louis	Bear Creek	60	12	16	836	585211	5280910	0	-90	Serpentine	South Kawishiwi	585211	5280910	822	Virginia Fm
B1-183	X	1971	1597.8	St. Louis	Kennecott	60	12	28	2113	584552	5277450	0	-90	Babbitt	Partridge River	584552	5277450	-434	Virginia Fm
B1-184	X	1971	1617.2	St. Louis	Kennecott	60	12	32	1780	583161	5276186	0	-90	Babbitt	Partridge River			-300	Still in DC
B1-184B	X	1971	1617.2	St. Louis	Kennecott	60	12	32	161	583161	5276186	0	-90	Babbitt	Partridge River	583161	5276186	-292	Virginia Fm
B1-185	X	1971	1551	St. Louis	Bear Creek	60	12	16	831	585398	5281423	0	-90	Serpentine	South Kawishiwi	585398	5281423	800	Virginia Fm
B1-186	X	1971	1529.5	St. Louis	Kennecott	60	12	29	1111	583834	5278577	0	-90	Babbitt	Partridge River	583834	5278577	644	Virginia Fm
B1-187	X	1971	1611	St. Louis	Kennecott	60	13	36	586	580552	5276363	0	-90	Babbitt	Partridge River	580552	5276363	1253	Virginia Fm
B1-188	X	1971	1618	St. Louis	Kennecott	60	13	36	611	580519	5276239	0	-90	Babbitt	Partridge River	580519	5276239	1428	Virginia Fm
B1-189	X	1971	1588.5	St. Louis	Kennecott	60	12	29	2115	584055	5277416	0	-90	Babbitt	Partridge River	584055	5277416	-476	Virginia Fm
B1-190	X	1971	1606	St. Louis	Kennecott	60	13	36	156	580428	5276324	0	-90	Babbitt	Partridge River	580428	5276324	1537	Virginia Fm
B1-191	X	1971	1621	St. Louis	Kennecott	60	13	36	1066	580837	5276371	0	-90	Babbitt	Partridge River	580837	5276371	620	Virginia Fm
B1-192	X	1971	1610	St. Louis	Kennecott	60	13	36	730	580681	5276291	0	-90	Babbitt	Partridge River	580681	5276291	1042	Virginia Fm
B1-193	X	1971	1604	St. Louis	Kennecott	60	13	36	895	580784	5276206	0	-90	Babbitt	Partridge River	580784	5276206	741	Virginia Fm
B1-194	X	1971	1569.3	St. Louis	Kennecott	60	12	28	1641	584409	5278184	0	-90	Babbitt	Partridge River	584409	5278184	-10	Virginia Fm
B1-195	X	1971	1578	St. Louis	Kennecott	60	12	29	1415	583094	5277231	0	-90	Babbitt	Partridge River	583094	5277231	224	Virginia Fm
B1-196	X	1971	1598	St. Louis	Kennecott	60	12	31	1266	580968	5276317	0	-90	Babbitt	Partridge River	580968	5276317	368	Virginia Fm
B1-197	X	1971	1586.5	St. Louis	Kennecott	60	12	29	1920	584028	5277255	0	-90	Babbitt	Partridge River	584028	5277255	-226	Virginia Fm
B1-198	X	1971	1619	St. Louis	Kennecott	60	13	36	691	580541	5276126	0	-90	Babbitt	Partridge River	580541	5276126	1351	Virginia Fm
B1-199	X	1971	1602	St. Louis	Bear Creek	60	13	36	1259	580745	5275557	0	-90	Babbitt	Partridge River	580745	5275557	471	Virginia Fm
B1-200	X	1971	1599.2	St. Louis	Kennecott	60	13	36	317	580422	5276206	0	-90	Babbitt	Partridge River	580422	5276206	1401	Virginia Fm
B1-201	X	1971	1599.6	St. Louis	Kennecott	60	13	36	580	580317	5276141	0	-90	Babbitt	Partridge River	580317	5276141	1564	Virginia Fm
B1-202	X	1971	1597.7	St. Louis	Kennecott	60	12	31	1516	581477	5276125	0	-90	Babbitt	Partridge River	581477	5276125	222	Virginia Fm
B1-203	X	1974	1609.2	St. Louis	Kennecott	60	12	29	1908	583877	5277642	0	-90	Babbitt	Partridge River	583877	5277642	-221	Virginia Fm
B1-204	none	1971	1596	St. Louis	Kennecott	60	12	31	640	581871	5276099	0	-90	Babbitt	Partridge River			105	Still in DC
B1-205	X	1974	1589.1	St. Louis	Kennecott	60	12	29	1207	582776	5277273	0	-90	Babbitt	Partridge River	582776	5277273	440	Virginia Fm
B1-206	X	1974	1528.2	St. Louis	Kennecott	60	12	28	1356	584292	5278451	0	-90	Babbitt	Partridge River	584292	5278451	285	Virginia Fm
B1-207	X	1974	1581.4	St. Louis	Kennecott	60	12	29	1505	583507	5277494	0	-90	Babbitt	Partridge River	583507	5277494	143	Virginia Fm
B1-208	X	1974	1584.7	St. Louis	Kennecott	60	12	29	1531	582851	5277171	0	-90	Babbitt	Partridge River	582851	5277171	188	Virginia Fm
B1-209	X	1974	1586.3	St. Louis	Kennecott	60	12	29	1965	583622	5277313	0	-90	Babbitt	Partridge River	583622	5277313	-338	Virginia Fm
B1-210	X	1974	1563.4	St. Louis	Kennecott	60	12	28	1456	584189	5278230	0	-90	Babbitt	Partridge River	584189	5278230	186	Virginia Fm
B1-211	X	1974	1586.6	St. Louis	Kennecott	60	12	29	2085	583920	5277336	0	-90	Babbitt	Partridge River	583920	5277336	-424	Virginia Fm
B1-212	X	1974	1589.5	St. Louis	Kennecott	60	12	32	1845	583016	5276992	0	-90	Babbitt	Partridge River	583016	5276992	-204	Virginia Fm
B1-213	X	1974	1562.5	St. Louis	Kennecott	60	12	29	1507	583765	5277986	0	-90	Babbitt	Partridge River	583765	5277986	118	Virginia Fm
B1-214	X	1974	1586	St. Louis	Kennecott	60	12	29	1995	584046	5277556	0	-90	Babbitt	Partridge River	584046	5277556	-375	Virginia Fm
B1-215	X	1974	1568.9	St. Louis	Kennecott	60	12	29	2005	584136	5277862	0	-90	Babbitt	Partridge River	584136	5277862	-410	Virginia Fm
B1-216	X	1974	1590.6	St. Louis	Kennecott	60	12	32	1795	582764	5276838	0	-90	Babbitt	Partridge River	582764	5276838	-135	Virginia Fm
B1-217	X	1974	1595.1	St. Louis	Kennecott	60	12	28	2028	584281	5277413	0	-90	Babbitt	Partridge River	584281	5277413	-340	Virginia Fm
B1-218	X	1974	1580.9	St. Louis	Kennecott	60	12	29	1645	583709	5277625	0	-90	Babbitt	Partridge River	583709	5277625	23	Virginia Fm
B1-219	X	1974	1595	St. Louis	Kennecott	60	12	28	2035	584455	5277817	0	-90	Babbitt	Partridge River	584455	5277817	-350	Virginia Fm
B1-220	X	1974	1594	St. Louis	Kennecott	60	12	32	1775	582874	5276728	0	-90	Babbitt	Partridge River	582874	5276728	-87	Virginia Fm
B1-221	X	1974	1588	St. Louis	Kennecott	60	12	29	1734	583863	5277835	0	-90	Babbitt	Partridge River	583863	5277835	-68	Virginia Fm
B1-222	X	1974	1590	St. Louis	Kennecott	60	12	28	2062	584481	5277328	0	-90	Babbitt	Partridge River	584481	5277328	-367	Virginia Fm
B1-223	X	1974	1589	St. Louis	Kennecott	60	12	28	2065	584660	5277949	0	-90	Babbitt	Partridge River	584660	5277949	-422	Virginia Fm
B1-224	X	1974	1566	St. Louis	Kennecott	60	12	29	1479	583610	5277780	0	-90	Babbitt	Partridge River	583610	5277780	228	Virginia Fm
B1-225	X	1974	1579.6	St. Louis	Kennecott	60	12	28	2095	584616	5277340	0	-90	Babbitt	Partridge River	584616	5277340	-430	Virginia Fm
B1-226	X	1974	1573	St. Louis	Kennecott	60	12	28	1814	584323	5278021	0	-90	Babbitt	Partridge River	584323	5278021	-161	Virginia Fm
B1-227	X	1975	1597	St. Louis	Kennecott	60	12	28	2125	584587	5277613	0	-90	Babbitt	Partridge River	584587	5277613	-450	Virginia Fm

DDH #	Chem	Date	Elevation Collar (ft)	County	Lessee	Twp	Rng	Sec	Total Depth (ft)	UTME Collar	UTMN Collar	Collar Azi	Collar Dip	Deposit	Intrusion DDH is in	UTME DC Base	UTMN DC Base	Elevation DC Base (ft)	Footwall
B1-228	X	1975	1586	St. Louis	Kennecott	60	12	32	1778	583938	5277041	0	-90	Babbitt	Partridge River	583938	5277041	-68	Virginia Fm
B1-229	X	1975	1581	St. Louis	Kennecott	60	12	28	2276	584776	5277374	0	-90	Babbitt	Partridge River	584776	5277374	-660	BIF
B1-230	X	1975	1587	St. Louis	Kennecott	60	12	29	1952	584152	5277331	0	-90	Babbitt	Partridge River	584152	5277331	-297	Virginia Fm
B1-231	X	1975	1599	St. Louis	Kennecott	60	12	29	1994	583695	5277237	0	-90	Babbitt	Partridge River	583695	5277237	-315	Virginia Fm
B1-232	X	1975	1559	St. Louis	Kennecott	60	12	28	2695	584923	5277540	0	-90	Babbitt	Partridge River	584923	5277540	-1108	BIF
B1-233	X	1975	1590	St. Louis	Kennecott	60	12	28	2005	584415	5277431	0	-90	Babbitt	Partridge River	584415	5277431	-273	Virginia Fm
B1-234	X	1975	1594	St. Louis	Kennecott	60	12	28	1994	584352	5277322	0	-90	Babbitt	Partridge River	584352	5277322	-349	Virginia Fm
B1-235	X	1975	1586	St. Louis	Kennecott	60	12	28	2055	584531	5277250	0	-90	Babbitt	Partridge River	584531	5277250	-374	Virginia Fm
B1-236	X	1975	1588	St. Louis	Kennecott	60	12	28	2135	584653	5277510	0	-90	Babbitt	Partridge River	584653	5277510	-487	Virginia Fm
B1-237	X	1975	1583.1	St. Louis	Kennecott	60	12	29	1598	583561	5277403	0	-90	Babbitt	Partridge River	583561	5277403	35	Virginia Fm
B1-238	X	1975	1598	St. Louis	Kennecott	60	12	28	2095	584521	5277715	0	-90	Babbitt	Partridge River	584521	5277715	-449	Virginia Fm
B1-239	X	1975	1598	St. Louis	Kennecott	60	12	29	2025	583944	5277483	0	-90	Babbitt	Partridge River	583944	5277483	-355	Virginia Fm
B1-240	X	1975	1589	St. Louis	Kennecott	60	12	28	2035	584483	5277548	0	-90	Babbitt	Partridge River	584483	5277548	-304	Virginia Fm
B1-241	X	1975	1589	St. Louis	Kennecott	60	12	28	1963	584349	5277532	0	-90	Babbitt	Partridge River	584349	5277532	-236	Virginia Fm
B1-242	X	1975	1591.8	St. Louis	Kennecott	60	12	28	2023	584419	5277651	0	-90	Babbitt	Partridge River	584419	5277651	-346	Virginia Fm
B1-243	X	1975	1596	St. Louis	Kennecott	60	12	28	2038	584558	5277886	0	-90	Babbitt	Partridge River	584558	5277886	-408	Virginia Fm
B1-244	X	1975	1595.9	St. Louis	Kennecott	60	12	28	2106	584625	5277782	0	-90	Babbitt	Partridge River	584625	5277782	-434	Virginia Fm
B1-245	X	1975	1580	St. Louis	Kennecott	60	12	28	1910	584387	5277924	0	-90	Babbitt	Partridge River	584387	5277924	-259	Virginia Fm
B1-246	X	1975	1601.8	St. Louis	Kennecott	60	12	28	2016	584352	5277753	0	-90	Babbitt	Partridge River	584352	5277753	-274	Virginia Fm
B1-247	X	1975	1585	St. Louis	Kennecott	60	12	28	1995	584301	5277841	0	-90	Babbitt	Partridge River	584301	5277841	-323	Virginia Fm
B1-248	X	1975	1575	St. Louis	Kennecott	60	12	28	1933	584489	5277982	0	-90	Babbitt	Partridge River	584489	5277982	-310	Virginia Fm
B1-249	X	1976	1591	St. Louis	Kennecott	60	12	28	2125	584690	5277679	0	-90	Babbitt	Partridge River	584690	5277679	-456	Virginia Fm
B1-250	X	1976	1596	St. Louis	Kennecott	60	12	29	2005	584396	5277843	0	-90	Babbitt	Partridge River	584396	5277843	-354	Virginia Fm
B1-251	X	1975	1576	St. Louis	Kennecott	60	12	28	1745	584429	5278086	0	-90	Babbitt	Partridge River	584429	5278086	-152	Virginia Fm
B1-252	X	1975	1572.4	St. Louis	Kennecott	60	12	28	2082	584688	5277248	0	-90	Babbitt	Partridge River	584688	5277248	-473	Virginia Fm
B1-253	X	1975	1590.1	St. Louis	Kennecott	60	12	28	1955	584242	5277493	0	-90	Babbitt	Partridge River	584242	5277493	-288	Virginia Fm
B1-254	X	1975	1586.9	St. Louis	Kennecott	60	12	29	2131	584101	5277700	0	-90	Babbitt	Partridge River	584101	5277700	-329	Virginia Fm
B1-255	X	1976	1593.8	St. Louis	Kennecott	60	12	32	1809	583348	5276386	0	-90	Babbitt	Partridge River	583348	5276386	-58	Virginia Fm
B1-256	X	1975	1589.5	St. Louis	Kennecott	60	12	30	640	582271	5277382	0	-90	Babbitt	Partridge River	582271	5277382	1212	Virginia Fm
B1-257	X	1975	1574.1	St. Louis	Kennecott	60	12	28	1885	584594	5278053	0	-90	Babbitt	Partridge River	584594	5278053	-225	Virginia Fm
B1-258	X	1975	1589.2	St. Louis	Kennecott	60	12	30	755	582318	5277298	0	-90	Babbitt	Partridge River	582318	5277298	899	Virginia Fm
B1-259	X	1976	1600.4	St. Louis	Kennecott	60	12	29	1936	583979	5277656	0	-90	Babbitt	Partridge River	583979	5277656	-231	Virginia Fm
B1-260	X	1975	1598.1	St. Louis	Kennecott	60	12	30	955	582126	5277178	0	-90	Babbitt	Partridge River	582126	5277178	715	Virginia Fm
B1-261	X	1976	1586.6	St. Louis	Kennecott	60	12	29	2034	584151	5277620	0	-90	Babbitt	Partridge River	584151	5277620	-379	Virginia Fm
B1-262	X	1976	1571.8	St. Louis	Kennecott	60	12	28	2132	584761	5277566	0	-90	Babbitt	Partridge River	584761	5277566	-497	Virginia Fm
B1-263	X	1976	1599.3	St. Louis	Kennecott	61	12	30	1240	582180	5277064	0	-90	Babbitt	Partridge River	582180	5277064	476	Virginia Fm
B1-264	X	1976	1581.4	St. Louis	Kennecott	60	12	30	766	582523	5277437	0	-90	Babbitt	Partridge River	582523	5277437	1103	Virginia Fm
B1-265	X	1976	1610.1	St. Louis	Kennecott	60	12	30	755	582047	5277275	0	-90	Babbitt	Partridge River	582047	5277275	1054	Virginia Fm
B1-266	X	1976	1602.9	St. Louis	Kennecott	60	12	31	1415	582094	5276986	0	-90	Babbitt	Partridge River	582094	5276986	228	Virginia Fm
B1-267	X	1976	1589.9	St. Louis	Kennecott	60	12	30	1225	582296	5277115	0	-90	Babbitt	Partridge River	582296	5277115	471	Virginia Fm
B1-268	X	1976	1588.7	St. Louis	Kennecott	60	12	28	2101	584112	5277452	0	-90	Babbitt	Partridge River	584112	5277452	-459	Virginia Fm
B1-269	X	1976	1595.5	St. Louis	Kennecott	60	12	31	1678	582509	5277008	0	-90	Babbitt	Partridge River	582509	5277008	-26	Virginia Fm
B1-270	X	1976	1579	St. Louis	Kennecott	60	12	29	553	582598	5277533	0	-90	Babbitt	Partridge River	582598	5277533	1114	Virginia Fm
B1-271	X	1976	1586	St. Louis	Kennecott	60	12	30	1075	582388	5277209	0	-90	Babbitt	Partridge River	582388	5277209	643	Virginia Fm
B1-272	X	1976	1587.1	St. Louis	Kennecott	60	12	29	1940	584012	5277826	0	-90	Babbitt	Partridge River	584012	5277826	-252	Virginia Fm
B1-273	X	1976	1576.5	St. Louis	Kennecott	60	12	29	1189	582962	5277433	0	-90	Babbitt	Partridge River	582962	5277433	495	Virginia Fm
B1-274	X	1976	1583.5	St. Louis	Kennecott	60	12	30	425	582285	5277572	0	-90	Babbitt	Partridge River	582285	5277572	1306	Virginia Fm
B1-275	X	1976	1583.5	St. Louis	Kennecott	60	12	30	543	582447	5277566	0	-90	Babbitt	Partridge River	582447	5277566	1108	Virginia Fm
B1-276	X	1976	1588.8	St. Louis	Kennecott	60	12	30	1435	582453	5277111	0	-90	Babbitt	Partridge River	582453	5277111	262	Virginia Fm
B1-277	X	1976	1570.8	St. Louis	Kennecott	60	12	29	1831	584065	5277967	0	-90	Babbitt	Partridge River	584065	5277967	-213	Virginia Fm

DDH #	Chem	Date	Elevation Collar (ft)	County	Lessee	Twp	Rng	Sec	Total Depth (ft)	UTME Collar	UTMN Collar	Collar Azi	Collar Dip	Deposit	Intrusion DDH is in	UTME DC Base	UTMN DC Base	Elevation DC Base (ft)	Footwall
B1-278	X	1976	1570	St. Louis	Kennecott	60	12	29	997	582897	5277534	0	-90	Babbitt	Partridge River	582897	5277534	738	Virginia Fm
B1-279	X	1976	1599.5	St. Louis	Kennecott	60	12	32	1635	582573	5276900	0	-90	Babbitt	Partridge River	582573	5276900	36	Virginia Fm
B1-280	X	1976	1579.6	St. Louis	Kennecott	60	12	29	1315	583027	5277336	0	-90	Babbitt	Partridge River	583027	5277336	335	Virginia Fm
B1-281	X	1976	1611.2	St. Louis	Kennecott	60	12	32	2155	583890	5276436	0	-90	Babbitt	Partridge River	583890	5276436	-464	Virginia Fm
B1-282	X	1976	1609.5	St. Louis	Kennecott	60	12	30	529	581447	5277043	0	-90	Babbitt	Partridge River	581447	5277043	1351	Virginia Fm
B1-283	X	1976	1610.1	St. Louis	Kennecott	60	12	30	572	581451	5277047	327	-45	Babbitt	Partridge River	581381	5277117	1339	Virginia Fm
B1-284	X	1976	1610.8	St. Louis	Kennecott	60	12	30	535	582015	5277345	0	-90	Babbitt	Partridge River	582015	5277345	1306	Virginia Fm
B1-285	X	1976	1593	St. Louis	Kennecott	60	12	29	1080	582737	5277368	0	-90	Babbitt	Partridge River	582737	5277368	593	Virginia Fm
B1-286	X	1976	1564.7	St. Louis	Kennecott	60	12	29	932	583051	5277745	0	-90	Babbitt	Partridge River	583051	5277745	854	Virginia Fm
B1-287	X	1976	1609.5	St. Louis	Kennecott	60	12	30	580	582014	5277347	0	-38	Babbitt	Partridge River	582014	5277347	1511	Virginia Fm
B1-288	X	1976	1589.8	St. Louis	Kennecott	60	12	32	1780	583071	5277066	0	-90	Babbitt	Partridge River	583071	5277066	-120	Virginia Fm
B1-289	X	1976	1609.7	St. Louis	Kennecott	60	12	31	1485	581887	5276850	0	-90	Babbitt	Partridge River	581887	5276850	142	Virginia Fm
B1-290	X	1976	1604.7	St. Louis	Kennecott	60	12	30	925	581759	5277053	0	-90	Babbitt	Partridge River	581759	5277053	738	Virginia Fm
B1-291	X	1976	1583.2	St. Louis	Kennecott	60	12	29	1550	582980	5277174	0	-90	Babbitt	Partridge River	582980	5277174	83	Virginia Fm
B1-292	X	1976	1560.1	St. Louis	Kennecott	60	12	29	1127	583118	5277642	0	-90	Babbitt	Partridge River	583118	5277642	539	Virginia Fm
B1-293	X	1976	1596.6	St. Louis	Kennecott	60	12	28	2050	584250	5277669	0	-90	Babbitt	Partridge River	584250	5277669	-394	Virginia Fm
B1-294	X	1976	1603.3	St. Louis	Kennecott	60	12	31	935	581551	5276922	0	-90	Babbitt	Partridge River	581551	5276922	724	Virginia Fm
B1-295	X	1976	1606.9	St. Louis	Kennecott	60	12	32	2315	583956	5276334	0	-90	Babbitt	Partridge River	583956	5276334	-634	Virginia Fm
B1-296	X	1976	1591.5	St. Louis	Kennecott	60	12	32	1715	582800	5277033	0	-90	Babbitt	Partridge River	582800	5277033	-114	Virginia Fm
B1-297	X	1976	1604.4	St. Louis	Kennecott	60	12	32	1748	582653	5276793	0	-90	Babbitt	Partridge River	582653	5276793	-69	Virginia Fm
B1-298	X	1976	1602.4	St. Louis	Kennecott	60	12	29	1611	582709	5277125	0	-90	Babbitt	Partridge River	582709	5277125	187	Diabase
B1-299	X	1976	1584.5	St. Louis	Kennecott	60	12	28	2068	584176	5277800	0	-90	Babbitt	Partridge River	584176	5277800	-395	Virginia Fm
B1-300	X	1976	1594.6	St. Louis	Kennecott	60	12	29	1860	583905	5277771	0	-90	Babbitt	Partridge River	583905	5277771	-235	Virginia Fm
B1-301	X	1976	1590.5	St. Louis	Kennecott	60	12	32	1812	582863	5276929	0	-90	Babbitt	Partridge River	582863	5276929	-108	Virginia Fm
B1-302	X	1976	1608	St. Louis	Kennecott	60	12	32	2066	583501	5276167	0	-90	Babbitt	Partridge River	583501	5276167	-365	Virginia Fm
B1-303	X	1976	1592.1	St. Louis	Kennecott	60	12	29	1874	583776	5277523	0	-90	Babbitt	Partridge River	583776	5277523	-198	Virginia Fm
B1-304	X	1976	1610	St. Louis	Kennecott	60	12	31	1725	582444	5276649	0	-90	Babbitt	Partridge River	582444	5276649	-27	Virginia Fm
B1-305	X	1976	1595.4	St. Louis	Kennecott	60	12	29	1525	582652	5277229	0	-90	Babbitt	Partridge River	582652	5277229	436	Virginia Fm
B1-306	X	1976	1591.5	St. Louis	Kennecott	60	12	29	1664	583766	5277761	0	-90	Babbitt	Partridge River	583766	5277761	-38	Virginia Fm
B1-307	X	1976	1606.4	St. Louis	Kennecott	60	12	31	1685	582378	5276765	0	-90	Babbitt	Partridge River	582378	5276765	41	Virginia Fm
B1-308	X	1976	1574.7	St. Louis	Kennecott	60	12	29	1820	583951	5277929	0	-90	Babbitt	Partridge River	583951	5277929	15	Virginia Fm
B1-309	X	1976	1579.7	St. Louis	Kennecott	60	12	29	1395	583237	5277456	0	-90	Babbitt	Partridge River	583237	5277456	324	Virginia Fm
B1-310	X	1976	1610.7	St. Louis	Kennecott	60	12	30	517	581784	5277235	0	-90	Babbitt	Partridge River	581784	5277235	1368	Virginia Fm
B1-311	X	1976	1583.3	St. Louis	Kennecott	60	12	29	780	582726	5277581	0	-90	Babbitt	Partridge River	582726	5277581	1340	Virginia Fm
B1-312	X	1976	1577.3	St. Louis	Kennecott	60	12	29	1281	582852	5277370	0	-90	Babbitt	Partridge River	582852	5277370	1267	Virginia Fm
B1-313	X	1976	1611.8	St. Louis	Kennecott	60	12	30	413	581783	5277236	349	-45	Babbitt	Partridge River	581745	5277274	1487	Virginia Fm
B1-314	X	1976	1571	St. Louis	Kennecott	60	12	29	900	582947	5277681	0	-90	Babbitt	Partridge River	582947	5277681	781	Virginia Fm
B1-315	X	1976	1607	St. Louis	Kennecott	60	12	32	1786	583490	5276614	0	-90	Babbitt	Partridge River	583490	5276614	-27	Virginia Fm
B1-316	X	1976	1592.7	St. Louis	Kennecott	60	12	31	1655	582310	5276869	0	-90	Babbitt	Partridge River	582310	5276869	-9	Virginia Fm
B1-317	X	1976	1586.6	St. Louis	Kennecott	60	12	29	758	582672	5277687	0	-90	Babbitt	Partridge River	582672	5277687	1053	Virginia Fm
B1-318	X	1976	1550.6	St. Louis	Kennecott	60	12	29	1180	583460	5278010	0	-90	Babbitt	Partridge River	583460	5278010	541	Virginia Fm
B1-319	X	1976	1562.7	St. Louis	Kennecott	60	12	29	1375	583427	5277609	0	-90	Babbitt	Partridge River	583427	5277609	259	Virginia Fm
B1-320	X	1976	1608.7	St. Louis	Kennecott	60	12	32	2150	583701	5276307	0	-90	Babbitt	Partridge River	583701	5276307	-381	Virginia Fm
B1-321	X	1976	1564.8	St. Louis	Kennecott	60	12	29	411	583157	5278032	0	-90	Babbitt	Partridge River	583157	5278032	1449	Virginia Fm
B1-322	X	1976	1553.9	St. Louis	Kennecott	60	12	29	795	583293	5278046	0	-90	Babbitt	Partridge River	583293	5278046	906	Virginia Fm
B1-323	X	1976	1584.2	St. Louis	Kennecott	60	12	30	825	582454	5277322	0	-90	Babbitt	Partridge River	582454	5277322	810	Virginia Fm
B1-324	X	1976	1589.7	St. Louis	Kennecott	60	12	32	1796	583358	5276820	0	-90	Babbitt	Partridge River	583358	5276820	-74	Virginia Fm
B1-325	X	1976	1553.4	St. Louis	Kennecott	60	12	29	1211	583373	5277696	0	-90	Babbitt	Partridge River	583373	5277696	402	Virginia Fm
B1-326	X	1976	1545.8	St. Louis	Kennecott	60	12	29	593	583232	5278135	0	-45	Babbitt	Partridge River	583232	5278239	1204	Virginia Fm
B1-327	X	1976	1633.3	St. Louis	Kennecott	60	12	33	2341	584245	5276373	0	-90	Babbitt	Partridge River	584245	5276373	-601	Virginia Fm

DDH #	Chem	Date	Elevation Collar (ft)	County	Lessee	Twp	Rng	Sec	Total Depth (ft)	UTME Collar	UTMN Collar	Collar Azi	Collar Dip	Deposit	Intrusion DDH is in	UTME DC Base	UTMN DC Base	Elevation DC Base (ft)	Footwall
B1-328	X	1976	1589	St. Louis	Kennecott	60	12	30	425	582403	5277401	0	-90	Babbitt	Partridge River	582403	5277401	1237	Virginia Fm
B1-329	X	1976	1568.6	St. Louis	Kennecott	60	12	29	747	583329	5278433	0	-50	Babbitt	Partridge River	583329	5278571	1028	Virginia Fm
B1-330	X	1976	1607.7	St. Louis	Kennecott	60	12	32	2287	583563	5276071	0	-90	Babbitt	Partridge River	583563	5276071	-626	Virginia Fm
B1-331	X	1976	1578.1	St. Louis	Kennecott	60	12	29	955	582787	5277462	0	-90	Babbitt	Partridge River	582787	5277462	791	Virginia Fm
B1-332	X	1976	1588.2	St. Louis	Kennecott	60	12	30	447	582386	5277427	336	-62	Babbitt	Partridge River	582331	5277482	1306	Virginia Fm
B1-333	X	1976	1529.8	St. Louis	Kennecott	60	12	29	805	583456	5278245	0	-90	Babbitt	Partridge River	583456	5278245	845	Virginia Fm
B1-334	X	1976	1571.3	St. Louis	Kennecott	60	12	29	1185	583029	5277575	0	-90	Babbitt	Partridge River	583029	5277575	444	Virginia Fm
B1-335	X	1976	1613.7	St. Louis	Kennecott	60	12	30	575	582151	5277344	332	-77	Babbitt	Partridge River	582126	5277369	1213	Virginia Fm
B1-336	X	1976	1591.5	St. Louis	Kennecott	60	12	30	415	582222	5277454	0	-90	Babbitt	Partridge River			1620	Collared in VF
B1-337	X	1976	1548.8	St. Louis	Kennecott	60	12	29	697	583415	5278308	0	-90	Babbitt	Partridge River	583415	5278308	991	Virginia Fm
B1-338	X	1976	1584.8	St. Louis	Kennecott	60	12	29	829	582885	5277778	0	-90	Babbitt	Partridge River	582885	5277778	1335	Virginia Fm
B1-339	X	1976	1612.3	St. Louis	Kennecott	60	12	30	403	581572	5277115	327	-45	Babbitt	Partridge River	581539	5277147	1484	Virginia Fm
B1-340	X	1976	1545.7	St. Louis	Kennecott	60	12	29	599	583295	5278264	0	-90	Babbitt	Partridge River	583295	5278264	1066	Virginia Fm
B1-341	X	1976	1566.1	St. Louis	Kennecott	60	12	29	843	583363	5278383	333	-50	Babbitt	Partridge River	583226	5278520	963	Virginia Fm
B1-342	X	1976	1562.4	St. Louis	Kennecott	60	12	29	965	583249	5277891	0	-90	Babbitt	Partridge River	583249	5277891	925	Virginia Fm
B1-343	X	1976	1619.8	St. Louis	Kennecott	60	12	30	363	581684	5277167	331	-55	Babbitt	Partridge River	581648	5277202	1431	Virginia Fm
B1-344	X	1976	1536.1	St. Louis	Kennecott	60	12	29	866	583361	5278162	0	-90	Babbitt	Partridge River	583361	5278162	861	Virginia Fm
B1-345	X	1976	1531.2	St. Louis	Kennecott	60	12	29	874	583718	5278285	326	-59	Babbitt	Partridge River	583610	5278392	802	Virginia Fm
B1-346	X	1976	1609.6	St. Louis	Kennecott	60	12	30	513	581615	5277054	336	-45	Babbitt	Partridge River	581581	5244131	1332	Virginia Fm
B1-347	X	1976	1530.5	St. Louis	Kennecott	60	12	29	385	583792	5278623	0	-90	Babbitt	Partridge River	583792	5278623	1270	Virginia Fm
B1-348	X	1976	1530.7	St. Louis	Kennecott	60	12	29	1023	583856	5278518	0	-90	Babbitt	Partridge River	583856	5278518	619	Virginia Fm
B1-349	X	1976	1531.8	St. Louis	Kennecott	60	12	29	331	583714	5278518	327	-50	Babbitt	Partridge River	583694	5278538	1437	Virginia Fm
B1-350	X	1976	1609.7	St. Louis	Kennecott	60	12	30	785	581614	5277055	0	-90	Babbitt	Partridge River	581614	5277055	1112	Virginia Fm
B1-351	X	1976	1531.8	St. Louis	Kennecott	60	12	29	364	583603	5278465	341	-60	Babbitt	Partridge River	583569	5278499	1327	Virginia Fm
B1-352	X	1977	1529	St. Louis	Kennecott	60	12	29	843	583683	5278332	327	-60	Babbitt	Partridge River	583595	5278420	933	Virginia Fm
B1-353	X	1977	1603	St. Louis	Kennecott	60	12	30	815	581724	5277107	0	-90	Babbitt	Partridge River	581724	5277107	831	Virginia Fm
B1-354	X	1977	1528.5	St. Louis	Kennecott	60	12	29	455	583627	5278425	346	-60	Babbitt	Partridge River	583581	5278472	1256	Virginia Fm
B1-355	X	1977	1567.3	St. Louis	Kennecott	60	12	28	1865	584216	5277964	0	-90	Babbitt	Partridge River	584216	5277964	-267	Virginia Fm
B1-356	X	1977	1596.3	St. Louis	Kennecott	60	12	32	1845	582671	5276085	0	-90	Babbitt	Partridge River	582671	5276085	-149	Virginia Fm
B1-357	X	1977	1597.4	St. Louis	Kennecott	60	12	31	1712	582401	5276055	0	-90	Babbitt	Partridge River	582401	5276055	-23	Virginia Fm
B1-358	X	1977	1590.4	St. Louis	Kennecott	60	12	32	1831	583251	5276761	0	-90	Babbitt	Partridge River	583251	5276761	-142	Virginia Fm
B1-359	X	1977	1595.6	St. Louis	Kennecott	60	12	32	2055	582597	5275746	0	-90	Babbitt	Partridge River	582597	5275746	-393	Virginia Fm
B1-360	X	1977	1597.6	St. Louis	Kennecott	60	12	31	1735	582143	5276014	0	-90	Babbitt	Partridge River	582143	5276014	-62	Virginia Fm
B1-361	X	1977	1595.1	St. Louis	Kennecott	60	12	32	2158	583278	5276037	0	-90	Babbitt	Partridge River	583278	5276037	-513	Virginia Fm
B1-362	X	1977	1597.8	St. Louis	Kennecott	60	12	32	1911	583123	5276956	0	-90	Babbitt	Partridge River	583123	5276956	-189	Virginia Fm
B1-363	X	1977	1592	St. Louis	Kennecott	60	12	31	1723	582105	5276739	0	-90	Babbitt	Partridge River	582105	5276739	-99	Virginia Fm
B1-364	X	1977	1594.5	St. Louis	Kennecott	60	12	31	1705	582174	5276637	0	-90	Babbitt	Partridge River	582174	5276637	-33	Virginia Fm
B1-365	X	1977	1608.7	St. Louis	Kennecott	60	12	30	625	581931	5277235	0	-90	Babbitt	Partridge River	581931	5277235	1143	Virginia Fm
B1-366	X	1977	1608.2	St. Louis	Kennecott	60	12	30	626	581826	5277172	335	-80	Babbitt	Partridge River	581811	5277186	1176	Virginia Fm
B1-367	X	1977	1590.4	St. Louis	Kennecott	60	12	31	1661	582039	5276840	0	-90	Babbitt	Partridge River	582039	5276840	-55	Virginia Fm
B1-368	X	1977	1598.6	St. Louis	Kennecott	60	12	32	1873	583021	5276893	0	-90	Babbitt	Partridge River	583021	5276893	-174	Virginia Fm
B1-369	X	1977	1590.4	St. Louis	Kennecott	60	12	31	1583	582250	5276963	0	-90	Babbitt	Partridge River	582250	5276963	41	Virginia Fm
B1-370	X	1977	1609	St. Louis	Kennecott	60	12	30	282	581900	5277285	0	-40	Babbitt	Partridge River	581900	5277314	1511	Virginia Fm
B1-371	X	1977	1599.5	St. Louis	Kennecott	60	12	32	2154	583069	5275909	0	-90	Babbitt	Partridge River	583069	5275909	-421	Virginia Fm
B1-372	X	1977	1610.3	St. Louis	Kennecott	60	12	31	1371	581971	5276946	0	-90	Babbitt	Partridge River	581971	5276946	269	Virginia Fm
B1-373	X	1977	1600.8	St. Louis	Kennecott	60	12	31	795	581362	5276765	0	-90	Babbitt	Partridge River	581362	5276765	934	Virginia Fm
B1-374	X	1977	1605	St. Louis	Kennecott	60	12	31	445	581297	5276866	0	-90	Babbitt	Partridge River	581297	5276866	1321	Virginia Fm
B1-375	X	1977	1565.6	St. Louis	Kennecott	60	12	29	365	583019	5278019	0	-90	Babbitt	Partridge River			900	Still in DC
B1-376	X	1977	1573.3	St. Louis	Kennecott	60	12	29	825	583107	5277886	0	-90	Babbitt	Partridge River	583107	5277886	776	Virginia Fm
B1-377	X	1977	1560.8	St. Louis	Kennecott	60	12	29	815	583344	5277972	0	-90	Babbitt	Partridge River	583344	5277972	1062	Virginia Fm

DDH #	Chem	Date	Elevation Collar (ft)	County	Lessee	Twp	Rng	Sec	Total Depth (ft)	UTME Collar	UTMN Collar	Collar Azi	Collar Dip	Deposit	Intrusion DDH is in	UTME DC Base	UTMN DC Base	Elevation DC Base (ft)	Footwall
B1-378	X	1977	1565.2	St. Louis	Kennecott	60	12	29	965	583183	5277762	0	-90	Babbitt	Partridge River	583183	5277762	687	Virginia Fm
B1-379	X	1977	1543.1	St. Louis	Kennecott	60	12	29	1100	583540	5278066	0	-90	Babbitt	Partridge River	583540	5278066	498	Virginia Fm
B1-380	X	1977	1573.8	St. Louis	Kennecott	60	12	29	1361	583132	5277393	0	-90	Babbitt	Partridge River	583132	5277393	258	Virginia Fm
B1-381	X	1977	1552.2	St. Louis	Kennecott	60	12	29	1113	583410	5277872	0	-90	Babbitt	Partridge River	583410	5277872	486	Virginia Fm
B1-382	X	1977	1558.7	St. Louis	Kennecott	60	12	29	945	583305	5277802	0	-90	Babbitt	Partridge River	583305	5277802	776	Virginia Fm
B1-383	X	1977	1560.3	St. Louis	Kennecott	60	12	29	1195	583270	5277625	0	-90	Babbitt	Partridge River	583270	5277625	529	Virginia Fm
B1-384	X	1977	1550.5	St. Louis	Kennecott	60	12	29	1273	583699	5278091	0	-90	Babbitt	Partridge River	583699	5278091	302	Virginia Fm
B1-385	X	1977	1555.8	St. Louis	Kennecott	60	12	29	1485	583904	5278224	0	-90	Babbitt	Partridge River	583904	5278224	172	Virginia Fm
B1-386	X	1977	1576.2	St. Louis	Kennecott	60	12	29	1292	583049	5277489	0	-90	Babbitt	Partridge River	583049	5277489	361	Virginia Fm
B1-387	X	1977	1532.3	St. Louis	Kennecott	60	12	29	965	583926	5278636	0	-90	Babbitt	Partridge River	583926	5278636	634	Virginia Fm
B1-388	X	1977	1533.8	St. Louis	Kennecott	60	12	29	1214	583320	5278352	0	-90	Babbitt	Partridge River	583320	5278352	473	Virginia Fm
B1-389	X	1977	1590	St. Louis	Kennecott	60	12	29	1434	583399	5277435	0	-90	Babbitt	Partridge River	583399	5277435	234	Virginia Fm
B1-390	X	1977	1542.8	St. Louis	Kennecott	60	12	29	1420	584025	5278262	0	-90	Babbitt	Partridge River	584025	5278262	185	Virginia Fm
B1-391	X	1977	1555.6	St. Louis	Kennecott	60	12	21	1238	584161	5278949	0	-90	Babbitt	Partridge River	584161	5278949	382	Virginia Fm
B1-392	X	1977	1578.4	St. Louis	Kennecott	60	12	29	1471	583194	5277297	0	-90	Babbitt	Partridge River	583194	5277297	195	Virginia Fm
B1-393	X	1977	1541.4	St. Louis	Kennecott	60	12	29	1079	583629	5278193	0	-90	Babbitt	Partridge River	583629	5278193	535	Virginia Fm
B1-394	X	1977	1583.4	St. Louis	Kennecott	60	12	29	1795	583264	5277193	0	-90	Babbitt	Partridge River	583264	5277193	-174	Virginia Fm
B1-395	X	1977	1532.9	St. Louis	Kennecott	60	12	29	1285	583954	5278373	0	-90	Babbitt	Partridge River	583954	5278373	328	Virginia Fm
B1-396	X	1977	1554.6	St. Louis	Kennecott	60	12	29	1294	583785	5278180	0	-90	Babbitt	Partridge River	583785	5278180	387	Virginia Fm
B1-397	X	1977	1559.2	St. Louis	Kennecott	60	12	29	1347	583539	5277666	0	-90	Babbitt	Partridge River	583539	5277666	252	Virginia Fm
B1-398	X	1977	1528.3	St. Louis	Kennecott	60	12	28	1211	584124	5278553	0	-90	Babbitt	Partridge River	584124	5278553	433	Virginia Fm
B1-399	X	1977	1579.4	St. Louis	Kennecott	60	12	29	1355	582922	5277270	0	-90	Babbitt	Partridge River	582922	5277270	293	Virginia Fm
B1-400	X	1977	1623.1	St. Louis	Kennecott	60	12	31	1018	581088	5276741	0	-90	Babbitt	Partridge River	581088	5276741	666	Virginia Fm
B1-401	X	1977	1619.7	St. Louis	Kennecott	60	12	31	983	580950	5276706	0	-90	Babbitt	Partridge River	580950	5276706	665	Virginia Fm
B1-402	X	1977	1535.2	St. Louis	Kennecott	60	12	28	1275	584198	5278667	0	-90	Babbitt	Partridge River	584198	5278667	350	Virginia Fm
B1-403	X	1977	1623.2	St. Louis	Kennecott	60	12	36	595	580796	5276709	0	-90	Babbitt	Partridge River	580796	5276709	1084	Virginia Fm
B1-404	X	1977	1602	St. Louis	Kennecott	60	12	31	1099	581166	5276633	0	-90	Babbitt	Partridge River	581166	5276633	531	Virginia Fm
B1-405	X	1977	1602.3	St. Louis	Kennecott	60	12	31	1223	580985	5276441	0	-90	Babbitt	Partridge River	580985	5276441	466	Virginia Fm
B1-406	X	1977	1535.9	St. Louis	Kennecott	60	12	21	1247	584131	5278769	0	-90	Babbitt	Partridge River	584131	5278769	335	Virginia Fm
B1-407	X	1977	1623.1	St. Louis	Kennecott	60	13	36	977	580822	5276477	0	-90	Babbitt	Partridge River	580822	5276477	759	Virginia Fm
B1-408	X	1977	1612.5	St. Louis	Kennecott	60	12	31	1305	581225	5276533	0	-90	Babbitt	Partridge River	581225	5276533	377	Virginia Fm
B1-409	X	1977	1619	St. Louis	Kennecott	60	12	32	1969	583825	5276541	0	-90	Babbitt	Partridge River	583825	5276541	-283	Virginia Fm
B1-410	X	1977	1621.2	St. Louis	Kennecott	60	13	36	759	580714	5276420	0	-90	Babbitt	Partridge River	580714	5276420	1012	Virginia Fm
B1-411	X	1977	1626.9	St. Louis	Kennecott	60	13	36	465	580647	5276523	0	-90	Babbitt	Partridge River	580647	5276523	1228	Virginia Fm
B1-412	X	1977	1607.4	St. Louis	Kennecott	60	12	31	1300	581431	5276659	0	-90	Babbitt	Partridge River	581431	5276659	354	Virginia Fm
B1-413	X	1977	1610.3	St. Louis	Kennecott	60	13	36	525	580574	5276432	0	-90	Babbitt	Partridge River	580574	5276432	1194	Virginia Fm
B1-414	X	1977	1561.9	St. Louis	Bear Creek	60	12	28	2065	585148	5277680	0	-90	Babbitt	Partridge River	585148	5277680	1562	Virginia Fm
B1-415	X	1977	1608.5	St. Louis	Kennecott	60	13	36	245	580371	5276269	0	-90	Babbitt	Partridge River	580371	5276269	1504	Virginia Fm
B1-416	X	1977	1594.1	St. Louis	Kennecott	60	13	36	365	580370	5276062	0	-90	Babbitt	Partridge River			1620	Collared in VF
B1-417	X	1977	1603.6	St. Louis	Kennecott	60	13	36	215	580384	5276493	0	-90	Babbitt	Partridge River			1620	Collared in VF
B1-418	X	1977	1618.5	St. Louis	Kennecott	60	13	36	235	580719	5276861	0	-90	Babbitt	Partridge River			1620	Collared in VF
B1-419	X	1977	1596.8	St. Louis	Kennecott	60	13	36	758	580575	5275994	0	-90	Babbitt	Partridge River			1620	Collared in VF
B1-420	X	1977	1562.5	St. Louis	Kennecott	60	12	28	1732	584740	5278278	0	-90	Babbitt	Partridge River	584740	5278278	-128	BIF
B1-421	X	1977	1611.2	St. Louis	Kennecott	60	12	32	1935	583934	5276610	0	-90	Babbitt	Partridge River	583934	5276610	-225	Virginia Fm
B1-422	X	1977	1566	St. Louis	Kennecott	60	12	29	43	583354	5278387	0	-90	Babbitt	Partridge River			960	Bulk Smp DDH
B1-423	X	1977	1566	St. Louis	Kennecott	60	12	29	55	583358	5278397	0	-90	Babbitt	Partridge River			960	Bulk Smp DDH
B1-424	X	1977	1566	St. Louis	Kennecott	60	12	29	62	583366	5278397	0	-90	Babbitt	Partridge River			960	Bulk Smp DDH
B1-425	X	1977	1566	St. Louis	Kennecott	60	12	29	62	583368	5278404	0	-90	Babbitt	Partridge River			960	Bulk Smp DDH
B1-426	X	1977	1566	St. Louis	Kennecott	60	12	29	62	583375	5278405	0	-90	Babbitt	Partridge River			960	Bulk Smp DDH
B1-427	X	1977	1566	St. Louis	Kennecott	60	12	29	51	583353	5278393	0	-90	Babbitt	Partridge River			960	Bulk Smp DDH

DDH #	Chem	Date	Elevation Collar (ft)	County	Lessee	Twp	Rng	Sec	Total Depth (ft)	UTME Collar	UTMN Collar	Collar Azi	Collar Dip	Deposit	Intrusion DDH is in	UTME DC Base	UTMN DC Base	Elevation DC Base (ft)	Footwall
B1-428	X	1977	1557.4	St. Louis	Kennecott	60	12	21	1168	584405	5279234	0	-90	Serpentine	South Kawishiwi	584405	5279234	491	Virginia Fm
B1-429	X	1977	1538.6	St. Louis	Kennecott	60	12	28	1466	584602	5278489	0	-90	Babbitt	Partridge River	584602	5278489	88	BIF
B1-430	X	1977	1572.8	St. Louis	Kennecott	60	12	28	2041	584988	5277863	0	-90	Babbitt	Partridge River			-360	Still in DC
B1-431	X	1978	1527.3	St. Louis	Kennecott	60	12	21	1519	584965	5279220	0	-90	Serpentine	South Kawishiwi	584965	5279220	23	BIF
B1-432	none	1978	1547.5	St. Louis	Kennecott	60	12	28	1955	585212	5278471	0	-90	Babbitt	Partridge River			-605	Still in DC
B2-01	X	1959	1548	St. Louis	Bear Creek	60	12	3	569	586881	5284621	305	-45	Dunka Pit	South Kawishiwi	586834	5284653	1491	Virginia Fm
B2-02	X	1959	1531	St. Louis	Bear Creek	60	12	2	1425	586963	5284559	305	-45	Dunka Pit	South Kawishiwi	586844	5284643	1386	Virginia Fm
B2-03	X	1960	1500	St. Louis	Bear Creek	60	12	2	425	587292	5284503	305	-45	Dunka Pit	South Kawishiwi	587080	5284652	1241	Virginia Fm
B2-04	X	1960	1476	St. Louis	Bear Creek	60	12	2	1136	587703	5284671	305	-45	Dunka Pit	South Kawishiwi	587274	5284972	951	Virginia Fm
B2-05	X	1960	1530	St. Louis	Bear Creek	60	12	2	509	587171	5285013	305	-45	Dunka Pit	South Kawishiwi	587113	5285053	1459	Virginia Fm
B2-06	X	1960	1541	St. Louis	Bear Creek	60	12	2	563	587130	5285177	305	-60	Dunka Pit	South Kawishiwi	587092	5285204	1460	Virginia Fm
B2-07		1960	1532	St. Louis	Bear Creek	61	12	35	1611	587510	5285368	305	-40	Dunka Pit	South Kawishiwi	587181	5285599	1195	BIF
B2-08	X	1960	1483	St. Louis	Bear Creek	60	12	2	165	587623	5284579	305	-45	Dunka Pit	South Kawishiwi	587252	5284839	1030	Virginia Fm
B2-09	X	1960	1489	St. Louis	Bear Creek	60	12	2	462	587622	5284435	305	-50	Dunka Pit	South Kawishiwi	587124	5284784	881	Virginia Fm
B2-10	X	1960	1476	St. Louis	Bear Creek	60	12	2	848	587808	5284608	305	-50	Dunka Pit	South Kawishiwi	587303	5284962	741	BIF
B2-11	X	1960	1490	St. Louis	Bear Creek	60	12	2	3145	587627	5284721		-90	Dunka Pit	South Kawishiwi			600	
B2-12	X	1960	1489	St. Louis	Bear Creek	60	12	2	635	587393	5284435	305	-50	Dunka Pit	South Kawishiwi	587130	5284620	1105	Virginia Fm
B2-13	X	1960	1500	St. Louis	Bear Creek	60	12	2	1200	587441	5284982	305	-45	Dunka Pit	South Kawishiwi			950	
B2-14	X	1960	1491	St. Louis	Bear Creek	60	12	2	1115	587833	5284871		-90	Dunka Pit	South Kawishiwi	587833	5284871	341	BIF
B2-15	X	1960	1510	St. Louis	Bear Creek	60	12	2	872	587399	5284859		-90	Dunka Pit	South Kawishiwi	587399	5284859	1119	Virginia Fm
BA-1	X	1967	1595	St. Louis	Humble Oil	59	12	4	3325	584172	5275523		-90	Babbitt	Partridge River	584172	5275523	-1439	VF / BIF
BA-2	X	1968	1550	St. Louis	AMAX	60	12	34	3574	585805	5277105		-90	Babbitt	South Kawishiwi	585805	5277105	-1792	Giants Range
BA-3	X	1968	1550	St. Louis	Humble Oil	59	13	14	3588	578801	5272213		-90	Dunka Road	Partridge River			-1730	Still in DC
BA-4	X	1969	1565	St. Louis	Humble Oil	59	13	1	2674	580555	5273985		-90	Dunka Road	Partridge River	580555	5273985	-1008	VF / BIF
BA-5	X	1969	1580	St. Louis	Humble Oil	59	12	7	3647	582291	5273527	315	-85	Babbitt	Partridge River			1000	Still in DC
BA-6	X	1969	1540	St. Louis	Humble Oil	59	13	30	2502	571377	5268297		-90	Longnose	Partridge River	571377	5268297	-1455	VF / BIF
BC-80-1	X	1980	1555	St. Louis	Exxon	57	14	34	561	567610	5246899	255	-47	Whiteface Reservoir	South Complex			1620	Graphite
BE-1			1560	Lake		61	10	16	304	605620	5291580		-90	August Lake	South Kawishiwi				
BE-2			1510	Lake		61	10	16	403	605800	5291580	322	-50	August Lake	South Kawishiwi				
BF-1	none	1959	1525	St. Louis	Bear Creek	60	12	10	199	585628	5282688	315	-60	Dunka Pit	South Kawishiwi			1450	Collared in VF
BF-2	X	1959	1522	St. Louis	Bear Creek	60	12	10	852	586217	5282442		-90	Dunka Pit	South Kawishiwi	586217	5282442	807	Virginia Fm
BF-4	X	1960	1490	St. Louis	Bear Creek	61	12	35	972	588132	5286540	305	-50	Dunka Pit	South Kawishiwi	587639	5286884	774	Giants Range
BL-1	X	1983	1410	St. Louis	MDNR	55	13	36	563	580901	5229005		-90		Bear Lake Inclusion				Still in D.C.
BL89-1	X	1989	1455	St. Louis	Lehmann	61	12	25	2569	589460	5287040		-90	Birch Lake	South Kawishiwi	589460	5287040	-1060	Giants Range
BL89-2	X	1989	1445	St. Louis	Lehmann	61	12	25	2706	589630	5286980		-90	Birch Lake	South Kawishiwi	589630	5286980	-1157	Giants Range
BL90-1	X	1990	1465	St. Louis	Lehmann	61	12	25	2531	589440	5286980		-90	Birch Lake	South Kawishiwi	589440	5286980	-1018	Giants Range
BL90-2		1990	1435	St. Louis	Lehmann	60	12	36	2586	589320	5286780		-90	Birch Lake	South Kawishiwi	589320	5286780	-1040	Giants Range
BL90-3	X	1990	1505	Lake	Lehmann	61	11	19	1357	590415	5290100		-90	Birch Lake	South Kawishiwi	590415	5290100	188	Giants Range
BL90-3W	X	1990	395	Lake	Lehmann	61	11	19	1350	590415	5290100		-87	Birch Lake	South Kawishiwi			188	Giants Range
BL-95-1		1995		Lake	Lehmann								-90	Birch Lake	South Kawishiwi				
BL-95-1W		1995		Lake	Lehmann								-90	Birch Lake	South Kawishiwi				
BM-1	X	1953	1490	Lake	USBM	62	11	26	145.6	597270	5297927	311	-73	Spruce Road	South Kawishiwi	597244	5297949	1378	Giants Range
BM-2	X	1953	1492	Lake	USBM	62	11	26	194.5	597212	5297867		-90	Spruce Road	South Kawishiwi	597212	5297867	1315	Giants Range
BM-3	X	1953	1499	Lake	USBM	62	11	26	341	597644	5298068	329	-60	Spruce Road	South Kawishiwi	597558	5298210	1211	Giants Range
C80-1		1980	1555	St. Louis		57	14	34	603	567610	5246900	255	-47	Whiteface Reservoir	South Complex				Collared in VF
C88-1	X	1988	1455	St. Louis	Lehmann	61	12	25	2402	589295	5287150		-90	Birch Lake	South Kawishiwi	589295	5287150	-832	Giants Range
CDC-23			1470		MGS				307			195	-45						
CDC-33		1991	1831	Lake	MGS	57	10	21	210				-90						
CDC-40		1991	1535	Lake	MGS	57	11	9	55				-90						
CL-1	X	1968	1520	St. Louis	W.S. Moore	56	14	22	704	568487	5240621	270	-60	Linwood Lake	South Complex				Still in D.C.

DDH #	Chem	Date	Elevation Collar (ft)	County	Lessee	Twp	Rng	Sec	Total Depth (ft)	UTME Collar	UTMN Collar	Collar Azi	Collar Dip	Deposit	Intrusion DDH is in	UTME DC Base	UTMN DC Base	Elevation DC Base (ft)	Footwall
CL-2	X	1968	1540	St. Louis	W.S. Moore	55	14	3	534	567923	5236829	270	-60	@ Contact	South Complex	567854	5236829	1149	Thomson Fm
CL-3	none	1968	1525	St. Louis	W.S. Moore	56	14	9	360	566780	5243776	270	-60	in Thomson Fm	South Complex			1700	Collared in VF
CN-01	X	1957	1520	St. Louis	Bear Creek	57	14	28	1182	566781	5249038		-90	Waterhen	South Complex				Still in D.C.
CN-02	X	1957	1515	St. Louis	Bear Creek	57	14	28	561	566579	5249021		-90	Waterhen	South Complex				Still in D.C.
CN-03	X	1957	1515	St. Louis	Bear Creek	57	14	28	461.2	566623	5249422	270	-65	Waterhen	South Complex	566578	5249422	1220	Virginia Fm
CN-04	X	1958	1515	St. Louis	Bear Creek	57	14	28	695	566660	5248758	270	-65	Waterhen	South Complex				Still in D.C.
CN-05	X	1959	1535	St. Louis	Bear Creek	57	14	28	589	566599	5248298	270	-60	Waterhen	South Complex				Still in D.C.
CN-06	X	1959	1525	St. Louis	Bear Creek	57	14	28	745	566504	5248326	270	-60	Waterhen	South Complex	566394	5248326	920	Virginia Fm
CN-07	X	1959	1530	St. Louis	Bear Creek	57	14	28	1751	567009	5249011		-90	Waterhen	South Complex				Still in D.C.
CN-08	X	1959	1515	St. Louis	Bear Creek	57	14	28	434	566670	5249669	270	-60	Waterhen	South Complex				Still in D.C.
CN-09	X	1959	1540	St. Louis	Bear Creek	57	14	28	745	566748	5248295	230	-60	Waterhen	South Complex				Still in D.C.
CN-10	X	1968	1540	St. Louis	American Shield	57	14	28	1875	567024	5248296		-90	Waterhen	South Complex	567024	5248296	-205	Virginia Fm
CN-11	X	1969	1550	St. Louis	American Shield	57	14	27	2975	567508	5248858		-90	Waterhen	South Complex	567508	5248858	-1313	Virginia Fm
CV-1	X	1974	1570	St. Louis	Exxon	55	14	29	870	564330	5229351	295	-60	Cloquet Valley	South Complex	564237	5229399	921	Thomson Fm
CV-2	X	1974	1570	St. Louis	Exxon	55	14	9	884	566671	5234411	315	-60	Cloquet Valley	South Complex	566587	5234495	893	Thomson Fm
D-01	X	1975	1495	St. Louis	Exxon	60	12	2	1628	587817	5284263		-90	Dunka Pit	South Kawishiwi	587817	5284263	-129	Giants Range
D-02	X	1977	1475	St. Louis	Exxon	60	12	2	1651	587903	5284674		-90	Dunka Pit	South Kawishiwi	587903	5284674	-105	Giants Range
D-03	X	1978	1500	St. Louis	Exxon	60	12	2	1944	588100	5284500		-90	Dunka Pit	South Kawishiwi	588100	5284500	-153	Giants Range
D-04	X	1978	1520	St. Louis	Exxon	60	12	10	1347	586801	5283440		-90	Dunka Pit	South Kawishiwi	586801	5283440	305	Giants Range
D-05	X	1978	1510	St. Louis	Exxon	60	12	11	1873	587134	5283377		-90	Dunka Pit	South Kawishiwi	587134	5283377	-80	Giants Range
D-06A	X	1979	1521	St. Louis	Exxon	60	12	11	2125	587365	5283253		-90	Dunka Pit	South Kawishiwi	587365	5283253	-495	Giants Range
D-07	X	1979	1481	St. Louis	Exxon	61	12	35	1520	588193	5285961		-90	Dunka Pit	South Kawishiwi	588193	5285961	57	Giants Range
D-08	X	1980	1490	St. Louis	Exxon	61	12	35	1140	587892	5285813		-90	Dunka Pit	South Kawishiwi	587892	5285813	476	Giants Range
D-09	X	1980	1490	St. Louis	Exxon	60	12	2	1477	587656	5284343		-90	Dunka Pit	South Kawishiwi	587656	5284343	193	BIF
D-10	X	1980	1485	St. Louis	Exxon	60	12	2	1684	587512	5284110		-90	Dunka Pit	South Kawishiwi	587512	5284110	-136	BIF
D-11	X	1981	1494	St. Louis	Exxon	61	12	35	1252	587901	5285647		-90	Dunka Pit	South Kawishiwi	587901	5285647	270	Giants Range
D-12	X	1981	1470	St. Louis	Exxon	61	12	35	1348	587860	5285403		-90	Dunka Pit	South Kawishiwi	587860	5285403	204	Giants Range
D-13	X	1981	1490	St. Louis	Exxon	60	12	2	1002	587424	5284374		-90	Dunka Pit	South Kawishiwi	587424	5284374	603	Virginia Fm
DDH-1			1430	Lake		61	11	5	188	592865	5294880		-90	Maturi	South Kawishiwi			585	
DDH-3	X	1976	1540	St. Louis	INCO	58	14	34	1200	567573	5257799		-90	Skibo	South Complex	567573	5257799	450	Virginia Fm
DR-2 (B-2)			1605	St. Louis	Newmont	60	12	10	2447	587940	5283165		-90	Dunka Pit	South Kawishiwi	587940	5283165	-940	
DS-1	X	1983	1895	Lake	Lehmann	57	10	11	454	608376	5253957	270	-70		Central Complex				Still in D.C.
DU-01	X	1967	1500	Lake	Duval	61	11	4	2895	594210	5294630		-90	Maturi	South Kawishiwi	594210	5294630	-1143	Giants Range
DU-02	X	1967	1430	Lake	Duval	61	11	5	1780	593115	5293825		-90	Maturi	South Kawishiwi	593115	5293825	-1144	Giants Range
DU-03	X	1968	1500	Lake	Duval	62	11	34	3055	595885	5295540		-90	Mat-S.Rd	South Kawishiwi	595885	5295540	-1353	Giants Range
DU-04	X	1968	1510	Lake	Duval	62	11	34	3425	596780	5295850		-90	Mat-S.Rd	South Kawishiwi	596780	5295850	-1713	Giants Range
DU-05	X	1969	1470	Lake	Duval	61	11	4	1515	593880	5295215		-90	Maturi	South Kawishiwi	593880	5295215	178	Giants Range
DU-06	X	1969	1470	Lake	Duval	61	11	4	3005	594550	5294420		-90	Maturi	South Kawishiwi	594550	5294420	-1507	Giants Range
DU-07	X	1969	1525	Lake	Duval	62	11	36	3195	598900	5296910		-90	Filson Cr.	South Kawishiwi	598900	5296910	-1401	Giants Range
DU-08	X	1969	1510	Lake	Duval	61	11	3	4235	596140	5294745		-90	Mat-S.Rd	South Kawishiwi	596140	5294745	-2627	Giants Range
DU-09	X	1969	1470	St. Louis	Duval	61	12	36	2696	589960	5286515		-90	Birch Lake	South Kawishiwi			-1300	
DU-10	X	1969	1475	St. Louis	Duval	61	12	36	2225	588559	5285610		-90	Dunka Pit	South Kawishiwi	588559	5285610	-685	Giants Range
DU-11	X	1969	1480	St. Louis	Duval	61	12	36	1165	588532	5286811		-90	Dunka Pit	South Kawishiwi	588532	5286811	333	Giants Range
DU-12	X	1976	1455	Lake	Duval	61	11	31	3354	590115	5286620		-90	Birch Lake	South Kawishiwi	590115	5286620	-1547	Giants Range
DU-13	X	1970	1450	Lake	Duval	61	11	8	3805	593415	5293200		-90	Maturi	South Kawishiwi	593415	5293200	-2082	Giants Range
DU-14	X	1976	1425	Lake	Duval	61	11	20	4835	592455	5289865		-90	Birch Lake	South Kawishiwi	592455	5289865	-2996	Giants Range
DU-15	X	1971	1460	St. Louis	Duval	61	12	25	2800	589265	5287035		-90	Birch Lake	South Kawishiwi	589265	5287035	-995	Giants Range
DU-16	X	1976	1460	Lake	Duval	61	11	31	3945	590655	5287025		-90	Birch Lake	South Kawishiwi	590655	5287025	-2270	Giants Range
DU-17	X	1976	1450	Lake	Duval	61	11	17	4559	593150	5291445		-90	Birch Lake	South Kawishiwi	593150	5291445	-2830	Giants Range
DU-18	X	1977	1470	Lake	Duval	61	11	4	2157	593985	5294930		-90	Maturi	South Kawishiwi	593985	5294930	-493	Giants Range

DDH #	Chem	Date	Elevation Collar (ft)	County	Lessee	Twp	Rng	Sec	Total Depth (ft)	UTME Collar	UTMN Collar	Collar Azi	Collar Dip	Deposit	Intrusion DDH is in	UTME DC Base	UTMN DC Base	Elevation DC Base (ft)	Footwall
DU-19	X	1977	1485	Lake	Duval	61	11	4	1863	594285	5295145		-90	Maturi	South Kawishiwi	594285	5295145	-272	Giants Range
DU-20	X	1977	1490	Lake	Duval	61	11	4	2465	594450	5294895		-90	Maturi	South Kawishiwi	594450	5294895	-879	Giants Range
DU-09-W1	X	1969	-1120	St. Louis	Duval	61	12	36	85	589960	5286515		-90	Birch Lake	South Kawishiwi			-1300	
DU-15-W1	X	1986	-340	St. Louis	Lehmanh	61	12	25	213	589265	5287035		-80	Birch Lake	South Kawishiwi	589265	5287069	-974	BIF
DV-CR-39				St. Louis	MGS	61	13	23	200										
E-10(NM-1C)	X		1490	St. Louis	Newmont	60	12	2	1622	587779	5285052		-90	Dunka Pit	South Kawishiwi	587779	5285052	240	Giants Range
E-11(NM-11)	X		1475	St. Louis	Newmont	60	12	2	1542	588017	5284988		-90	Dunka Pit	South Kawishiwi	588017	5284988	54	Giants Range
E-5 (NM-5)	X		1500	St. Louis	Newmont	60	12	2	2448	588010	5284384		-90	Dunka Pit	South Kawishiwi	588010	5284384	-374	Giants Range
E-6 (NM-6)	X		1490	St. Louis	Newmont	60	12	2	1545	587773	5285191		-90	Dunka Pit	South Kawishiwi	587773	5285191	247	Giants Range
E-7 (NM-7)	X		1500	St. Louis	Newmont	60	12	2	2305	587835	5283983		-90	Dunka Pit	South Kawishiwi	587835	5283983	-500	Giants Range
E-8 (NM-8)	none		1490	St. Louis	Newmont	60	12	2	245	587797	5284898		-90	Dunka Pit	South Kawishiwi			250	Still in D.C.
E-9 (NM-9)	X		1500	St. Louis	Newmont	60	12	2	1887	588082	5285207		-90	Dunka Pit	South Kawishiwi	588082	5285207	-90	Giants Range
FHL-1	X	1984	1352	St. Louis	MDNR	52	15	10	1887	558363	5205070	263	-61	Fish Lake	South Complex	558288	5205061	922	Thomson Fm
FHL-2	X	1984	1400	St. Louis	MDNR	52	15	10	1315	558481	5205070		-90	Fish Lake	South Complex	558481	5205070	559	Thomson Fm
FL-1	\	1981		Lake	MDNR	59	11	12	125.5				-90		Central Complex				
FL-2		1981	1535	Lake	MDNR	59	11	12	65				-90		Central Complex				
G-8161	X	1964	1525	St. Louis	Erie Mining	60	12	10	253	586100	5281981		-90	Dunka Pit	South Kawishiwi			375	Still in D.C.
G-8162	X	1964	1530	St. Louis	Erie Mining	60	12	10	250	586695	5282959		-90	Dunka Pit	South Kawishiwi			310	Still in D.C.
HL-1A	X	1971	1545	St. Louis	Phelps Dodge	56	13	31	1061	574220	5238326	310	-45	Harris Lake	South Complex				Still in D.C.
HL-2	X	1971	1545	St. Louis	Phelps Dodge	56	13	31	703	572851	5238284	310	-45	Harris Lake	South Complex				Still in D.C.
I-01A	X	1969	1575	St. Louis	Phelps Dodge	54	14	10	344	567742	5225302	300	-45	Boulder Creek	South Complex				Still in D.C.
I-02	X	1969	1560	St. Louis	Phelps Dodge	54	14	16	1000	566563	5223259	300	-45	Boulder Creek	South Complex				Still in D.C.
I-03	X	1969	1565	St. Louis	Phelps Dodge	54	14	16	403	566443	5223319	300	-45	Boulder Creek	South Complex				Still in D.C.
I-04	X	1969	1560	St. Louis	Phelps Dodge	54	14	16	1000	566681	5223212	300	-45	Boulder Creek	South Complex				Still in D.C.
I-05A	X	1969	1565	St. Louis	Phelps Dodge	54	14	10	993	567912	5225221	300	-45	Boulder Creek	South Complex				Still in D.C.
I-06	X	1969	1580	St. Louis	Phelps Dodge	54	14	9	1087	567361	5224529	300	-45	Boulder Creek	South Complex				Still in D.C.
I-07	X	1969	1585	St. Louis	Phelps Dodge	54	14	16	1283	567015	5223880	300	-45	Boulder Creek	South Complex				Still in D.C.
I-08	X	1969	1545	St. Louis	Phelps Dodge	54	14	16	1432	566280	5222665	300	-45	Boulder Creek	South Complex				Still in D.C.
I-09	X	1969	1535	St. Louis	Phelps Dodge	54	14	16	1002	567153	5223402	300	-45	Boulder Creek	South Complex				Still in D.C.
I-10	X	1969	1545	St. Louis	Phelps Dodge	54	14	16	572	566403	5222881	300	-45	Boulder Creek	South Complex				Still in D.C.
I-12	X	1969	1560	St. Louis	Phelps Dodge	54	14	16	1083	566623	5223493	300	-45	Boulder Creek	South Complex				Still in D.C.
I-13	X	1969	1565	St. Louis	Phelps Dodge	54	14	16	994	566521	5223157	300	-45	Boulder Creek	South Complex				Still in D.C.
II-1	X	1969	1535	St. Louis	Phelps Dodge	57	14	16	493	566559	5252329	280	-45	Skibo South	South Complex				Still in D.C.
II-2	X	1969	1540	St. Louis	Phelps Dodge	57	14	16	1702	565759	5251897	280	-45	Skibo South	South Complex				Collared in VF
II-3	X	1969	1530	St. Louis	Phelps Dodge	57	14	16	510	566731	5252787	280	-45	Skibo South	South Complex				Still in D.C.
II-4	X	1969	1530	St. Louis	Phelps Dodge	57	14	16	623	566562	5252586	280	-45	Skibo South	South Complex				Still in D.C.
II-5	X	1969	1525	St. Louis	Phelps Dodge	57	14	16	593	566499	5252100	280	-45	Skibo South	South Complex				Still in D.C.
II-6	X	1969	1535	St. Louis	Phelps Dodge	57	14	16	1323	566771	5252287	280	-45	Skibo South	South Complex				Still in D.C.
IL-1	X	1968	1435	St. Louis	American Shield	53	14	6	700	563657	5216134		-90	Boulder Lake North	South Complex				Still in D.C.
IL-2	X	1968	1440	St. Louis	American Shield	53	14	6	455	563503	5216885		-90	Boulder Lake North	South Complex				Still in D.C.
IL-3	X	1968	1490	St. Louis	American Shield	53	14	6	515	564039	5217617		-90	Boulder Lake North	South Complex				Still in D.C.
IV-1	X	1970	1415	St. Louis	Phelps Dodge	53	14	8	817	564253	5215579	90	-45	Boulder Lake North	South Complex				Still in D.C.
IV-2	X	1970	1410	St. Louis	Phelps Dodge	53	14	7	912	563428	5214851	270	-45	Boulder Lake North	South Complex				Still in D.C.
IV-3	X	1970	1435	St. Louis	Phelps Dodge	53	14	6	1002	563825	5216197	270	-45	Boulder Lake North	South Complex				Still in D.C.
IV-4	X	1970	1380	St. Louis	Phelps Dodge	53	14	18	993	563325	5214483	270	-45	Boulder Lake North	South Complex				Still in D.C.
IV-5	X	1970	1380	St. Louis	Phelps Dodge	53	14	18	600	563544	5214486	270	-45	Boulder Lake North	South Complex				Still in D.C.
IV-6	X	1970	1435	St. Louis	Phelps Dodge	53	14	7	673	564222	5215441	270	-45	Boulder Lake North	South Complex				Still in D.C.
IV-7	X	1970	1450	St. Louis	Phelps Dodge	53	14	7	515	563444	5215338	270	-45	Boulder Lake North	South Complex				Still in D.C.
IV-8	X	1970	1445	St. Louis	Phelps Dodge	53	14	7	503	563890	5215682	270	-45	Boulder Lake North	South Complex				Still in D.C.
IV-9	X	1970	1435	St. Louis	Phelps Dodge	53	14	7	768	563684	5216079	270	-45	Boulder Lake North	South Complex				Still in D.C.

DDH #	Chem	Date	Elevation Collar (ft)	County	Lessee	Twp	Rng	Sec	Total Depth (ft)	UTME Collar	UTMN Collar	Collar Azi	Collar Dip	Deposit	Intrusion DDH is in	UTME DC Base	UTMN DC Base	Elevation DC Base (ft)	Footwall
K-01	X	1960's	1490	Lake	Hanna Mining	62	11	25	2645	599161	5297635		-90	Filson Cr.	South Kawishiwi	599145	5297700	-914	Giants Range
K-02	X	1960's	1450	Lake	Hanna Mining	61	11	8	2240	592612	5293617		-90	Maturi	South Kawishiwi	592540	5293595	-727	Giants Range
K-03	X	1960's	1500	Lake	Hanna Mining	62	10	20	40	602662	5298606	330	-43	Nickel Lake	South Kawishiwi				Still in D.C.
K-03A	X	1960's	1500	Lake	Hanna Mining	62	10	20	284	602662	5298606	330	-43	Nickel Lake	South Kawishiwi				Still in D.C.
K-04	X	1960's	1500	Lake	Hanna Mining	62	11	33	1697	595162	5296040		-85	Mat-S.Rd	South Kawishiwi	595150	5296010	-127	Giants Range
K-05	X	1960's	1500	Lake	Hanna Mining	62	11	25	307	599822	5297027	0	-45	Filson Cr.	South Kawishiwi			-1700	Still in D.C.
K-06	X	1960's	1495	Lake	Hanna Mining	62	11	25	300	599259	5297012	0	-45	Filson Cr.	South Kawishiwi			-1615	Still in D.C.
K-07	X	1960's	1500	Lake	Hanna Mining	62	10	20	300	602730	5298702	328	-45	Nickel Lake	South Kawishiwi				Still in D.C.
K-08	X	1960's	1430	Lake	Hanna Mining	61	11	8	3420	593079	5293252		-90	Maturi	South Kawishiwi	593020	5293240	-1905	Giants Range
K-09	none	1960's	1480	Lake	Hanna Mining	62	11	25	300	599149	5297521	0	-60	Filson Cr.	South Kawishiwi			-1180	Still in D.C.
K-10	none	1960's	1490	Lake	Hanna Mining	62	11	25	100	599145	5297366		-90	Filson Cr.	South Kawishiwi			-1310	Still in D.C.
K-11	X	1960's	1495	Lake	Hanna Mining	62	11	25	362	599819	5297457	0	-45	Filson Cr.	South Kawishiwi			-1340	Still in D.C.
K-12	X	1960's	1495	Lake	Hanna Mining	62	11	25	214	599836	5297431		-90	Filson Cr.	South Kawishiwi			-1360	Still in D.C.
K-13	X	1960's	1505	Lake	Hanna Mining	62	11	25	100	599697	5297400		-90	Filson Cr.	South Kawishiwi			-1405	Still in D.C.
K-14	none	1960's	1500	Lake	Hanna Mining	62	11	25	100	599424	5297279		-90	Filson Cr.	South Kawishiwi			-1495	Still in D.C.
K-15	X	1960's	1505	Lake	Hanna Mining	62	11	25	100	599195	5297153		-90	Filson Cr.	South Kawishiwi			-1485	Still in D.C.
K-16	X	1960's	1500	Lake	Hanna Mining	62	11	25	265	599254	5297034	328	-45	Filson Cr.	South Kawishiwi			-1600	Still in D.C.
K-17	X	1960's	1490	Lake	Hanna Mining	62	11	25	189	599229	5297110		-90	Filson Cr.	South Kawishiwi			-1530	Still in D.C.
K-18	X	1960's	1490	Lake	Hanna Mining	62	11	25	200	599316	5297067		-90	Filson Cr.	South Kawishiwi			-1610	Still in D.C.
K-19	none	1960's	1500	Lake	Hanna Mining	62	11	25	200	599166	5297061		-90	Filson Cr.	South Kawishiwi			-1535	Still in D.C.
K-20	X	1960's	1490	Lake	Hanna Mining	62	11	25	250	599258	5297982		-90	Filson Cr.	South Kawishiwi			-425	Still in D.C.
K-21	X	1960's	1490	Lake	Hanna Mining	62	11	25	150	599315	5297108		-90	Filson Cr.	South Kawishiwi			-1575	Still in D.C.
K-22	none	1960's	1490	Lake	Hanna Mining	62	11	25	200	599268	5297062		-90	Filson Cr.	South Kawishiwi			-1590	Still in D.C.
K-23	none	1960's	1490	Lake	Hanna Mining	62	11	25	200	599204	5297066		-90	Filson Cr.	South Kawishiwi			-1550	Still in D.C.
K-24	none	1960's	1510	Lake	Hanna Mining	62	11	25	100	599363	5297232		-90	Filson Cr.	South Kawishiwi			-1510	Still in D.C.
K-25	X	1960's	1500	Lake	Hanna Mining	62	11	25	166	599474	5297326		-90	Filson Cr.	South Kawishiwi			-1460	Still in D.C.
K-26	X	1960's	1510	Lake	Hanna Mining	62	11	25	186	599690	5297457		-90	Filson Cr.	South Kawishiwi			-1350	Still in D.C.
K-27	X	1960's	1490	Lake	Hanna Mining	62	11	25	200	599264	5297108		-90	Filson Cr.	South Kawishiwi			-1550	Still in D.C.
K-28	none	1960's	1490	Lake	Hanna Mining	62	11	25	100	599516	5297431		-90	Filson Cr.	South Kawishiwi			-1375	Still in D.C.
K-29	X	1960's	1490	Lake	Hanna Mining	62	11	25	494	599256	5297217	135	-45	Filson Cr.	South Kawishiwi			-1470	Still in D.C.
KA-1	X	1968	1470	Lake	Kennecott	61	11	7	1635	591410	5293115		-90	Birch Lake	South Kawishiwi	591410	5293115	-117	Giants Range
KA-2	X	1968	1505	Lake	Kennecott	61	11	7	1161	590705	5292315		-90	Birch Lake	South Kawishiwi	590705	5292315	588	Giants Range
KA-3	X	1969	1425	Lake	Kennecott	61	11	17	3179	592200	5291650		-90	Birch Lake	South Kawishiwi	592200	5291650	-1730	Giants Range
KA-4		1970	1495	Lake	Kennecott	61	11	7	2465	591535	5292640		-90	Birch Lake	South Kawishiwi	591535	5292640	-509	Giants Range
KAF-1W			1510	St. Louis	Bear Creek	61	12	13	185	589700	5290320			Birch Lake	South Kawishiwi	589700	5290320	1336	BIF
LE-1	X	1975	1481	St. Louis	Nicor	59	13	19	606	572669	5269280	270	-45	Longear	Partridge River			-1280	Still in D.C.
LE-2	none	1984	1555	St. Louis	Nicor	59	13	19	502	572676	5269384	270	-45	Longear	Partridge River			-1140	Still in D.C.
LE-3	X	1984	1535	St. Louis	Nicor	59	13	19	499	572615	5269106	270	-45	Longear	Partridge River			-1140	Still in D.C.
LN-01	X	1975	1528	St. Louis	Nicor	59	13	30	634	572176	5268151	318	-45	Longnose	Partridge River			-2140	Still in D.C.
LN-02	X	1984	1528	St. Louis	Nicor	59	13	30	570	572236	5268287	318	-45	Longnose	Partridge River			-1910	Still in D.C.
LN-03	none	1984	1528	St. Louis	Nicor	59	13	30	502	572281	5268420	318	-45	Longnose	Partridge River			-1985	Still in D.C.
LN-04	X	1984	1528	St. Louis	Nicor	59	13	30	612	572219	5268203	318	-45	Longnose	Partridge River			-2120	Still in D.C.
LN-05	X	1984	1528	St. Louis	Nicor	59	13	30	602	572629	5268089	318	-45	Longnose	Partridge River			-2450	Still in D.C.
LN-06	X	1984	1528	St. Louis	Nicor	59	13	30	595	572404	5268127	318	-45	Longnose	Partridge River			-2300	Still in D.C.
LN-07	X	1984	1528	St. Louis	Nicor	59	13	30	602	572712	5268181	318	-45	Longnose	Partridge River			-2435	Still in D.C.
LN-08	X	1984	1528	St. Louis	Nicor	59	13	30	402	572379	5268491	318	-45	Longnose	Partridge River			-2000	Still in D.C.
LN-09	X	1984	1528	St. Louis	Nicor	59	13	30	400	572268	5268348	318	-45	Longnose	Partridge River			-2050	Still in D.C.
LN-10	X	1984	1528	St. Louis	Nicor	59	13	30	330	572146	5268267	318	-45	Longnose	Partridge River			-2040	Still in D.C.
MPL-1	\	1975	1528	St. Louis	Minn Power	52	15	22	399				-90		South Complex				Still in D.C.
MV2-1W	X		1530	Lake	Bear Creek	62	10	30	54	601355	5297385	330	-68	Nickel Lake	South Kawishiwi			-1210	

DDH #	Chem	Date	Elevation Collar (ft)	County	Lessee	Twp	Rng	Sec	Total Depth (ft)	UTME Collar	UTMN Collar	Collar Azi	Collar Dip	Deposit	Intrusion DDH is in	UTME DC Base	UTMN DC Base	Elevation DC Base (ft)	Footwall
NE-1	X	1985	1575	Lake	MDNR	60	11	18	331	593815	5282300	210	-50		South Kawishiwi				
NE-2	\	1984	1740	Lake	MDNR	60	10	26	1138				-90		Central Complex				
NM-01	none		1530	Lake	Newmont	62	10	30	2303	601440	5297205		-90	Nickel Lake	South Kawishiwi			-1400	Still in D.C.
NM-02		1967	1510	Lake	Newmont	62	10	30	1667	600335	5296995		-90	Nickel Lake	South Kawishiwi			-1660	Still in D.C.
NM-03	X	1967	1520	Lake	Newmont	61	11	2	4370	597105	5295220		-90	Mat-S.Rd	South Kawishiwi	597105	5295220	-2674	Giants Range
NM-04	X	1967	1504	Lake	Newmont	61	11	10	5045	595446	5293625		-90	Mat-S.Rd	South Kawishiwi	595446	5293625	-3110	Giants Range
NM-05	X	1970	1510	Lake	Newmont	61	11	11	5525	597135	5293605		-90	Mat-S.Rd	South Kawishiwi	597135	5293605	-3415	Giants Range
NM-06	X	1971	1520	Lake	Newmont	61	11	10	4818	598150	5294810		-90	Mat-S.Rd	South Kawishiwi	598150	5294810	-2901	Giants Range
NM-12	X	1969	1515	St. Louis	Newmont	61	12	35	659	587675	5286006		-90	Dunka Pit	South Kawishiwi	587675	5286006	808	Giants Range
NM-13	X	1969	1515	St. Louis	Newmont	61	12	35	378	587577	5286079		-90	Dunka Pit	South Kawishiwi	587577	5286079	1436	BIF
NM-13D	X	1969	1515	St. Louis	Newmont	61	12	35	659	587577	5286079		-90	Dunka Pit	South Kawishiwi			1200	Still in D.C.
NM-14	X	1969	1535	St. Louis	Newmont	61	12	35	812	587541	5285421		-90	Dunka Pit	South Kawishiwi	587541	5285421	942	BIF
NM-15	X	1969	1540	St. Louis	Newmont	61	12	35	745	587495	5285455		-90	Dunka Pit	South Kawishiwi	587495	5285455	1063	BIF
NM-16	X	1969	1535	St. Louis	Newmont	61	12	35	754	587444	5285494		-90	Dunka Pit	South Kawishiwi	587444	5285494	898	Giants Range
NM-17	X	1969	1506	St. Louis	Newmont	61	12	35	757	587730	5286079		-90	Dunka Pit	South Kawishiwi	587730	5286079	986	BIF
NM-18	X	1969	1520	St. Louis	Newmont	61	12	35	548	587395	5285530		-90	Dunka Pit	South Kawishiwi	587395	5285530	1333	Giants Range
NM-19	X	1969	1520	St. Louis	Newmont	61	12	35	614	587650	5286177		-90	Dunka Pit	South Kawishiwi	587650	5286177	956	Giants Range
NM-20	X	1969	1500	St. Louis	Newmont	61	12	35	564	587529	5285811		-90	Dunka Pit	South Kawishiwi	587529	5285811	950	Giants Range
NM-21	X	1969	1515	St. Louis	Newmont	61	12	35	917	587773	5285933		-90	Dunka Pit	South Kawishiwi	587773	5285933	662	Giants Range
NM-22	X	1968	1520	St. Louis	Newmont	61	12	35	691	587724	5286274		-90	Dunka Pit	South Kawishiwi	587724	5286274	918	Giants Range
NM-23	X	1969	1495	St. Louis	Newmont	61	12	26	703	588210	5287280		-90	Dunka Pit	South Kawishiwi	588210	5287280	1043	Giants Range
NM-24	X	1969	1540	St. Louis	Newmont	60	12	10	657	586154	5282957		-90	Dunka Pit	South Kawishiwi	586154	5282957	1188	Virginia Fm
NM-25	X	1969	1515	St. Louis	Newmont	61	12	35	847.5	587870	5286469		-90	Dunka Pit	South Kawishiwi	587870	5286469	951	Giants Range
NM-26	X	1969	1505	St. Louis	Newmont	61	12	35	906	587899	5286295		-90	Dunka Pit	South Kawishiwi	587899	5286295	765	Giants Range
NM-27	X	1969	1475	St. Louis	Newmont	61	12	10	640	585788	5282470		-90	Dunka Pit	South Kawishiwi	585788	5282470	1070	Virginia Fm
NM-28	X	1969	1490	St. Louis	Newmont	61	12	35	513	588016	5286664		-90	Dunka Pit	South Kawishiwi	588016	5286664	1044	Giants Range
NM-29	X	1969	1530	St. Louis	Newmont	61	12	35	400	587626	5285738		-90	Dunka Pit	South Kawishiwi			840	Still in D.C.
NM-30	X	1969	1505	St. Louis	Newmont	61	12	35	400	587724	5285665		-90	Dunka Pit	South Kawishiwi			600	Still in D.C.
NM-31	X	1969	1520	St. Louis	Newmont	61	12	35	163	587334	5285347		-90	Dunka Pit	South Kawishiwi	587334	5285347	1363	Virginia Fm
NM-32	X	1969	1528	St. Louis	Newmont	61	12	35	298	587432	5285274		-90	Dunka Pit	South Kawishiwi	587432	5285274	1285	Virginia Fm
NM-33	X	1969	1515	St. Louis	Newmont	60	12	2	398	587529	5285201		-90	Dunka Pit	South Kawishiwi			900	Still in D.C.
NM-34	X	1969	1520	St. Louis	Newmont	60	12	2	287	587347	5285110		-90	Dunka Pit	South Kawishiwi	587347	5285110	1296	Virginia Fm
NM-35	X	1969	1510	St. Louis	Newmont	60	12	2	307	587249	5284878		-90	Dunka Pit	South Kawishiwi	587249	5284878	1268	Virginia Fm
NM-36	X	1969	1490	St. Louis	Newmont	60	12	2	325	587323	5284671		-90	Dunka Pit	South Kawishiwi	587323	5284671	1250	Virginia Fm
NM-37	X	1969	1505	St. Louis	Newmont	61	12	35	812	587992	5286226		-90	Dunka Pit	South Kawishiwi	587992	5286226	1100	Giants Range
NM-38	X	1968	1520	St. Louis	Newmont	61	12	35	456	587772	5286542		-90	Dunka Pit	South Kawishiwi	587772	5286542	1225	BIF
NM-39	X	1969	1500	St. Louis	Newmont	61	12	35	147	587991	5286835		-90	Dunka Pit	South Kawishiwi	587991	5286835	1397	Virginia Fm
NM-40	X	1969	1500	St. Louis	Newmont	61	12	35	396	587431	5285884		-90	Dunka Pit	South Kawishiwi	587431	5285884	1415	Virginia Fm
NM-41	X	1969	1515	St. Louis	Newmont	60	12	2	228	587152	5284646		-90	Dunka Pit	South Kawishiwi	587152	5284646	1297	Virginia Fm
NM-42		1969	1507	St. Louis	Newmont	60	12	2	720	587201	5284305		-90	Dunka Pit	South Kawishiwi	587201	5284305	797	BIF
NM-43	X	1969	1500	St. Louis	Newmont	60	12	2	1118	587274	5284098		-90	Dunka Pit	South Kawishiwi	587274	5284098	406	Giants Range
NM-44		1969	1500	St. Louis	Newmont	60	12	2	400	587104	5284073		-90	Dunka Pit	South Kawishiwi			690	Still in D.C.
NM-45	X	1969	1490	St. Louis	Newmont	60	12	10	280	586300	5283153		-90	Dunka Pit	South Kawishiwi	586300	5283153	1270	Virginia Fm
NM-46	X	1969	1525	St. Louis	Newmont	60	12	10	400	585934	5282665		-90	Dunka Pit	South Kawishiwi	585934	5282665	1127	Virginia Fm
NM-47	X	1968	1525	St. Louis	Newmont	61	12	35	386.5	587918	5286738		-90	Dunka Pit	South Kawishiwi	587918	5286738	1305	BIF
NM-48		1969	1490	St. Louis	Newmont	60	12	2	400	587128	5284208		-90	Dunka Pit	South Kawishiwi			740	Still in D.C.
NM-50	X	1968	1500	St. Louis	Newmont	61	12	26	466	587991	5286987		-90	Dunka Pit	South Kawishiwi	587991	5286987	1330	Giants Range
NM-51	X	1968	1490	St. Louis	Newmont	61	12	26	401	588137	5287183		-90	Dunka Pit	South Kawishiwi	588137	5287183	1138	BIF
NM-52	X	1969	1530	St. Louis	Newmont	61	12	26	227	587967	5287158		-90	Dunka Pit	South Kawishiwi	587967	5287158	1429	Giants Range
NM-53	X	1969	1510	St. Louis	Newmont	61	12	26	768	588015	5287122		-90	Dunka Pit	South Kawishiwi	588015	5287122	1251	Giants Range

DDH #	Chem	Date	Elevation Collar (ft)	County	Lessee	Twp	Rng	Sec	Total Depth (ft)	UTME Collar	UTMN Collar	Collar Azi	Collar Dip	Deposit	Intrusion DDH is in	UTME DC Base	UTMN DC Base	Elevation DC Base (ft)	Footwall
NM-54	X	1969	1490	St. Louis	Newmont	61	12	26	586	588064	5287085		-90	Dunka Pit	South Kawishiwi	588064	5287085	1123	Giants Range
NM-55	X	1969	1500	St. Louis	Newmont	61	12	26	578	588113	5287049		-90	Dunka Pit	South Kawishiwi	588113	5287049	1093	BIF
NM-56	X	1969	1510	St. Louis	Newmont	61	12	26	718	588162	5287012		-90	Dunka Pit	South Kawishiwi	588162	5287012	983	Giants Range
NM-57	X	1969	1515	St. Louis	Newmont	61	12	26	1024	588211	5286975		-90	Dunka Pit	South Kawishiwi	588211	5286975	882	Giants Range
NM-58	X	1969	1500	St. Louis	Newmont	61	12	26	978	588259	5286939		-90	Dunka Pit	South Kawishiwi	588259	5286939	756	Giants Range
NM-59	X	1969	1490	St. Louis	Newmont	61	12	26	828	588308	5286902		-90	Dunka Pit	South Kawishiwi	588308	5286902	780	Giants Range
NM-60	X	1969	1540	St. Louis	Newmont	60	12	3	543	586433	5283890		-90	Dunka Pit	South Kawishiwi	586433	5283890	1202	Virginia Fm
NM-61		1969	1500	St. Louis	Newmont	61	12	26	400	588113	5287353		-90	Dunka Pit	South Kawishiwi	588113	5287353	1271	BIF
NM-62		1969	1500	St. Louis	Newmont	61	12	26	400	588241	5287524		-90	Dunka Pit	South Kawishiwi			1155	Still in D.C.
NM-63		1969	1460	St. Louis	Newmont	61	12	26	392	588387	5287719		-90	Dunka Pit	South Kawishiwi			1010	Still in D.C.
NM-64	X	1969	1510	St. Louis	Newmont	61	12	26	213	587955	5286939		-90	Dunka Pit	South Kawishiwi	587955	5286939	1363	BIF
OL-1	X	1983	1665	St. Louis	Lehmann	56	13	22	574	577947	5240626		-90	Otto Lake	South Complex				Still in D.C.
PO-1	X	1988	1610	St. Louis	Resource Explor.	60	12	21	765	584202	5280034		-90	Serpentine	South Kawishiwi	584202	5280034	896	Virginia Fm
PO-2	X	1988	1530	St. Louis	Resource Explor.	60	12	10	500	585612	5282107		-90	Dunka Pit	South Kawishiwi	585612	5282107	1216	Virginia Fm
S-1		1981	1570	Lake	MDNR	57	11	10	143.5				-90		South Complex				
SE-1	X	1984	1616	St. Louis	MDNR	57	13	35	1344	579883	5246892	90	-51	Central Complex	South Complex				Still in D.C.
SE-2		1986	1490	St. Louis	MDNR	57	12	33	554			90	-67	Central Complex	South Complex				Still in D.C.
SE-3	X	1984	1525	Lake	MDNR	57	11	25	403	600601	5248984	263	-60	Central Complex	South Complex				Still in D.C.
SL-01	X	1967	1510	St. Louis	American Shield	57	14	28	722	566815	5248898	270	-45	Waterhen	South Complex	566694	5248898	1114	Troct. Hfls
SL-02	X	1967	1510	St. Louis	American Shield	57	14	28	944	566725	5248660	270	-60	Waterhen	South Complex	566591	5248660	760	Horhfelds
SL-03	X	1967	1510	St. Louis	American Shield	57	14	28	502	566627	5249144	270	-45	Waterhen	South Complex				Still in D.C.
SL-04	X	1967	1510	St. Louis	American Shield	57	14	28	673	566663	5248414	270	-60	Waterhen	South Complex	566570	5248414	981	Horhfelds
SL-05	X	1967	1510	St. Louis	American Shield	57	14	28	672	566630	5248536	270	-60	Waterhen	South Complex	566529	5248536	1341	Horhfelds
SL-06	X	1967	1510	St. Louis	American Shield	57	14	28	607	566657	5248660	270	-45	Waterhen	South Complex				Still in D.C.
SL-07	X	1968	1510	St. Louis	American Shield	57	14	28	562	566716	5248896	270	-45	Waterhen	South Complex	566635	5248896	1246	Horhfelds
SL-08	X	1968	1510	St. Louis	American Shield	57	14	28	560	566540	5249275	270	-45	Waterhen	South Complex	566422	5249275	1122	Horhfelds
SL-09	X	1968	1510	St. Louis	American Shield	57	14	28	742	566515	5249512	270	-60	Waterhen	South Complex	566326	5249512	892	Horhfelds
SL-10	X	1969	1510	St. Louis	American Shield	57	14	28	992	566789	5248918		-90	Waterhen	South Complex	566789	5248918	748	Horhfelds
SL-11	X	1969	1510	St. Louis	American Shield	57	14	28	1190	566746	5249146	270	-45	Waterhen	South Complex	566546	5249146	853	Troct. Hfls
SL-13	X	1970	1510	St. Louis	American Shield	57	14	28	1180	566780	5249265	270	-45	Waterhen	South Complex	566550	5249265	753	Horhfelds
SL-14	X	1970	1510	St. Louis	American Shield	57	14	28	457	566910	5248897	270	-45	Waterhen	South Complex				Still in D.C.
SL-15	X	1970	1510	St. Louis	American Shield	57	14	28	721	566671	5249393	270	-45	Waterhen	South Complex				Still in D.C.
SL-16	X	1970	1510	St. Louis	American Shield	57	14	28	865	566435	5249146	90	-60	Waterhen	South Complex				Still in D.C.
SL-17	X	1970	1510	St. Louis	American Shield	57	14	28	774	566552	5248669	270	-45	Waterhen	South Complex				Still in D.C.
SL-19a	X	1971	1520	St. Louis	American Shield	57	14	22	603	567292	5250118	270	-45	Waterhen	South Complex				Still in D.C.
SL-20	X	1970	1525	St. Louis	American Shield	57	14	21	213	566460	5250411	270	-45	Waterhen	South Complex				Still in D.C.
SL-21	X	1973	1510	St. Louis	American Shield	57	14	28	606	566795	5249005		-90	Waterhen	South Complex				Still in D.C.
SL-22	none	1973	1510	St. Louis	American Shield	57	14	28	124	566823	5248793		-90	Waterhen	South Complex				Still in D.C.
SL-23	X	1975	1510	St. Louis	American Shield	57	14	28	131	566618	5248782		-90	Waterhen	South Complex				Still in D.C.
SL-24	X	1975	1510	St. Louis	American Shield	57	14	28	262	566698	5249023		-90	Waterhen	South Complex				Still in D.C.
SL-25	X	1975	1510	St. Louis	American Shield	57	14	28	429	566885	5249024		-90	Waterhen	South Complex				Still in D.C.
SL-26	X	1975	1510	St. Louis	American Shield	57	14	28	987	566830	5249143		-90	Waterhen	South Complex				Still in D.C.
SL-27	X	1982	1510	St. Louis	American Shield	57	14	28	279	565707	5250948		-90?	Waterhen	South Complex				Still in D.C.
SL-28	X	1982	1510	St. Louis	American Shield	57	14	28	252	565656	5250950		-90?	Waterhen	South Complex				Still in D.C.
SL-29	none	1982		St. Louis	American Shield				395				-90?	Waterhen	South Complex				Still in D.C.
SL-30	none	1982		St. Louis	American Shield				206				-90?	Waterhen	South Complex				Still in D.C.
SL-1A	X	1986	1493	St. Louis	MDNR	56	14	22	192	568149	5240880		-90	Linwood Lake	South Complex				Still in D.C.
SL-1B		1986	1435	St. Louis	MDNR	56	14	22	1008	568149	5240880		-90	Linwood Lake	South Complex				Still in D.C.
SL-2		1988	1520	St. Louis	MDNR	58	14	16	895	566820	5262120		-90	Allen	Partridge River			1650	Collared in VF
SL-4	\	1987	1640	St. Louis	MDNR	59	12	10	791			270	-46						

DDH #	Chem	Date	Elevation Collar (ft)	County	Lessee	Twp	Rng	Sec	Total Depth (ft)	UTME Collar	UTMN Collar	Collar Azi	Collar Dip	Deposit	Intrusion DDH is in	UTME DC Base	UTMN DC Base	Elevation DC Base (ft)	Footwall
SR-1	X	1985	1500	St. Louis	W.S. Moore	57	14	9	754	566901	5253549	270	-43	Skibo South	South Complex				Still in D.C.
TH-1	X	1990	1590	Lake	MDNR	60	10	3	180	605400	5285125		-90	-----	Central Complex				Still in D.C.
TH-2	X	1990	1618	Lake	MDNR	60	10	4	191	603590	5285120		-90	-----	Central Complex				Still in D.C.
TH-3	X	1990	1590	Lake	MDNR	61	10	34	161	605360	5287340		-90	-----	Central Complex				Still in D.C.
TH-4	X	1990	1542	Lake	MDNR	61	10	23	151	607045	5289215		-90	-----	Central Complex				Still in D.C.
TH-5	X	1990	1545	Lake	MDNR	61	10	24	193	609640	5289355		-90	-----	Central Complex				Still in D.C.
TH-6	X	1990	1583	Lake	MDNR	61	9	30	160	611410	5287430		-90	-----	Central Complex				Still in D.C.
TS-1	X	1986	1535	St. Louis	MDNR	52	15	31	241	554429	5198371		-90	Fish Lake	South Complex				Collared in VF
TS-2	\	1986	1545	St. Louis	MDNR	52	15	31	779			180	-65	Fish Lake	South Complex				Collared in VF
V-1	X	1969	1400	St. Louis	Phelps Dodge	53	15	36	483	561839	5209230	300	-45	Boulder Lake	South Complex	561762	5209274	1110	Thomson Fm
V-2	X	1969	1395	St. Louis	Phelps Dodge	53	15	25	983	562073	5209701	300	-45	Boulder Lake	South Complex	561862	5209309	687	Thomson Fm
V-3	X	1969	1405	St. Louis	Phelps Dodge	53	15	36	1232	562049	5209201	300	-45	Boulder Lake	South Complex				Still in D.C.
VI-1	X	1970	1390	St. Louis	Phelps Dodge	53	16	18	1045	563577	5212935	270	-45	Boulder Lake	South Complex				Still in D.C.
VI-2	X	1970	1390	St. Louis	Phelps Dodge	53	15	24	913	562376	5212151	90	-45	Boulder Lake	South Complex				Still in D.C.
VI-3	X	1970	1390	St. Louis	Phelps Dodge	53	16	19	595	563531	5212546	270	-45	Boulder Lake	South Complex				Still in D.C.
VII-1	X	1969	1400	St. Louis	Phelps Dodge	53	15	25	502	561642	5211182	270	-45	Boulder Lake	South Complex				Still in D.C.
VII-2	X	1969	1395	St. Louis	Phelps Dodge	53	15	24	539	561728	5211401	270	-43	Boulder Lake	South Complex				Still in D.C.
VII-3A	X	1970	1375	St. Louis	Phelps Dodge	53	15	24	693	561314	5212443	270	-60	Boulder Lake	South Complex				Still in D.C.
VII-4	X	1970	1390	St. Louis	Phelps Dodge	53	15	24	948	561800	5211403	270	-45	Boulder Lake	South Complex				Still in D.C.
VII-5	X	1970	1390	St. Louis	Phelps Dodge	53	15	24	693	561561	5211859	270	-45	Boulder Lake	South Complex				Still in D.C.
VII-6	X	1970	1390	St. Louis	Phelps Dodge	53	15	24	1000	561784	5211441		-90	Boulder Lake	South Complex				Still in D.C.
VII-7	X	1971	1400	St. Louis	Phelps Dodge	53	15	23	594	560183	5212181	270	-45	Boulder Lake	South Complex	560064	5212181	1000	Thomson Fm
VIII-2	X	1969	1550	St. Louis	Phelps Dodge	54	14	23	802	569370	5222263	270	-45	Grid VIII	South Complex				Still in D.C.
VIII-4A	none	1969	1570	St. Louis	Phelps Dodge	54	14	14	962	569572	5222872	270	-45	Grid VIII	South Complex				Still in D.C.
W-01	X	1975	1580	St. Louis	Exxon	59	13	17	1559	573414	5270987		-90	Wetlegs	Partridge River	573414	5270987	148	V.F. into BIF
W-02	X	1976	1570	St. Louis	Exxon	59	13	20	1893	572999	5270471		-90	Wetlegs	Partridge River	572999	5270471	-276	V.F. into BIF
W-03	X	1976	1550	St. Louis	Exxon	59	14	25	1708	570078	5268381		-90	Wetlegs	Partridge River	570078	5268381	-41	V.F. into BIF
W-04	X	1976	1470	St. Louis	Exxon	58	14	4	3114	566602	5265061		-90	Wyman Creek	Partridge River			85	Still in D.C.
W-05	X	1977	1480	St. Louis	Exxon	58	14	3	1634	566699	5265561		-90	Wyman Creek	Partridge River	566699	5265561	774	V.F. into BIF
W-06	X	1977	1575	St. Louis	Exxon	59	13	17	1491	573530	5271151		-90	Wetlegs	Partridge River	573530	5271151	185	V.F. into BIF
W-07	X	1977	1585	St. Louis	Exxon	59	13	17	1199	573257	5271193		-90	Wetlegs	Partridge River	573257	5271193	524	V.F. into BIF
W-08B	X	1977	1585	St. Louis	Exxon	59	13	17	1102	573331	5271337		-90	Wetlegs	Partridge River	573331	5271337	640	V.F. into BIF
W-09	X	1977	1590	St. Louis	Exxon	59	13	17	1041	573132	5270987		-90	Wetlegs	Partridge River	573132	5270987	623	V.F. into BIF
W-10	X	1978	1590	St. Louis	Exxon	59	13	17	1135	573557	5271454		-90	Wetlegs	Partridge River	573557	5271454	603	V.F. into BIF
W-11	X	1978	1580	St. Louis	Exxon	59	13	17	1161	572951	5270280		-90	Wetlegs	Partridge River	572951	5270280	505	V.F. into BIF
W-12	X	1978	1580	St. Louis	Exxon	59	13	19	1425	572459	5270280		-90	Wetlegs	Partridge River	572459	5270280	224	V.F. into BIF
W-13	X	1978	1580	St. Louis	Exxon	59	13	18	1315	572815	5270673		-90	Wetlegs	Partridge River	572815	5270673	634	V.F. into BIF
W-14	X	1979	1575	St. Louis	Exxon	59	13	17	2030	573432	5270680		-90	Wetlegs	Partridge River	573432	5270680	-479	V.F. into BIF
W-15	X	1979	1495	St. Louis	Exxon	58	14	3	2545	567801	5265541		-90	Wyman Creek	Partridge River			-375	Still in D.C.
X-1	X	1971	1455	St. Louis	Phelps Dodge	53	16	23	613	569873	5212399	315	-45	Thompson Lake	South Complex				Still in D.C.

Appendix B

***Mass Balance Calculations for copper migration
in calculated zones above the basal contact***

Modeled Copper Migration

Deposit	Zone	Cu/Ni (avg)	Depletion (Lb's Cu)	Addition (Lb's Cu)	DDH (#)	Grid Size (meters)
Spruce Road	1	2.553	29,063,774	-	105	50
Spruce Road	2	2.447	78,777,698	-	103	50
Spruce Road	3	2.521	70,433,117	-	104	50
Spruce Road	4	2.543	72,597,542	-	95	50
Spruce Road	5	2.543	-	63,597,765	89	50
Spruce Road	6	2.712	34,938,649	-	91	50
Spruce Road	7	2.683	34,938,930	-	100	50
Spruce Road	8	2.766	224,559,304	-	94	50
Subtotals:			545,309,015	63,597,765		
Total:			481,711,250			

Deposit	Zone	Cu/Ni (avg)	Depletion (Lb's Cu)	Addition (Lb's Cu)	DDH (#)	Grid Size (meters)
Maturi	1	2.508	-	269,994,229	59	100
Maturi	2	2.607	-	380,226,641	56	100
Maturi	3	3.000	506,411,980	-	58	100
Maturi	4	2.000	848,622,168	-	59	100
Maturi	5	2.404	-	162,834,420	48	100
Maturi	6	2.255	40,373,992	-	37	100
Maturi	7	2.320	-	242,414,098	36	100
Maturi	8	2.256	-	70,623,022	24	100
Subtotals:			1,395,408,140	1,126,092,417		
Total:			269,315,723			

Deposit	Zone	Cu/Ni (avg)	Depletion (Lb's Cu)	Addition (Lb's Cu)	DDH (#)	Grid Size (meters)
Dunka Pit	1	3.060	405,223,890	-	122	75
Dunka Pit	2	2.656	111,595,102	-	102	75
Dunka Pit	3	2.561	114,490,432	-	87	75
Dunka Pit	4	2.497	-	41,951,786	75	75
Dunka Pit	5	2.170	39,523,905	-	65	75
Dunka Pit	6	2.520	98,536,387	-	57	75
Dunka Pit	7	2.399	1,594,289,361	-	50	75
Dunka Pit	8	2.372	1,077,183,651	-	48	75
Subtotals:			3,440,842,729	41,951,786		
Total:			3,398,890,943			

Deposit	Zone	Cu/Ni (avg)	Depletion (Lb's Cu)	Addition (Lb's Cu)	DDH (#)	Grid Size (meters)
Dunka Road	1	3.605	164,454,354	-	54	75
Dunka Road	2	3.771	237,006,390	-	65	75
Dunka Road	3	3.631	308,575,988	-	65	75
Dunka Road	4	3.652	332,571,190	-	60	75
Dunka Road	5	3.418	402,182,930	-	57	75
Dunka Road	6	3.257	168,537,503	-	51	75
Dunka Road	7	3.220	1,216,152,806	-	61	75
Dunka Road	8	3.256	1,658,494,374	-	42	75
Subtotals:			4,487,975,535	0		
Total:			4,487,975,535			

Deposit	Zone	Cu/Ni (avg)	Depletion (Lb's Cu)	Addition (Lb's Cu)	DDH (#)	Grid Size (meters)
Babbitt	1	4.595	156,915,330	-	428	50
Babbitt	2	4.744	368,245,439	-	500	50
Babbitt	3	4.383	87,562,699	-	447	50
Babbitt	4	4.278	176,702,880	-	400	50
Babbitt	5	4.120	-	7,094,628	354	50
Babbitt	6	4.001	102,766,103	-	320	50
Babbitt	7	3.893	323,612,115	-	301	50
Babbitt	8	3.586	1,044,406,351	-	232	50
Subtotals:			2,260,210,917	7,094,628		
Total:			2,253,116,289			

Appendix C

Enclosed Digital Data files

