

**SUMMARY REPORT  
OF THE  
NATURAL RESOURCES RESEARCH INSTITUTE'S  
CONTRIBUTION TO THE  
INTERAGENCY  
MINERALS INFORMATION INDEXING PROJECT**

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## **INTRODUCTION**

Mineral exploration files for the State of Minnesota are held in various locations across the state. In order to better serve the exploration industry, a unified indexing system is being developed by government agency and industry representatives. Implementation of the indexing system is under way, although still in a state of flux. The final product is to be a digital index of specified information contained in exploration files and reports that will be placed on the Worldwide Web to make the information more available to exploration companies and other interested parties.

## **PURPOSE AND SCOPE OF PROJECT**

The purpose of this interagency project is to provide public online access, in standardized form, to the multitude of reports, documents, and maps produced or held by the three public minerals agencies in Minnesota, i.e., the Minerals Division of the Minnesota Department of Natural Resources (MDNR), the Minnesota Geological Survey (MGS), and the Natural Resources Research Institute (NRRI). Initial work on the indexing project is focused in the area of non-ferrous minerals to better serve this exploration industry.

The scope of NRRI's part in the project extends to indexing all published reports on non-ferrous minerals projects undertaken by NRRI since its inception in 1983. These include 21 reports published at NRRI and 3 reports published at NRRI's Coleraine Minerals Research Laboratory (CMRL). The reports are listed in Appendix A and referenced by NRRI report number. Report numbers beginning with "CMRL" are held at NRRI's Coleraine facility (Coleraine Minerals Research Laboratory, Natural Resources Research Institute, University of Minnesota, Duluth, Box 188, Coleraine, MN 55722). Report numbers beginning with "NRRI" are held at NRRI's Duluth facility (see address on title page).

In addition to indexing its non-ferrous reports, NRRI is responsible for starting a Locality Thesaurus—a listing of geological names and terms associated with a physical locality, such as “Virginia Horn,” “Duluth Gabbro Complex,” “Vermilion District,” and “Camp Rivard Fault.” This thesaurus will be used as a foundation from which a fully cross-referenced locality thesaurus for the State of Minnesota will be built. Multiple names applied to any particular “locality” are cross-referenced. Initial efforts are concentrated in the non-ferrous area, but include ferrous and glacial locality terms as well.

### **ACKNOWLEDGEMENTS**

Funding for this project was provided by the Minerals Coordinating Committee from the Minerals Diversification Program of the Minnesota Legislature with funding through the Minnesota Department of Natural Resources.

## NON-FERROUS MINERAL REPORT INDEXING

### INDEXING PROCEDURE

Indexing consists of producing a georeferenced, ArcView shape file of the project study area in NAD 83, UTM Zone 15, and an associated database file containing prespecified information regarding the project for each NRRI non-ferrous minerals report.

#### **ArcView Shape Files**

Using ArcView 3.1, a polygon was drawn to bound the study area of each report. In general, these polygons were obtained from maps contained within the reports and were drawn to full-section boundaries. Exceptions were made in the case of very localized areas, e.g., test pit in the Babbitt Deposit (Benner et. al., 1998; Appendix A, CMRL/TR-98-23), and those of a large scale, e.g., the Midcontinent Rift System (Hauck, 1995; Appendix A, NRRI/TR-95/33). The polygon drawn for the latter report (Hauck, 1995) is a generalized outline and should not be construed as actual extent.

The polygons were saved as shape files. Data tables for the polygons were amended to include a field titled PROJ\_NUM. The publication identification number was entered into this field, which is to be used for linking with the database.

The individual polygon shape files for all 24 reports were merged into a single shape file, using ArcView 3.1's GeoProcessing tool. This file, nrrinfer.shp, is listed in Appendix B and can be found on Disk 1, along with the accompanying files nrrinfer.dbf and nrrinfer.shx.

#### **Associated Database File**

The associated database file for this project was produced in Access97 (Appendix B, Disk 1: nrrinfer.mdb). The database definition used for the Mineral Indexing Project is as follows:

<u>Field Name</u>	<u>Type</u>	<u>Size</u>	<u>Description</u>
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PRJ	Text	15	Defaulted to UTM Zone 15
DATUM	Text	10	Defaulted to NAD83
COMP_AGC	Text	200	Company or Agency for the data set
PROJ_NAM	Text	200	Project Name
PROJ_NUM	Text	30	Project Number
RPSTRY	Text	150	Agency where the data is stored
END_DATE	Number	8	Date of report, analysis, etc. (i.e., yyyyymmdd)
BEG_DATE	Number	8	Date project started, data collected (i.e., yyyyymmdd)
TCNQ	Text	150	Technique (see thesaurus)
DOC_TYPE	Text	150	Document Type (see thesaurus)
SCALE	Number	10	Scale of map (i.e., 24000)
COMMENTS	Text	320	Use sentences

The thesaurus for the Technique Field is as follows:

Geophysics

- Airborne Magnetics
- Airborne Electromagnetics
- Ground Magnetics
- Horizontal Loop Electromagnetics (HLEM)
- Vertical Loop Electromagnetics (VLEM)
- Very Low Frequency Electromagnetics (VLFEM)
- Time Domain Electromagnetics (TEM)
- Induced Polarization / Resistivity (IP)
- Specific Gravity
- Magnetic Susceptibility
- Paleo Magnetics
- Seismic

Geochemistry

- Geology
- Drilling
- Metallurgy

The thesaurus for the Document Type Field is as follows:

Report

- Published
- Unpublished
- Other

Maps

- Published
- Unpublished
- Other

## Correspondence

### **Metadata file**

A metadata file for the NRRI non-ferrous minerals indexing project was created in DataLogr 2.0 (Appendix B, Disk 1: nrrifer.html). The metadata standard used to document the data set is the “Minnesota Geographic Metadata Guidelines.”

## **LOCALITY THESAURUS**

### **LOCALITY THESAURUS PROCEDURE**

Books, reports, theses, and maps were combed for Minnesota geological features associated with a physical locality. These terms were categorized and entered into the first sheet of an Excel97 spreadsheet (Appendix B, Disk 1: nrrinfer.xls) under such headings as basins; batholiths; complexes; deposits, prospects, and reserves; faults; etc. The sheet is titled "Locality Thesaurus." The second sheet of the spreadsheet, titled "Cross Reference," contains cross-referenced listings where multiple names are associated with a given geologic feature. Equivalent names are listed horizontally in rows. The third sheet of the spreadsheet, titled "Selected References," contains a selected listing of sources from which the terms were procured.

## **SUMMARY**

NRRI has indexed 24 non-ferrous minerals reports according to the MDNR - Minerals Division's specifications. The indexing consists of two components: 1) georeferenced polygons of the project study areas produced as ArcView shape files in NAD 83, UTM Zone 15 (Appendix B, Disk 1: nrrinfer.shp, nrrinfer.shx, nrrinfer.dbf); and 2) an associated database containing pre-specified project information (Appendix B, Disk 1: nrrinfer.mdb). A metadata file for the data set was produced in accordance with the Minnesota Geographic Metadata Guidelines (Appendix B, Disk 1: nrrinfer.html). In addition, NRRI has produced a Locality Thesaurus primarily for non-ferrous minerals, which will serve as a basis for design of a full-blown Locality Thesaurus for the State of Minnesota (Appendix B, Disk 1: nrriloc.xls). Included with the thesaurus is a cross-referenced listing of equivalent "localities," i.e., multiple names for one "locality," and a list of selected references from which the thesaurus was derived.



**APPENDIX A**  
LISTING OF INDEXED  
NRRI NON-FERROUS PUBLICATIONS

## Technical Reports <sup>1</sup>

*CMRL/TR-95-18*

Copper/Nickel Metallurgical Program for the Gabbro Complex, by CMRL Staff, 1995

*CMRL/TR-98-17*

Metallurgical Testing of Copper-Nickel Bearing Material from the Duluth Gabbro: Progress Summary, by B.R. Benner, 1998

*CMRL/TR-98-23*

Metallurgical Testing of Copper-Nickel Bearing Material from the Duluth Gabbro, by B.R. Benner, J. Engesser, and H.B. Niles, 1998

*NRRI/GMIN-TR-88-07*

The Impact of State and Provincial Tax and Royalty Policies on Non-ferrous Mining Ventures: A Comparative Economic Analysis, by L.M. Zanko, 1988, 119 pgs.

*NRRI/GMIN-TR-89-11*

Geology, Geochemistry, and Stratigraphy of a Portion of the Partridge River Intrusion, by M.J. Severson and S.A. Hauck, 1990, 236 pgs., 4 plates, 1 diskette

*NRRI/GMIN-TR-89-13*

Airborne Imaging Scanner Survey of Northeastern Minnesota, by S.A. Hauck, C. Ager, J. Pastor, L. Zanko, and N. Aaseng, 1990, 55 pgs., 3 plates, 2 diskettes

*NRRI/GMIN-TR-89-15*

Origin and Occurrence of Platinum Group Elements, Gold and Silver in the South Filson Creek Copper-Nickel Mineral Deposit, Lake County, Minnesota, by M.J.P. Kuhns, S.A. Hauck, and R.J. Barnes, 1990, 60 pgs., 3 plates, 1 diskette

*NRRI/GMIN-TR-89-16*

Geology and Mineralization in the Dunka Road Copper-Nickel Mineral Deposit, St. Louis County, Minnesota, by S. Geerts, R.J. Barnes, and S.A. Hauck, 1990, 69 pgs., 7 plates, 1 diskette

*NRRI/GMIN-TR-89-17*

Geology and Mineralization of a Cyclic Layered Series, Water Hen Intrusion, St. Louis County, Minnesota, by J. Strommer, P. Morton, S.A. Hauck, and R.J. Barnes, 1990, 29 pgs., 12 plates, 1 diskette

*NRRI/TR-91/12*

Bedrock Geochemistry of Archean Rocks in Northern Minnesota, edited by J.A. Englebert and S.A. Hauck, 1991, 4 papers, 203 pgs., 17 plates, 6 diskettes

*NRRI/TR-91/13a*

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<sup>1</sup> Note: CMRL reports are stored at the Coleraine Minerals Research Laboratory, Natural Resources Research Institute, University of Minnesota, Duluth, Box 188, Coleraine, MN 55722, and other NRRI reports are stored at the Natural Resources Research Institute library, 5013 Miller Trunk Highway, Duluth, MN 55811-1442.

Geology, Mineralization, and Geostatistics of the Minnamax/Babbitt Cu-Ni Deposit (Local Boy Area), Minnesota, Part I: Geology, by M.J. Severson, 1991, 96 pgs., 10 plates, 1 diskette

*NRRI/TR-91/13b*

Geology, Mineralization, and Geostatistics of the Minnamax/Babbitt Cu-Ni Deposit (Local Boy Area), Minnesota, Part II: Mineralization and Geostatistics, by M.J. Severson and R.J. Barnes, 1991, 216 pgs., 18 plates, 2 diskettes

*NRRI/TR-91/14*

Geology, Stratigraphy, and Mineralization of the Dunka Road Cu-Ni Prospect, Northeastern Minnesota, by S.D. Geerts, 1991, 63 pgs., 29 plates, 1 diskette

*NRRI/TR-93/34*

Igneous Stratigraphy of the South Kawishiwi Intrusion, Duluth Complex, Northeastern Minnesota, by M.J. Severson, 1994, 210 pgs., 15 plates, 1 diskette

*NRRI/TR-93/52*

Geology and Mineralization of the Serpentine Copper-Nickel Deposit, by L.M. Zanko, M.J. Severson, and E.M. Ripley, 1994, 90 pgs., 6 plates

*NRRI/TR-94/21a*

The Babbitt Copper-Nickel Deposit, Part A: Digital Drill Hole Data Files for the Babbitt and Serpentine Copper-Nickel Deposits, by R.L. Patelke, 1994, 48 pgs., 1 plate, 7 diskettes

*NRRI/TR-94/21b*

The Babbitt Copper-Nickel Deposit, Part B: Structural Datums, by M.J. Severson, R.L. Patelke, S.A. Hauck, and L.M. Zanko, 1994, 48 pgs., 5 plates, 1 diskette

*NRRI/TR-94/21c*

The Babbitt Copper-Nickel Deposit, Part C: Igneous Geology, Footwall Lithologies, and Cross-Sections, by M.J. Severson, R.L. Patelke, S.H. Hauck, and L.M. Zanko, 1996, 79 pgs., 31 plates

*NRRI/TR-95/26*

Geology of the Southern Portion of the Duluth Complex, by M.J. Severson, 1995, 185 pgs., 8 plates, 1 diskette

*NRRI/TR-95/33*

Midcontinent Rift System Bibliography, by S.A. Hauck, 1995, 270 pgs.

*NRRI/TR-96/04*

Geologic Mapping and Structural Analysis of the Peter Mitchell Mine, by M.J. Severson, in press

*NRRI/TR-97/13*

Geology and Cr-PGE Mineralization of the Birch Lake Area, South Kawishiwi Intrusion, Duluth Complex, by S. Hauck, M. Severson, E. Ripley, S. Goldberg, and T. Alapieti, 1997, 32 pgs.

*NRRI/TR-97/19*

Igneous Stratigraphy and Mineralization in the Basal Portion of the Partridge River Intrusion, Duluth Complex, Allen Quadrangle, Minnesota, by M.J. Severson, 1997, 102 pgs., 4 plates, 1 diskette

**Technical Summary Report**

*NRRI/GMIN-TSR-89-1*

Precious Metals (Pt-Pd-Au-Ag) in Three Copper-Nickel Deposits in the Duluth Complex, by S.A. Hauck and R. Barnes, 1989, 19 pgs.

**APPENDIX B**

LISTING OF FILES  
CONTAINED ON DISK 1

nrrinfer.apr*	An ArcView 3.1 project file displaying the bounding polygons indicating the study areas of NRRI non-ferrous minerals projects.
nrrinfer.dbf	An ArcView 3.1 dBase file containing the attribute data of the bounding polygons.
nrrinfer.shp	An ArcView 3.1 shape file consisting of the bounding polygons indicating the study areas of NRRI's non-ferrous minerals projects.
nrrinfer.shx	An ArcView 3.1 file that stores the index of the bounding polygons.
nrrinfer.mdb	An Access97 database file containing the NRRI non-ferrous minerals reports index.
nrriloc.xls**	An Excel97 spreadsheet file containing the locality thesaurus.
nrrinfer.html	A Netscape hypertext document containing the metadata (composed in DataLogr 2.0) for the NRRI non-ferrous minerals indexing project.

\*NRRI non-ferrous (minerals reports)

\*\*NRRI locality (thesaurus)