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Miscellaneous Release—Data 265

Regional Geology and Mineral Deposits of Northern Ontario, North of Latitude 49°30´

by G.M. Stott and S.D. Josey

Users of OGS products are encouraged to contact those Aboriginal communities whose traditional territories may be located in the mineral exploration area to discuss their project.

This publication can be downloaded from
http://www.geologyontario.mndm.gov.on.ca/mndmaccess/mndm_dir.asp?type=pub&id=MRD265

Introduction

This digital data release is intended to provide, on an updated regional geology base, a snapshot of the currently available Mineral Deposit Inventory (MDI) record of mineral occurrences, prospects and past and producing mines in the region of northern Ontario, north of latitude 49° 30´.

The contents of this DVD comprise a GIS-compatible map, created in ESRI ArcGIS® software, illustrating the relative distribution of the currently known MDI sites in relation to general Precambrian bedrock geology across this part of Ontario. The location of the MDI sites, and the tables of applicable information for each site (e.g., status, UTM easting and northing, associated assessment file(s), primary and secondary commodities, exploration history, etc.) are taken primarily from the Ontario Geological Survey's (OGS) MDI database on GeologyOntario (http://www.geologyontario.mndm.gov.on.ca/), with additions from Resident Geologist Program staff. The geology is mainly derived—with some revisions—from various OGS publications, including OGS 2006, Stott 2008a, 2008b and 2009, and Stott and Josey 2009, with additional, updated geology from more recently published OGS maps (*see* "References"). The Precambrian geology underlying the James Bay and Hudson Bay lowlands has been interpreted from aeromagnetic maps and limited diamond-drill hole data.

In addition to the locations of the currently known MDI sites, the locations of communities and parks across this part of Ontario are also shown. To be as accurate as possible, the topographic base was reconstructed from various sources and, in conjunction with the revised geology, should assist in regional land use planning and predictive modelling of potential mineral occurrences.

This MRD is meant to be used in conjunction with Open File Report 6242 *Mineral Deposits of Northern Ontario, North of Latitude 49°30´*, a complementary publication that is available separately.

Map Projections, Scale and Base Map Information

All spatial data on the DVD are projected in decimal degrees. (Geographic coordinate system: North American 1983; Datum: North American 1983.)

The (*.mxd*) data frame is projected in Lambert Conic Conformal for display and printing purposes.

The base map, with the exception of the lakes and rivers, is the Ministry of Natural Resources' Land Information Ontario / Natural Resource Values Information System base map. The rivers were digitized from LandSat images and the lakes are a combination of the Ministry of Natural Resources' Land Information Ontario / Natural Resource Values Information System, LandSat images, and Natural Resources Canada.

Sources of Information

Digital base map information was derived from the Ontario Land Information Warehouse, Land Information Ontario, Ontario Ministry of Natural Resources, scale 1:20 000, and from 1:50 000 scale maps of the National Topographic System (NTS), with modifications by staff of the Ministry of Northern Development, Mines and Forestry.

Mineral Deposit Inventory information is from the MDI database on GeologyOntario (http://www.geologyontario.mndm.gov.on.ca/). Ann Wilson, Resident Geologist's Office, Timmins, provided additional, new and updated information on mineral occurrences in the McFaulds Lake region.

Compilation geology is derived from published maps of the Ontario Geological Survey (*see* "References").

Credits

Geological interpretation by G.M. Stott and S.D. Josey, 2008-2009.

Geology of the McFaulds Lake area from J. Mungall, Noront Resources Ltd. and University of Toronto (personal communication, 2008).

Preparation of base map and digital cartography by S.D. Josey.

References

Ayer, J.A., Chartrand, J.E., Duguet, M., Rainsford, D.R.B. and Trowell, N.F. 2009. Geological compilation of the Burntbush–Detour lakes area, Abitibi greenstone belt; Ontario Geological Survey, Preliminary Map P.3609, scale 1:100 000.

Buse, S., Smar, L., Stott, G.M. and McIlraith, S.J. 2009. Precambrian geology of the Winisk Lake area; Ontario Geological Survey, Preliminary Map P.3607, scale 1:100 000.

MacDonald, C.A., ter Meer, M., Lowe, D., Isaac, C. and Stott, G.M. 2009. Precambrian geology of the Caribou Lake greenstone belt, northwestern Ontario; Ontario Geological Survey, Preliminary Map P.3613, scale 1:50 000.

Madon, Z.B., McIlraith, S.J. and Stott, G.M. 2009. Geological compilation of the Miminiska Lake–Fort Hope area, eastern Uchi domain; Ontario Geological Survey, Preliminary Map P.3611, scale 1:250 000.

Ontario Geological Survey 2004. Mineral Deposit Inventory Version 2 (MDI2), October 2004 Release; Ontario Geological Survey.

Ontario Geological Survey 2006. 1:250 000 scale bedrock geology of Ontario; Ontario Geological Survey, Miscellaneous Release–Data 126-Revised.

Stott, G.M. 2008a. Precambrian geology of the Hudson Bay and James Bay lowlands region interpreted from aeromagnetic data—west sheet; Ontario Geological Survey, Preliminary Map P.3597–Revised, scale 1:500 000.

Stott, G.M. 2008b. Precambrian geology of the Hudson Bay and James Bay lowlands region interpreted from aeromagnetic data—east sheet; Ontario Geological Survey, Preliminary Map P.3598–Revised, scale 1:500 000.

Stott, G.M. 2009. Precambrian geology of the Hudson Bay and James Bay lowlands region interpreted from aeromagnetic data—south sheet; Ontario Geological Survey, Preliminary Map P.3599–Revised, scale 1:500 000.

Stott, G.M. and Josey, S.D. 2009. Proterozoic mafic (diabase) dikes and other post-Archean intrusions of northwestern Ontario, north of latitude 49°30′; Ontario Geological Survey, Preliminary Map P.3606, scale 1:1 000 000.

Stott, G.M., Josey, S.D., Rainsford, D.R.B. and McIlraith, S.J. 2009. Precambrian geology and aeromagnetic data of the Hudson Bay and James Bay lowlands region with Precambrian basement depth estimates and related tables of geochronology and diamond-drill hole data; Ontario Geological Survey, Miscellaneous Release–Data 233.

Using the Data with ArcGIS® Software

The data may be accessed with ESRI ArcGIS® 8.3, and 9.2 or newer.

- Copy the **MRD** folder to your hard drive from the DVD. Alternately, make a new folder on your hard drive and copy all folders within the **MRD** directory to your new folder.
- For each newly copied folder right-click and uncheck the Read-only option check box.
- The 'MRD\Fonts' folder provided on the DVD contains font files required by ArcGIS for symbolizing some of the features on the map. The fonts must be installed prior to viewing the data sets in ArcMap. These can be installed by simply copying them to your \\Windows\Font directory.
- Use ArcGIS to open any of the project files "*.mxd", found on the DVD. Please note that at full map extent, regeneration time for some layers may be slow.

The annotation is stored in a Geodatabase and, therefore, if using ArcGIS 8.3, it cannot be viewed and the data will have to be labeled or the annotation recreated.

Folders and Files on the DVD

TOP FOLDER	FOLDER	CONTENTS	DESCRIPTION
\\MRD		MDI_MRD_version_8_3_shapefiles.mxd	ArcMap version 8.3 project file
		MDI_MRD_version_9_2_geodatabase.mxd	ArcMap version 9.2 project file
		MRD 265 Readme.doc	Word file containing legend, attribute information and other related information
		MRD 265 Readme.pdf	Portable document format file containing legend, attribute information and other related information
		MDIMRD.mdb	Geodatabase containing all feature classes
	\Fonts	OGSFaults.TTF	Font used for symbolizing features in ArcMap
		OGSMisc.TTF	Font used for symbolizing features in ArcMap
		OGScontacts.TTF	Font used for symbolizing features in ArcMap
	\LayerFiles	Geology polygons.lyr	This folder contains layer files which can be used to symbolize associated shape files
		Lakes.lyr	
		Rivers.lyr	
		Railway.lyr	
		Roads.lyr	
		Faults.lyr	
		Iron Formation.lyr	
		Provincial Parks.lyr	

		Indian Reserves.lyr	
		Utility.lyr	
		Trans Hudson.lyr	
		Sutton Inlier Gabbroic Intrusions.lyr	
		Facies.lyr	
		Paleozoic Boundary.lyr	
		Provincial Border.lyr	
		Settlement100k.lyr	
		Mineral Deposit Inventory.lyr	
	\ShapeFiles\Base	IR_Reserve.shp	This folder contains shape file versions of all Base information
		Neatline_Main_Map.shp	
		NorthONTlakes.shp	
		Prov_Park_Regulated.shp	
		Province_Boundary.shp	
		Railway.shp	
		RIVERS.shp	
		Roads600k.shp	
		Settlement100k.shp	
		Utility.shp	
	\ShapeFiles\Geology	Geoline.shp	This folder contains shape file versions of all Geological information
		Geopoly.shp	
		Iron_Formation.shp	
		Mineral_Deposit_Inventory.shp	
		Paleozoic_Boundary.shp	

Data Layers and Attributes

There are 2 project files or *.mxd's that are located in the \\MRD folder. MDI_MRD_version_9_2_geodatabase.mxd is for ArcMap version 9.2 or newer and MDI_MRD_version_8_3_shapefiles.mxd is for ArcMap version 8.3.

Only Geological attribute tables are described.

FEATURE CLASS	FEATURE CLASS DESCRIPTION	FIELD	ATTRIBUTE DESCRIPTION
Mineral Deposit Inventory	Contains all Mineral Deposit Inventory (MDI) point location data	OBJECT_ID	Unique object identification number from the Mineral Deposit Inventory Database. http://www.geologyontario.mndm.gov.on.ca/
		MDI_IDENT	Unique Mineral Deposit identification number from the Mineral Deposit Inventory Database http://www.geologyontario.mndm.gov.on.ca/
		STATUS	Status of Mineral Deposit attributes classified as either; **'PRODUCING MINE, PAST PRODUCING MINE WITH RESERVES, PAST PRODUCING MINE WITHOUT RESERVES, PROSPECT, OCCURRENCE, DEVELOPED PROSPECT WITHOUT RESERVES, OR DEVELOPED PROSPECT WITH RESERVES.**
		LOC_DESCR	Any location description information.
		UTM_DATUM	Indicates the horizontal control datum used to position the MDI point locations. All data in this feature class use the **NAD83** datum.
		UTM_ZONE	The Universal Transverse Mercator projection used to project the data. All data points are either zone **15, 16,** or **17.**
		UTM_EAST	The Universal Transverse Mercator Easting value. Units are in metres.
		UTM_NORTH	The Universal Transverse Mercator Northing value. Units are in metres.
		SOURCE_MAP	Source map reference for the MDI point.
		ACCESS_D	General location directions or accessibility options.
		ACCURACY	Indicates accuracy of the data in metres.

		AFRI_ID	Indicates any associated Assessment File from the Assessment File Research Imaging (AFRI) database. http://www.geologyontario.mndm.gov.on.ca/
		PUB_COMMOD	This field is used for the Open File Report map face legend. It lists the Primary commodity at the location ± any other primary or secondary commodities present.
		MAPCODE	Map code used to reference MDI data present on the Open File Report map face.
		COMMODITY	Lists Primary and Secondary commodities present.
		NAME	MDI location Names past and present.
		COMMENT	Additional location information.
		EXP_HIST	Exploration history of the MDI location.
Paleozoic Boundary	Line features dividing Paleozoic rocks from the Archean rocks	FEATURE	Descriptive attributes defined as; **'PALEOZOIC ARCHEAN BOUNDARY'; 'PROVINCIAL BOUNDARY'; 'SHORELINE' or 'NEATLINE'.**
Iron Formation	Unit 7c in legend consisting of Metasedimentary rocks made up of marble, chert, iron formation and minor metavolcanic rocks	FEATURE	All attributes are coded as **'Marble, chert, iron formation, minor metavolcanic rocks'**. Descriptive field to define the TYPE field.
		TYPE	Unique value attributed as **IRON FORMATION** used to symbolize map.
		SOURCE	Source information if available.
Geoline	Line features consisting of geological contacts, faults, neatlines and terrane boundaries (terrane boundaries are incomplete).	FEATURE	Descriptive attributes defined as either; **'CONTACT, GEOPHYSICAL, TREND, INTERPRETED'; 'CONTACT, SHARP, TREND, INTERPRETED'; 'FAULT, DEXTRAL HORIZONTAL COMPONENT, TREND, INTERPRETED'; 'FAULT, SINISTRAL HORIZONTAL COMPONENT, TREND, INTERPRETED'; 'FAULT, UNKNOWN HORIZONTAL COMPONENT, TREND, INTERPRETED'; 'NEATLINE'; or 'TERRANE BOUNDARY'.** Descriptive field to describe the TYPE field.

		TYPE	Coding used to symbolize map. Attributes are defined as either; **'MCTGPTI',; 'MCTGLSTI'; 'MFTDXTI'; 'MFTSXTI'; 'MFTUXTI'; 'NEATLINE'; or 'TERRANE BOUNDARY'.**
		BOUNDARY	This field indicates whether the line feature is a **'TERRANE BOUNDARY'.**
		LABEL	Any name associated with the line feature
		SOURCE	Any source information.
		SUTTON_GABBRO	This field indicates any line features that are defined as the **'INTERPRETED AEROMAGNETIC EXTENT OF GABBROIC INTRUSIONS OF THE SUTTON INLIERS'.**
Geopoly	Polygon features consisting of geological units	FEATURE	All features coded as **'GEOLOGICAL UNIT'.**
		TYPE	Geological Unit number or code used to classify different rock types. (See “Legend” for geological unit descriptions. The descriptions can also be found within the Geopoly attribute table under the *_ROCKTYPE, *_DESCRIPTION and *_ERA fields.)
		FACIES	Defines the metamorphic facies. Only a few geological units are defined as **'GRANULITE'** facies within this field.
		LABEL	Any name associated with the line feature.
		AREA_BD_OV	This field is used to define the **'AREA OF INFERRED TRANS-HUDSON OROGEN OVERPRINT ON ARCHEAN CRUST'** and the **'INTERPRETED AEROMAGNETIC EXTENT OF GABBROIC INTRUSIONS OF THE SUTTON INLIERS'**.
		PRIME_ROCK	The primary rock type geological unit number or code.
		SECON_ROCK	The secondary rock type geological unit number or code.
		TERT_ROCK	The tertiary rock type geological unit number or code.
		P_ROCKTYPE	Describes the primary rock type general classification.
		P_DESCRIPTION	Subdivision of the primary rock type.

		P_ERA	Primary rock type Era or Eon classification.
		S_ROCKTYPE	Describes the secondary rock type general classification.
		S_DESCRIPTION	Subdivision of the secondary rock type.
		S_ERA	Secondary rock type Era or Eon classification.
		T_ROCKTYPE	Describes the tertiary rock type general classification.
		T_DESCRIPTION	Subdivision of the tertiary rock type.
		T_ERA	Tertiary rock type Era or Eon classification.
		SOURCE	Any source map information.

Legend[a]

PHANEROZOIC

CENOZOIC

QUATERNARY

PLEISTOCENE AND RECENT

UNCONFORMITY

PRECAMBRIAN

MESOPROTEROZOIC (1.0 to 1.6 Ga)

35 Alkalic Intrusive Suite and Carbonatite (circa 1.1 to 1.2 Ga): Alkalic syenite, ijolite, associated mafic and ultramafic rocks, and minor carbonatite

35a Martison Carbonatite Complex

34 Mafic and Related Intrusive Rocks (circa 1.1 to 1.2 Ga)

34a Nipigon mafic sills (circa 1100-1115 Ma)

34c Ultramafic, gabbroic and granophyric intrusions (probably related to unit 35)

31 Sibley Group (circa 1.34 Ga): Conglomerate, sandstone, shale

MESO- TO PALEOPROTEROZOIC (1.0 to 2.5 Ga)

30 Felsic Intrusive Rocks
30a Granite, alkali granite, granodiorite, quartz feldspar porphyry, minor related volcanic rocks (1.5 to 1.6 Ga)

INTRUSIVE CONTACT

PALEOPROTEROZOIC

27 Carbonatite-Alkalic Intrusive Suite (circa 1.8 to 1.9 Ga): Carbonatite complex and associated rocks

26 Mafic Dikes and Sills
26a Sutton Inliers: gabbroic sills (circa 1871 Ma)
26d Mafic plutons of uncertain age; gabbro, diorite, quartz diorite

INTRUSIVE CONTACT

25 Trans-Hudson Orogen Supracrustal Rocks
25a Mafic and ultramafic metavolcanic rocks, metasedimentary rocks, differentiated mafic to ultramafic intrusions of the Fox River belt
25b Undifferentiated clastic and carbonate metasedimentary rocks
25c Sutton Inliers – Sutton Ridges Formation: unsubdivided clastic metasedimentary rocks (including wacke, siltstone, argillite, chert breccia and conglomerate), and chert-banded and clastic iron formation
25d Sutton Inliers – Nowashe Formation: carbonate metasedimentary rocks (dolomite, cherty dolomite, stromatolitic dolomite, argillaceous dolomite)
25e Undifferentiated clastic metasedimentary migmatite

INTRUSIVE CONTACT

ARCHEAN

16 Pyroxenite, Diorite, Monzonite, Syenite
16c Syenite, nepheline- and/or foid-bearing syenite

15 Massive to Foliated Granodiorite to Granite
15a Potassium feldspar megacrystic units

14 Diorite, Quartz Diorite: Minor tonalite, monzonite, granodiorite, syenite and hypabyssal equivalents
14a Diorite, monzonite, quartz monzonite

13 Muscovite-Biotite and Cordierite-Biotite Granite, Granodiorite to Tonalite

12 Tonalite to Granodiorite: Foliated to massive
12a Biotite tonalite to granodiorite
12b Hornblende tonalite to granodiorite

11 Tonalite to Granodiorite: Foliated to gneissic with minor supracrustal inclusions

10 Gabbro, Anorthosite, Ultramafic Rocks

10a Gabbro
10b Anorthosite
10c Ultramafic rocks

INTRUSIVE CONTACT

9 Coarse Clastic Metasedimentary Rocks: With minor, mainly alkalic, mafic to felsic metavolcanic rocks

9a Metasedimentary rocks (conglomerate, arkose, arenite, wacke, sandstone, siltstone, argillite)

8 Migmatized Supracrustal Rocks: Metavolcanic and minor metasedimentary rocks, mafic gneisses of uncertain protolith

7 Metasedimentary Rocks: Wacke, siltstone, arkose, argillite, slate

7a Wacke, siltstone, argillite
7c Marble, chert, iron formation, minor metavolcanic rocks
7d Conglomerate and arenite
7e Paragneiss and migmatites

6 Felsic to Intermediate Metavolcanic Rocks: Rhyolitic, rhyodacitic, dacitic and andesitic flows, tuffs and breccias, and related migmatites

6a Dacitic and andesitic flows, tuffs and breccias
6b Rhyolitic, rhyodacitic flows, tuffs and breccias

5 Mafic to Intermediate Metavolcanic Rocks: Basaltic and andesitic flows, tuffs and breccias

4 Mafic to Ultramafic Metavolcanic Rocks: Basaltic and minor komatiitic flows, metasedimentary and pyroclastic rocks

3 Mafic Metavolcanic and Metasedimentary Rocks[c]: Mafic metavolcanic rocks, minor iron formation

2 Felsic to Intermediate Metavolcanic Rocks: Rhyolitic, rhyodacitic, dacitic and andesitic flows, tuffs and breccias

1 Metasedimentary Rocks and Mafic to Ultramafic Metavolcanic Rocks[bc]: Coarse clastic metasedimentary rocks, marble, quartz arenite, iron formation, komatiite, mafic metavolcanic rocks, and minor felsic metavolcanic rocks

[a] Rock codes generally conform to Provincially Significant Mineral Potential (PSMP) map codes (OGS 2006), with modifications. Number codes subdivided into a, b, c, etc., are generally arranged, especially for Proterozoic units, from younger to older. Codes preceded by the letter "G" indicate interpretation from geophysical data.

[b] *This unit was formerly classified as Keewatin. Most of these rock units range in age from 2.7 Ga to 2.8 Ga based on U/Pb zircon ages.*

[c] *This unit comprises those greenstone successions in which shallow-water supermature sediments (quartz arenites, shallow-water carbonates) have been identified. This type of unit unconformably overlies older granitoid rocks, notably in older greenstone belts in the North Caribou Lake region.*

SYMBOLS


Area of inferred Trans-Hudson Orogen overprint on Archean crust


Interpreted aeromagnetic extent of gabbroic intrusions of the Sutton Inliers


Fault, interpreted; dextral horizontal displacement


Fault, interpreted; sinistral horizontal displacement


Fault, interpreted; unknown horizontal displacement


Limit of Paleozoic rocks


Granulite facies metamorphism


Provincial boundary


Provincial Park


First Nation reserve


Primary road/highway, secondary road, trail


Hydro line or other utility line


Town

Mineral Deposit Inventory (MDI) Commodities

- Ag ± (Au ± Cd ± Cu ± Co ± Mo ± Ni ± Pb ± W ± Zn)
- aggregate ± g
- asb
- As,Au
- Au ± (Ag ± As ± Bi ± Co ± Cu ± Fe ± Ga ± gr ± Mo ± Ni ± Pb ± Pd ± Pt ± Sb ± Sn ± S/py ± Th ± U ± V ± W ± Zn)
- brl ± (Nb ± Sn ± tur ± Ta)
- clay ± (Au ± lig ± si snd ± U)
- Co ± (Ag ± Au ± Cu ± Ni ± Pb ± Pd ± Zn)
- Cr ± (Au ± Cu ± Fe ± Ni ± Pd ± Pt ± Rh ± Ru)
- Cu ± (Ag ± Au ± Co ± Cr ± Fe ± Mo ± Ni ± Pb ± Pd ± PGE ± S/py ± V ± W ± Zn)
- Fe ± (Ag ± Au ± clay ± Co ± Cr ± Cu ± Ni ± PGE ± S/py ± Zn)
- g ± aggregate
- gp ± ls
- gr ± U
- hem (gemstones),Fe
- kimberlite ± dm
- Li ± (Be ± brl ± Ce ± Cs ± Nb ± phosphate ± Rb ± Sn ± tur ± Ta ± W)
- lig ± (clay ± oil sh ± peat ± si snd ± U)
- ls
- mb
- miscellaneous stone
- Mo ± (Ag ± Au ± Cu ± fl ± Li ± Nb ± Ta ± U)
- Nb ± (ap ± brl ± Fe ± Li ± mag ± Mo ± ne syenite ± phosphate ± REE ± Sn ± Ta ± Zn)
- Ni ± (Ag ± Au ± asb ± Co ± Cr ± Cu ± Fe ± Pb ± Pd ± Pt ± PGE ± Rh ± Ta ± Ti ± V ± Zn)
- Oil sh
- Pb ± (Ag ± Au ± Cr ± Cu ± Ni ± V ± Zn)
- Peat
- PGE,Cr
- phosphate ± Nb
- qte
- Rb,Li,Cs,Ta
- REE ± (phosphate ± Nb ± REE ± Ti ± U)
- S/py ± (Co ± Cu ± Fe ± Ni)
- Sb,Au
- si snd ± (clay ± lig)
- sl
- Sn ± (brl ± Li ± Nb ± Ta)
- soapstone ± (serpentinite ± tlc)
- Ta ± (brl ± Cs ± Li ± mi ± Nb ± Rb ± Sb ± Sn ± tur)
- Th ± U
- tlc ± soapstone
- Trap rock
- U ± (Au ± Cu ± Mo ± Th)
- V,Ti
- W ± (Ag ± Au ± Cu ± Li ± Ni ± tur)
- Zn ± (Ag ± Au ± Bi ± brl ± Cr ± Cu ± Ga ± In ± Mo ± Ni ± Pb ± Pd ± Pt ± V)

Commodity Abbreviations

Ag……silver
ap……...apatite
As……arsenic
asb……...asbestos
Au.…….....gold
Be……beryllium
Bi..…….....bismuth
brl…….....beryl
Cd……..cadmium
Ce……..……..…cerium
Co…….……..…..cobalt
Cr…….....chromium
Cs……..…….…cesium
Cu……..……..…copper
dm..……..…..diamond
Fe…..……..…….……iron
fl…..……..fluorite (fluorspar)
g…..……granite
Ga…...…….gallium
gp……..…..…….gypsum
gr……..…..…….graphite
hem…..…..……hematite
In……..……...indium
Li……..…..……...lithium
lig……..…..……...lignite
ls……..……...limestone
mag…..…….…...magnetite
mb…..……..marble
mi…..…….……..mica
Mo.……..……molybdenum
Nb…..…….niobium
ne…..….nephelite (nepheline)
Ni…..…….nickel
Pb…..…..……...lead
Pd…..……..palladium
PGE...platinum group element
Pt…..……..platinum
qte…….quartzite
Rb…….rubidium
REE……..rare earth elements
Rh……..rhodium
Ru……ruthenium
S/py……...sulphur/pyrite
Sb…….antimony
sh…….shale
si……..silica
sl……...slate
Sn……tin
snd……sand
Ta……..tantalum
Th……thorium
Ti……titanium
tlc……..talc
tur……...tourmaline
U…….uranium
V……..vanadium
W……...tungsten
Zn…….zinc