

**U.S. Geological Survey**  
**Scientific Investigations Report 2005-5283**  
**Codes and Abbreviations Used in the Appendix Data Files**

- Column Header for Data Attribute -

<b>Column Abbreviation</b>	<b>Column Header Description</b>
1991-2000_mgy	Pumpage rate between 1991 and 2000
2000-2003_mgy	Pumpage rate between 2000 and 2003
2003_Status	Pumping status in 2003
Alt_USGS_ID	Alternative Site/Station identification number assigned by USGS or EPA
Approved_Date	Date of approval for well construction
AQ_code	Primary aquifer well is open to
Aquifer	Principal aquifer of well
BotBdrx	Geologic name of the last bedrock contacted
Bottom1...(N+1)	Ending depth of reported lithologic unit
BSMTbelow	Estimated elevation that the basement (igneous or metamorphic) bedrock is below
CARBONATE	Combined thickness of the carbonate bedrock deposits
Classification	Type of water use
COLOR	Reported color of geologic unit (CWI source only in Appendix B worksheet 2)
Completion	General description of the last bedrock unit that the well penetrates to
Completion_Date	Date well construction was completed
County	County
D2Bdrx_ft	Depth to bedrock, in feet
D2BSMT_ft	Depth to basement (igneous or metamorphic) bedrock, in feet
D2TopBdrx	Depth to the top of the first bedrock surface, in feet
Depth_alt_ft	Altitude at well depth, in feet
DNR_Perm_No	High-capacity permit number assigned by WDNR
DRLLR_DESC	Well Driller reported lithology for CWI
DTW_ft	Depth to ground water surface, in feet
E_UTM15_83	X-coordinate in UTM projection, Zone 15, NAD83 datum, meter units
Geo_ID	Assigned project log id
GWSI_NAME	Abbreviated local id number shared between USGS and WGNHS well data sources
HARDNESS	Well Driller reported hardness of geologic unit for CWI source in Appendix B
Interval_Depth_Bot	Similar to Bottom1...(N+1) but for CWI source in Appendix B
Interval_Depth_Top	Similar to Top1 but for CWI source in Appendix B
Lith	General description of encountered lithology in well
Lith_ID	Assigned project log id if well log can be used in Appendix B for lithologic data
LITH_MINOR	Minor lithology encountered in interval for CWI source in Appendix B
LITH_PRIM	Primary lithology of interval for CWI source in Appendix B
LITH_SEC	Secondary lithology of interval for CWI source in Appendix B
Lith1...(N+1)	Lithologic unit description
Loc_Accuracy	Location of well accuracy code, rounded to nearest 100 meters
Log_ID	Assigned project log id either Geo_ID or Lith_ID
LS_altitude_ft	Altitude at land surface, in feet
model_mgy	Pumpage rate used in model

N_UTM15_83	Y-coordinate in UTM projection, Zone 15, NAD83 datum, meter units
No_obs	Number of water-level observations made at well
Obs_date	Water-level observation date, in YYYYMMDD format
OTHER	Combined thickness of the other type of bedrock deposits
Range_E	PLSS Range, easting
Remarks_2004	Comments about the water use site
SANDSTONE	Combined thickness of the sandstone bedrock deposits
Source	Data source
State	State
STRAT	CWI abbreviation for interval stratigraphy (often formation names)
Testpoint_no	ID of point of water-level observation used to calibrate the ground-water-flow model
Top1	Starting depth of the first lithologic unit from land surface
TopBdrx	Geologic name of the first bedrock contacted
TopBdrx_alt_ft	Altitude of the top of the first bedrock surface, in feet
Township_N	PLSS Township, northing
UNLITH_CRS	Combined thickness of the unlithified coarse deposits
UNLITH_FN	Combined thickness of the unlithified fine deposits
USGS_Station_ID	Site/Station identification number assigned by USGS
Well_depth_ft	Well depth, in feet
Well_ID	Data source well id
Well_ID	A unique well id if provided by source
Well_No	Well number assigned if owner or operator has multiple wells
WL_Accuracy	Water-level accuracy code
WL_altitude_ft	Reported or averaged water-level altitude, in feet
Wuse_ID	Project ID for water supply well in Appendix F

- Data Sources for the Appendixes -

	Appendix A	Appendix B	Appendix C	Appendix D	Appendix E	Appendix F
Source Abbreviation	Well logs	Lithology	Hydrolithologic Thickness	Ground-water Levels	Streamflow	Water Use
WI wcr	x	x	x	x	-	-
CWI	x	x	x	x	-	-
MNOBS	x	x	x	x	-	-
WiscLITH	x	x	x	-	-	-
NWIS	-	-	-	x	x	-
GWSI	-	-	-	x	-	-
PSC	-	-	-	-	-	x
WDNR wuse	-	-	-	-	-	x
MNDNR wuse	-	-	-	-	-	x
USGS-WI WSC	-	-	-	-	-	x

“x”, source is part of data file, and “-”, source does not provide data

**Data Source Format:**

Source Abbreviation, Data Source Name, State, Ownership, Accessibility, Contact, Contact E-mail Address, Contact Phone Number

1. **WI wcr**, Water Well Data, WI, Wisconsin Department of Natural Resources- Bureau of Drinking Water and Groundwater, cd-ROM, Randall Clark, randell.clark@dnr.state.wi.us, (608) 267-7895
2. **CWI**, County Well Index, MN, Minnesota Geological Survey, University of Minnesota, cd-ROM or via ftp, Tim Wahl, tewahl@umn.edu, (612) 627-4801
3. **MNOBS**, Observation Well Network, MN, Minnesota Department of Natural Resources- Water Division, data request, Tom Gullett, tom.gullett@dnr.state.mn.us, (651) 297-3902
4. **WiscLith**, WiscLith, WI, Wisconsin Geologic and Natural History Survey, cd-ROM, Staff, wisclith@wgnhs.uwex.edu, (608) 263-7386
5. **NWIS**, National Water Information System, MN and WI, United States Geological Survey, via website, report authors, cdunning@usgs.gov, (608) 828-9901
6. **GWSI**, Ground-water Site Inventory, WI, United States Geological Survey- Wisconsin District- Water Resources Discipline, internal database, report authors, cdunning@usgs.gov, (608) 828-9901
7. **PSC**, Annual Water Reports, WI, Public Service Commission of Wisconsin, via website, no contact information provided
8. **WDNR wuse**, High-capacity Well Pumpage Data, WI, Wisconsin Department of Natural Resources- Bureau of Drinking Water and Groundwater, via website and in-person, Randall Clark, randell.clark@dnr.state.wi.us, (608) 267-7895
9. **MNDNR wuse**, High-capacity Well Pumpage Data, MN, Minnesota Department of Natural Resources- Division of Waters, via website, Sean Hunt, sean.hunt@dnr.state.mn.us, none provided
10. **USGS-WI WSC**, reports (listed under citations #4 and #5) and phone communications to water utility operators, WI, United States Geological Survey- Wisconsin Water Science Center, contact report authors, (608) 828-9901

**Citations:**

1. Ellefson, B.R., Mueller, G.D., Buchwald, C.A., 2002, Water use in Wisconsin, 2000: U.S. Geological Survey, Open-file Report 02-356.
2. Lawrence, C.L., and Ellefson, B.R., 1982, Water use in Wisconsin, 1979: U.S. Geological Survey, Open-File Report 82-444.
3. Lawrence, C.L., Ellefson, B.R., and Cotter, R.D., 1984, Public-supply pumpage in Wisconsin, by aquifer: U.S. Geological Survey, Open-file Report 83-931.
4. Minnesota Geological Survey, 2003, County Well Index: University of Minnesota, version 4, CD-ROM.
5. Wisconsin Department of Natural Resources, 2003, Water Well Data: Wisconsin Well Construction Reports Plus Other Related Files: Wisconsin Bureau of Drinking Water & Groundwater, CD-ROM.
6. Wisconsin Geological and Natural History Survey, 2003, wiscLITH: A Digital Lithologic and Stratigraphic Database of Wisconsin Geology: Wisconsin Geological and Natural History Survey Open-File Report 2003-05, CD-ROM.

**Links:**

1. CWI data is available at a ftp site: <ftp://156.98.153.1/pub2/cwi4/>
2. NWIS ground-water data for Minnesota is available at <http://nwis.waterdata.usgs.gov/mn/nwis/gw>
3. NWIS ground-water data for Wisconsin is available at <http://nwis.waterdata.usgs.gov/wi/nwis/gw>
4. PSC water use data for WI municipalities is available at a [http://psc.wi.gov/a\\_wegs/](http://psc.wi.gov/a_wegs/)
5. MN DNR water use data report and shapefile is available at [http://www.dnr.state.mn.us/waters/watermgmt\\_section/appropriations/wateruse.html](http://www.dnr.state.mn.us/waters/watermgmt_section/appropriations/wateruse.html)
6. MN DNR ground-water-level data through the observation network monitoring program is available at [http://www.dnr.state.mn.us/waters/groundwater\\_section/obwell/index.html](http://www.dnr.state.mn.us/waters/groundwater_section/obwell/index.html)
7. WI high capacity well data with some reported annual pumpage is available at <http://dnr.wi.gov/org/water/dwg/>

**- Geologic Unit Codes -**

<b>Unit Code</b>	<b>Project Formation Name</b>	<b>General Rock Type</b>
ALVM	Holocene Alluvium Deposits	Alluvium
GBSG	Glacial Buried Sand & Gravel Deposits	Sand and Gravel
GSSG	Glacial Surficial Sand & Gravel Deposits	Sand and Gravel
QBAA	Quaternary Buried Sand & Gravel- Artesian	Sand and Gravel
QBUA	Quaternary Buried Sand & Gravel- Unconfined	Sand and Gravel
QFUB	Quaternary Fluvial Sand & Gravel- Unconfined	Sand and Gravel
QFUU	Quaternary Fluvial Sand & Gravel- Unconfined	Sand and Gravel
QHUB	Quaternary Unconfined	Drift
QWTA	Quaternary Deposits- Water Table Condition	Drift
QUAT	Quaternary Undifferentiated (Undiff.) Deposits	Drift
MQKS	Maquoketa Formation	Shale
MQKT	Maquoketa Formation	Dolomite
SNNP	Sinnipee (Galena, Decorah, Platteville) Group	Dolomite
KREG	Cretaceous Regolith	Iron-cemented gravel or marl
OPVL	Platteville Formation	Dolomite and/or limestone
OPCJ	Platteville-Jordan Formations (Fms.) Undiff.	Dolomite and sandstone
OGWD	Glenwood Formation	Shaley sandstone
OSTP	St. Peter Formation	Sandstone
OSTPREAD	St. Peter- Readstown Member	Sandstone
OSTPTNTI	St. Peter- Tonti Member	Sandstone
OSPL	St. Peter- Prairie du Chien Fms. Undiff.	Sandstone and dolomite
OPDC	Prairie du Chien Formation	Dolomite
OPDCJRDN	Prairie du Chien-Jordan Formations Undiff.	Dolomite and Sandstone

CAMB	Cambrain Undiff. Formations	Shale and/or sandstone
CJRD	Jordan Formation	Sandstone
CJRDVOSR	Jordan- Van Oser Member	Sandstone
CJRDNRWK	Jordan- Norwalk Member	Sandstone
CJSL	Jordan- St. Lawrence	Sandstone or siltstone or dolomite
TRPL	Jordan- St. Lawrence (Used in Wisconsin)	Sandstone or siltstone or dolomite
CSTL	St. Lawrence- Lodi and Black Earth Combined	Sandy dolomite
CSTLLODI	St. Lawrence- Lodi Member	Sandstone
CSTLBKEH	St. Lawrence- Black Earth Member	Dolomite
CTNL	Tunnel City Group	Sandstone and/or shale
CSLF	St. Lawrence-Franconia Formations Undiff.	Sandstone and/or shale and/or siltstone
CFRN	Franconian Formation	Mostly sandstone some siltstone
CFRA	Franconian Stage	Mostly sandstone some siltstone
CFIG	Franconian-Ironton-Galesville Fms. Undiff.	Mostly sandstone some siltstone
CIRN	Ironton Formation	Sandstone
CIGL	Ironton-Galesville Formations Undiff.	Sandstone
CIGE	Ironton-Galesville-Eau Claire Fms. Undiff.	Sandstone
CGEC	Galesville-Eau Claire Formations Undiff.	Sandstone
WNWC	Wonowoc	Sandstone
CTNCWC	Tunnel City-Wonowoc Formations Undiff.	Sandstone
CECR	Eau Claire	Mostly sandstone some siltstone and shale
CWCEC	Wonowoc-Eau Claire Formations Undiff.	Sandstone
CEMS	Eau Claire-Mt. Simon Formations Undiff.	Sandstone
CDRE	Dresbachian Stage	Sandstone and/or shale
CMTS	Mt. Simon Formation	Sandstone
PUDF	Paleozoic Undifferentiated	Sandstone and/or shale
EKMD	Elk Mound Group	Sandstone
CSST	St. Croixan Undifferentiated	Sandstone and/or shale and/or siltstone
CSTC	St. Croixan Undifferentiated	Sandstone and/or shale and/or siltstone
PEML	Mille Lacs Group	Sandstone
PMHN	Hinckley Formation	Sandstone
PHMN	Hinckley Formation (Variation in sources)	Sandstone
PMHF	Hinckley-Fond du Lac Formations Undiff.	Sandstone
PMFL	Fond du Lac Formation	Sandstone and/or shale
PUUU	Pre-Cambrian Undifferentiated	Basement-igneous or metamorphic rock
PREC	Unstudied Precambrian Formations	Basement- granite
PMRC	Red Clastic Series	Basement- red shale
PMSC	Solar Church Formation	Basement- siltstone/shale
PEBC	Bradbury Creek Granodiorite	Basement-not specified for this study
PESC	St. Cloud Granite	Basement-not specified for this study
PERF	Reformatory Granite	Basement-not specified for this study
PAMC	McGrath Gneiss	Basement-not specified for this study
PEST	Sterns Granitic Complex	Basement-not specified for this study
PEWR	Warman Granite	Basement-not specified for this study
PEHL	Hillman Migmatite	Basement-not specified for this study
PEIL	Isle Granite	Basement-not specified for this study
PEDN	Denham Formation	Basement-not specified for this study
PMCF	Copper Falls Formation	Basement-not specified for this study

PETM	Thompson Formation	Basement-not specified for this study
PMCV	Chengwatana Volcanic Group	Basement-not specified for this study
PMVU	Keeweenawan Volcanics	Basement-not specified for this study
PEYV	Proterozoic Basalt Dike	Basement-not specified for this study
PCCR	Pre-Cambrian Crystalline Rock	Basement-not specified for this study
PEAG	Early Proterozoic Archean Granite	Basement-not specified for this study
PEUD	Early Proterozoic Granite	Basement-not specified for this study
PEGU	Early Proterozoic Granite Pluton	Basement-not specified for this study
PMSU	Mid-Proterozoic Sediment	Basement-not specified for this study
PMUD	Mid-Proterozoic Rock	Basement-not specified for this study
UREG	Undifferentiated Regolith	Basement-not specified for this study
PMVV	Undifferentiated Volcanic	Basalt- basement or intrusions
MTPL	ND (Not Defined)	Multiple aquifer units- not specified by source
BDRX	ND (Not Defined)	Unspecified bedrock
DLMT	ND (Not Defined)	Dolomite
SNDS	ND (Not Defined)	Sandstone
SHALE	ND (Not Defined)	Shale
SLTS	ND (Not Defined)	Siltstone
NONE	ND (Not Defined)	No bedrock present- unlithified deposits
NR	ND (Not Defined)	No record
NRCD	ND (Not Defined)	No record
RTL	ND (Not Defined)	Refer to log for interpretation

- Lithologic Unit Codes -

<b>Lithologic Code</b>	<b>Lithologic Type</b>
BOULDERS	boulders
CL	clay
COBBLE	cobble
DLMT	dolomite
GV	gravel
HRDP	hardpan
SD	sand
SHALE	shale
SILT	silt
SLTS	siltstone
SNDS	sandstone
STONES	stones
TILL	till

- Location Accuracy Codes -

Private Land Survey System (PLSS) to UTM Coordinates Accuracy  
The legal description order in the PLS System is Q QQ QQQ QQQQ.

Note: This table was adapted from the Minnesota Department of Natural Resources- Division of Waters water use source. All well location coordinates have been rounded to the nearest 100 meters (approximately 300 feet) for security purposes.

#### Horizontal Accuracy

<b>Miles</b>	<b>Meters</b>	<b>Quarter-Section</b>	<b>Rating Value</b>	<b>Rating Description</b>
0 - 0.35	1 - 570	Various entries	0	accuracy varies
4.24	6830	No Section	9	reliability varies-uncertain location
0.71	1140	No Quarters	9	reliability varies-uncertain location
0.35	570	Q	5	poor
0.18	280	QQ	4	slightly poor
0.09	140	QQQ	3	good
0 - 0.04	1 - 70	QQQQ or better	3	location was very good to excellent before rounding coordinates

#### - Water Level Observation Accuracy Codes -

<b>Rating</b>	<b>Error, in feet</b>	<b>Rating Description</b>	<b>Measurement Method</b>
1	+/- 0 - 0.1	excellent	trained observer or part of monitoring program with measurement standards
5	+/- 0.5 - 20	poor to very good	method/accuracy is uncertain; measurement typically after well installation
-999	no value	no value	No water-level data is provided by source

#### - Water Use Classification Codes -

A more detailed explanation about water use classification is available in USGS Open-File Report 82-444 (Lawrence, 1982).

<b>Classification Code</b>	<b>Type of Water Use</b>
HiCap-CII	For commercial, industrial, power generation and institutional uses
HiCap-Irrigation	Particularly for cropland or golf course water application
HiCap-Other	Other high capacity water uses such as waysides or camps
Production Well	Water supplied from a private water supply distribution system that is privately owned by a group or individual(s)
Production Well	Water supplied from a water supply distribution system that is publicly owned by a city or village
Production Well	Subdivision Well also known as other than municipal (OTM)
Production Well	Non-community systems typically schools, motels, churches, camps, and parks