DEPARTMENT OF NATURAL RESOURCES

Instructions for collecting water level information and recording it in the DNR provided Excel spreadsheet

This document provides permit holders or their agents' instructions on how to properly format, copy, and enter data into the DNR Groundwater Level Monitoring Template. The target audience are those that report water level data as part of MNDNR Water Appropriation Permits.

Webpage link to the Groundwater Level Monitoring Template (https://files.dnr.state.mn.us/waters/watermgmt_section/appropriations/gw_level_measurement_reporting_template.xlsx)

Enter Data Correctly for Processing

- Date Format **must** be entered as: mm/dd/yyyy (10/1/2021)
- Time Format in **must** be entered as 24 hour time: hh:mm (12:00)
    - 24hr Time Chart from Wikipedia
- MDH Unique Well ID Column
    - 6 Digit Format: XXXXXX (123456)
    - 10 Digit Format: XXXXXXXXXX (1000012345)
    - This column can only contain numbers assigned by MDH

Transducer Data tab: Figure 1 and 2

Information

- For all electronic Water Level Data including: Transducer, SCADA, etc.
- Add all transducer data (including for multiple wells) on this worksheet (tab) (Figure 1).
    - **DO NOT** add additional tabs.
- Enter multiple transducer data by entering the next Unique Well ID into Column A (MDH Unique Well ID:) for the first row of new data (Figure 2).
    - **Helpful tip**: For multiple transducer data sets, it is helpful to skip a row between data sets to create separation for moving between data sets, but is not required.
- Temperature Data is not required, but should be submitted if available.
- Review all data to be sure data sets match raw data if copying each column individually.

Data Entry Process: Transducer Data

1. Enter your permit information into the "Permit Holder Name:", Permit ID Number, and Primary Contact rows.
2. Enter the observation well 6 or 10 digit Unique ID into the First Column under MDH Unique Well ID.
3. Copy all data from your transducer export into the spreadsheet using **the right click -> "Paste Options"-> paste as "Match Destination Formatting"** option (Figure 1). This may also appear as the 2nd option with a "123" listed in the lower right of the icon.
    a. Depending on your equipment, it may be best to copy each column individually.

Figure 1: Adding Electronic Water Level Data

TRANSDUCER DATA FORM   To report water level data from logger

Permit Holder Name:	John Doe
Permit ID Number:	2010-1234
Primary Contact:	John Doe

MDH Unique Well ID:	Date (MM/DD/YYYY)	Time (0:00-23:59)	Depth to Water (Decimal Feet)	Water Temperature (Enter numerical value)
123456	10/1/2021	0:19	77.1	49.795
	10/1/2021	1:19	77.2	49.801
	10/1/2021	2:19	76.9	49.754
	10/1/2021	3:19	77.2	49.835
		4:19	77.0	49.791
		5:19	77.1	49.822

Paste Options:

Match Destination Formatting (M)

4. For multiple wells requiring electronic monitoring/transducer data (Figure 2):
   a. Go to the end of the 1st data set.
      i. **Excel Tip:** hold "Ctrl" and push "Down Arrow" to quickly move to the bottom of the data.
   b. Repeat steps 2 and 3.

Figure 2: Multiple Transducer Example

TRANSDUCER DATA FORM   To report water level data from logger

Permit Holder Name:	John Doe
Permit ID Number:	2010-1234
Primary Contact:	John Doe

MDH Unique Well ID:	Date (MM/DD/YYYY)	Time (0:00-23:59)	Depth to Water (Decimal Feet)	Water Temperature (Enter numerical value)
123456	10/1/2021	0:19	77.1	49.795
	10/1/2021	1:19	77.2	49.801
	10/1/2021	2:19	76.9	49.754
	10/1/2021	3:19	77.2	49.835
	10/1/2021	4:19	77.0	49.791
	10/1/2021	5:19	77.1	49.822
456789	10/1/2021	0:08	104.974	9.289
	10/1/2021	0:23	104.97	9.289
	10/1/2021	0:38	104.97	9.244
	10/1/2021	0:53	104.972	9.277
	10/1/2021	1:08	104.96	9.307
	10/1/2021	1:23	104.961	9.286
	10/1/2021	1:38	104.969	9.265
	10/1/2021	1:53	104.962	9.293
	10/1/2021	2:08	104.967	9.282

5. For additional wells utilizing electronic/transducer monitoring, **follow step 4.**

Figure 3: Converting Date and Time from a single column to multiple columns (if necessary)

1. Open a blank excel document or worksheet.
2. Copy "Date and Time" combined data column into Column A of the new excel sheet.
3. In Column B (Date Column), 1st row of data, enter the equation "=int(columnA)" and hit enter.
   a. Select all of column b, and use the Format tools to format the column to display as a "Date".
   b. **Excel Tip:** Hover over the small square in the lower right corner of the cell containing the equation until a bold "plus" sign appears and double click or click to drag to the bottom of the data set. This will carry the calculation through the full data set.
4. In Column C (Time Column), 1st row of data, enter the equation "=columnA# – columnB#" and hit enter.
   a. Format column C to display as 24hr time.
   b. **Excel Tip:** To carry the calculation through the data set, hover over the lower right corner of the cell containing the equation until a bold "plus" sign appears and double click or click to drag to the bottom of the data set.
5. Transfer to the "Transducer" tab of the Groundwater Reporting template following the "Data Entry Process: Transducer Data" section.

Figure 3: Converting Date and Time to Separate Columns
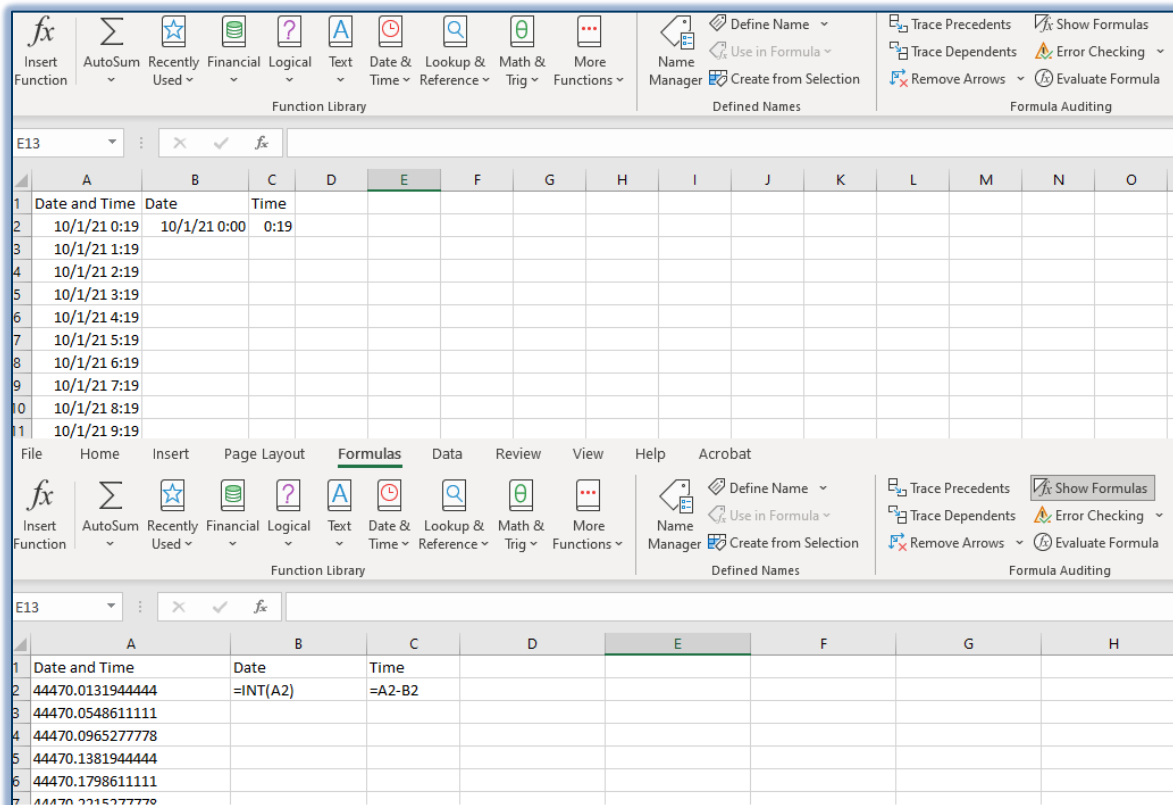
Initial Transducer Set Up for Raw Data Submission – Varies by Manufacturer

- When setting up a transducer, the file name should begin with the 6 or 10 digit Unique ID Number.
  - **File name at set up: UniqueID-SiteName-DateStarted.**
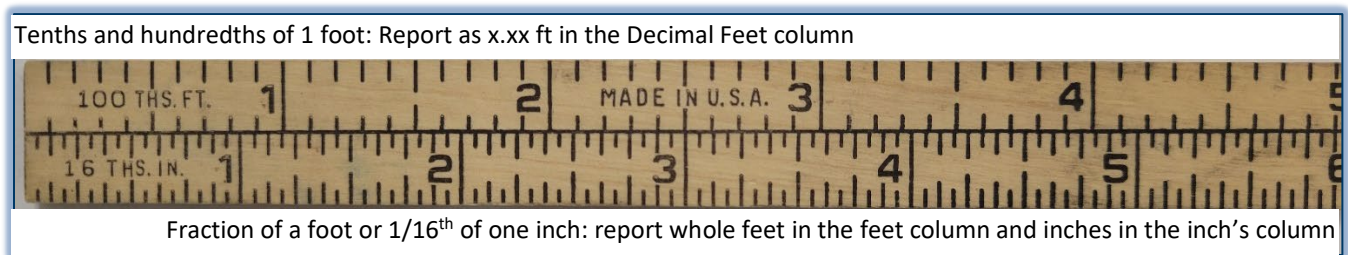- The transducer should be set up to read as "Depth to Water".

- Transducer should be calibrated regularly to a known hand reading per permit requirements.
- For additional assistance with transducer set up, please email your local submission email address.

Water Level Data Tab: Figure 5

Information

- This is for all readings where an individual <u>physically visited</u> the well and took a <u>measurement utilizing an electronic tape or chalked steel tape</u>. This is often referred to as a hand/manual reading or calibration measurement.
- If the well is instrumented and the transducer was connected at the time of a hand reading, report the value of the transducer reading in the "Remarks" column.
- In the Remarks Column, indicate if a nearby production well (or the measured well) is actively pumping.
- Check how your water level measuring device is reading (Figure 4).
  - If your measurement utilizes an engineer's rule (tenths of a foot), enter the number in the "Decimal Feet" column (top of ruler) and overwrite the equation. Do not enter anything in the "Feet" or "Inches" column if you are using an engineer's rule.
  - If your measurement is read in fractions of an inch (bottom of ruler), enter the feet (XX) and inches (x x/16) in the separate columns, and the template will automatically calculate the Decimal Feet column (bottom of ruler).

Figure 4: Measuring in Different Formats

Tenths and hundredths of 1 foot: Report as x.xx ft in the Decimal Feet column

Fraction of a foot or 1/16th of one inch: report whole feet in the feet column and inches in the inch's column

Data Entry Process: Manual Water Level Measurement

1. Enter the 6 or 10 digit unique well ID in the MDH Unique Well ID column.
   a. This column is for numerical information only.
2. Enter the Date in MM/DD/YYYY (5/1/2021) format in the Date Column.
3. Enter the time in hh:mm (24hr format) in the time column.
4. Enter the measured water level in the designated format for your equipment (Figure 5).
   a. Engineers Rule (tenths of feet): Enter only in the "Decimal Feet" column, delete equation.
   b. Standard Rule (fraction of feet): Enter only in the "Feet" and "Inches" columns.
5. Enter any necessary comments in the Remarks column such as (this can be blank):
   a. Logger Downloaded.
   b. Transducer Reading at time of hand reading: xx.xx ft.
   c. Well running.
   d. Local Well Name.
   e. Reset data logger.
6. If multiple readings from the same well were taken during the reporting period, enter those readings in the next row.
7. If multiple different wells are read, follow steps 1 – 5 of the Water Level Data Tab process.

Figure 5: Water Level Data Tab - Example

WATER LEVEL DATA FORM   To report hand measurements / field visits

Permit Holder Name:	John Doe
Permit ID Number:	2010-1234
Primary Contact:	John Doe

MDH Unique Well ID:	MEASUREMENT		WATER LEVEL (Feet or Decimal Feet)			Remarks (Indicate pump running status or other extenuating circumstances in this column)
	Date (MM/DD/YYYY)	Time (0:00-23:59)	Feet	Inches	Decimal Feet (Autocalculated)	
123456	10/15/2021	15:05			77.42	Transducer Reading: 77.41
100005168	10/15/2021	15:06	104	11 5/16	104.94	Pump Running
999999	10/15/2021	15:11	34	5 5/16	34.44	Static
456789	10/15/2021	15:38			81.06	Transducer Reading: 81.0
	10/31/2021	15:50			79.46	Static

Pump Data Tab: Figure 6 (not required for all permits)

Information

- Only include this information if the permit requires the data be submitted.

Process

1. Enter unique well ID into the MDH Unique Well ID Column.
2. Enter the pump start date into the date column and the time the pump was started in the time column.
3. Enter the pump stop date into the date column and the time the pump was stopped in the time column.
4. Enter the volume pumped for the pumping cycle into the total volume column.

Figure 6: Pump Operation Example

Permit Holder Name:	John Doe
Permit ID Number:	2010-1234
Primary Contact:	John Doe

MDH Unique Well ID:	PUMP START		PUMP STOP		VOLUME
	Date (MM/DD/YYYY)	Time (0:00-23:59)	Date (MM/DD/YYYY)	Time (0:00-23:59)	Total Gallons
123456	08/05/2020	15:45	08/08/2020	8:00	2,434,200
	08/15/2020	9:15	08/18/2020	18:00	3,159,000
	08/22/2020	14:00	08/24/2020	22:00	1,650,200
	08/25/2020	17:00	08/28/2020	22:00	2,725,800
	09/03/2020	16:20	09/06/2020	13:20	2,434,200

Additional Tabs

- Data is not required to be included in the **Calculations tab.**
  - Use this tab if you need to complete any calculations that DNR should be aware of that may affect your data submission.
- Data is not required to be included in the **notes tab.**
  - Include any information that you feel is necessary in this tab, including measuring point elevations, pertinent field information. Please do not include pictures due to the size (send via an email if necessary).

Key Points

- **Do not** add new tabs.
- **Do not** insert text where you are not directed to.
- Call or email your local area hydrologist or water appropriation hydrologist if you have questions.

Good Data Collection Practices

- Always take two (2) hand readings.
    - If the readings are not with in .1, take a third reading to verify depth to water.
- Measure from the same spot on the well casing.
    - Add a mark in permanent marker to the edge of the casing to mark a measuring point.
- Always take a hand reading when you download a transducer.
- Check your transducer battery level when downloading.
- Report the instantaneous transducer value when downloading for comparison to hand readings.
- Add comments in the "Water Level Data" tab for hand readings, or general information in your submission email.
- Call or email DNR staff with any questions.

Regional emails for data submittal

[Map of regional contacts to send water level monitoring data](#)

Where to Submit your DNR Permit-Required Water Monitoring Data
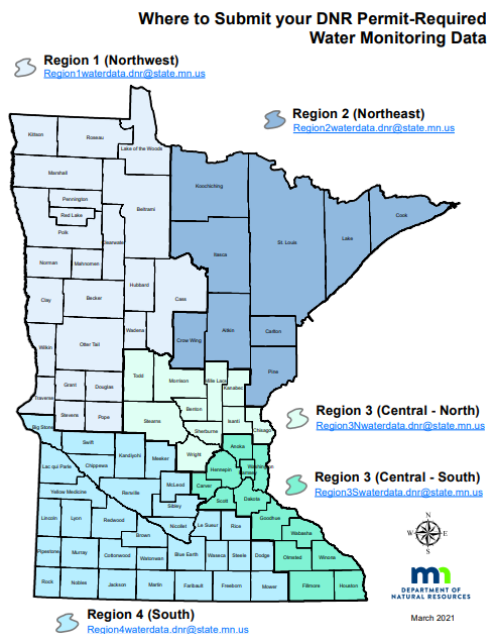
- Region 1 (northwest MN): Region1waterdata.dnr@state.mn.us
- Region 2 (northeast MN): Region2waterdata.dnr@state.mn.us
- Region 3 (Central and Eastern MN) Region3Nwaterdata.dnr@state.mn.us
  or Region3Swaterdata.dnr@state.mn.us
- Region 4 (South and southwest MN) Region4waterdata.dnr@state.mn.us