

**Nebraska Department of Environment and Energy
Standard Operating Procedure (SOP)**

**Water Quality Division
Water Quality Assessment Section – GW**

SOP Number: GW-110

Title: Groundwater Sample Location/Well Inventories

Written Date: July 8, 2024

Purpose: To document the condition of a sampled well and the natural and manmade features surrounding it in order to better understand, interpret, and document the sample results obtained from that well.

Equipment/Materials Needed:

- 1" : 1 mile county road map(s) of area of interest with locations of wells to be sampled plotted on the map
- Well inventory sheet (see Appendix A - available upon request)
- NDWR well registration list of area of interest (this is most useful if printed out in two parts--a list of the wells to be sampled and a list of all wells in the area, both including as much owner/operator information as possible)
- Ownership plat map(s) of area of interest--latest (if available)
- Rural residential directory of area of interest--latest (if available)
- 1 : 24,000 (or other scale) USGS topographic map(s) of area of interest (optional)

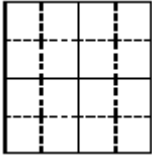
Procedures:

1. Upon arrival at the sampling site, mark the approximate location of the well on the county road map (and/or the topographic map, if applicable), using the sample number for that particular location.
2. If the well is running and/or possible to sample, proceed with sampling and related activities (as per SOPs # GW-060, 061 (if applicable), 070, 080, 090, and 100) and site inventory as per Step 3. If the well is not running but is possible to sample, try to indicate on the map the route into the wellsite (e.g. the direction of the pivot access road, a driveway, a nearby fence line, etc.) so it will be easier to locate the next time you or someone else visits the site. If the well is not possible to sample (e.g. no access, abandoned well, bad location, etc.), cross it off both the map and the well registration list and move on to the next site.
3. Fill out an inventory sheet (see Appendix A for an example and explanation of abbreviations/terms) for the site. Using the county road map, topographic map (if available), well registration list, and your own observations, fill out as much of the inventory as is possible onsite. Be sure to accurately cross-reference the sample/location number on the map, inventory sheet and the well registration list.
4. At a convenient time (usually after the field season), fill in the remaining blanks on the inventory sheet. For the most part, this will consist of analytical results and information from the well registration that may not have been convenient or available at the time of sampling.

Appendix A. Example field inventory sheet. (NOTE: the provided sheet is an example commonly used in GWMA sampling. It may be modified for individual studies or other types of ground water sampling.)

EXPLANATION OF TERMS/ABBREVIATIONS USED ON INVENTORY SHEET

SAMPLE #:	The unique sample identifier for that particular sample. The format for the sample number is determined by the individual project manager. In the past, samples for the GWMA (formerly SPA) program
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	have always started with 'S.' Whatever naming convention is used, the total number of characters is limited to eight (8).
Date:	The date on which the sample was obtained. Be sure to include month, day, and year.
Time:	The time at which the sample was obtained. Use military time; e.g. 8:15 AM would be 0815; 3:40 PM would be 1540.
Sampled by:	The initials of the sampling crew.
Blank:	Circle if a field blank was prepared at this sample location; indicate the number as well.
Dup:	Circle if a duplicate sample was taken at this sample location; indicate the number as well.
Pest:	Circle if a pesticide sample was taken at this sample location.
Split:	Circle if a split sample was taken at this sample location; indicate the number as well.
LOCATION	
Legal:	The township (North), range (East or West), and section number together with subsection dividers to quarter-quarter-quarter section (10 acre subdivision) if possible. Provide both alphabetical (A, B, C, D) and directional (NE, NW, SW, SE) section subdivision notations; e.g. Sec. 5 AB = NW1/4, NE 1/4.
Long:	Longitude of the sample location, in either decimal degrees or degrees-minutes-seconds.
Lat:	Latitude of the sample location, in either decimal degrees or degrees-minutes-seconds.
(Dig/GPS/Map Est):	The method by which the longitude and latitude was obtained. Dig = digitized from a standard map (e.g. a county road map or a 1:24,000 topographic map); GPS = Global Positioning System; Map Est = estimated from a standard map (usually a 1:24,000 topographic map).
County:	The county in which the sample location is found. This often takes the form of initials for the counties, which can be circled in the field. It's also a good idea to include the STORET number for the county.
ST = 31:	The numerical indicator for the State of Nebraska.
NRD = :	The Natural Resources District in which the sample location is found. This can be either the NRD's name (e.g. Lower Loup) or its number. This can be filled in before the sampling event.
Hydrologic Unit:	The hydrologic unit number of the sample location.
Topo Map:	The name of the USGS 7.5' topographic map on which the sample location is found.
	The square diagram at the upper right hand corner of the inventory sheet represents the section in which the sampled well is located. This section is divided into quarter and quarter-quarter sections. Place the approximate location of the sampled well on this diagram, making any necessary notes or additions (roads, center pivots, etc.).
GPS INFORMATION	

Filename:	The name of the GPS data file which contains the locational data for a given sampling point. This filename is automatically assigned by the GPS unit and is read directly from it while obtaining the location.
Offset from well:	The distance and direction from the well (if any) which the GPS unit is set up.
Start Time:	The time (military) at which the GPS unit begins collecting locational data.
End Time:	The time (military) at which the GPS unit stops collecting locational data.
WELL	
Domestic:	Circle if the well is used for domestic or household supply.
Municipal:	Circle if the well is used for public water supply.
Pivot:	Circle if the well is attached to a center pivot irrigation system.
Other Sprinkler:	Circle if the well is attached to a sprinkler system other than a center pivot, e.g. side roll, towline, mobile gun, etc.
Gate:	Circle if the well is attached to a gated pipe irrigation system.
Ditch:	Circle if the well discharges to an open ditch.
Other:	Circle if any other kind of well (e.g. stock, industrial, etc.)
Location:	Location of the well with respect to surroundings.
Pit:	Circle if the well is located in a well pit.
Low-lying:	Circle if the well is located in a low-lying area.
Near Ditch/Drainage:	Circle if the well is located near some sort of drainage feature, either manmade (ditch) or natural (drainage); circle the appropriate one.
High:	Circle if the well is located on naturally high ground, compared to the surrounding topography.
Flat:	Circle if the well is located on relatively flat ground.
Sidehill:	Circle if the well is located on sloping ground on the side of a hill.
Low End Field:	Circle if the well is located at the low end of a cropped field.
Center Field:	Circle if the well is located in the center of a field (this is typically where center pivot wells are located).
Well Condition:	General observations as to the condition of the well; e.g. good, oily, cracked pad, barren (may indicate herbicide use), etc.
DWR Reg #:	The Nebraska Department of Water Resources registration number for the well to be sampled.
Date Drilled:	The date the well was drilled, as shown on the NDWR registration.
Reg/Approx/Known:	In reference to the Date Drilled , Reg: the date drilled is listed on the well registration; Approx: the date drilled is estimated, either by appearance or by the owner or driller's memory; and Known: the date drilled is not listed on the well registration, but there is some other record which indicates the date drilled. Circle the appropriate one.
Yield:	The approximate yield of the well, in gallons per minute, usually from NDWR registration.

<u>POINT SOURCES</u>	
Barnyard:	Circle if there is a barnyard (stock corral, pen, holding area, etc.) near the well.
____ft.____of well:	The approximate distance (in feet) and direction which the barnyard is from the well.
Active/Idle:	The barnyard is either active or idle (circle one).
Cattle/Swine/Poultry/ Horse/Other:	The type(s) of animals contained in the barnyard (circle one or more).
Up/Down Hill	The barnyard is either up or downhill from the well (circle one).
Septic/Sewer:	Circle if there is a septic system or sewer near the well.
____ft.____ of well:	The approximate distance (in feet) and direction which the septic system or sewer is from the well.
Up/Down Hill	The septic system or sewer is either up or downhill from the well (circle one).
Chemigation:	Circle if there is a chemigation system attached to the well.
On/Off:	The chemigation system is running or off (circle one) while sampling is occurring.
Fert/Pest:	The chemigation system is injecting fertilizer or pesticide (circle one) while sampling is occurring.
Other PS:	Describe any other possible point sources which may have an impact on the well.
<u>NONPOINT SOURCES</u>	
Crops at/near well:	Describe the type of crops around the wellsite. Circle one or more: Corn, Soybeans, Sorghum, Alfalfa, Beans (edible), Small Grain (wheat, oats, barley, etc.), Potatoes, Other (anything not already on the list).
Type, distance, direction:	Describe which crops are at what approximate distance and direction from the wellsite.
Pesticides/Fertilizer used:	If known, describe which field, type(s) of pesticides and/or fertilizers applied, amount, the method of application, the time of application, etc.
<u>OTHER WELL INFORMATION</u> (STORET)	
	NOTE: The code numbers and abbreviations are taken from USEPA's STORET data system, into which all NDEQ ground water data is ultimately entered as per SOP # GWS-150.
Type (84056):	The type of well sampled.
Irrig:	Circle if an irrigation well.
Dmstc:	Circle if a domestic well.
Pubsp:	Circle if a public supply well.
Stksp:	Circle if a stock supply well.
Ind:	Circle if an industrial well.
Unusd:	Circle if an unused well.
Other:	Circle if a well type other than those listed.
Topography (84060):	The general shape of the land surface surrounding the well.

Vally:	Circle if in a valley.
Slope:	Circle if on a sloping land surface.
Hlltp:	Circle if on a hilltop.
Draw:	Circle if in a draw or shallow, local drainage.
Flat:	Circle if on flat land.
Lcdep:	Circle if in a local depression.
Trrc:	Circle if on a terrace.
Undlg:	Circle if on an undulating land surface.
Flpln:	Circle if in a floodplain.
Other:	Circle if on a land surface other than those listed.
Well Owner (84059):	The actual owner of the well.
Priv:	Circle if a privately owned well.
Inst:	Circle if an institutional (e.g. public) well.
Comm:	Circle if a commercially owned well.
Casing Material (84114):	The type of casing used in the well
Steel:	Circle if steel casing.
PVC:	Circle if polyvinyl chloride (PVC; plastic) casing.
Cncrt:	Circle if concrete casing.
Other:	Circle if casing type other than those listed.
Drill Method (84063):	The method used to construct the well.
Dug:	Circle if a hand-dug well.
Bore:	Circle if a bored well.
Cable:	Circle if a cable-tooled well.
Drivn:	Circle if a driven well.
Rvrt:	Circle if well constructed using reverse-rotary drilling.
Other:	Circle if a well constructed using a methodology other than those listed.
Avail. Log (84055):	The kind of log available for the well.
D:	Circle if a driller's log.
E:	Circle if an electric log.
G:	Circle if a geologic log.
On back:	Circle if the log is copied on the back of the field sheet.
Well Depth (72008):	The completed depth of the well, in feet.
Source Well Depth Info (84126):	The source of the information about the well depth.
Ownop:	Circle if from owner/operator.
Drillg:	Circle if from driller's log.
Ragnc:	Circle if from registering agency/registration.
Other:	Circle if a source of well depth information other than those listed.
SWL (72019):	The static water level in the well, in feet below ground surface (BGS).
Source SWL (84128):	The source of the information about the static water level (abbreviations the same as those for Source Well Depth Info)
PWL (73674):	The pumping water level in the well, in feet below ground surface (BGS).
Pump Per (72004):	The duration of pumping before sampling, in minutes.
Screen Length (82509):	The length of the screened interval in the well, in feet (combine separate screen lengths).
Elevation (72000):	The elevation of the well, in feet above mean sea level (MSL). NOTE: there is no default location for

	measuring elevation (e.g. base of the well, discharge point, etc.).
Sample Type Freq (84053)	The frequency of sampling. WQA (water quality-annual) is the STORET default for this parameter (i.e. there is no choice involved).
Sample Purpose (84122):	The purpose for which the sample was taken. GWQAL (ground water quality analysis) is the STORET default for this parameter (i.e. there is no choice involved).
Reg Ag (84121):	The regulating agency overseeing the sampling. State is the STORET default for this parameter (i.e. there is no choice involved).
Date of Lab Analysis (73672):	The date on which the laboratory analysis was performed, by year, month, and day, respectively.
FIELD DATA	
Temperature:	The field temperature of the sample, in degrees Centigrade.
Conductivity:	The field conductivity (specific conductance) of the sample, in micromhos/centimeter.
pH:	The field pH of the sample, in standard pH units.
Hach NO₃-N:	The field nitrate reading of the sample as measured with a Hach kit, approximately in milligrams/liter.
Triazine:	The field results of a triazine (mostly atrazine) immunoassay screening.
Positive:	Circle if there is some indication of triazine content in the sample (NOTE: a positive result on this screen will result in collection of a sample for pesticide analysis).
Negative:	Circle if there is no indication of triazine content in the sample.
Not Applicable:	Circle if a triazine screen was not run for this particular sample.
LAB DATA	
NHHS Lab/Other Lab:	The analysis was provided by Nebraska Health and Human Services (NHHS) lab or another lab (circle one).
NRD WQ Sample NO ₃ -N:	The results of any Natural Resources District (NRD) water quality sample for nitrate, in milligrams/liter.
Year:	The year in which the NRD nitrate sample was taken.
Nitrate-N, Chloride, Sulfate, Bicarbonate:	The lab results of the analyses for these parameters, in milligrams/liter, and the corresponding result of a duplicate or split sample (if applicable).
Sodium, Magnesium, Calcium, Potassium:	The lab results of the analyses for these parameters, in milligrams/liter, and the corresponding result of a duplicate or split sample (if applicable).
Ionic Balance:	The ionic balance of anions (nitrate-N, chloride, sulfate, and bicarbonate) versus cations (sodium, magnesium, calcium, and potassium), expressed as milliequivalents/liter, and calculated as a percentage difference.
WELL OWNER/OPERATOR	
Name:	Name of the well owner/operator.
Address:	Address of the well owner/operator.

Prior/Onsite Permission:	Permission to sample the well was given prior to the sampling event or onsite (circle one).
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