

State of Wisconsin  
DEPARTMENT OF NATURAL RESOURCES  
473 Griffith Ave.  
Wisconsin Rapids WI 54494

Tony Evers, Governor  
Preston D. Cole, Secretary  
Telephone 608-266-2621  
Toll Free 1-888-936-7463  
TTY Access via relay - 711



November 13, 2019

Mary Bogen  
250 Joyce St.  
Wausau, WI 54401-6165

Clifford Howe & Jeffrey Kluge  
169845 Brickyard Dr  
Ringle WI 54471

PECFA #54471-9771-45      BRRTs #03-37-219504      Parcel ID#072-2809-213-0013

Site Name: Bogies East Bar  
Site Address: R15345 2<sup>nd</sup> Ave, Ringle

Re: Action Required – PECFA Site

Dear Ms. Bogen, Mr Howe & Mr. Kluge:

The Wisconsin Department of Natural Resources (“department”) is contacting you regarding the property at R15345 2<sup>nd</sup> Ave, Ringle. The department was notified in 4/26/1999 of petroleum contamination at the property. As the party identified as being responsible for the petroleum contamination, you have certain legal responsibilities to take action to clean up the contamination under Wis. Stats. § 292.11(3), known as the hazardous substance spill law. As the legal owners of the property, you may also have certain legal responsibilities under the hazardous substance spill law.

Our records indicate that your site still requires investigation and/or cleanup and is eligible for funding under the **Petroleum Environmental Cleanup Fund Award (PECFA)**, meaning reimbursement is available to you for the cleanup of petroleum contamination at your property. However, **funding for PECFA will end on June 30, 2020**. As such, the department is working with property owners to clean up as many sites as possible while reimbursement funding is still available.

According to information in the case file, the last status report for your property was received on 3/31/2015. Because of the inaction at your site, **we request that, by 12/13/2019, you:**

- 1) **Inform the department in writing of your plans to finish the necessary environmental response actions at this site.** As part of this response, please include the name and contact information of your environmental consultant. If you do not have an environmental consultant, a list of PECFA-registered firms has been included for your convenience; **or**
- 2) **Inform the department in writing of your plans to abandon the monitoring wells at this site.** Please include the name and contact information of your environmental consultant. A list of PECFA-registered firms, and information on properly abandoning wells, has been included for your convenience; **or**
- 3) **Provide access to the department to abandon the monitoring wells on your site.** The department will hire a contractor to complete this work and incur these expenses as authorized under Wis. Stats. § 292.31(3). The department will file a lien against the above-referenced property in order to recover those costs, as authorized under Wis. Stat. 292.81. Prior to filing a lien, the department will send a second notice and draft lien detailing the amount of the lien that will be filed. An access agreement and return envelope has been included for your convenience should you choose this option.

If you act now, it is possible for environmental work to be done with minimal out of pocket costs to you, through the end of PECFA in June 2020. However, response to this notice and cooperation in moving the site toward case closure are required in order to access PECFA reimbursements. Currently, for your site, there is a PECFA deductible of \$10,000.00 of which the full \$10,000.00 deductible has been applied. Your site has a maximum reimbursement of \$190,000.00 with \$91,061.70 remaining.

The department would like to work with you to finish the response action at your site while PECFA reimbursement is still available. Your prompt attention to this request is appreciated.

If you have any questions regarding this notice or how to move your site forward, please contact me in writing at the letterhead address or by phone at 715-421-7862. I can also be reached by email at [dee.lance@wisconsin.gov](mailto:dee.lance@wisconsin.gov).

Sincerely,



Hydrogeologist  
Remediation and Redevelopment Program

cc: Dave Rozeboom  
Ron Anderson METCO

Enc:  
PECFA Eligible Consulting Firms (RR-993)  
A Fact Sheet of Frequently Asked Questions about Temporary Monitoring Wells (RR-647)  
Access Agreement

**REGISTERED PECFA CONSULTING FIRMS  
NOVEMBER 2019**



RR-993

NOVEMBER 2019

CONSULTING FIRM NAME	CREDENTIAL ID	DATE CREDENTIAL EXPIRES	CONTACT PERSONS EMAIL	COMPANY ADDRESS
AECOM TECHNICAL SERVICES INC	240806	12/1/2020	kyle.wagoner@aecom.com	200 INDIANA AVE., STEVENS POINT, WI 54481
AMERICAN ENGINEERING TESTING INC	1021645	5/24/2020	mneal@amengtest.com	550 CLEVELAND AVE N, ST PAUL, MN 55114
AMI CONSULTING ENGINEERS, P.A.	15363	6/4/2021	chad.scott@amiengineers.com	91 MAIN ST, SUPERIOR WI 54880-7058
ARCADIS US INC	240395	3/29/2020	jennine.trask@arcadis.com	126 N JEFFERSON ST, MILWAUKEE, WI 53202
ASSURED ENVIRONMENTAL ASSOC INC	240081	11/27/2020	aea@wi.rr.com	14120 W GLENDALE AVE, BROOKFIELD, WI 53005
BARR ENGINEERING CO.	240111	9/7/2020	tobrien@barr.com	4300 MARKETPOINT DR, STE 200, MINNEAPOLIS, MN 55435
BAY WEST INC	240121	4/16/2021	edb@baywest.com	5 EMPIRE DR, ST PAUL, MN 55103-1867
BRAUN INTERTEC CORP	240149	4/3/2020	mgretebeck@braunintertec.com	2309 PALACE ST, LA CROSSE, WI 54603
COOPER ENGINEERING CO INC	240209	2/20/2021	bmarkgren@cooperengineering.net	2600 COLLEGE DRIVE P.O. BOX 230, RICE LAKE, WI 54868-0230
DAKOTA INTERTEK CORP	240228	4/9/2021	chi@dakotaic.com	16600 WEST NATIONAL AVENUE, NEW BERLIN, WI 53151
DOUGLAS ENGINEERING ENV SVCS	240249	5/1/2020	dsw@douglas-eng.com	3517 HARPER RD, MADISON, WI 53704
DRAKE CONSULTING GROUP, LLC	1084423	11/6/2020	dilburns@drakecg.com	10624 N PORT WASHINGTON RD STE 202, MEQUON, WI 53092-5049
ENDEAVOR ENVIRONMENTAL SERVICES, INC	843103	2/5/2021	iramcheck@endeavorenv.com	2280-B SALSCHIEDER CT, GREEN BAY, WI 54313
ENDPOINT SOLUTIONS CORP	1083970	10/10/2020	mark@endpointcorporation.com	6871 S LOVERS LANE, FRANKLIN, WI 53132
ENGEL & ASSOCIATES INC	240286	11/1/2020	ron@engelandassociates.com	N4737 HWY 175 S, FOND DU LAC, WI 54937
ENVIRONMENTAL TROUBLESHOOTERS ERM, INC.	240333 240343	2/27/2021 11/20/2020	cwilson@etsmn.com david.dusing@erm.com	3825 GRAND AVE, DULUTH, MN 55807 700 W VIRGINIA ST, #601, MILWAUKEE, WI 53204
FEHR GRAHAM & ASSOCIATES	1193652	10/13/2021	jangel@fehr-graham.com	1237 S PILGRIM RD, PLYMOUTH, WI 53073
FREE FLOW TECHNOLOGIES, LTD	1058502	9/17/2021	cproctor@freeflowtech.com	4920 FOREST HILLS RD, LOVES PARK, IL 61111
GABRIEL ENVIRONMENTAL SERVICES	240375	4/26/2021	jpolich@gabrielenvironmental.com	1500 SYLVANIA AVE, SUITE 112, STURTEVANT, WI 53177-1274
GENERAL ENGINEERING COMPANY	240384	1/29/2020	kanderson@generalengineering.net	916 SILVER LAKE DR., PORTAGE, WI 53901
GILES ENGINEERING ASSOC INC	240400	9/10/2021	tgiles@gilesengr.com	N8 W22350 JOHNSON DR, WAUKESHA, WI 53186-1679
GOLDER ASSOCIATES INC	829189	2/4/2021	mbergeon@golder.com	2247 FOX HEIGHT LN, STE A, GREEN BAY, WI 54304
GROUNDWATER & ENVIRONMENTAL SERVICES, INC	240284	4/23/2020	kkaminski@gesonline.com	1301 CORPORATE CENTER DR, STE 190, EAGAN, MN 55121
GZA GEOENVIRONMENTAL INC	240433	4/9/2021	patrick.sheehan@gza.com	20900 SWENSON DRIVE, SUITE 150, WAUKESHA, WI 53186
HIMALAYAN CONSULTANTS LLC	824547	8/11/2020	gadhikary@himalayanllc.com	W156 N11357 PILGRIM ROAD, GERMANTOWN, WI 53022
K SINGH & ASSOC INC	240518	1/28/2021	ksingh@ksinghengineering.com	3636 NORTH 124th STREET, WAUWATOSA, WI 53222
KAPUR & ASSOCIATES INC	240520	2/22/2021	tpeterson@kapurinc.com	7711 N PORT WASHINGTON RD, MILWAUKEE, WI 53217
KONICEK ENVIRONMENTAL CONSULTING, LLC	899523	5/13/2020	g_konicek@yahoo.com	1032 SOUTH SPRING ST, PORT WASHINGTON, WI 53074
KPRG AND ASSOCIATES, INC	891886	3/7/2020	richardg@kprginc.com	14665 WEST LISBON RD, STE 2B, BROOKFIELD, WI 53005
LANDMARK ENGINEERING SCIENCES, INC	849569	6/4/2021	landmark-engineering@live.com	119 COOLIDGE AVE, STE 100, WAUKESHA, WI 53186-6602
MACH IV ENGINEERING AND SURVEYING	1110371	4/6/2020	rmach@mach-iv.com	2260 SALSCHIEDER COURT, GREEN BAY, WI 54313
MERIDIAN ENVIRONMENTAL CONSULTING, LLC	240043	11/26/2020	kshimko.meridianenv@gmail.com	2711 N ELCO RD, FALL CREEK, WI 54742
METCO	240609	11/21/2020	metcohq@metcohq.com	709 GILLETTE ST STE 3, LA CROSSE, WI 54603
MIDWEST ENVIRONMENTAL CONSULTING, LLC	17138	11/24/2021	mwenvirocon@gmail.com	N6395 E. PARADISE RD, BURLINGTON, WI 53105-2635
MORaine ENVIRONMENTAL INC	240653	11/21/2020	moraine@execpc.com	1402 7TH AVE, GRAFTON, WI 53024-2330
MSA PROFESSIONAL SERVICES INC	263385	4/15/2020	jenglebert@msa-ps.com	1230 SOUTH BOULEVARD, BARABOO, WI 53913
NRP ENVIRONMENTAL CONSULTANTS	240685	11/21/2020	nrcconsultants@gmail.com	2357 PAMPERIN RD STE 2, GREEN BAY, WI 54313-8929
O'BRIEN & GERE ENGINEERS, INC.	751130	3/18/2021	meg.hermann@obg.com	333 W. WASHINGTON ST., SYRACUSE, NY 13202
PINNACLE ENGINEERING	35067	5/22/2021	JHOLLAND@PINENG.COM	11541 95TH AVE N, MAPLE GROVE, MN 55369
PIONEER ENVIRONMENTAL, INC	255884	12/2/2020	idrapeau@pei-wisc.com	203 1/2 E MAIN ST, MOUNT HOREB, WI 53572
RAMBOLL ENVIRON US CORPORATION	1180782	7/27/2021	itarvin@ramboll.com	175 N. CORPORATE DRIVE, SUITE 160, BROOKFIELD, WI

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This list is for public information only. The Wisconsin DNR does not endorse any of the registered PECFA consulting firms. If the PECFA consulting firm you are looking for is not on this list, then their credential has expired.

# REGISTERED PECFA CONSULTING FIRMS

NOVEMBER 2019



RR-993

NOVEMBER 2019

CONSULTING FIRM NAME	CREDENTIAL ID	DATE CREDENTIAL EXPIRES	CONTACT PERSONS EMAIL	COMPANY ADDRESS
READYEARTH CONSULTING, INC	1163841	3/8/2021	<a href="mailto:ibartley@readyearth.net">ibartley@readyearth.net</a>	P.O. BOX 365, PEWAUKEE, WI 53072
REI ENGINEERING INC	240774	12/20/2020	<a href="mailto:klassa@reiengineering.com">klassa@reiengineering.com</a>	4080 N 20TH AVE, WAUSAU, WI 54401
ROBERT E LEE & ASSOCIATES INC	240791	11/9/2021	<a href="mailto:mlarson@releinc.com">mlarson@releinc.com</a>	1250 CENTENNIAL CENTRE BLVD, HOBART, WI 54155
SAND CREEK CONSULTANTS INC	240813	5/14/2021	<a href="mailto:mark.dawson@sand-creek.com">mark.dawson@sand-creek.com</a>	151 MILL STREET, P.O. BOX 218, AMHERST, WI 54406
SCS ENGINEERS	240158	2/5/2021	<a href="mailto:mhuber@scsengineers.com">mhuber@scsengineers.com</a>	2830 DAIRY DR, MADISON, WI 53718-6751
SEYMOUR ENVIRONMENTAL SERVICES INC	240831	11/21/2020	<a href="mailto:rseymour@chorus.net">rseymour@chorus.net</a>	2531 DYRESON RD P.O. BOX 398, MC FARLAND, WI 53558-0398
SIGMA GROUP INC	240841	11/1/2020	<a href="mailto:dczernicki@thesigmagroup.com">dczernicki@thesigmagroup.com</a>	1300 WEST CANAL ST, MILWAUKEE, WI 53233
SOLUTECH INC	1012506	12/16/2020	<a href="mailto:rmaschue@solutechenv.com">rmaschue@solutechenv.com</a>	5841 CORPORATE WAY, WEST PALM BEACH, FL 33407
STANTEC CONSULTING SERVICES INC	240675	11/1/2020	<a href="mailto:brian.larson@stantec.com">brian.larson@stantec.com</a>	12075 N CORPORATE PKWY, STE 200, MEQUON, WI 53092
TERRACON CONSULTANTS INC	253923	7/29/2021	<a href="mailto:brschroyer@terracon.com">brschroyer@terracon.com</a>	9856 S 57TH ST, FRANKLIN, WI 53132
UNITED ENGINEERING CONSULTANTS INC	247942	2/20/2021	<a href="mailto:tauec@sbcglobal.net">tauec@sbcglobal.net</a>	16237 W RYERSON RD, NEW BERLIN, WI 53151-3627
WEST CENTRAL ENVIRONMENTAL CONSULTANTS	240960	1/29/2020	<a href="mailto:vanalstj@wcec.com">vanalstj@wcec.com</a>	14 GREEN RIVER ROAD, P.O. BOX 594, MORRIS, MN 56267-0594



# A Fact Sheet of Frequently Asked Questions about Temporary Monitoring Wells

PUB-RR-647

August 2012

Wisconsin Administrative Code chapter NR 141 specifies standards for design, installation, construction, abandonment, and documentation of groundwater monitoring wells. These standards apply to monitoring well networks for site investigation and for remedial action monitoring at contaminated sites. However, s. NR 141.29 states that “temporary wells may be installed according to less stringent standards than specified for permanent groundwater monitoring wells”. This section also requires the Department to approve the construction of temporary wells (TWs) prior to installation and that they be abandoned within 120 days of construction. Temporary wells will vary in their design and the ways in which they do not comply with ch. NR 141. A typical TW design will include a casing diameter smaller than the required minimum of 1.9 inches inside diameter and may be installed without an annular-space seal. (Note that this fact sheet does not address one-time groundwater sampling using direct-push soil borings.)

The circumstances where temporary wells are appropriate for groundwater monitoring include:

- site characteristics that create limitations on the construction of standard wells
- performance of a preliminary assessment, rather than a site investigation;
- the need for short-term groundwater monitoring, such as a part of a rapid site assessment or field screening
- investigation of a potentially sinking plume, (e.g., one or more dense non-aqueous contaminants)
- initial monitoring of a shifting groundwater flow path;
- the need for additional analytical data to supplement or complement an existing data set

Circumstances where the use of TWs is not usually appropriate are:

- closure decisions - Data from TWs should only be used to supplement the data acquired from standard monitoring wells. Only when minor contaminant concentrations do not warrant long-term monitoring might data from TWs be the only justification for a case closure request. (See Q&A #14 in this fact sheet.)
- finer-grained soils
- long-term monitoring

**Cautions:** Temporary wells, such as those installed with driven-point and direct-push methods, may have a valid role in some site investigations and closures, depending on the site conditions. But caution should be used when interpreting the data generated from wells built to standards less stringent than those of ch. NR 141. Technical difficulties can arise involving construction, development, sampling, and abandonment of temporary wells. The questions and answers of this fact sheet are intended to help the reader to evaluate the appropriateness of TW installations and the reliability of data from these wells. **Note that it is not the intent of this fact sheet to encourage the use of temporary wells.**



Wisconsin Department of Natural Resources  
101 S. Webster St., Madison, WI 53702  
[dnr.wi.gov/topic/Brownfields](http://dnr.wi.gov/topic/Brownfields)



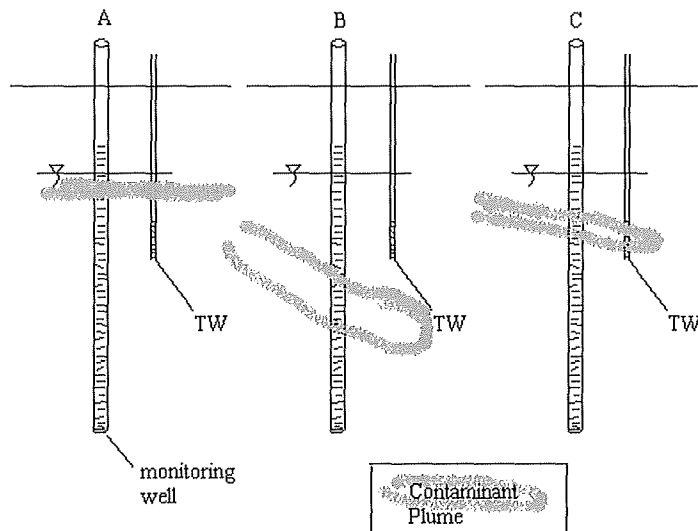
## USE OF TEMPORARY WELLS IN SITE INVESTIGATIONS

### 1. What is the role of temporary wells in defining groundwater contamination in a site investigation (SI) and site clean up for closure?

TWs may be used to both find a groundwater (GW) contaminant plume and to confirm that the extent of a contaminant plume has been defined, either during an initial investigation or in subsequent investigative phases. To illustrate this point, assume that a down-gradient monitoring well (MW) has contaminant levels at or near the ch. NR 140 enforcement standards (ESs). The well may be at the plume edge, but this conclusion must be confirmed. A TW could be installed 20 feet down-gradient from the MW. If no contaminant detections occur in samples from this TW, the extent of the plume has then been defined with increased confidence. However, if the TW sample has a detected contaminant, the installation of another MW may be necessary, based on the professional judgment of the project consultant and the Department project manager, and on the consideration that a TW can yield concentrations both below and above corresponding data from standard monitoring wells.

Generally, the nearer the contaminant concentration in a TW is to the ES, the more likely a MW and follow-up monitoring may be justified. If the TW data include one or more ES exceedances, a MW and follow-up sampling is probably necessary before site closure can be obtained. The same logic holds true when defining the vertical extent of a plume.

Cases have been reported in which GW samples from TWs and direct-push soil borings have no contaminant detections while groundwater from a monitoring well in the same area is contaminated. The following diagrams illustrate several possible explanations for this phenomenon. TWs installed with direct push methods are not effective at consistently monitoring at the water table because of the short screens used with these wells. Figure A illustrates the short screen set below a shallow plume. Figure B shows the short temporary screen above a diving plume. Figure C shows the case where the short screen of the TW intercepts the plume and would produce a sample with a higher contaminant concentration than would a permanent monitoring well where contaminant dilution across a longer screen would occur. This scenario assumes that borehole soil smear and lack of well development do not interfere in the analytical results.



**Figures A, B, C.** Illustrations of reasons why water quality results from permanent and temporary wells may differ.

The absence of a contaminant in a TW does not necessarily rule out contamination because of quality control considerations such as lack of well development or adequacy of sampling techniques. While the same may be true for any monitoring well that complies with ch. NR 141, it is far more likely that the TW installed by direct push methods will not yield data that is representative of actual groundwater conditions. If a TW has one or more ES exceedances, a MW should generally be installed and follow-up sampling performed as part of a thorough site investigation.

TWs are of limited use in defining plume status by the 120-day limit on their use. A TW should not be installed outside of the area into which the plume margin is expected to advance in 120 days, based on groundwater flow system and contaminant transport information known about the site.

**2. Can temporary wells be used for obtaining water table elevations and aquifer characteristics like hydraulic conductivity?**

TWs are more appropriate for measuring hydraulic head and are less appropriate for collecting GW quality data. (The TW screen must intersect the water table to be used to measure the water table elevation.) They are not appropriate for collecting hydraulic conductivity, transmissivity, etc., because TWs cannot be properly constructed or developed and therefore will produce erroneous data when performing slug and similar tests. In addition, the radius of influence would be too small to be meaningful. Even if a well is installed with a filter pack and was developed, it may still not yield representative results.

Note that the usefulness and validity of TWs for obtaining hydraulic head measurements depends on the geologic environment. In environments of high hydraulic conductivity, TWs may function well, but in environments of lower conductivity, the use of TWs becomes dubious. Groundwater in TWs in environments of lower hydraulic conductivities may only reach hydraulic equilibrium with its surroundings after a long period of time, if ever. Surrounding conditions may never be accurately represented. A period of stabilization after installation should be observed before any head measurements are performed for both TWs and standard monitoring wells.

**3. Can TWs be used as piezometers?**

Yes, they can be used as piezometers for collecting hydraulic head measurements and may actually be more accurate than a piezometer that complies with ch. NR 141. The classic definition of a piezometer is a pipe open at the top and bottom (no screen) that measures hydraulic head at a discrete point in the aquifer. A TW typically has a much shorter open interval than most permanent piezometers. Consequently, water level measurements and analytical data from TWs may not be comparable to data from a well with a longer screened interval. Note, however, that deeper installations mean more difficulty with installation of the well and an effective annular seal, and also with abandonment of the well.

**4. Are TWs for measurement of both field and lab parameters?**

TWs are more appropriate for the measurement of non-sensitive field parameter measurements, such as chloride, nitrate, specific conductance, and alkalinity. Concentrations of these parameters are not influenced by subsurface conditions as are those of, for example, volatile organic compounds. However, measurements of these field parameters have more validity in geologic environments with higher hydraulic conductivities. When TWs are used to evaluate other types of contaminants, the results may not be representative of groundwater conditions. In addition, parameter results may only

represent conditions at the well screen in a stratified subsurface environment because of the short screens commonly used with TWs.

### **TEMPORARY WELL CONSTRUCTION AND ABANDONMENT**

5. **Can TWs act as a conduit for downward migration of contaminants if they have no annular space seals?**

Yes, but with the proper equipment, an annular seal can accompany the installation of a TW by direct-push methods. However, the small diameter boreholes do run a higher risk for failure of the seal, even under the best of installation conditions. Since the wells are being placed in a potentially contaminated environment, the boring or well can possibly act as a contaminant conduit. Dual-wall direct-push equipment has a temporary outer casing that reduces this possibility and makes placement of some grout for an annular seal more feasible.

6. **Do DNR requirements contain any minimum construction specifications for temporary wells?**

Although there are no specifications for temporary wells in the Wisconsin Administrative Code, ss. NR 141.27 and NR 141.29 contain a description of constraints that should be considered when installing them. The TW installation method and design, including such details as casing size, pre-packed screens, and annular-space seals, may impose limits on the usefulness and environmental safety of the technology.

7. **Temporary wells may have no security from vandalism and no protection from damage. Can these disadvantages be addressed?**

The installation of protective casing with a lockable cap can be used to prevent vandalism and protect against damage. Security problems are reduced by using TWs in compliance with s. NR 141.29, which limits the use of a TW to 120 days after installation.

8. **Should temporary wells be developed, and can it be done adequately, given that they lack a filter pack?**

Development requires the movement of water in and out of the borehole to remove fine-grained soil particles that become smeared on the sides of the borehole during installation. Removal of these particles increases the hydraulic connection between the surrounding material and the well screen. Consequently, groundwater samples collected from a monitoring well that has been developed may be more representative of groundwater quality in the vicinity of the well, compared to an undeveloped well. Development of TWs may be difficult because of the small well diameter that limits the development procedure and the small amount of water in the well available for development. These are significant disadvantages and are the reasons why sample analytical results from these wells may not be representative of groundwater quality, except those from a geologic environment of high hydraulic conductivities.

An alternative TW development mechanism is jetting the well screen with water under pressure. However, this method has several disadvantages: an administrative code variance must be obtained for the introduction of water into the well; and, a representative sample can be obtained from a jetted



well only after groundwater has completely replaced the introduced jetting water in the well. This process will take place more slowly in environments of lower hydraulic conductivity.

**9. Are there any special considerations in abandoning temporary wells?**

The abandonment of temporary wells can be difficult in some circumstances. There are techniques for addressing these problems, but they take time and money, which can undermine the usefulness of temporary wells as a less expensive alternative to wells that comply with ch. NR 141.

Several considerations should be addressed when abandoning a TW. Where the annular seal is narrow in width or is nonexistent, collapse of the borehole upon removal of the casing is likely. This will make it difficult to get sealing material to the bottom of the hole. Another problem is that standard 3/8" bentonite chips are too large to easily fall down the typical 1" or 1 1/4" well casing and granular bentonite can easily "bridge" in the small diameter casing. The use of a grout will solve this problem. A small diameter well casing can serve as the grout tremie pipe, a conduit for pumping grout into the well from the bottom up to the top. In a low hydraulic conductivity environment, the water in the well is not easily displaced by the grout and should be pumped out first. As an alternative, the well screen can be broken and the casing removed as the grout is pumped. This provides space and a path for the grout to displace the water.

The issue of TW abandonment should be considered before the TW is installed. Temporary wells are often installed in places where access is limited. This can make getting the proper well abandonment equipment to the well difficult.

Well abandonment forms available from the Department must be completed and submitted to the DNR for each well abandoned, as required by s. NR 141.25, Wis. Adm. Code.

### **VALIDITY OF GROUNDWATER QUALITY RESULTS**

**10. Are groundwater quality results from temporary wells reproducible and verifiable? Are the results representative of the surrounding groundwater?**

Research and case studies have produced inconclusive answers to these questions. For example, Kaback et al., (1990) compared the ability of a Hydropunch and 4 adjacent MWs to produce valid groundwater sample data. Results for 2 of the MWs showed excellent correlation with the Hydropunch analytical data. However, results for the other 2 wells showed variation. The reproducibility of results is dependent on the development of the TW and the hydraulic connection between it and the GW system, the hydraulic conductivity of the surrounding geologic environment, and on the sampling protocol. (See the *Groundwater Sampling Desk Reference, 1996.*)

**11. Without a filter pack, temporary wells may yield turbid samples, implying the need for filtering. Is this consistent with current procedures? Is low-flow pumping a viable alternative?**

Filtering is only allowed for metals analyses. Low-flow purging techniques should yield a less turbid and more representative sample compared to purging with a bailer, for example. But, low flow pumping may be difficult in many TW situations, because of constraints such as small diameter well casing (i.e. the pump is too large) or the well is too deep (a peristaltic pump will not function properly).

**12. Can representative groundwater samples be obtained from the bottom of a soil boring installed by the direct-push method?**

Typically, no. The quality of GW samples collected from soil borings may be more compromised than those collected from TWs. This is because of possible turbidity of the sample and the reduced hydraulic connection between the point of sampling in the borehole and the surrounding subsurface environment. Both situations are attributable to the lack of a well screen filter pack.

Note that ch. NR 141, Wis. Adm. Code, is not intended to regulate the sampling of groundwater using direct-push soil borings.

**REGULATORY ISSUES**

**13. Could direct push methods be categorically approved under NR 141? Have any of the methods for installing TWs already been approved?**

The Department has not approved any methods of installing TWs, relying instead on the exception-approval process described in s. NR 141.29 and s. NR 141.31. See #14 below for a discussion on the procedure for approving the use of TWs and on the use of data from unapproved sampling points.

**14. Explain the approval procedure for the use of temporary wells, including who grants the approval and the expected and required level of detail for submitted requests.**

Typically, approval of deviations from the following administrative code requirements for TW installation **is required** (see s. NR 141.29 and s. NR 141.31):

- s. NR 141.07 (casing)
- s. NR 141.19 (borehole diameter)
- s. NR 141.21 (well development)
- s. NR 141.25 (well abandonment)

A TW approval request is submitted, usually by the site owner's consultant, to the DNR project manager or regional hydrogeologist. The TW approval request should include:

- a statement of the reason for the TW approval (cost reduction alone is unlikely to be a valid justification);
- a description of the geologic environment in which the TWs will be installed;
- reference to the administrative code sections that contain monitoring well construction specifications that would not be met by the approved TW; and
- information on the proposed deviations from the code-required specifications (for example, casing, screen, sand-pack, grout).

The approval process does not require the payment of a fee.

Approvals by Department staff may be issued either verbally or in written format prior to the installation of a TW. Verbal approvals should be documented in the site file by a written summary of the approval, including the site name, the date, the contact name and affiliation, and the information submitted as part of the request.

A second approval approach is to issue a consulting company a written approval for the company's standard TW installation and specifications. The consultant would then inform the Department project manager when a TW was installed according to the pre-approved TW specifications. Deviations from the pre-approved specifications would have to be approved either verbally or in writing prior to installation. Department staff should require that the approved installation specifications include the limitation of installations to appropriate geologic environments (for example, those with higher hydraulic conductivities). In addition, a pre-approval should be issued by a DNR project manager and be limited to the project manager's assigned sites. Note that use of consultant design pre-approvals for TWs is not recommended, primarily because pre-approval will eliminate the opportunity for a DNR project manager to evaluate specific site conditions that may necessitate a modification of the consultant's pre-approved TW design.

DNR staff who approve the installation and use of TWs should be aware that the approved TWs will be considered approved alternative monitoring wells constructed in compliance with NR 141, and, consequently, can be used to obtain data to justify closure of a site. (NR 726.05(3)(a)3. contains the requirement that "samples shall be taken from monitoring wells constructed in accordance with ch. NR 141". However, that section also provides that "The department may approve an alternative monitoring program designed to show whether groundwater quality standards have been met.") Therefore, staff should be prepared to consider TW data in site closure requests if Department approval has been given for the TWs. However, staff should use their professional judgement to evaluate the likely validity of groundwater quality results from the approved TWs, based on knowledge of site-specific conditions, in the same way that staff currently evaluates the quality of data from standard monitoring wells. Note that Department staff does not have to consider or accept, in the closure review process, data from temporary wells that have not been approved.

**15. Temporary wells must be abandoned after 120 days as required by NR 141. Is this time period adequate to gather groundwater data and also to prevent these wells from being forgotten?**

Yes, in most cases. The administrative code has two timelines for abandonment. Section NR 141.29 allows the use of a TW for 120 days after installation, and s. NR 141.25(1)(b) requires the abandonment of all monitoring wells within 60 days after use has been discontinued. The time period that expires first defines when the TW must be abandoned. If contamination is evident and verified and must be further defined, then the installation of a permanent monitoring well is warranted.

**TEMPORARY WELL LIMITATIONS**

**16. What are the potential benefits and limitations of temporary wells?**

Benefits: Overall cost savings; lower time and materials costs; less soil cuttings; minimized number of MWs needed and subsequent long-term sampling; optimized placement of MWs; better definition of discrete zones of contamination (properly placed short well screen); a quicker, more detailed site characterization if TWs are used in combination with cone penetrometer testing (CPT); better identification of the aerial extent of contamination that may be missed by conventional MWs (for example, identification of MTBE and other less-retarded contaminants that can migrate faster than the main plume).

Limitations: direct-push technologies (geoprobes, CPT, etc.) may be limited by soil type and depth, and soil and rock "refusal"; smaller sample volumes are collected; TWs generally are difficult to

develop; turbid samples; uncertain quality of analytical results; potentially unrepresentative samples, particularly in soil of lower transmissivity; short screen length may miss contamination; TWs may be incapable of collecting a GW sample near the water table; long sample collection time and increased sample alteration (oxidation and volatilization) in silt and clay formations.

**17. Are temporary wells better suited to some types of soils (in terms of grain-size and extent of heterogeneity) than others?**

Yes; they are much better suited to geologic environments with greater homogeneity and courser grain size with attendant higher hydraulic conductivities.

**18. Given their limitations, how can temporary wells be used to facilitate rapid site assessment?**

See Q&A #1 in this document and refer to the *Groundwater Sampling Desk Reference*, pp. 2 – 6.

**REFERENCES**

Kabeck, D.S., C.L. Bergen, C.A. Carlson, and C.P. Carlson. 1990. Testing a Groundwater Sampling Tool: Are the Samples Representative? *Ground Water Management 2*: 403-417 (4<sup>th</sup> National Outdoor Action Conference)

Karklins, Steve. *Groundwater Sampling Desk Reference*. Wisconsin Department of Natural Resources PUBL-DG-037 96, September 1996

This document contains information about certain state statutes and administrative rules but does not necessarily include all of the details found in the statutes and rules. Readers should consult the actual language of the statutes and rules to answer specific questions.

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Wisconsin Department of Natural Resources  
ACCESS PERMISSION AGREEMENT

BRRTS# 03-37-219504  
PECFA# 54471-9771-45

I, \_\_\_\_\_ hereby give my permission to the Wisconsin Department of Natural Resources (“the department”) and its employees, duly authorized representatives, agents and contractors, to enter upon and have access at reasonable times to property located at R15345 2<sup>nd</sup> Ave, Ringle within Marathon County, Wisconsin, referred to herein as the “Property”, and that is owned by Mary Bogen to perform a limited scope of work , so that the department may:

- collect samples from groundwater wells installed on my property, as appropriate; and
- properly abandon the groundwater monitoring wells installed after sampling is complete.

The department is responsible for any investigative waste that is produced by these activities and will return to collect any investigative waste that may be temporarily stored on the Property.

The permission that is granted herein to perform the limited scope of work defined above shall remain in effect until December 31, 2020 when the work is expected to be complete. If an extension is necessary to complete the work, the department will inform you in writing. If the owner of the Property wishes to withdraw permission for continued access before December 31, 2020, the owner of the Property shall notify the department of that fact in writing. The department shall, within 90 days after receiving such notice, finalize well abandonment. If access is denied, the department may attempt to obtain access through a special inspection warrant if well abandonment cannot be finalized.

The department has authority to enter into this access permission agreement at the Property described above under Wis. Stat. § 292.31 (3) and by the signature of the Property owner.

If the department collects samples from the groundwater wells prior to abandonment, the department will report all sampling results to the owner of the Property, and occupants as appropriate, within 10 business days of receiving the sampling results.

Property owner certifications

*Please mark the box to indicate that you understand and agree to the following information.*

- As the owner of the Property, I, \_\_\_\_\_, hereby agree not to damage or interfere with sampling and well abandonment activities and the use of any monitoring wells installed on my Property as permitted herein, and I agree to notify third parties who plan to conduct any activity on the property described above that monitoring wells are

installed on the Property. I understand that I am responsible for any damage to monitoring wells if I cause that damage.

- As the owner of the Property, I, \_\_\_\_\_ understand that the department, in the course of conducting the actions described above, may find that an additional hazardous substance discharge or environmental pollution may exist on the Property. If this occurs, these findings must be reported to the department per Wis. Stat. § 292.11 (2) and Wis. Admin. Code NR 706.05.

If the department discovers a hazardous substance discharge or environmental pollution on the Property that has not already been reported to the department, any current owner of this Property, along with any identifiable causer of the contamination, may be required to take additional response actions pursuant to Wis. Stat. § 292.11 (3) and Wis. Admin. Code chs. NR 700 to 754.

### Entry notification

The department or the department's contractor shall notify the owner of the Property by telephone or email of any planned activity on the Property at least 48 hours in advance of entering the Property.

IN WITNESS WHEREOF:

\_\_\_\_\_  
Signature of Property Owner or Authorized Representative

\_\_\_\_\_  
Date

\_\_\_\_\_  
Mailing Address

\_\_\_\_\_  
Area Code Telephone Number

\_\_\_\_\_  
Email Address

Please provide contact information for occupants, tenants, or lessees, if different than owner:

\_\_\_\_\_  
Name of Occupant(s)

\_\_\_\_\_  
Area Code and Telephone Number(s)

\_\_\_\_\_  
Email Address(es)