STATE OF CONNECTICUT

DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION

WATER SUPPLY WELL RECEPTOR SURVEY

GUIDANCE DOCUMENT

Bureau of Water Protection and Land Reuse
Remediation Division

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The Connecticut Department of Energy and Environmental Protection (CTDEEP) has developed this guidance document, with support from the Environmental Professionals' Organization of Connecticut. Persons who are required to investigate and remediate polluted or potentially polluted sites must consider the need to conduct a detailed water supply well receptor survey in order to assess whether an on-site groundwater pollution plume may, or can be reasonably expected to, adversely affect water supply wells on and off-site.

The purpose of this document is to provide guidance to Certifying Parties, responsible parties, property owners, and/or environmental professionals about the circumstances under which such a receptor survey is warranted, where such a survey is necessary, and how to conduct such a survey.

1.0 WATER SUPPLY WELL RECEPTOR SURVEY RATIONALE

Persons required to investigate properties and remediate releases of contamination must be aware of the location of water supply wells in proximity to a release or threat of a release that has the potential to impact groundwater quality.

The Connecticut General Statutes (CGS) and Regulations of Connecticut State Agencies (RCSA) require an understanding of the location of water supply wells in proximity to a known release, as indicated in the following statutes:

1.1 The Significant Environmental Hazard Notification (SEHN) statute (CGS section 22a-6u) requires Technical Environmental Professionals (TEPs), including Licensed Environmental Professionals (LEPs), clients of TEPs, and/or property owners to report certain pollution conditions to the owner of the property and/or CTDEEP, depending on the nature of the release and its proximity to water supply wells.

1.2 The Property Transfer and Voluntary Remediation statutes, as well as state and federal RCRA Corrective Action laws, require remediation of releases to the environment in accordance with the Remediation Standard Regulations (RSRs), RCSA section 22a-133k-1 through 3. Remediation of releases at a subject property must achieve specific soil and groundwater cleanup standards. The decision as to which standards apply hinge not only on groundwater classification but also on the actual use of the groundwater. Hence, the person responsible for investigation and remediation must have an understanding of the location and nature of water supply wells in proximity to a known release.

For instance, water supply wells for domestic or other purposes (industrial or agricultural) can exist in areas that have a GB or GC groundwater classification, or in areas that are generally served by municipal/private water service lines. Due to varying local regulatory requirements concerning mandatory tie-in provisions when public water mains are available,

development history, and potential inconsistencies in databases, it cannot be assumed that private or public water supply wells are not in use at properties located within GB or GC groundwater classification areas, or in GA classification areas where public water is available. In the case of industrial use, even though the water is deemed non-domestic, there is the potential that the water may be consumed, accidentally or otherwise, thereby posing a risk to human health.

1.3 The Property Transfer, Voluntary Remediation and RCRA Corrective Action statutes require investigation of subject properties or establishments, as applicable, in accordance with prevailing standards and guidelines. In accordance with CTDEEP's 2007 Site Characterization Guidance Document (SCGD), the cultural environmental setting of a subject property must be determined (SCGD Section 3.2.5) at the outset of site characterization during the Phase I Environmental Site Assessment. The cultural setting includes, but is not limited to, information pertaining to public and private water use.

1.4 The Property Transfer and Voluntary Remediation statutes require the submittal of an Environmental Condition Assessment Form (ECAF) at the time of property or business transfer and at the time of entrance into the program, respectively. The information presented in the ECAF[1] regarding the known or potential for short-term risk to human health and reportable conditions are key elements in CTDEEP's decision-making process for oversight of investigation and remediation.

1.5 Pursuant to the Underground Storage Tank Petroleum Cleanup Account laws, C.G.S. Section 22a-449(p), achievement of Milestones, specifically Milestones #2 and #3, requires knowledge of drinking water wells that may be affected by a release.

1.6 RCSA section 22a-133v-6(d)(1) of the LEP Regulations, require that, at all times, LEPs hold paramount human health and the environment. Consequently, LEPs must have an understanding of the location of water supply wells in proximity to a known release.

2.0 WHEN TO CONDUCT A WATER SUPPLY WELL RECEPTOR SURVEY

A water supply well receptor survey should be conducted whenever information is available which indicates the potential for off-site migration of groundwater contamination. A few specific examples include, but are not limited to the following:

2.1 Regardless of any other timeframe listed below and the groundwater classification, if at any time during the site investigation the conceptual site model (CSM) developed in accordance with the SCGD indicates an existing groundwater plume migrating off-site or the potential for polluted groundwater to migrate off-site, a water supply well receptor survey completed in accordance with this guidance is to be conducted.

[1] Revised ECAF dated June 1, 2009

2.2 A water supply well receptor survey is expected to be conducted at Property Transfer sites within 75 days after the date of CTDEEP's "Acknowledgement Letter" when information, including the CSM available at the time of ECAF submittal, indicates the potential for off-site migration of groundwater contamination.

2.3 A water supply well receptor survey is expected to be conducted at RCRA Corrective Action and the Voluntary Remediation Program sites within 75 days of ECAF submittal when the CSM or other information available at that time indicates the potential for off-site migration of groundwater contamination.

2.4 A water supply well receptor survey is expected to be conducted for SEHN conditions when contamination is detected in a water supply well (above or below an acceptable standard) or when contaminated groundwater is within 500 feet of a water supply well (threatened water supply wells). The survey must be completed within the SEHN timeframe. A SEHN is required pursuant to CGS section 22a-6u, regardless of any other CTDEEP action and involvement, with the one exception of a CTDEEP-issued administrative order.

2.5 Subsection GW8-(A), of the Application to Lower Groundwater Quality Classifications to Class GB, as provided for in the Water Quality Standards, requires among other things, that all sources of drinking water within 500 feet of the re-class boundary, including the area whose groundwater is proposed to be reclassified, must be identified. In addition, all existing uses of groundwater within and downgradient of such areas must be identified.

3.0 WELL RECEPTOR SURVEY RADIUS AND EXTENT

CTDEEP considers 500 feet as a minimum radius for which the presence of private or public water supply wells needs to be identified and potentially tested for constituents of concern (COCs). The 500-foot radius is based on the following typical Connecticut scenario:

- The source area for a bedrock well pumping 3-5 gallons per minute would be expected to be greater than 500 feet radially, given certain conservative hydrogeologic assumptions about the porosity of the fractured crystalline bedrock in Connecticut into which wells are installed. This distance was calculated based on the following equation:

  Radius = $\sqrt{aQT/\pi nH}$, where

  a = 0.133681 ft^3/gal, Cubic feet to gallons conversion factor
  Q = Pumping rate of the well (gallons per minute)
  T = 259,200 minutes, (assumed value, equivalent to 180 days)
  π = 3.1415926
  n = Porosity (expressed as decimal. i.e.: For fractured crystalline bedrock, n= 0.0022)
  H = Saturated Thickness (feet)

In addition, CTDEEP will default to the property line as a minimum focus point of the survey radius, unless otherwise specified by statute or regulation. In some instances, expanding the survey radius to greater than 500 feet may be appropriate. Examples of conditions that may dictate a search radius greater than 500 feet include, but are not limited to:

- a pumping well outside the 500-foot radius that is potentially drawing the contaminated plume in a different direction than would be expected during non-pumping conditions;
- a plume is known or suspected to have migrated more than 500 feet;
- fractured bedrock or utility conduit that may serve as a preferential pathway for contaminant migration;
- highly permeable zones extending beyond 500 feet; or,
- hydrogeologic characterization or plume delineation that is not well understood, especially if water supply wells are potentially present.

4.0 TOOLS FOR CONDUCTING A WATER SUPPLY WELL RECEPTOR SURVEY

The following resources may provide useful information regarding the potential presence of water supply wells in Connecticut. However, they should not be considered all inclusive. Part of the evaluation should consider the limitations of the information sources. Supplemental investigations will likely be needed to fill the data gaps inherent in these resources. Ultimately, a door-to-door survey may be the only way to verify the presence or absence of a water supply well.

- Water Quality Classification Maps of Connecticut define the groundwater classification for the area and zones of influence. However, private wells may exist in GB and GC groundwater classification areas, or in GA areas supplied with public water.
- CTDEEP's Atlas of the Public Water Supply Sources & Drainage Basin of Connecticut, June 1982 (DEP Bulletin No. 4). This publication is presently out of print, but copies are available for review at the CTDEEP Bookstore. Information in this volume should be considered as a guide, as it is outdated.
- Hydrogeologic Data reports published in conjunction with the Water Resources Bulletins for each of the ten major river basins in the state. Most of these publications are available for purchase at the CTDEEP Bookstore. However, some are out of print and are only available for review at the CTDEEP Bookstore.
- Water well completion reports available at the 1) Department of Consumer Protection, 365 Capital Avenue, Hartford, CT; 2) local health departments and health districts; and 3) the File Room 79 Elm Street, Hartford, Connecticut, which are generally listed chronologically by year and then by town.

- Site plans are available at local health, building and planning departments and may depict the location(s) of drinking water well(s).

- The Department of Public Health (DPH) Drinking Water Section maintains a web site (http://www.ct.gov/dph) of public drinking water supplies including community and non-community systems. In order to access the database, select "Environmental Health" from the main menu on the left side of the page and then select "Public Drinking Water" from the list of topics. Select Public Water System Classifications and Inventory from the list of topics under Public Water Systems, which leads to the Contact Information section excel spreadsheet that includes information on registered public systems in the State. The DPH has shared their web site with the chief elected officials for all municipalities in the State. Therefore, the LEP, TEP or property owner, when complying with the SEHN requirements of CGS section 22a-6u, may also contact the office of the chief elected official for the town or city in which they are working.

- The water utility company may be contacted directly to assess water service connection and water use billing records. Most water utility companies have a system for screening individuals who are seeking information about their respective water supply systems. In some instances, the water utility company can provide a list of addresses in a particular area that are connected to the public water supply. The environmental professional should understand that a water supply well may still be in use at a property connected to the public water supply.

- Regardless of how a particular piece of property is zoned (residential, commercial or industrial), the town or city assessor's cards generally contain information regarding whether the property is served by public or private water. Many Connecticut towns and cities have made this information readily available on their assessor's website page.

- The CTDEEP publishes a list of SEHNs. Consulting this database may identify areas where water supply well inventories have already been conducted. This database is available on the CTDEEP website www.ct.gov/deep/remediation.

- A door-to-door survey is necessary to assess properties where water supply information has not been confirmed or is not available. Mailings may be distributed to inquire as to the presence of water supply wells followed by personal contact if no response is received. Certified, 'return-receipt requested' is suggested for documenting the completion of the search. These mailings should be sent to the property owner, and in case of rented or tenant-occupied dwellings, the property owner should be advised that he or she has an obligation under CGS section 47a-7 and section 47a-52 for supplying tenants with a potable supply of drinking water.

- The CTDEEP website www.ct.gov/deep/aquiferprotection provides maps identifying aquifer protection areas in Connecticut.

5.0 RATIONALE FOR SAMPLING WATER SUPPLY WELLS

The decision to sample a water supply well identified within the search radius should be based on the environmental professional's CSM, including but not limited to, the nature of the release, knowledge of the hydrogeology, and appropriate seasonal and dimensional understanding of the hydrology and contaminant plume(s). In making such decisions, the LEP should identify whether a potential **short-term** risk to human health exists, and the risk to human health involved if the CSM is not valid. CTDEEP may be contacted (860/424-3705) for additional guidance regarding the necessity of sampling a water supply well(s).

When sampling a water supply well, the sample acquisition points relative to any treatment system should be considered and documented. At a minimum, a raw (untreated) water sample and a sample representing water used for direct human consumption should be analyzed.

All water samples collected from private and public water supply wells must be analyzed by a laboratory that is certified by the DPH's Laboratory Division and approved by DPH for the specific analysis requested. In addition, the water samples must be analyzed using the appropriate analytical method for drinking water as prescribed by the US EPA and consistent with those analytical methods used under the Safe Drinking Water Act. For example, when analyzing for the presence of aromatic and chlorinated volatile organic compounds, US EPA Test Method 524.2 should be used. The LEP is required to assess the validity and usability of the laboratory data in accordance with CTDEEP's Quality Assurance and Quality Control Guidance (QA/QC). The guidance is available on the CTDEEP website www.ct.gov/deep/remediation.

There may be instances where the offer to sample a water supply well is refused by the property owner. In such instances, it is recommended that the environmental professional, especially in cases regarding SEHNs, provide follow-up written documentation to the well owner confirming their refusal to be sampled. That correspondence should be sent certified via U.S. Mail with return receipt requested to the property owner and a copy of the correspondence should also be provided to the local director of health and CTDEEP Remediation Division. The local director of health should also be informed if the property status is not owner-occupied (rented or leased).

If an environmental professional identifies an inactive or improperly abandoned water supply well or an industrial water or other non-potable supply well as a result of the survey, the environmental professional should determine if there is any opportunity for someone to consume water from the well or for the well to be connected to a distribution system, accidentally or otherwise. If either of these possibilities exists, and the well is accessible for sampling purposes, the well should be sampled.

When a water supply well has been determined to be polluted, prompt steps should be taken to resample the well(s) to confirm the findings. If a water supply well is determined to be polluted or threatened, the LEP, TEP, and applicable property owner should evaluate his or her obligations under CGS section 22a-6u. At all times, the LEP must evaluate his or her responsibilities under RCSA sections 22a-133v-1 through 6 of the LEP Regulations, to hold paramount, the health, safety, and welfare of the public and the environment.

6.0 REPORTING

Documentation of a completed water supply well receptor survey should be submitted to the Remediation Division of the Bureau of Water Protection and Land Reuse in the form of a Water Supply Well Receptor Survey Report. This report must be a clear, concise, and logical presentation of the purpose of the survey, rationale for the extent of the survey, findings of the survey, any determinations of existing or potential risks to water supply wells, and recommended future actions, if applicable. The water supply well receptor survey report should include, but not be limited to, the following elements:

- An introduction stating the reason, objective and scope of the receptor survey;
- A discussion of the statutory or regulatory program under which the receptor survey was conducted, who the survey was completed on behalf of, and who conducted the survey;
- A summary of the environmental setting;
- A discussion of the resources used to identify water supply well receptors;
- A presentation of the findings of the survey, including, but not limited to a scaled map (tax assessor, Sanborn, or equally detailed map) depicting radius of survey, parcels, water supply well locations and addresses; information regarding the construction of the well, if available; and the hydrologic connection to the site;
- A discussion of the environmental professional's determination of risk to human health resulting from polluted groundwater;
- A presentation of all laboratory analytical results of all water supply well sampling conducted; and
- A brief discussion of any additional work related to impacted or potentially impacted water supply wells.