FACTORS TO BE CONSIDERED WHEN DEVELOPING A GROUNDWATER USE RESTRICTION ORDINANCE TO SERVE AS AN INSTITUTIONAL CONTROL ORDER UNDER PART 201 AND/OR PART 213

INTRODUCTION

Part 201, Environmental Remediation, and Part 213, Leaking Underground Storage Tanks, of the Natural Resources and Environmental Protection Act (NREPA), 1994 PA 451, as amended, and the Part 201 Administrative Rules, allow for remedial action plans (RAPs), interim responses designed to meet criteria (IRDC), and corrective action plans (CAPs) that rely on institutional controls (ICs) to restrict exposure to hazardous substances. A local ordinance (LO) is one form of IC. The hazardous substance exposure most commonly controlled through LO is groundwater ingestion, i.e. use of groundwater for drinking water. This document deals with groundwater use restrictions, focusing on drinking water uses, and does not cover the entire range of exposure controls that could be accomplished by IC.

This document and the accompanying checklist (Attachment A) have been prepared by the Department of Environmental Quality (DEQ) to assist two audiences:

- Persons preparing or reviewing a RAP, IRDC, or CAP
- Local units of government (LUGs) that are considering enactment of ordinances that restrict groundwater use

These documents are not a comprehensive list of all elements or issues that may need to be addressed on a site-specific basis in a RAP, IRDC, or CAP, but rather, are intended to be a guide for ensuring that RAPs, IRDCs, and CAPs that include an LO will reliably restrict exposure to hazardous substances. With regard to actions being considered by LUGs, this document and the checklist are intended to raise issues that should be thoroughly considered in formulating an ordinance in order to assure that the ordinance meets its objectives and does not have unintended consequences.

The accompanying checklist is used by DEQ staff in reviewing groundwater use restriction ordinances that are proposed as ICs. The checklist is provided to persons preparing RAPs, IRDCs, and CAPs, and to LUGs to assist them in understanding the factors considered by the DEQ in determining if an LO is adequate.

It is the responsibility of the person seeking approval of any IC, including an LO, to provide sufficient information to the DEQ for the department to determine if the IC is adequate.

General Considerations

The DEQ does not encourage or discourage LUGs to enact an ordinance as an institutional control (unless the DEQ is conducting a cleanup, in which case it may approach a LUG). It is up to the community to determine if enacting a groundwater use restriction ordinance is in its best interests. A LUG that is considering an LO, or has been asked by a person conducting a cleanup to enact an LO, is encouraged to contact the appropriate DEQ Division as early in the process as possible to facilitate communication about the issues involved with LO development.

The DEQ will not review an LO proposed by a person conducting a cleanup unless the LUG is involved in the review process.

The DEQ can only recognize an LO as "acceptable" in the context of a specific RAP, IRDC, or CAP. Before the DEQ can approve an LO or other IC, it must make a finding that it is impractical to accomplish the necessary use restrictions through restrictive covenants. The person proposing an IC to the DEQ must generally document what efforts have been made to secure the necessary restrictive covenants, including offers of reasonable compensation to the affected property owners. The DEQ will review this information to determine if it is impractical to secure deed restrictions. In a case where a large number of properties is affected (e.g., more than 20), the DEQ will not require that the liable party contact each property owner before seeking approval of an IC.

If the DEQ has determined that the impracticality test has been met, Parts 201 and 213 require the department to determine, on a facility-by-facility basis, whether an LO is reliable and effective in controlling exposure to groundwater at a particular location. The DEQ will determine whether the ordinance is effective in eliminating unacceptable risks in each relevant exposure pathway, depending on the concentration of hazardous substances present in the groundwater, the different ways that exposure to those contaminants may occur, and the scope of restrictions in the ordinance. A risk or exposure is unacceptable if an actual or reasonably foreseeable future exposure to hazardous substances will occur at concentrations exceeding applicable criteria. If there are unacceptable exposures that are not adequately controlled by the LO, the RAP, IRDC, or CAP must provide for other means of eliminating the unacceptable exposures. When the DEQ undertakes a review of a draft ordinance prior to a full analysis of all of the various exposure control options available under Parts 201 and 213, that review should not be taken as an indication that using an IC has already been chosen as the preferred remedy at any particular facility.

Technical Considerations

The area covered by the ordinance must be clearly delineated, in both vertical and horizontal dimensions. In cases where there is more than one water-bearing formation under the property, the ordinance must indicate whether all or only certain formations are covered by the restriction(s). When making that decision, consideration should be given to the importance of the unimpacted aquifer(s) (i.e. is an aquifer the community's only source of water for its municipal supply?) and the likelihood that the unimpacted aquifer may be contaminated by drilling through the contaminated aquifer to install a well in a deeper, uncontaminated aquifer. There are well construction techniques that can prevent this type of cross-contamination from occurring, but the ability of a LUG to effectively oversee these drilling activities to assure that these techniques are properly carried out should be factored into its decision about how extensively to apply restrictions under the ordinance.

The area covered by the ordinance must consider contaminant migration and the influence and potential exposures related to nearby water withdrawals. The restricted area must include the current plume, the anticipated area of plume expansion (if applicable), and often may require a buffer zone. The size of the buffer zone will be determined by the DEQ on a facility-specific basis using professional judgment and considering the rate of groundwater movement, the concentration gradients in the plume, uncertainties in facility characterization, and the potential exposure that could occur under various withdrawal scenarios. There may be situations where more than one buffer zone boundary will need to be established at a facility. This can occur when there is the potential for more than one pumping rate or withdrawal volume to be applied to the aquifer. The DEQ views a buffer zone as necessary in most cases to assure reliable restriction of unacceptable exposures, since there is some degree of uncertainty associated with most site characterization work. If fate and transport models are used to predict migration, sufficient environmental monitoring must be conducted to confirm the validity of those predictions.

The area covered by use restrictions must be identified on a map of appropriate scale, and be based on reproducible, unambiguous boundaries. The map must be part of the ordinance. However, if LO restrictions apply throughout an entire jurisdiction (e.g. city), a map is not required.

The current and potential uses of groundwater being restricted must be clearly identified. This is most effectively done by identifying both prohibited uses and allowable uses. The DEQ's experience has shown that a total prohibition on groundwater use is seldom practical. This is more true as the size of the restricted area increases. At a minimum, exceptions that allow for groundwater monitoring wells must be provided. Exceptions to allow for construction dewatering wells and wells used for nonconsumptive purposes such as irrigation

are often prudent, provided that these wells do not result in the exacerbation of the contaminant plume. Exceptions for dewatering wells must be conditioned on the proper handling and disposal of the water that is removed. It is helpful for prohibited and allowed uses to be reviewed in relation to the exposure pathways that are considered under Parts 201 and 213 (e.g., ingestion, dermal contact, etc.).

A large number of exceptions, and exceptions that have a high potential for exposures or that require a large degree of geological review, should be avoided. Exceptions that require a significant hydro geological review should also contain a process and identify resources for developing that information. Ordinances should be crafted to minimize the number of exceptions that rely on future determination that will need to be made. Allowing for a significant number of potential future determinations decreases the reliability and effectiveness of the ordinance and may prohibit approval of the ordinance as an exposure control. The burden for future determinations, if it is necessary to include any, should be placed on an entity that is qualified to make the necessary technical judgments and who will be objective (e.g. an environmental consulting firm engaged by the village). The firm should be required to provide and maintain documentation of their qualifications.

When reviewing the uses of groundwater that are allowable under a proposed LO, the DEQ will consider whether those uses may render the LO ineffective in controlling exposure, and whether those uses could affect the plume in a way that makes it reasonably possible to predict plume behavior over time. Certain uses, such as agricultural or golf course irrigation or large volume cooling water withdrawals, make it more difficult to predict the future of a groundwater contaminant plume. While the DEQ may accept an LO even if all potential exacerbating uses are not prohibited, local officials should consider the consequence of groundwater contamination on other activities, even if those activities will not result in exposure to the contaminated groundwater. For example, a plume that is allowed to remain in place under an LO may be affected by a golf course irrigation well or industrial cooling water well that is located outside the area where drinking water uses are prohibited. The person who operates that well may be liable for costs of exacerbating the groundwater contamination or for damages under common law. Local officials must balance the needs of all groundwater users in an area when considering groundwater use restrictions, even in a limited area.

The accompanying checklist includes a number of groundwater uses and activities that can result in exposure to groundwater. These lists of uses and activities may not be comprehensive, but should be useful to persons considering the utility of an LO for a given area.

Legal Considerations

The ordinance must include a statement indicating that its purpose is to protect the public health, safety, and welfare, and that the ordinance has been enacted, in part, as a response to groundwater contamination. It may be advisable for the LUG to develop and maintain an administrative record documenting how the restrictions relate to the protection of health, safety, and welfare in case the legality of the ordinance is subsequently challenged.

The community, through its appropriate governing body, must officially certify that the ordinance has been properly adopted according to the local government's own procedures. This includes authority, public notice requirements, etc. The DEQ will rely upon the certification unless there are obvious deficiencies in procedure or authority.

Information must be provided to explain how compliance with the ordinance will be monitored and enforced. Simply having an ordinance is not sufficient. It must be effectively enforced. The DEQ will rely on the representation of the local governing body that compliance with the ordinance will be monitored and effectively enforced, unless information to the contrary is brought to the attention of the DEQ. The LO must specify who has enforcement authority and the enforcement tools available to assure compliance with the LO.

Part 201 requires that an ordinance be "published and maintained in the same manner as a zoning ordinance." This must be confirmed in writing by an appropriate local official (e.g. clerk's office). The concern to be addressed is that the public have sufficient access to the ordinance to know whether property they own or occupy (or that they are considering acquiring) is affected by it. In addition, the reliability of the ordinance will often hinge on the acceptability and level of awareness of those persons whose property is affected by the groundwater use restriction. For this reason, the DEQ requires that in addition to the LUG following its zoning ordinance process, all owners of parcels of land included in the use restriction area be notified of the proposed groundwater restriction, either by the party requesting the restriction or through the ordinance enacting process. Part 213 has a statutory requirement that the ordinance be filed with the register of deed as an ordinance affecting multiple properties.

Under both Part 201 and Part 213, the ordinance must state that the community will notify the DEQ at least thirty (30) days prior to modifying or revoking the ordinance or allowing it to lapse (e.g. under "sunset" provisions). This notice should be provided by registered mail to the Director of the DEQ. Revocation or significant modification of an ordinance that is being relied upon to impose necessary use restrictions in a DEQ-approved RAP, IRDC, or CAP would immediately invalidate our Department's approval of the RAP, IRDC, or CAP.

Additional response activity may be required of the person whose RAP, IRDC, or CAP relied on the LO.

Example Scenarios

A LUG may be developing a groundwater use restriction ordinance in one of three situations:

1. To address known groundwater contamination in a specific, well defined area. In this case, data from a draft RAP, IRDC, or CAP may be used to define the area where use restrictions are required.

2. To address one or more specific known sites, but also to impose restrictions in anticipation of the need for control on the use of groundwater in a larger area. The RAP(s)/IRDC(s)/CAP(s) may be available to define part of the need, but the larger area potentially needing use control may not be well defined.

3. To deal with general, area-wide groundwater contamination problems, none or few of which are well defined. This approach may be desirable to a community that wishes to, and is able to, make presumptive decisions. Each RAP, IRDC, or CAP still requires DEQ approval if it relies on an LO that is enacted to address a large area.

Consider two examples:

First, consider a RAP that provides the following information. Groundwater at the facility is known to be contaminated with benzene at up to 25 parts per billion (ppb) in an area 800' wide and 2500' long. The plume is stable and will not expand in the future. Soil contamination has been reduced to acceptable levels in all areas of the facility. There is only one aquifer at the site. A survey was conducted of all property owners and occupants in the area of the plume to confirm that no groundwater use is occurring (no drinking water wells, no irrigation wells, and no commercial or industrial supply wells). Municipal water is used by all homes and businesses in the area of the plume. An LO prohibits the use of groundwater for drinking water wells. In this case, the LO would be an acceptable exposure control, since the only exposure pathway that would have an unacceptable risk from benzene at 25 ppb is ingestion (drinking water).

In contrast, consider the same facility, but assume benzene concentrations are up to 25,000 ppb in groundwater in a portion of the plume, and that the plume is expected to stabilize with concentrations as high as 10,000 ppb in an area 400' by 750', however, the exact distribution of benzene concentration in the stabilized plume cannot be precisely determined. Again, an LO prohibits drinking and other domestic uses. This ordinance alone is not sufficient to control potential unacceptable exposures, since the existing and projected benzene

concentrations pose unacceptable risks via inhalation of vapors in basements, through direct contact with groundwater, and as a result of venting into a very small stream adjacent to the facility. Therefore, approval of a RAP, IRDC, or CAP for this facility must include other exposure controls in addition to the LO.

June 8, 2006

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Checklist for Local Ordinance to Restrict Groundwater Use
(Part 201 & 213 of the NREPA)

Section 20120b(5) of the Natural Resources and Environmental Protection Act (NREPA) allows the Department to approve of an institutional control in lieu of restrictive covenants as a mechanism for restricting unacceptable exposures under certain conditions in conjunction with a Remedial Action Plan (RAP) under Part 201. Similarly, Section 21310(a)(3) of the NREPA allows for institutional controls as part of a Corrective Action Plan (CAP) prepared under Part 213. The most common form of institutional control proposed is an local ordinance (LO) or regulation enacted by a local unit of government (LUG) to restrict groundwater use. This checklist will assist staff in reviewing the adequacy of an LO that is proposed as an institutional control under Part 201 and/or Part 213. This checklist allows staff to evaluate whether a groundwater use restriction ordinance reliably controls unacceptable exposures and whether the ordinance complies with the specific requirements of Section 20120b(5) and/or Section 21310(a)(3). Institutional controls must be approved in relation to a specific RAP, CAP or interim response activity. Approval of an institutional control for one facility does not assure that it is adequate for other facilities in the same jurisdiction.

Facility name _____

LO Name/Title _____

LO Date/version number _____

LO draft ☐ or existing ordinance ☐

Checklist completed by _____

Date of review _____

SCOPE OF RESTRICTIONS

It is necessary to determine whether the proposed LO adequately restricts exposures in pathways that are relevant to the facility, and where hazardous substance concentrations exceed DEQ-established residential risk-based criteria. If criteria are exceeded in a relevant exposure pathway that is not addressed by the proposed LO, exposures in that pathway must be reliably restricted by some other means (e.g., unacceptable indoor air inhalation risks from contaminants in groundwater controlled by a restrictive covenant that prohibits construction or requires special construction techniques). An ordinance may allow for some uses of groundwater and still be an adequate institutional control. The allowable uses need to be evaluated in light of the criteria that are now, or are expected in the future to be, exeeded. Exceptions for the use of certain wells are necessary (e.g., monitoring wells that are part of response activity) and some may prudent in order for the LO to be practical to implement (e.g., construction dewatering).

1. Briefly describe the means by which exposures will be controlled in the proposed LO (e.g., all wells prohibited, new wells require permit, use of all wells prohibited with specific exceptions, etc.)

2. Which exposure pathways and uses will be prohibited by the proposed LO? (note yes or no in each column for each pathway and use). Consider residential, commercial, industrial, agricultural and other uses of the water resource.

	Existing wells	New wells	Notes
Drinking water ingestion			
Indoor air inhalation			
Groundwater contact			
Irrigation			
Construction dewatering (allowable only if water is contained and removed or permit is obtained)			
Monitoring wells			
Heat pumps			
Use of wells determined to have no impact on plume (process for determination must be acceptable)			
Use of wells for "public emergency" (must be defined, must include notice to DEQ of emergency)			
Other			
Other			
Other			

3. Are restrictions applicable to all groundwater in the area covered by the proposed LO? If not, describe exceptions (applicable only to shallow aquifer but not to deep aquifer) and whether those exceptions may result in unacceptable exposures, possible cross-contamination between saturated zones, etc.

   If restrictions do not apply to all aquifers in the are covered by the proposed LO, describe any special well construction techniques required for new wells that would be allowed, and whether those restrictions appear adequate.

AREA COVERED BY PROPOSED LO

1. Describe the area covered by the proposed LO (e.g., plume plus buffer zone for XYZ Facility, entire county, etc.)

   _____

2. Does this area cover the current extent of groundwater contamination at levels exceeding criteria of concern, plus the anticipated extent of expansion of the plume, if any, along with a buffer zone? (A buffer zone may be required to account for uncertainties in plume definition and migration.)

	Yes	No	Not applicable
Current plume	☐	☐	☐
Anticpated expansion	☐	☐	☐
Buffer zone	☐	☐	☐

3. The ordinance must include a scaled map of the area groundwater use restrictions are proposed, unless the entire jurisdiction will be restricted, or unless the restricted area is described by some other boundary that is unambiguous without a map to delineate the restricted area (e.g., all of Oak City west of the Blue River).

   Map necessary? ☐
   Scaled map provided? ☐

EXISTING WELLS AND WELLHEAD PROTECTION ZONES

1. Are there any existing wells in the area where use restrictions are required which may pose an unacceptable risk? This information must be confirmed by consultation with the local water utility, if any, to determine where municipal water is being used, and/or by a door-to-door survey to confirm the presence of wells.

   Yes ☐ No ☐

   If no, describe the documentation that demonstrates, and the basis for concluding that, there are no existing wells of concern.

   _____

   If yes, describe plans, if any, to eliminate these wells.

_____

2. Is there a well-head protection zone in or near the area of the plume?

   Yes ☐ No ☐

If yes, describe. If the plume threatens the municipal water supply, a no-action alternative to address groundwater is not acceptable.

3. Are there any other existing wells in or near the area requiring use restriction which may affect the groundwater contamination plume in a way that would render the LO ineffective (e.g., high volume irrigation or cooling water wells)? Describe any provisions of the proposed LO that may be relevant to these wells.

GENERAL ORDIANCE PROVISIONS

1. Note whether the following provisions are included in the proposed LO. *If any that are noted "required" are missing, the proposed LO will not reliably restrict groundwater use . If provisions noted "desirable" are not included, case-by-case evaluation is necessary to determine whether the LO would be protective, reliable and enforceable without the missing provisions.*

Purpose statement (desirable) *(indicating that the ordinance is intended to protect the public health and safety, and being enacted, at least in part, in response to the presence of groundwater contamination)*	Yes ☐	No ☐	Notes:
Enforcement provisions (required) *(person or department designated as being responsible for enforcement; penalties provided for that are consistent with violations of other provisions of LUG's code; injunctive relief provided)*	Yes ☐	No ☐	Notes:
Severability *(language indicating that if a portion of the ordinance is found unenforceable or faulty by a court, that the rest remains enforceable. Must provide notice to DEQ if court action alters LO)*	Yes ☐	No ☐	Notes:
Notice to DEQ (required) *(as required by Sect. 18(5) of Part 201 and Sect.10(a)(3) of Part 213, 30 days notice to DEQ prior to modification, lapse or revocation of the ordinance)*	Yes ☐	No ☐	Notes:
Published and maintained in same manner as zoning ordinances (required for Part 201) *(this may not require specific language in ordinance; can be confirmed with correspondence from LUG)*	Yes ☐	No ☐	Notes:
Filed with register of deeds as ordinance affecting multiple properties (required for Part 213)	Yes ☐	No ☐	Notes:

NOTICE TO LOCAL HEALTH DEPARTMENT

1. If the proposed LO is not a well permitting program administered by a local health department, the RAP/CAP must include provisions for the local government that is enacting the LO to notify the local health department that has responsibility for groundwater well permitting about the groundwater use restrictions that are part of the proposed LO. The RAP/CAP must also include a written acknowledgement from the County/District health department that well permits will not be granted in the restricted area, in accordance with the LO. Copies of both documents should be attached to this checklist.

Notice provided to local health department Yes ☐ No ☐

Acknowledgment received from local health department Yes ☐ No ☐

LUG ACTION

1. If the proposed LO has not already been enacted by the LUG, has an appropriate official of the LUG confirmed, in writing, that the LUG would be willing to implement the LO as proposed and/or with modifications identified by DEQ as necessary to comply with Section 20120b(5) and Section 21310(a)(3)? A draft ID cannot be approved without written indication of the LUG's support for the action.

Yes ☐ (copy attached) No ☐

Comments: _____

CONCLUSIONS

1. LO Adequte Yes ☐ No ☐ INSUFFICIENT INFORMATION

2. If yes, prepare memo to project manager and attach copy to this form.

3. If no or insufficient information, describe reasons and follow up action taken. Memo or letter summarizing deficiencies may be attached.

_____

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PROCESS FOR DETERMINING THE EXISTANCE OF PRIVATE WATER WELLS

Current regulations, which require permits and well logs for the installation of private water wells, have not always been in place. Consequently, in older urban areas, the existence of wells is not always known. Additionally, the presence of a well log or a connection to a municipal water supply does not preclude the existence of a private well. Determining the existence of private water wells can be accomplished with a high degree of confidence if the following steps are followed:

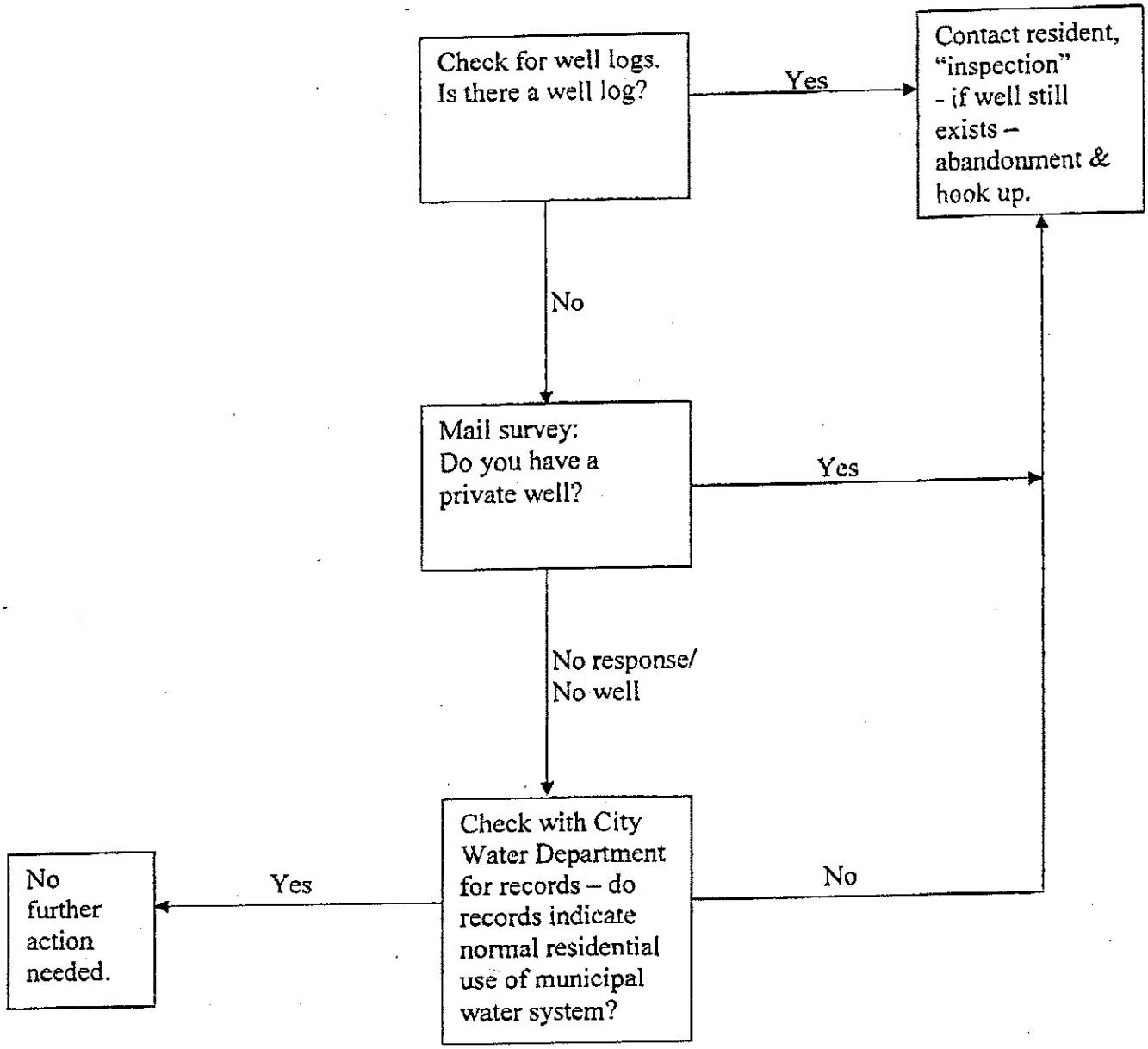
+ The area of concern must be checked for the existence of well logs. These can be obtained from the local health department and at the Department of Environmental Quality (DEQ) website www.deq.state.mi.us/well-logs/.

+ Each residence and business address within the area of concern where a well log cannot be found must then receive a door-to-door or mailer survey. The survey should explain that it is being sent due to the existence of a groundwater contamination problem in the area and request information identifying the existence, location, and depth of any private water wells located on the property.

+ For those addresses where there is no response to the survey or for those who respond that they do not have a well, the survey information must be verified by contacting the local municipal water authority and reviewing billing records for those addresses. Water bills must be reviewed to insure that each address receives a bill and that each bill reflects normal usage and not just a hookup fee.

These steps are illustrated in the attached flow chart.

DECISION TREE FOR DETERMINING THE EXISTANCE OF PRIVATE WATER WELLS



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