AN OVERVIEW OF MICHIGAN'S WELLHEAD PROTECTION PROGRAM

Michigan Department of Environmental Quality

History of Wellhead Protection

The purpose of Michigan's Wellhead Protection Program (WHPP) is to protect public water supply systems (PWSS), which use ground water, from potential sources of contamination. Protection is provided by identifying the area which contributes ground water to PWSS wells, identifying sources of contamination within the area, and developing methods to manage the area and minimize the threat to the PWSS.

Michigan's WHPP was developed in response to 1986 amendments to the federal Safe Drinking Water Act (SDWA). Unlike many programs throughout the country, wellhead protection is a voluntary program which is implemented on a local level through the coordination of activities by local, county, regional, and state agencies. Guidelines for the program were developed by the Michigan Department of Environmental Quality (MDEQ). Although the program is voluntary, PWSSs who choose to participate in wellhead protection must develop a local WHPP consistent with the guidelines established by the state. Local WHPPs must specifically address seven elements which include the establishment of roles and duties, wellhead protection area (WHPA) delineation, identification of potential sources of contamination within the WHPA, development of strategies to manage potential sources and minimize threats to the PWSS, development of contingency plans for water supply emergencies, identification of procedures for the development of new well sites and incorporate them into the local WHPP, and provide opportunities for public participation.

Funding for WHPP is available through a grant program designed to assist PWSSs in the development and implementation of WHPPs. The program is a 50% grant program which must be matched with 50% local funds. Grant money will be awarded to PWSSs based on a scoring system as outlined in the Grant Application.

Seven Elements of Wellhead Protection

Roles and Responsibilities

This element is designed to identify individuals working as a team in development and implementation of the local WHPP. While one individual is generally identified as the primary contact for the local WHPP, the establishment of roles and responsibilities requires the building of partnerships within the community and the participation of multiple individuals. Since ground water knows no political boundaries, partnerships may be developed between local, township, county, regional, and state agencies; and organizations to facilitate management of the WHPA. In an effort to develop effective partnerships, local teams may include managers at the local level (city manager, utilities superintendent, city engineer, fire chief, building inspectors, etc.), county and state agency representatives, local watershed councils, and representatives from the general public. The team can serve to provide consistency in the local WHPP as new parts of the program are addressed or team members leave. Building a team to oversee the wellhead protection process helps to ensure a continuance and continuity of the program in future years.

Wellhead Protection Area

Delineation

The federal SDWA defines a WHPA as "... the surface and subsurface area surrounding a water well or well field, supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water well or well field." In simpler terms, it is that area which contributes

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ground water to a PWSS well. Michigan's WHPP requires a hydrogeologic study to identify the contributing area. The area contributing ground water to a well may extend for miles therefore, Michigan's WHPP is based upon a ground water time-of-travel (TOT) of 10 years. The 10 year TOT provides a reasonable length of time for responding to environmental problems within the WHPA while concurrently providing a smaller area which can be reasonably managed.

Tritium Analysis

Tritium analysis may be used to estimate the time since recharge to the ground water system occurred and the susceptibility of the ground water system to contamination. Tritium concentrations in ground water provide a useful method for determining an aquifer's degree of confinement. Tritium levels that are at or below one tritium unit indicate that the aquifer as "not vulnerable".

Potential Sources of Contamination

Michigan's WHPP requires the identification of potential sources of contamination within the WHPA. As a minimum, known and potential sites of environmental contamination should be included on a contaminant source inventory list. Known sites of environmental contamination may include leaking underground storage tanks, Superfund sites, sites of environmental contamination, and oil and gas contamination sites. Sites which represent a potential for contamination include registered underground storage tanks, hazardous waste generators, chemical storage facilities and ground water discharges.

Land use associated with agricultural operations, commercial facilities, manufacturing and industrial facilities, institutional facilities, and utility companies may also be considered potential sources of contamination. Abandoned wells left improperly sealed provide a direct conduit into the ground water system through which contaminants may migrate and should be considered potential sources of contamination.

Wellhead Protection Area Management

The goal of WHPA management is to provide mechanisms which will prevent existing and potential sources of contamination from reaching the public water supply well or well field. Communities are encouraged to develop management strategies which may be unique to their situation and specific to the contaminant source inventory developed for the WHPA. Management approaches may entail a broad range of activities including facility inspections, land-use regulations, operational policies, best management practices, public information and education. Management strategies should serve to generate support and attention to the WHPA for local, county, state, and federal regulatory activities. The strategies should attempt to minimize (eliminate if possible) land use activities which pose a significant threat to the PWSS, motivate landowners within the WHPA to take appropriate steps to reduce threats to the PWSS, and provide education to residents, businesses, and industries located within the WHPA to emphasize their role in making wellhead protection work.

An important aspect of wellhead protection is the general acceptance of the concept by community leaders and the development of land use and land protection measures which support wellhead protection. One means of providing for intelligent land use development is the incorporation of the wellhead protection concept and the WHPA into a community's Master Plan. Incorporation in the Master Plan aids community leaders in recognizing the extent of the WHPA and the need to set goals and objectives for community development which serve to protect the PWSS. This approach provides a mechanism for the effective use of local regulations in support of wellhead protection. Such support may come through the development of community wide zoning provisions, the development of a local site plan review process, or development of local standards for operation and maintenance of facilities located in the WHPA.

Contingency Plans

As part of the local WHPP it is important that the PWSS identify an effective contingency plan for emergencies that may threaten wells serving the PWSS. The plan should identify personnel, testing equipment, materials and procedures necessary for the fast and effective mitigation of emergencies. A contingency plan should include public water supply system emergency response protocol (as required by the SDWA), notification procedures, and methods for handling emergencies based upon the nature of the emergency and the threat to the PWSS. Contingency plans should provide a course of action with an emphasis on providing a mechanism for containment in the case of chemical spills. The contingency plan should also identify alternative water supplies in the event that an emergency results in an impact to a well or wells serving the PWSS.

New Wells

Wellhead protection activities provide an excellent opportunity for the assessment of the PWSS by providing information on existing ground water availability, the ability of the PWSS to meet present demands, and the susceptibility of the existing wells to contamination. Where water supply expansion, increases in water use, or susceptibility of existing wells to contamination threats warrants development of additional production facilities, a mechanism should be provided to incorporate the new facilities into the local WHPP. PWSSs which undergo expansion with the construction of new wells are strongly encouraged to incorporate the new wells into the local WHPP. WHPA delineation is easier (and cheaper) at the time of construction, wellhead protection can be used to evaluate the availability of the ground water resources in an area, and wellhead protection helps ensure that ground water resource development is occurring in areas which are not subject to contamination.

Public Education and Participation

Community involvement in the development and implementation of the local WHPP helps to ensure its success and longevity. While it is best if all citizens are provided an opportunity to participate, it is essential that individuals who live, work, and own businesses in the WHPA take an active interest in the program. To generate interest in wellhead protection, communities have focused on public education and the dissemination of wellhead protection information. Public education may be provided by presentations, at village/city/township meetings, before local boards and commissions, and at local schools. Information can be provided through wellhead protection newsletters and brochures, radio and cable television spots, and signs posted in WHPAs.