

1 INTRODUCTION

Ground water is the source of drinking water for an estimated 97% of the Navajo Nation's public water systems. The major aquifers used for drinking water include, the Coconino Aquifer, Navajo Aquifer, Dakota Aquifer and the San Juan Unit Aquifers. We now know that groundwater used for drinking water supplies is often vulnerable to contamination. Most public water supply wells are located in or around the communities using them as a drinking water source. Therefore, preventative measures must be taken to minimize the possibility that land uses will contaminate the groundwater utilized by the public water systems¹.

Section 1428 of the 1986 Amendments to the federal Safe Drinking Water Act (SDWA) mandates that every state and Tribe with Primacy develop a wellhead protection program. The Safe Drinking Water Act requires that all federally defined public water systems using ground water as their source implement a wellhead protection program. The NNSDWA (Title 22, Chapter 11, Subchapter 15, Subsection 308 - WELLHEAD PROTECTION) addresses the requirements for public water systems to include mandatory wellhead protection measures for public water systems on the Navajo Nation using wells or springs (excluding systems using purchased sources, or interties) as their source of supply. On the Navajo Nation, local wellhead protection programs shall, at a minimum, include the following elements:

- ▶ A completed vulnerability assessment;
- ▶ A delineated wellhead protection area for each well, wellfield, or spring;
- ▶ An inventory within the wellhead protection area of all potential sources of contamination that may pose a threat to the water bearing zone (aquifer) utilized by the well, spring or wellfield;
- ▶ Documentation that delineation and inventory findings are distributed to required entities;
- ▶ Contingency plans for providing alternate sources of drinking water in the event that contamination does occur; and

¹The term "public water system" means a system for the provision to the public of water for human consumption through pipes or other constructed conveyances, if such system has at least fifteen (15) service connections or regularly serves at least twenty-five (25) individuals. Such term includes: i) any collection, treatment, storage and distribution facilities under control of the operator of such system and which are used primarily in connection with such system, and ii) any collection or pretreatment storage facilities not under such control which are used primarily in connection with such system. A public water system is either a "community water system" or a "non-community water system."

- ▶ Coordination with local emergency responders for appropriate spill / incident response measures.

The intent of the WHPP is to be pro-active and prevent contamination of groundwater used for drinking water. The objective of wellhead protection is to protect the health of the people using groundwater supplies for drinking water. This will be accomplished by providing management zones around public wells or wellfields to detect and manage potential sources of groundwater contamination.

Pollution prevention is the NNEPA PWSSPs preferred approach to groundwater protection. In conjunction with the other federal groundwater protection programs, the NNEPA PWSSPs WHPP provides a safeguard for groundwater used by public water systems. The integrated approach, emphasizing interagency coordination among multiple levels of government, is the best method for protecting public drinking water supplies.

The NNEPA PWSSPs WHPP follows statutory requirements found under Section 1428 of the 1986 Federal Safe Drinking Water Act (SDWA) amendments and the Navajo Nation Primary Drinking Water Regulations (NNPDWR) Section 1700 - WELLHEAD PROTECTION. Wellhead protection assists local communities in protecting their groundwater based drinking water supplies. A component of the WHPP is the delineation of wellhead protection areas. A wellhead protection area is defined as the surface and subsurface area surrounding a well or wellfield that supplies a public water supply through which contaminants are likely to pass and eventually reach the water well(s). In simpler terms, it is the area managed by a community to protect groundwater based public drinking water supplies.

Within wellhead protection areas, potential contaminant sources are identified and managed to eliminate or reduce their risk of contaminating public water supplies. NNEPA PWSSPs WHPP advocates a progressive management concept. Education and use of Best Management Practices (BMPs) are important measures which may reduce or eliminate the need for restrictive regulatory protection plans. Local land use protection or design standards may be necessary to protect the drinking water supply.

NNEPA PWSSP serves as the contact point for individuals, organizations, and municipalities seeking information on the NNEPA PWSSPs WHPP. Questions on wellhead protection should be directed to:

NNEPA PWSSP
Wellhead Protection Program
P.O. Box 339
Window Rock, Arizona 86515
928-871-7755 / wellhead.protection@navajopublicwater.org

Costs of Contamination

A primary motivation for implementing a local wellhead protection program is that the financial impact of a contaminated public water supply can be quite high. Experience shows that it is considerably more cost effective to implement a pro-active pollution prevention program to guard against ground water contamination rather than pay for an alternate drinking water supply or initiate groundwater remediation efforts.

Direct costs associated with well contamination include:

- ▶ Administrative costs of responding to contamination,
- ▶ Loss of developed wellfield,
- ▶ Purchase of water while locating an alternate supply,
- ▶ Hydrogeologic studies to locate alternate sources,
- ▶ Development of a new water source – if there is unallocated groundwater available,
- ▶ Process to obtain water permit (water permit from the Navajo Nation Department of Water Resources Management),
- ▶ Engineering, construction and equipment costs of well replacement (with most deep wells valued between \$100,000 – \$800,000 each),
- ▶ Treatment of contaminated groundwater – if possible,
- ▶ Investigation / remediation costs,
- ▶ Public information and education costs,
- ▶ Legal proceedings against responsible party, if identified, and
- ▶ Increased NNSDWA monitoring requirements.

Indirect costs associated with groundwater contamination affecting a public water supply include:

- ▶ Loss of (peak) capacity,
- ▶ Reduced consumer confidence,
- ▶ Lost opportunity costs,

- ▶ Potentially increased health risks,
- ▶ Potential reduction in development opportunities, and
- ▶ Potentially lower land values and tax base (potentially).

Once a water well is contaminated, a facility's operations come under increased public scrutiny. Many investors will not locate in an area without conducting an environmental audit, further amortizing the Navajo Nation's economic / community development expectations. The perception of contaminated water may cause potential developers to look elsewhere.

Many communities are recognizing that their water supplies are vulnerable to contamination. This awareness, coupled with increased information on both the direct and indirect costs associated with wellfield contamination, is a key force driving implementation of local wellhead protection programs.

Wellhead Protection and NNSDWA Monitoring Requirements under Phase II and Phase V

Under the 1986 amendments to the SDWA, Congress expanded the contaminant monitoring requirements for many public water systems. If no monitoring waivers are granted, public water systems are required to analyze for over 80 different Volatile Organic Compounds (VOCs) and Synthetic Organic Compounds (SOCs). The NNEPA PWSSP is able to reduce monitoring requirements through approved Monitoring Waiver applications for systems that are determined to be at relatively low risks of exposure.

Monitoring requirements can incorporate both site variability in hydrogeologic vulnerability to contamination, and the current and past history of contaminant loading when determining sampling frequency. These two factors, hydrogeologic susceptibility and contaminant loading, combine to indicate a public water supply's vulnerability (potential for contamination). Based on the public water supply's Vulnerability Assessment and on-going contaminant control measures through effective wellhead protection efforts, it is expected that the NNEPA PWSSP will establish a reduced monitoring program (with a subsequent substantial reduction in monitoring costs) for many groundwater based public water systems.