

CHAPTER 5

SOURCE WATER PROTECTION

INTRODUCTION

This chapter presents the City of Bingen's Well Head Protection Plan.

This program was developed to help protect the City's sources of supply by identifying possible pollutant sources within the zones of contribution of the City's wells that may affect source water quality. Protection of the City's sources can be accomplished through monitoring, to the best extent possible, all potential contaminant sources and limiting future development within the wellhead protection area that could adversely affect the City's source of supply. Specific criteria against which the adequacy of source water protection is measured are presented in WAC 246-290-135.

WELLHEAD PROTECTION PROGRAM

The City of Bingen intends to reduce the potential risk for contamination of groundwater within the identified wellhead protection area by implementing a wellhead protection program. The program identifies potential contaminant sources, describes procedures for notifying the potential contaminant sources of their location within the wellhead protection area, identifies actions to protect the groundwater supply, and defines local spill response procedures for spill incidents within the wellhead protection area.

PROGRAM DEVELOPMENT AND IMPLEMENTATION

The purpose of a wellhead protection program is to provide local utilities with a program for preventing groundwater contamination. A successful wellhead protection program consists of a number of components that must be developed before the plan can be fully implemented. The major components of the plan are described below and form the basis of the chapter that follows:

- A Susceptibility Assessment determining the susceptibility to contamination
- A Delineated Wellhead Protection Area based on all reasonably available hydrogeologic information, including an assessment of susceptibility to contamination.
- An Inventory of all known and identifiable potential contamination sources within each wellhead protection area.
- A Spill Response Plan for each wellhead protection area containing documentation for coordination with local first responders (police, fire, HAZMAT team, etc.).

- Contingency Plans for providing alternative sources of drinking water in the event of contamination.
- A Wellhead Protection Area Management Plan to reduce the likelihood that potential contaminant sources will pollute the drinking water supply.

SUSCEPTIBILITY ASSESSMENT

Completion of a susceptibility assessment is an important initial step in selecting appropriate delineation methods to define wellhead protection area boundaries. Completion of the susceptibility assessment and submittal to the Department of Health (DOH) allows for a susceptibility ranking. Sources that receive low susceptibility ratings receive susceptibility waivers from DOH to reduce or waive the amount of required monitoring for volatile organic compounds (VOCs) and synthetic organic compounds (SOCs). Depending on factors such as well construction, casing, and location in a geologic setting, drinking water supplies vary in their susceptibility to contaminants discharged at the surface. Wells that have been poorly constructed or have been improperly cased have an increased susceptibility. Additionally, wells located in a geologic setting where no confining layer (aquitard/layer of low permeability) exists between the aquifer and surface have a much higher susceptibility than those drawing water from deep below the surface, with impermeable layers overlying the aquifer.

The Susceptibility Assessments forms are designed to evaluate the vulnerability of a water source's potential for contamination. Vulnerability is influenced by physical susceptibility to contaminants such as the depth of the well, its construction, the geology of the area, and the aquifer characteristics, as well as the source's risk of exposure to contaminants due to the existence of pollution of the soil or groundwater in the area. Susceptibility Assessments Forms must be completed in order to apply for any monitoring waivers. The form evaluates the system characteristics, well construction, hydrogeologic setting, groundwater mapping, and water quality in order to determine each source's vulnerability to contamination. The City's three active sources have fairly low vulnerability to contamination. Completed susceptibility assessment survey forms for each of the City's three operating wells are included in Appendix M.

WELLHEAD PROTECTION AREA

The purpose of delineating a wellhead protection area is to estimate the area capable of contributing contaminants to a pumping well. These areas are referred to as zones of contribution (ZOC's) and provide a basis for focusing a community's groundwater protection efforts. Multiple methods are used to delineate ZOC's. A groundwater model simplifies the characteristics of an aquifer in order to provide mathematical estimates of actual conditions. As the groundwater model is increasingly simplified, the model becomes easier to use, but the results become less accurate. The most commonly accepted groundwater models for delineating a wellhead protection area (WHPA), or zone of contribution, are the Calculated Fixed Radius (CFR), Analytical, and Numeric models.

The simplest groundwater model is based on the CFR method. In the CFR method, the delineations are concentric areas around each well that are calculated based on pumping data and known or assumed aquifer characteristics.

An Analytical model requires basic hydrogeologic information including the direction of groundwater flow, gradient, and certain physical characteristics of the aquifer. These physical characteristics include the aquifer thickness, the rate at which the aquifer will transmit water (transmissivity), and whether the aquifer is confined or unconfined.

A Numeric model requires significantly more data than other methods. In Numeric modeling, a grid is superimposed over the study area. Each square in the grid, called a cell, is characterized by physical parameters that are estimated from data collected from a variety of sources. The sources may include well logs, geologic and hydrogeologic maps, geophysical data, groundwater elevation data, stream flow discharge, and meteorological data. The parameters used to define the hydrogeological characteristics of each cell in the study area include identification of the vertical relationship of each aquifer and confining layer, the transmissivity of each aquifer, the thickness of the fine grained materials which separate the aquifers, the annual recharge, the connection between surface water and groundwater, the relationship between the model area and the surrounding areas (boundary conditions), and lastly, the location and pumping rate of wells. The Numeric method generates more accurate results than the CFR or Analytical methods. However, Numeric models are relatively costly to develop. Consequently, Numeric models are more commonly used by large utilities, with complex aquifers, which have the resources to collect the extensive model input data required.

A WHPA is defined as the surface and subsurface area surrounding a groundwater source through which contamination can potentially travel and reach the source. WHPAs are based on ZOC's that are derived from the estimated time of travel required for a contaminant to move from the point of introduction into the water bearing formation to the source. The DOH Wellhead Protection Program requires a WHPA to be subdivided into five zones, which include:

- A sanitary control zone of at least a 100-foot radius, unless engineering justification supports a smaller area (WAC 246-290-135). No source of contamination may be constructed, stored, disposed of, or applied within the sanitary control zone without the permission of DOH and the water purveyor.
- Four primary zones based on 6 month, 1-year, 5-year, and 10-year time of travel boundaries. These zones are referred to as the zones of contribution of the WHPA. Within this report, these zones will be abbreviated as ZOC_½ – 6-month zone of contribution, ZOC₁ – 1-year, ZOC₅ – 5-year, and ZOC₁₀ – 10-year zone of contribution.

- One buffer zone (if necessary) extending from ZOC₁₀ to a groundwater divide and highlighting areas where the aquifer may be particularly susceptible or vulnerable to contamination.

The ZOC₁₀ defines the boundary of the WHPA and the area to be inventoried and managed to reduce the risk of contamination.

ANALYSIS

The CFR Method was used to analyze the wellhead protection area ZOCs for the City's three active wells. This method is the minimum acceptable method of delineation for public water systems. The following equation is applicable:

$$r = \sqrt{\frac{Qt}{\pi nH}}$$

Where:

r	=	Radius of ZOC _t
Q	=	Volume of water withdrawal (cubic feet per year)
t	=	travel time (0.5, 1, 5 and 10 years)
n	=	Porosity = 0.22 (default value)
H	=	well screen interval (ft) = 10 feet (default value)

This equation was used to calculate zone of contribution radii for the 6-month (0.5-year), 1-year, 5-year, and 10-year time horizons for the City's wells. The value to be used for Q , the groundwater withdrawal rate, reflects the maximum annual withdrawal anticipated for each well. The water right limitations, which are detailed in Chapter 1 of this Plan in Table 1-1, are used as the maximum annual withdrawal anticipated for each well. The actual screened intervals for the City's wells are unknown. According to the DOH *Wellhead Protection Program Guidance Document* (April 1995), if the actual screened intervals are unknown or the well is constructed with an open interval at its base, a value of 10 feet should be used. The pumping volumes used in the CFR Method are shown below in Table 5-1.

TABLE 5-1

City of Bingen Maximum Annual Pumping Volumes

Source	Qa [acre-ft/year]	Qa [cubic ft/year]
Dry Creek Well	226	9,844,560
Reservoir Well	80	3,484,800
Park Well	420	18,295,200

Radii values calculated for the various times of travel are presented in Table 5-2.

TABLE 5-2

City of Bingen Wellhead Protection Zones of Contribution (CFR Method)

Time of Travel	ZOC Radius (feet) ⁽¹⁾		
	Dry Creek Well	Reservoir Well	Park Well
6 month	845	500	1,150
1 year	1,195	710	1,625
5 years	2,670	1,590	3,640
10 years	3,775	2,245	5,145

(1) Radii are rounded to the nearest 5 feet.

Figures 5-1(A-C) show the limits of the 6-month, 1-year, 5-year, and 10-year zones of contribution for the City's three active wells.

CONTAMINANT SOURCE INVENTORY

An essential element of wellhead protection is an inventory of all potential sources of groundwater contamination in and around the delineated WHPA. The purpose of the inventory is to identify past, present, and proposed activities that may pose a threat to the well or surrounding area. For the inventory to be effective a full accounting of all known and potential sources of contamination within the zones must be conducted and the information accurately mapped. The inventory can also help to plan management strategies and establish a mailing list to notify businesses located within the WHPA as well as emergency response agencies.

POTENTIAL CONTAMINANT SOURCES

Within a WHPA, there are many diverse activities that may contaminate an aquifer thereby jeopardizing the water supply. It is important that these activities are properly inventoried and, if necessary, regulated to prevent degradation of the groundwater supply. Relevant activities include land use and zoning practices, landfill, commercial and industrial operations, underground storage tanks, clandestine drug lab sites, septic systems, dry wells and catch basins, as well as known sites of contamination. A discussion of these practices, their potential effects on groundwater and the regulatory requirements that may apply are included in the following sections.

Land Use and Zoning

A portion of the City of Bingen's WHPA is located within the City of Bingen service area and the remaining portion is located within unincorporated Klickitat County. Areas within the service area are zoned residential, and the area within Klickitat County is

zoned Rural Development District. Rural Development District is a mixed-use zoning district that allows a number of different land uses such as single-family residential, resource uses, and limited commercial activity. The area within the Port of Klickitat is zoned General Industrial.

Landfills

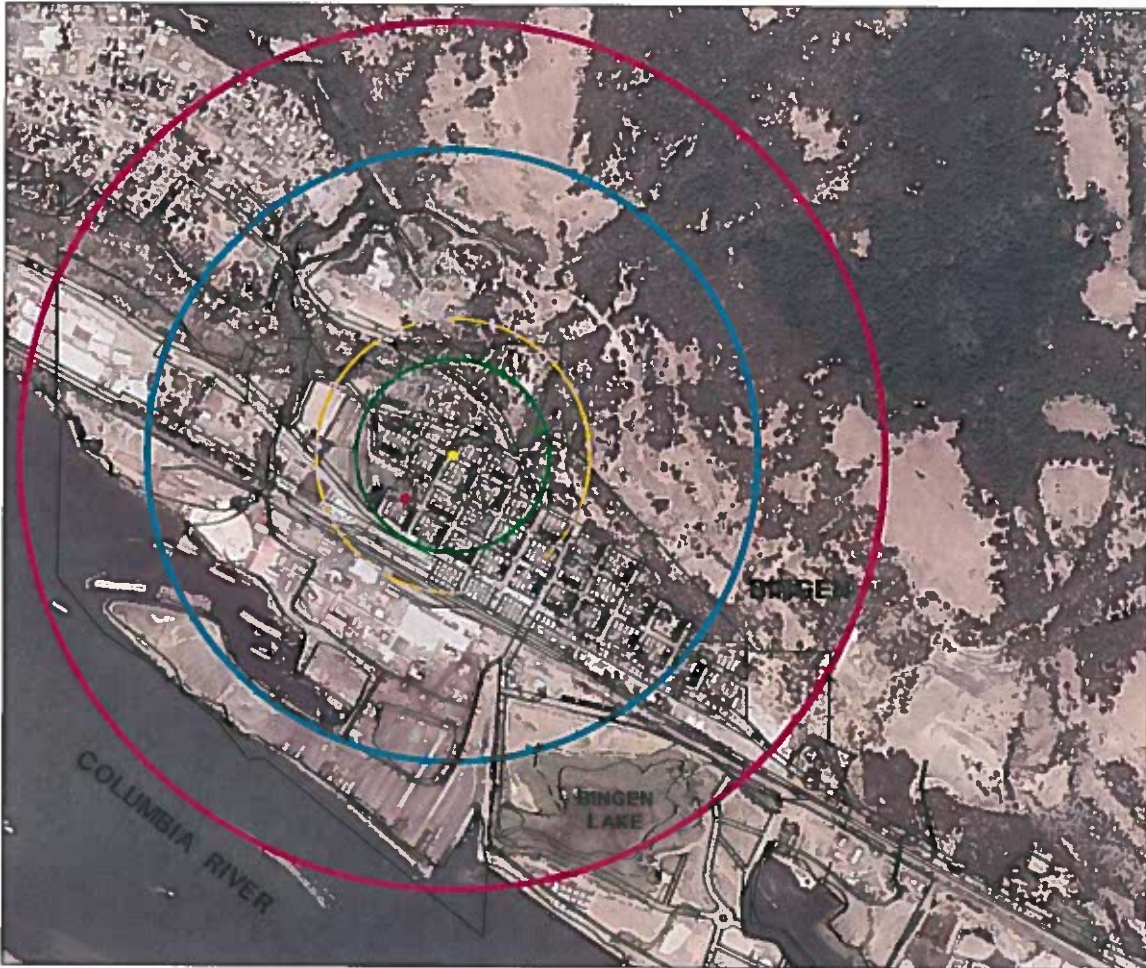
A landfill is a disposal facility in which solid waste is permanently placed and is not a land treatment facility. Landfills are regulated by the Washington State Department of Ecology under WAC 173-304, Minimum Functional Standards for Solid Waste Handling. These regulations set siting and closure criteria, performance standards, and operating requirements for landfills. The regulations are highly restrictive in that a proposed landfill site must meet a series of “fatal flaw” tests. A wellhead protection area would qualify as a fatal flaw, thereby prohibiting the construction of a new landfill.

Past landfill practices were not so restrictive; however, abandoned and improperly maintained landfills and dump sites are often a major source of groundwater contamination. Leachate from landfills poses a threat to groundwater quality should it migrate to the water table. The Department of Ecology is responsible for mitigating dump site cleanup when potentially hazardous leachates are present.

There are no known active or closed landfills located within the City of Bingen’s WHPA.

Commercial and Industrial Activity

Areas of commercial and industrial land use are located within most wellhead protection boundaries. Businesses that may contribute contaminants to the groundwater include dry cleaners, gas stations and other businesses with fuel storage tanks, auto repair shops, metal plating facilities, asphalt and concrete facilities, and machine shops. Wastes generated at these businesses include substances such as petroleum products, solvents, surfactants, heavy metals, and other organic materials. These wastes can potentially enter the groundwater system through inadequate disposal practices or accidental spills. Table 5-3 presents typical commercial and industrial activities and the potentially hazardous chemicals that may be associated with them.

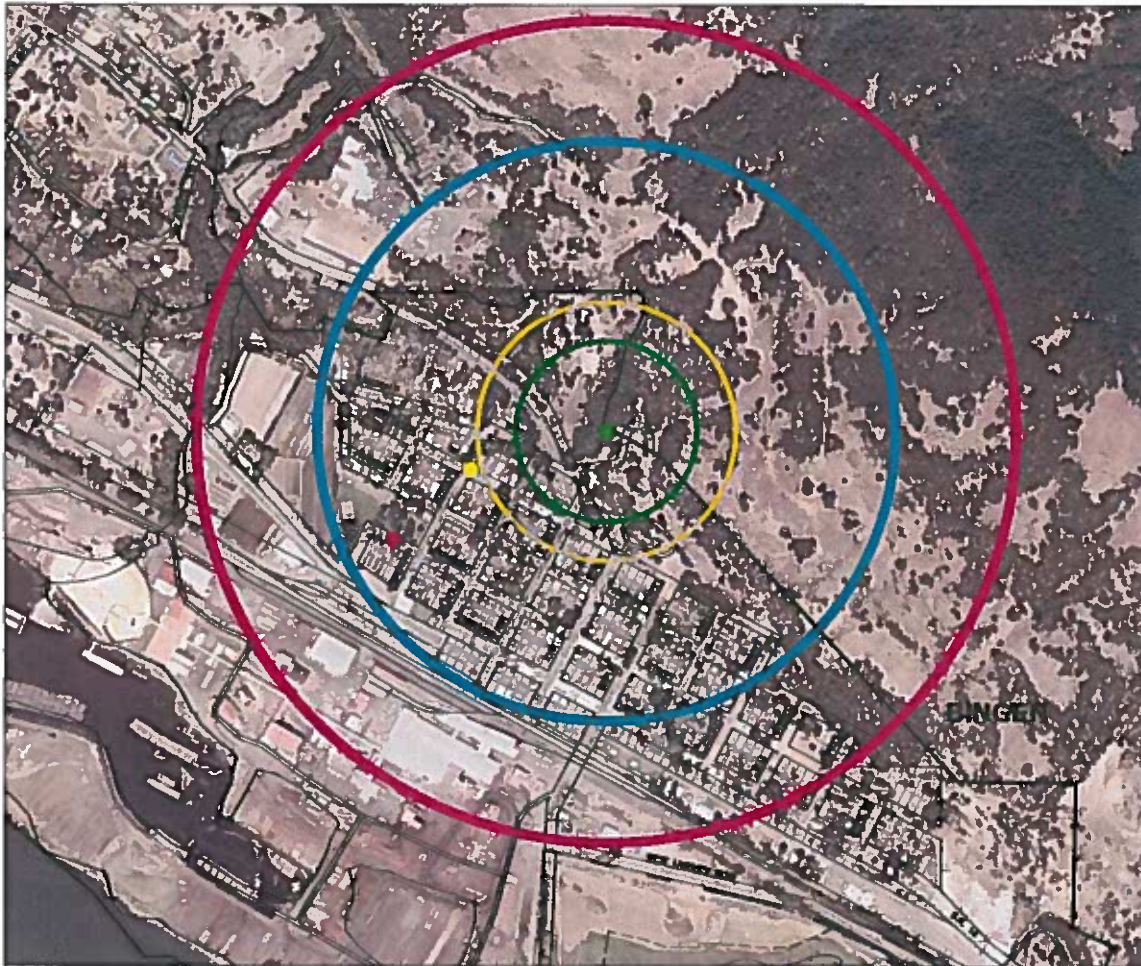


LEGEND

- DRY CREEK WELL
- RESERVOIR WELL
- PARK WELL
- 6 MONTH ZOC
- 1 YEAR ZOC
- 5 YEAR ZOC
- 10 YEAR ZOC

CITY OF BINGEN
 WATER SYSTEM PLAN UPDATE
 FIGURES 5-1A
 DRY CREEK WELL EDGES OF CONTRIBUTION

George & O'Connell, Inc.
ENGINEERS AND ARCHITECTS

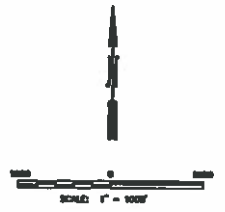
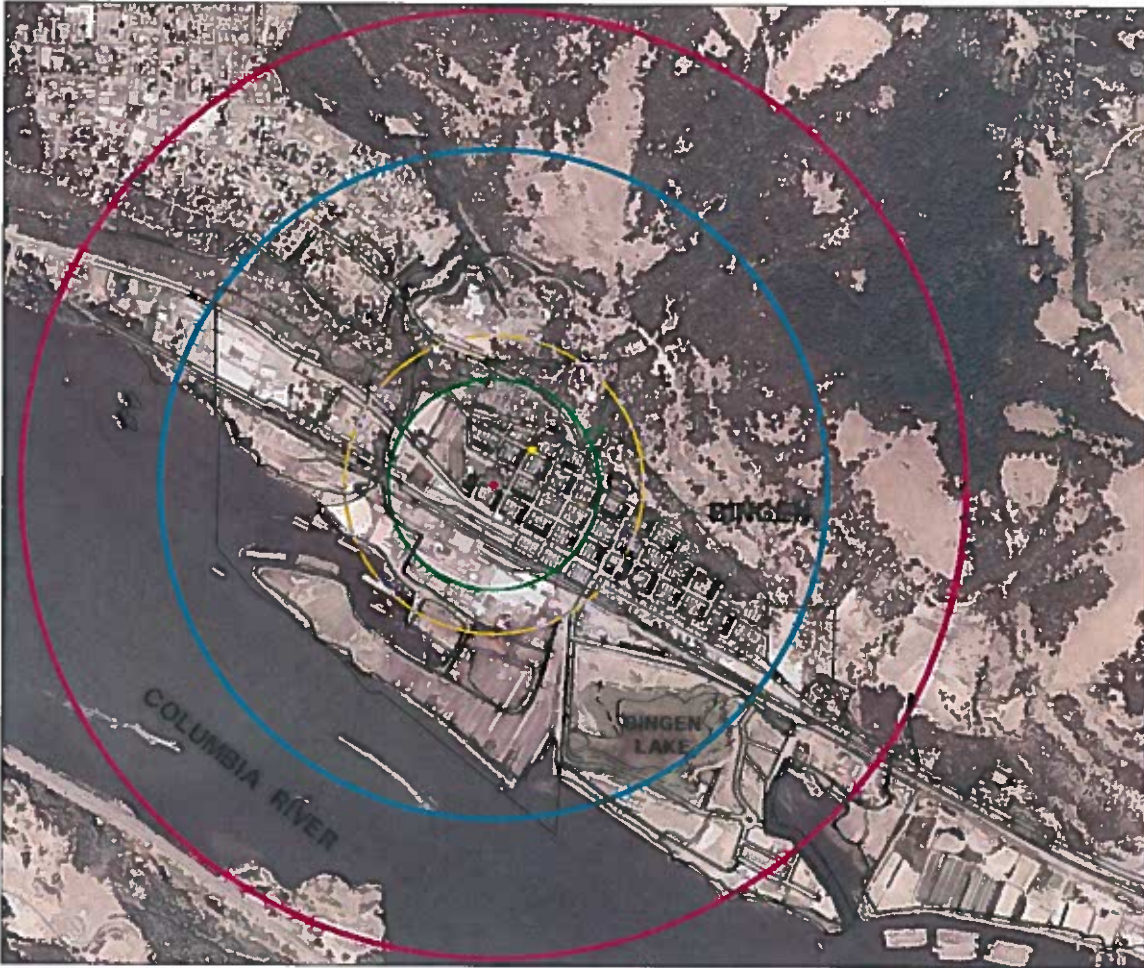


LEGEND

- DRY CREEK WELL
- RESERVOIR WELL
- PARK WELL
- 6 MONTH ZOC
- 1 YEAR ZOC
- 5 YEAR ZOC
- 10 YEAR ZOC

CITY OF ENGLEWOOD
 WATER SYSTEM PLAN UPDATE
 FIGURE 5-18
 RESERVOIR WELL ZONES OF CONTRIBUTION

 George & Oakes, Inc.
ENGINEERS AND ARCHITECTS



LEGEND

- DRY CREEK WELL
- RESERVOIR WELL
- PARK WELL
- 6 MONTH ZOC
- 1 YEAR ZOC
- 5 YEAR ZOC
- 10 YEAR ZOC

CITY OF BINGEN
 WATER SYSTEM PLAN UPDATE
 FIGURE C-1C
 PARK WELL ZONES OF CONTRIBUTION

Gray & Oakman, Inc.
ENGINEERS AND ARCHITECTS

TABLE 5-3

Chemicals Associated with Commercial and Industrial Activities

Commercial/Industrial Activity	Potential Contaminants
Automobile/Truck Service	waste oils, solvents, acids, paints, soaps
Boat Yard/Marinas	detergents, gasoline, diesel fuels, batteries, oil, seepage from boat waste disposal areas, wood preservative and treatment chemicals, paints, waxes, varnishes, automotive wastes
Dry Cleaners	solvents (perchloroethylene, petroleum solvents, Freon) spotting chemicals, (trichloroethane, methylchloroform, ammonia, peroxides, hydrochloric acid, rust removers, amyl acetate)
Cemeteries	fertilizers, pesticides
Country Clubs/Golf Courses	fertilizers, herbicides, pesticides, swimming pool chemicals, automotive wastes
Electric/Electronic Equipment Manufacturers	nitric, hydrochloric and sulfuric acid, heavy metal sludges, ammonium persulfate, cutting oil and degreasing solvent, corrosive soldering flux, waste plating solution, cyanide, methylene chloride, perchloroethylene, trichloroethane, acetone methanol
Furniture/Wood Manufacturing	paints, solvents, degreasing and solvent recovery sludge
Metal Plating Shops	sodium and hydrogen cyanide, metallic salts, alkaline solutions, acids, solvents, heavy metal contaminated wastewater/sludge
Lawns and Gardens	fertilizers, herbicides, pesticides
Printers, Publishers	solvents, inks, dyes, oils, miscellaneous organics, photographic chemicals
Sand and Gravel Mining	diesel fuel, motor oil, hydraulic fluids
Scrap, Salvage and Junkyards	used oil, gasoline, antifreeze, PCB contaminated oils, lead acid batteries

Underground Storage Tanks

Underground storage tanks (USTs) and leaking underground storage tanks (LUSTs) are a major threat to groundwater quality. Petroleum products which may contain impurities that are mobile in the groundwater system are the most commonly stored substances in USTs. The EPA estimates that 35 percent of all USTs could be leaking. The most common causes of leaks are structural failure, corrosion, improper fittings, and improper installation. Ecology regulates underground storage tanks in Washington State under WAC 173-360, Underground Storage Tank Regulations. The regulations require that

owners and operators of underground storage tanks comply with the following sections of the regulations:

- Notification, reporting, and record keeping
- Performance standards and operating closure requirements
- Registration and licensing
- Financial responsibility

The WAC allows a number of exemptions including tanks whose capacity is 110 gallons or less, farm and residential tanks with less than 1,100 gallons, heating oil less than 1,100 gallons per premises, and septic tanks.

As of July 1, 1991, owners and operators of all existing nonexempt underground tanks must have a permit from Ecology. A valid permit is a requirement for delivery of regulated substances. The permit must be updated annually. As a condition of the permit, the owner must have completed the following requirements:

- An assessment of the tank condition by an Ecology licensed tank service provider.
- Replacement of leaking tanks and site cleanup.
- Installation of leak detection devices.
- Proof of insurance to compensate a third party in the event of bodily injury or property damage resulting from a leaking tank. One million dollars insurance is required for petroleum marketing facilities.

By 1998, all existing nonexempt underground storage tanks must have provided cathodic protection and spill and overflow containment, in addition to the above requirements.

Installation and replacement of underground storage tanks must meet the specifications and performance and design standards identified in the WAC. Ecology follows the federal UST guidelines, which at this time do not require double wall vessels.

Underground storage tank inspections are performed by Ecology primarily through the information developed in the permitting process. Although routine annual inspections are not performed, Ecology inspectors do prioritize sites considered potentially hazardous. Technical assistance visits are also conducted at the request of the owner/operator. This provides another avenue in which Ecology can monitor the status of USTs. Ecology maintains a file on all permitted USTs in Washington State, as required by RCRA, Subtitle 1. The file provides the site name and address, tank identification number, date of installation, size, tank status, and the substance stored at the site.

There are twelve known USTs within the City of Bingen ZOC, eight operational and four closed in place. Hattenhauer Distributing Co (204 W Steuben St.) has three operational USTs within the ZOC₁₀ of Dry Creek and Park Wells, Hunsaker Oil Co. (102 East Steuben Street) has two operational USTs, Bingen Ford Lamphiear Auto (previously

located at 120 East Steuben Street) has three closed in place USTs, and Wilson Oil, Inc (117 East Steuben Street) has three operational USTs and one closed in place within the ZOC₅ of Dry Creek and Park Wells and within the ZOC₁₀ of Reservoir Well.

Clandestine Drug Labs

Clandestine drug labs have been becoming an increasing problem in many parts of the country. Labs that produce illicit drugs use a wide variety of solvents and toxic, caustic and acidic substances. Because their activities are strictly illegal, they rarely dispose of wastes in an environmentally friendly manner. Therefore, these sites are potentially sources of groundwater contamination.

DOH maintains a list of known sites in Washington contaminated by clandestine drug labs. No sites within the City of Bingen area are included on the DOH list. Unfortunately there is no way to know the location of sites that have not been discovered and closed.

Septic Systems

Contaminants associated with septic tank effluent include pathogenic organisms, toxic substances, and nitrogen compounds. Ammonia and nitrate nitrogen are highly soluble in water.

The City of Bingen is served by a sewer system, while outside of the City boundary individuals rely on septic tanks. County parcel records do not always indicate the sewage disposal method. However, with the exception of two residences northeast of Highway 141 (Oak Street), all residences within the WHPA are connected to the City of Bingen sewer system and routed to the City's Wastewater Treatment Facility (WWTF) for treatment and ultimate disposal in the Columbia River. The City of Bingen WWTF (208 Marina Drive) is located within its WHPA.

Dry Wells, Catch Basins, and Improperly Sealed or Secured Wells

Stormwater serves as a source of groundwater recharge, but it can also be a source of groundwater contamination. Runoff from streets, parking lots and other impervious surfaces can contain heavy metals, hydrocarbons, petroleum products, pesticides, and animal wastes. Dry wells may be used for stormwater, septic waste, or other wastewater disposal at commercial, industrial, and multi-family residential sites. Dry wells and catch basins may be located along major transportation corridors. Contaminants generated along transportation routes, such as highways and railroad corridors, include petroleum products, lead, hazardous chemicals and other emission products. Dry wells and catch basins are potential sites of contamination because their intended use often discharges contaminants directly into the groundwater.

Accidental Spills

Accidental spills or releases of contaminants can potentially impact groundwater supplies. Potential sources of spills and leaks include underground storage tanks, accidents and poor disposal practices. The City of Bingen wells are located in secure, residential areas, with few potential sources of contamination nearby. For these reasons, it is unlikely there will be a hazardous spill that would affect the City's wells. The City should contact the agencies listed later in this chapter under "Spill Response Planning" for assistance if there is a spill, with the Department of Ecology's 24 Hour Spill Response being the first contact.

A notification letter should be sent out to the local emergency responders discussing the wellhead protection plan and the need for precautions during spill response within the wellhead protection areas. A copy of Figures 5-1(A-C) which show the well locations and the time of travel boundaries should be included with these letters. A sample notification letter has been included as Appendix N.

Confirmed and Suspected Contamination Sites

Under WAC 173-340, Model Toxics Control Act – Cleanup, the Department of Ecology is responsible for ensuring all hazardous waste sites are properly remediated. This includes confirmed and suspected sites of contamination as well as Leaking Underground Storage Tanks (LUSTs). A separate inventory for each, which includes the status of cleanup efforts, is maintained by Ecology. Ecology conducts an initial site investigation within 90 days of learning of a potentially contaminated site. If this investigation shows that remediation action is required, the site will appear on the Confirmed and Suspected Contaminated Sites Report. The sites are also given a Washington Ranking Mode BIN number between 1 and 5. A ranking of 1 indicates the greatest assessed risk to human health and the environment. The contaminant type and the affected media, such as groundwater, are also noted. Once the remedial action has been completed, Ecology's Toxics Cleanup Program determines if the site can be removed from the list.

The siting and operation of facilities that use, treat, store, or dispose of hazardous waste are subject to the requirements of the Resource Conservation and Recovery Act (RCRA), Subtitle C. In Washington State, the Department of Ecology regulates facilities that generate more than 220 pounds of hazardous waste per month under WAC 173-303, Dangerous Waste Regulations. The regulations are significant in that they establish a number of requirements for these facilities including surveillance and monitoring, record keeping, performance and design criteria, and siting and closure procedures. Ecology divides the facilities into three levels of hazardous waste accumulation: Level 1 facilities generate 2,200 pounds of waste per month or more; level 2 facilities generate between 220 and 2,200 pounds per month; and level 3 facilities generate less than 220 pounds. Level 3 generators are exempt from the regulations. All level 1 and 2 facilities must initially file a report of their activities with Ecology and update those activities annually. From these reports, an identifier code is established for each facility. This code is

required by a transporter to deliver or accept shipments. A summary of those activities are published annually by Ecology, thereby allowing water purveyors the opportunity to determine the types of activities present within their WHPA.

There are three sites in the Klickitat County area listed in the Department of Ecology Toxics Cleanup Program Confirmed and Suspected Contaminated Sites List. All of these sites, which include Evergreen Fuel Company, Klickitat County Fire District #5, and Olympic Wood Products, are located outside of the City's WHPA.

SUMMARY OF POTENTIAL CONTAMINANT SOURCES

Table 5-4 summarizes the potential sources of contamination found within the 6-month, 1-year, 5-year, and 10-year zones of contribution for the City of Bingen wells.

TABLE 5-4

Potential Contaminant Sources within the City of Bingen Wellhead Protection Area

Potential Source	6-Month ZOC	1-Year ZOC	5-Year ZOC	10-Year ZOC
USTs	Hattenhauer Distributing Co.	Hattenhauer Distributing Co., Hunsacker Oil Co., Wilson Oil, Inc, Bingen Ford Lamphiear Auto ⁽¹⁾	Hattenhauer Distributing Co., Hunsacker Oil Co., Wilson Oil, Inc., Bingen Ford Lamphiear Auto ⁽¹⁾	Hattenhauer Distributing Co., Hunsacker Oil Co., Wilson Oil, Inc., Bingen Ford Lamphiear Auto ⁽¹⁾
LUSTs		Hunsacker Oil Co Wilson Oil, Inc	Hunsacker Oil Co Wilson Oil, Inc	Hunsacker Oil Co. Wilson Oil, Inc.
Hazardous Waste Generators	None Known	None Known	None Known	None Known
Known Sites Contaminated by Clandestine Drug Labs	None Known	None Known	None Known	None Known
State Cleanup Sites	None Known	None Known	None Known	None Known
Solid Waste Transfer Station	None Within City of Bingen			
Sewage Treatment Facility	None	None	City of Bingen WWTF	City of Bingen WWTF

(1) Bingen Ford Lamphier Auto is no longer in operation but has three closed in place USTs.

INVENTORY DATA SOURCES

The inventory of potential contaminant sources was compiled using various data sources. Agencies such as Ecology and EPA maintain contaminant databases that list businesses that handle and store potential contaminants. The following databases were used to create the inventory for the City's WHPAs:

- **Underground Storage Tank Report, (August 2014)**
The most recent version of the Underground Storage Tanks (UST) Report was obtained from Ecology's Toxics Cleanup Program. This list was used to locate the facilities that contain underground storage tanks and verify facilities located by field surveys of the wellhead protection areas.
- **Leaking Underground Storage Tank Report, (August 2014)**
The most recent Leaking Underground Storage Tank (LUST) Report was also obtained from Ecology's Toxics Cleanup Program. This report was used to locate the leaking underground storage tanks on the wellhead protection area maps and note the status of remedial action at the site. The LUST report lists the site name, address, age, volume, and status of sites that contain leaking underground storage tanks.
- **Dangerous Waste and Materials Generators**
This program, the EPA's RCRA program, has been taken over by Ecology within the State of Washington and is regulated under the Dangerous Waste Regulations (173-303 WAC).
- **Confirmed and Suspected Contaminated Sites Report, (August 2014)**
Ecology maintains the Confirmed and Suspected Contamination Sites Report. The list is updated continuously as new information becomes available. Each site is given a site status code indicating the status of the cleanup process.
- **Clandestine Drug Lab List, (December 2010)**
The Department of Health maintains a list of sites contaminated by clandestine drug labs. A current list of sites contaminated by drug labs was obtained from the DOH web site.
- **Zoning and Land Use**
Zoning designations were obtained from the City.

NOTIFICATION OF FINDINGS

The City of Bingen will notify State and local agencies of the wellhead protection program's findings, including the WHPA boundaries. The City will also notify residents and customers within the contribution radii with a letter discussing risks to the water system and actions to be taken in case of a spill or accidental contaminant application. Any residents with on-site sewage disposal systems will also be sent notification of precautions they can take to minimize impacts from on-site sewage disposal systems.

SPILL RESPONSE PLANNING

Spill response planning is an important aspect of both an emergency management plan and a wellhead protection program. The release of hazardous materials in a wellhead protection area can create further problems than the initial contamination of soil and surface water. When the release occurs in either the 1-year, 5-year, or 10-year zones of travel, there is the possibility of the spill eventually contaminating the aquifers that supply the City's drinking water. Planning for spill response should reflect the needs and concerns of the City while maintaining the quality of the groundwater.

Specific response procedures for wellhead protection areas must be determined prior to the occurrence of a contamination incident. The information obtained as a result of the susceptibility assessment and the wellhead protection area inventory can be used to determine what types of spill response measures are necessary for the protection of drinking water sources. In order to be accepted by local emergency responders, spill response procedures for wellhead protection areas should be realistic and easily implemented.

In order for spill response procedures to be effectively executed, coordination, cooperation, and communication among the responding agencies, organizations, and individuals is imperative. There are many spill response organizations at the local, state, and federal levels. Depending on the magnitude and type of the release, any of the following organizations may be involved in a spill response for a wellhead protection area in Washington State.

- Department of Ecology (DOE): The Spill Response Team is responsible for determining the source and cause of the release, and responsible party. If the responsible party is unknown, DOE will investigate to determine who is responsible and ensure that containment, cleanup, and disposal proceedings begin. The DOE's 24 Hour Spill Response can be contacted at (360) 407-6300 (Southwest Region) or (509) 575-2490 (Central Region).
- Department of Health (DOH): The Department of Health is developing a set of standard operating procedures, in conjunction with organizations such as DOE's Spill Operations Section and the Association of Fire Chiefs, which first responders can use in wellhead protection areas, critical aquifer recharge areas, and other sensitive groundwater areas. DOH also provides assistance through laboratory support and services if necessary to the cleanup effort. The DOH Office of Drinking Water hotline is (877) 481-4901.
- Department of Transportation (DOT): The Washington State DOT can provide spill response assistance through traffic control, equipment, and

personnel for non-hazardous cleanup activities on state and interstate highways.

- State Patrol: The state patrol is responsible for managing spills on interstate and state highways.
- Local Fire Department: Initial response to a hazardous spill will most likely be from the City of Bingen fire department. The Klickitat County Fire District No. 5 should be notified of the wellhead protection area boundaries.
- State & Federal Government: The State Emergency Management Duty Officer hotline is (800) 258-5990. The National Guard Joint Operations Center hotline is (253) 512-8773. The FBI's Seattle office hotline is (206) 622-0460. The EPA Region 10 Duty Officer hotline is (206) 553-1264. The National Response Center hotline is (800) 424-8802. The Department of Homeland Security National Operations Center hotline is (202) 282-9685.

There are many spill response plans in existence in Washington State which address specific geographical areas such as wellhead protection areas and types of materials such as oil discharges. Organizations involved in the storage and transport of hazardous substances have also been required to develop spill response plans. These plans are designed to be consistent and compatible to ensure that response efforts can be carried out effectively.

CONTINGENCY PLANNING

Contingency planning is an important component of a wellhead protection program. In the event that either of the City's wells needs to be taken off line due to contamination, a contingency plan helps to provide mitigation. A properly prepared and updated contingency plan helps ensure the water system and local officials are prepared to respond to emergency situations. Contingency planning also includes provisions for alternate sources of drinking water. The following steps are necessary for the development of an effective contingency plan:

- Identify maximum capacities of the existing system as to source, distribution system, and water rights restrictions. Assume a loss of well and re-evaluate.
- Evaluate the expansion options of the existing system's capacities relative to existing water rights.
- Identify existing or potential interties with other public water systems.

- Evaluate current procedures and make recommendations on contingency plans for emergency events.

EXISTING CAPACITY

The maximum capacity of The City of Bingen's existing water system is discussed in Chapter 1 and evaluated in Chapter 3. The City has adequate source capacity to serve the demands through the year 2031 if consumption continues as projected without a reduction in DSL, and throughout the 20-year planning period if DSL is reduced to 10 percent over the next three years.

WATER RIGHTS

The City's water rights were discussed and evaluated in Chapters 1 and 3.

INTERTIES

The City of Bingen has interties with one adjacent purveyor, the City of White Salmon. One intertie is used exclusively and continuously for 13 service connections on the Old Line. The other two interties feed the City's main water system on an as needed basis. There are no other water purveyors immediately adjacent to the City's water service area that would be able to provide significant source capacity to the City in the event of an emergency.

RECOMMENDATIONS

In addition, the following items are recommended contingency planning efforts the City of Bingen should consider implementing:

- Develop emergency procedures for implementing water conservation measures should one of the wells become contaminated.
- Diversify future source locations. Ideally new sources could be located in areas with limited potential contaminant sources and in areas far from existing sources. This would minimize the chance of all of the sources being contaminated at one time.
- Investigate the possibility of obtaining data from nearby monitoring wells in order to track potential contaminants in the aquifer near the wells.
- Make general information available for the public at the City Hall regarding the location of wellhead protection areas and appropriate handling of wastes.

- Provide public education materials regarding appropriate handling and disposal of potential groundwater contaminants.