1 Introduction

1.1 Background

In 1995, seventeen Class A water utilities in the Spokane area came together and formed the Spokane Aquifer Joint Board (SAJB). Their intent is to act as a group, in matters concerning water quality. Their consolidated actions will better protect the regions sole source of potable drinking water and will ensure that any regulations and/or programs put in place will be consistent area wide.

Four other purveyors have become members of the SAJB. Two in May of 1997, and one in September of 1998. In September 1997, the City of Spokane signed an inter-local agreement to share information about the aquifer and the program, and to work with the SAJB when forming policies and regulations. In the fall of 1999, the City of Spokane also joined the SAJB, thus making this wellhead protection program a truly regional effort.

Members of the SAJB as of December 1999 are:

Carnhope Irrigation District No. 7
Consolidated Irrigation District No. 19
East Spokane Water District No. 1
Hutchinson Irrigation District No. 16
Irvin Water District No. 6
Kaiser Aluminum Corp.—Mead Works
Kaiser Aluminum Corp.—Trentwood
Liberty Lake Sewer/Water District
Millwood, Town of
Moab Irrigation District No. 20
Model Irrigation District No. 18
Modern Electric Water Company
North Spokane Irrigation District No. 8
Orchard Avenue Irrigation District No. 17
Pasadena Park Irrigation District No. 17
Spokane, City of
Spokane County Water District No. 3
Spokane Industrial Park
Trentwood Irrigation District No. 3
Vera Water & Power
Whitworth Water District No. 2

The Spokane Aquifer (that part of the Spokane Valley Rathrdum Prairie Aquifer positioned west of the Washington-Idaho border), serves as the only source of potable drinking water for Spokane area residents. Outside of the city's limits, residents obtain their water from private wells or from one of the many water utilities which serve the area north and east (the valley) of the city. These utilities range in type from municipal to private, and in service size from less than 25 connections to more than seven thousand connections.

Because these individual purveyors, with the exception of the Town of Millwood and the City of Spokane, are either privately held companies or water and irrigation districts that do not have "land use authority", they face challenges when attempting to implement a wellhead protection program that a municipally owned and operated utility does not face. Because most of the SAJB's members do not possess the authority to control development through zoning ordinances, or other types of regulation, the members need to work closely with the County of Spokane, the City of Spokane, the Town of Millwood, local businesses, and the public, to ensure that entities and activities posing significant risks to the water

supply are subjected to appropriate actions that will mitigate or eliminate their potential to pollute the groundwater.

1.2 Regulatory

In response to Section 1428 of the 1986 Amendments to the Federal Safe Drinking Water Act (SDWA), the State of Washington mandated that public water systems develop wellhead protection programs. The goal of a wellhead protection program is to protect the groundwater supply for people who depend on this resource for the benefit of their health and life. The SAJB's program enhances the technical understanding of the Spokane Aquifer, determines wellhead protection areas (delineation), develops individual purveyor contingency plans, performs an area wide contaminant source inventory, and involves the public.

The intent of the SAJB's wellhead protection program is to proactively prevent contamination of groundwater used for drinking water by providing management zones around water supply wells. The primary motivation for implementing this local wellhead protection program is the potentially large financial impact caused by a contaminated public water supply. Experience demonstrates that it is considerably more cost-effective to implement proactive pollution prevention than to pay for an alternative drinking water supply or to initiate groundwater remediation efforts.

In 1979, the U.S. Environmental Protection Agency (EPA) designated the Spokane Aquifer as a sole-source aquifer under the requirements of the Safe Drinking Water Act (SDWA). To be designated as sole-source, an aquifer must supply fifty percent or more of the drinking water for a given area and must be the only economically viable source of drinking water for the community. The Spokane Aquifer qualifies as a sole-source aquifer because all residents within SAJB member's water service areas and in the City of Spokane rely entirely on the aquifer for their potable water.

The Spokane Aquifer is an unconfined aquifer; as a result, it is also highly vulnerable to contamination from activities aboveground. Recognizing the aquifer's high level of susceptibility to contamination, the Spokane Aquifer Joint Board initiated this wellhead protection program to develop a protection plan that will maintain the excellent quality and long-term viability of this valuable natural resource.

1.2.1 SAJB Water Supply Description

Earlier research done for the City of Spokane reviewed all available, relevant geologic, hydrologic, and hydrogeologic studies completed since the 1950s. At that time, the information was evaluated for its usefulness in supporting the development of a conceptual model. Information from these studies formed the basic technical foundation for this project. However, it was found that supplemental data and information were needed to define some key aspects of the aquifer system that were not well understood. Additional investigations were conducted for this project, then worked into the model. These studies unveiled geologic findings and explained phenomena that, until now, were either anomalous or conjectural (see Chapter 2 and Chapter 3 of this report for an in-depth description of the data collection and modeling process). This project has given the SAJB a better

understanding of local groundwater conditions, and underscores the importance of protecting this invaluable groundwater resource.

The Spokane Aquifer is one of the most transmissive aquifers in the world, and the community of Spokane has, and will need to reap the benefits of this prolific source of drinking water long into the future. In order to maintain the aquifer's water quality, the need for a region-wide wellhead protection program is paramount for residents of this area.

The 20 purveyors participating in this wellhead protection program have all of their wells/well-fields located within the boundaries of the Spokane Aquifer, and depend on the groundwater derived from this western reach of the Rathdrum Prairie/Spokane Valley Aquifer for their domestic, municipal, commercial, and industrial water needs. The members are comprised of various types of water utilities, including a town, major industrial companies, privately and publicly owned water and irrigation districts. The success of these entities working together to develop this program will standardize area regulations and develop unified resolutions to safeguard the area's water supply. Figure 1-1 outlines the Spokane Aquifer, depicts the area studied, and shows the location of SAJB members wells and well fields. Figure 1-2 outlines each SAJB purveyor district. District information was obtained from Spokane County's Water Quality Management Program circular 1996.

1.2.2 Funding Mechanism

In 1995 members of the SAJB applied for and obtained grant funds from the Washington State Department of Ecology's Centennial Clean Water Fund. These funds cover approximately one-half of the costs required to complete the SAJB's wellhead protection program. SAJB members covered the additional costs.

During the course of the program, the SAJB began working with Spokane County's Water Quality Management Program (WQMP). The WQMP shared information with the SAJB, and partially funded additional technical aquifer research along with some of the public education programs.

Total funding for the project is shared by the Department of Ecology's Centennial Grant Program, Spokane County Water Quality Management Program, and SAJB members.

1.2.3 Wellhead Protection Regulations

The Federal Safe Drinking Water Act amendments of 1986 established a new wellhead protection (WHP) program to protect groundwater that contributes to public drinking water supplies. Under the SDWA, Section 1428, each state must prepare a WHP program for submittal to the EPA. As legislated through the Revised Code of Washington (RCW) 70.119A.080, the Washington State Department of Health (DOH), issued an EPA-approved WHP program in May 1994. The statewide program is administered by the DOH.

In accordance with federal requirements and in compliance with the drinking water regulations outlined in the Washington Administrative Code (WAC 246-290), the DOH requires all Class A water systems in Washington State to develop a wellhead protection program. The legislative authority for wellhead protection planning is found in RCW, Sections 43.20.050, 70.11911A060, and 70.119A080.

The Washington State Department of Health has the authority and responsibility to adopt any rules necessary to ensure a safe and reliable public drinking water supply. This authority includes rulings that establish requirements for water quality, reliability, management, planning, emergency response requirements, and reporting requirements. RCW 70.119A060 establishes mandates for public water systems, including requirements to protect water sources used for drinking water, thus ensuring the availability of safe and reliable drinking water. This regulation also provides for any investigative actions necessary to ensure that a safe and reliable drinking water supply is continuously available to the public. SAJB members are all Class A water systems and must meet all of these requirements.

When initiating their plans the SAJB, in accordance with the DOH's determination of elements that must be included in a WHP program for Class A purveyors, included as part of its program the following components:

- Individual member's susceptibility assessments,
- A delineated WHP area for each members' wells and/or well-fields,
- An inventory of potential contamination sources,
- Required documentation for delineation and inventory findings,
- Preparation of contingency plans to aid each member in providing alternate sources of water,
- Plan for coordination with local emergency responders,
- Inclusion of public participation,
- Implementation of their wellhead protection program.

1.2.4 Susceptibility Assessments

Prior to forming the SAJB, individual members completed and submitted susceptibility assessments to the Washington State Board of Health. The assessments are available for review from that agency, and because they are a part of the public record, they are not incorporated into this report.

Figure: 1-1 Wellhead Protection Study Area – SAJB Wells/Wellfields

Figure: 1-2 SAJB Purveyor Water Districts

1.3 WHP Report Contents

The SAJB's Wellhead Protection Report is briefly outlined as:

Volume I contains the technical assessment, public education projects, potential contaminant source inventory, and the contingency planning data.

Volume II contains the management and implementation planning, and the first half of the appendix .

Volume III is the second half of the appendix.

Volumes I and II contain the following chapters.

1.3.3 Data Resource Information

The SAJB's WHP program utilized and then built on technical information collected during the City of Spokane's WHP program. This information provided several new discoveries that enhanced and modified the previous conceptual model of the Spokane Aquifer developed for the City of Spokane.

Because of existing information, it was possible for the SAJB's project to focus on three discrete geographic regions of the aquifer. They were; the state-line area, the central Spokane Valley, and portions of north Spokane near the interface of the Hillyard Trough and the Little Spokane River Valley.

Field collection, quality control, and aquifer monitoring plans were designed to guide the data collection process. In-depth geological, hydrogeologic, geophysical, and water level monitoring studies were completed. The processes and findings of these studies appear in Chapter 2 of this report.

1.3.4 WHP Area Delineation

As water is pumped from a well, groundwater in the aquifer is drawn toward the well. In response to a pumping rate, the rate and direction of groundwater flow changes as a function of the hydraulic and geologic properties of the aquifer. The effects that pumping has on the aquifer can be estimated to determine groundwater capture zones for wells and/or well fields. Methods for identifying these capture zones can range from simple arithmetic approximations to numerical computer simulations. Because of the size and complexity of the Spokane Aquifer, numerical modeling was selected for delineating capture zones around the SAJB's production wells and well fields.

Special wellhead protection areas (SWHPAs) were recommended for the SAJB's wells because of the aquifer's highly transmissive characteristics. The SWHPAs' time allotment is specific to each SAJB well and is based on the reaction time required to supplement lost production if one or more of a member's well(s) are contaminated. This type of special wellhead protection area (SWHPA) is allowed by the DOH. In addition to the SWHPA's, the SAJB agreed to delineate an aquifer wide protection area. Figure 1-3 outlines this area. A letter of request and description of the delineation process to be used by the SAJB was sent to Dave Jennings at the DOH in Seattle, WA. A copy of the letter appears in Appendix A.

The delineation of the SWHPAs provides additional flexibility for the creation of management strategies during the implementation phase of the program. Once the WHP areas were identified, a variety of management strategies for pollution prevention and risk reduction will be applied to address different types of contaminant threats within these areas. It is a concept to increasing the level of control in areas close to the well site. A complete description of the delineation process is in Chapter 2 and 3 of this report.

1.3.5 Public Education/Involvement

One of the major components for success of any WHP program is its attention to its public education and involvement tasks. SAJB members elected to begin their public education process early in their program. Members, in order to confirm their commitment as a group, gave identity to the group by designing a logo and adopting the slogan “Local Water Utilities United for Safe Drinking Water”.

As part of their public education process, members elected, individually and as a group, to exhibit and distribute information at public functions, such as, the 8th Annual Environmental Form -“Expo 97” and the 1997 Spokane County Fair. A slide presentation was developed, and presented to local groups like the Sierra Club, Lion’s Club, and League of Women Voters. Newsletters were published under the SAJB identity and distributed to public libraries and to persons who expressed interest in the program. Press releases and media information packets were prepared and along with interviews, were used to involve television, radio, and newspapers in the program. “A meeting in a bag”, a 12 minute public education video and educational materials, was prepared to aid members with public information and educational presentations. Five public meetings, held in public schools, were advertised in local newspapers. A complete description of the tools used for public education and involvement is described in Chapter 4 of this report.

1.3.6 Wellhead Risk Ranking and Assessment

Several methods of risk ranking potential sources of groundwater contamination were examined. Because of the inconsistency in the amount of information for each entity identified in the potential contaminant source inventory, a simple “1” to “4” ranking system was developed. “1” represents the least danger, and “4” represents the highest danger posed to the aquifer from the source. The basis for the system and the system is described in Chapter 5 of this report.

1.3.7 Potential Contaminant Source Inventory

Potential sources of groundwater contamination and areas of known groundwater contamination incidents within the Spokane Aquifer were inventoried as part of the wellhead protection plan. Many different potential contaminant sources were identified in the plan. The sources included improperly maintained underground storage tanks, industrial and commercial activities, known hazardous material leaks, chemical spills, landfills, and potential contamination related to vehicle and chemical transportation.

The DOH requires that facilities located within a WHP area be notified. Letters of notification, along with program information, were mailed to more than 2,000 local businesses and organizations. Employees of member districts were trained to answer the questions the notification letters generated. At the same time, regulating agencies, such as,

Figure: 1-3 Wellhead Protection Study Area –Aquifer Wide Protection Area

Ecology, EPA, City of Spokane, and County of Spokane were sent listings of the businesses and organizations that received notifications. A complete description of the contaminate source inventory process is in Chapter 6 of this report.

1.3.8 Contingency Plan Technical Report(s)

Standardized guidelines were developed that allowed individual SAJB members to prepared contingency plans for each purveyor's district. These individual plans were assembled as part of the appendix of this report. At the same time members met with emergency responders and developed a general contingency plan technical report. The general plan, used with the individual plans, offers each purveyor guidelines, and flow charts that represent emergency response actions in the event of contamination in monitoring wells, production wells, and wellhead protection areas.

The general plan also includes tables of organic, synthetic, and inorganic constituents that are considered a major threat to groundwater quality, and identifies personnel to contact for appropriate spill/incident response measures. The standardized plan and its supporting documentation appears in Chapter 7 of this report.

1.3.9 Management Plan

Once the public meetings were complete, a search began for representatives of trucking, real estate, manufacturing, industry, etc., (local "stakeholders,"). These representatives were asked to join a Citizens Wellhead Committee (CWC). The CWC met approximately twice a month from late July to November to discuss the amount of "risk" they believed the people of Spokane were willing to take with their drinking water supply. The CWC's goal was to identify the major areas of concern, and present ideas that would protect groundwater in the region.

The results of the CWC's deliberations were converted into a public survey. The survey findings and the CWC's issues were then brought before a policy forming committee. This committee also developed recommendations for changes to the existing special/conditional use permit process and policy/guidelines changes for drywells aimed at protecting the local drinking water supply.

The SAJB intends to implement the recommendations of the CWC by providing an educational and awareness enhancing campaign, neighborhood household hazardous waste removal, pursuing proactive business assistance for chemical use reduction, and maintaining a continually updated contaminant source inventory database.

The implementation plan resulting from the management planning process is intended to protect the aquifer and to work with existing ordinances and policies. The CWC's formation process and its findings, along with the implementation plan derived from the management planning process, are outlined in Chapter 8 of this report.