5 Wellhead Risk Ranking and Assessment

5.1 Introduction

In order to describe the relative risks presented by each identified potential contaminant source, the SAJB chose to risk rank the contaminant sources inventory (CSI) database. The scoring system had to be flexible enough to provide for a wide variety of input from several sources, including scientists and engineers, planners, and the general public.

A scoring system to risk rank businesses and facilities was developed for this project utilizing the available information contained in the assembled CSI database. An initial ranking method that was reviewed required substantial data not currently available in the information used to develop the CSI. To ensure area wide regulatory uniformity, this same ranking system is used by the City of Spokane. A description of other national risk ranking programs is provided below for comparison to the system developed for the SAJB.

5.2 Examples of Risk Scoring Methods

Nationally, cities and water purveyors to assess potential threats to groundwater quality have used a variety of risk scoring methods. A few of the methods are described below:

- Dayton, Ohio: The City of Dayton uses a scoring method adapted from an EPA grant study done by the West Michigan Shoreline Regional Development Commission (WMSRDC). This study developed a risk ranking based on material source and type. Information such as SIC number, material description and type of activity was used. The study used EPA data published by Arthur D. Little, 1975. Dayton compiled maximum daily weights of regulated materials at a given facility and multiplied the weights by a ranking system for each material.

- Indianapolis Water Company, Indiana: This private water purveyor selected a ranking system proposed by the Ohio office of the EPA. The rankings were 1) highest risk for known contaminated sites, 2) medium to high for facilities with underground storage tanks, and solid waste disposal sites, 3) medium for bulk chemical storage and sewage handling systems, 4) medium to low for junk yards, quarries and vehicle maintenance sites, and 5) low for other business sites. Sites that were unknown were identified separately. It was a first cut at categorization for the purpose of focusing attention on the largest facilities handling potential contaminants, unknown facilities, or where more specific data needed to be gathered.

- Albuquerque and Bernadillo County, New Mexico: The City of Albuquerque and Bernadillo County developed a risk model based on 1) potential for groundwater contamination, 2) economic impacts of a contamination event, 3) type of wellhead capture zone the facility is located within, and 4) depth to groundwater.

- Spokane County Water Quality Management Program: Washington State University Study. In December 1994, a "Groundwater Risk Assessment Score Sheet (GRASS)" was developed for the Spokane Valley aquifer by Wade Hathhorn and Tyler Wubbena of Washington State University (WSU). The abstract states: "Modeled after the U.S. EPA's Hazardous Ranking System, GRASS incorporates chemical quantity, storage technique, toxicity, and fate and transport characteristics to establish a means for quantifying the relative risk for a contamination event to occur resulting from an accidental surface release of a given chemical inventory. In highlighting the utility of the ranking methodology, 47 organic chemicals were evaluated from approximately 53 sources across the Spokane Valley. With GRASS, users are able to produce a ranked list for the chemicals/sources evaluated. The information generated may be useful to land-use planners and water quality regulators in the development of future permitting of commercial/industrial activities within a wellhead protection area and is a valuable tool for aiding efforts to educate the general public regarding the issues of long-term preservation of the quality of groundwater supplies."

As part of the study, the developers defined a well developed algorithm to specifically address relative rank of contaminants. Further, the intent of this method was to make the algorithm flexible so that it could be revised and reassessed over time as new or better information becomes available. The weakness in the Spokane County—WSU method is the lack of sufficient field data. Of the 16 individual database lists acquired for the City of Spokane wellhead protection project, only one of the lists had sufficient data to use this ranking method. Consequently, the published results are conservative in that risks for individual sites appear to be worse than they probably are. This is because much of the necessary data is presently not available, such as type of tank or containment, and could not be obtained with the time and manpower available for this wellhead project. As a result, a worst case must be assumed for any unknown data. Therefore, more site-specific data is needed to adequately score many individual facilities using the GRASS algorithm. In the future as more data becomes available, the GRASS algorithm should be reconsidered for use in local Spokane wellhead protection programs.

For this CSI risk assessment, much of the supporting data for the above types of risk ranking are not readily available. Using the available information, a risk scoring system was developed for the wellhead protection program described in the following section.

5.3 Risk Ranking Criteria - SAJB Method

Because very little specific information is available for each site or business, relative ranking scores could be based only on categorical information. For example, sites that are known to be contaminated are obviously the highest risk, while businesses such as doctors' offices and hair salons pose a lower risk to groundwater contamination.

These two extremes, the low risk category and the high risk category, are the easiest to define. There are many businesses or sites that fall between these categories and cannot be ranked as high risk or low risk due to the limited data available. This suggests that four categories of risk are appropriate for the information available at this time. When executing the risk ranking method, subjectivity must be made to rank on the side of conservancy (a higher rank was given). As a result, as more information is provided or gathered, a change in individual businesses' ranking code may be required. The four levels of risk that were used to address the risk potential of the contaminant sources are as follows:

- Low Risk. Businesses in this category pose the least threat to groundwater. Examples are households and businesses that generally fit the profile of those addressed by Ecology's Moderate Risk Waste Program. These "small quantity generators" use or waste less than 2.2 pounds of certain pesticides or poisons and less than 220 pounds of hazardous materials per month. Although individual rankings are low, heavy concentrations of low risk entities can cause major problems, for example, a large number of households on acre sized lots using septic tanks. The risk assessment code for a low risk site is "1".

- Low to Medium Risk. This category is the largest and includes a great variety of risk potential. Businesses in this category are not typically in the hazardous materials business, but still use or waste more than 2.2 pounds of certain pesticides or poisons or more than 220 pounds of hazardous materials per month. While they may be considered regulated generators, the materials are handled in a controlled manner, such as in conformance with the current Ecology underground storage tank requirements or using above ground tanks, drums or other relatively small containers. The risk assessment code for a low to medium risk site is "2".

- Medium to High Risk. This category includes businesses or sites that store or process hazardous materials as their primary activity. These businesses deal in large quantities of hazardous materials and handle them in ways that are difficult to monitor or control, such as underground storage tanks that are not in conformance with current requirements. The risk assessment code for a medium to high risk site is "3".

- High Risk. This category includes businesses or owners of property that are known to have contaminated soils or groundwater, or have experienced an uncontrolled release. The risk assessment code for a high risk site is "4".

Table 5-1 lists each database used for the CSI inventory, its file code, risk rank and the general basis for the ranking entities listed on the database.

A complete list of SIC risk code assignment appears in Appendix O.

Table 5-1: CSI Inventories and Risk Assessment Codes

Inventory Name	File Code	Risk Rank	Basis for Rank
Critical Materials Users	CMU	4, 3, 2, or 1	SIC code
Facilities Index System - RCRIS	WAFINDS	3	Nature of activities
Facilities Index System - PCS	WAFINDS	3	Nature of activities
Facilities Index System - SSTS	WAFINDS	3	Nature of activities
Facilities Index System - NCDB	WAFINDS	3	Nature of activities
Facilities Index System - CRCLIS	WAFINDS	4	Nature of activities
Facilities Index System - DOCKET	WAFINDS	4	Nature of activities
Facilities Index System - FFIS	WAFINDS	3	Fed Facilities Compliance
Facilities Index System - TRIS	WAFINDS	4	Contaminant Release Inventory
Facilities Index System - PADS	WAFINDS	3	Nature of activities
Facilities Index System - PCB	WAFINDS	4	PCB use and storage
Facilities Index System - AIRS	WAFINDS	Not Ranked	Air pollution point sources - does not effect groundwater
Resource Conservation and Recovery Information System (RCRIS)	RCRA	3, 2, or 1	Large qty. generators, Transporters, treatment/storage/burner/blender = 3, Moderate qty. generators = 2, Small qty - 1
Corrective Action Database	CORACT	4	Poses a threat to groundwater
Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS)	CER3RG, CER8WA, CERCAP, CERPLR	4	Considered an immediate threat to groundwater
National Priorities List	NPL	4	Poses a threat to groundwater
EPCRA – Hazardous Site Listing	EPAHIL	4	Poses a threat to groundwater
EPCRA -Toxic Chemical Release Reporting	TRISUM	4	Poses a threat to groundwater
EPCRA – Hazardous Chemical Inventory	IT_95	3	Storage of materials
Confirmed and Suspected Contaminated Sites Report (CS&CSR)	ICIS	4	Poses a threat to groundwater
Ecology's Hazardous Sites List	EHSL	4	Poses a threat to groundwater
Underground Storage Tanks	UST	3, or 2	Installed prior to 1988 = 3, Installed after 1988 = 2
Leaking Underground Storage Tanks	LUST	4	Contaminated soils and sites that pose a threat to the aquifer
Shopsweep Survey	SHPSWP	3	In accordance to SIC code #75
Snapshot Survey	SNPSHT	3	In accordance to SIC code # 27
Drycleaner Survey	DRYCLN	3	In accordance to SIC code #28

CSI Inventories and Risk Assessment Codes (continued)

Inventory Name	File Code	Risk Rank	Basis for Rank
WSDA – Agencies	AGENCY	3	Nature of licensing process.
WSDA – Commercial Applicators	COMAPP	3	Nature of licensing process.
WSDA – Private Applicators	PVTAPP	1	Nature of licensing process.
Hazardous Materials List	CAMEO	3	Material storage.
Purveyors Survey	PVR	3, 2, or 1	General SIC for type of business
Sandborn Insurance Maps	HS	3, 2, or 1	General SIC for type of business
Milesker Maps	HM	3, 2, or 1	General SIC for type of business
Newspaper Articles	HNEWS	3, 2, or 1	General SIC for type of business
Additional Historical	H…..	4, 3, 2, or 1	Retains their original ranking.