

***GROUND WATER
SOURCE PROTECTION USER'S GUIDE***

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**STATE OF UTAH
DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF DRINKING WATER**

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INTRODUCTION

Protecting wells and springs is critical because they are vulnerable to contamination. The best way to protect a drinking water source is to develop and carry out a Drinking Water Source Protection (DWSP) plan. If you follow the advice in this user's guide, it will suggest important information that you should collect about your drinking water sources and help you identify the potential contamination sources (PCSs), which threaten them. This information will, in turn, help you plan strategies to protect your wells and springs.

It is the responsibility of public water systems (PWSs) to protect their wells and springs from contamination. The purpose of the DWSP Rule is to provide the framework for you to fulfill this responsibility. The Division of Drinking Water (DDW) does not have the authority to control the activities of PCSs. However, city, town, and county governments do. These local governments can work in your behalf to protect wells and springs from contamination by passing ordinances to control land uses within protection zones. If local government is unable or unwilling to provide protection for PWSs, these protection issues may be addressed through other means, such as land ownership, land use agreements, and public education programs.

There are other reasons for establishing source protection in your community. A quality source of drinking water is truly a source of community pride. Sources of drinking water are also valuable community assets and protecting them protects the capital the community has invested in them. Also realize, that it is very difficult and usually illegal for local government to restrict a potentially polluting activity just as its development plans are made public, especially if they comply with current zoning ordinances. Source protection plans anticipate potential problems and establish a process for dealing with them.

Ground Water Source Protection User's Guide

This user's guide is divided into two parts:

- **Part I** - provides guidance for writing a Preliminary Evaluation Report for proposed new wells, springs, and tunnels;
- **Part II** - provides guidance for writing DWSP Plans for existing wells, springs, and tunnels and for new sources with approved PERs that must be upgraded to DWSP Plans within one year.

Submittal Schedule for Proposed New Wells and Springs

A Preliminary Evaluation Report (PER) and construction specifications must be submitted to DDW for each new well, spring, and tunnel before its construction begins. This includes new sources for transient non-community water systems. A new source is any source for which plans and specification were submitted to the Division after July 26, 1993. A PWS shall not begin construction of a new source until DDW concurs with its PER. A refined report that meets the requirements of a

DWSP Plan must then be submitted to us within one year of when the PER approval letter is dated. Refer to Chapters 1& 2, for information on developing a PER for new sources.

Submittal Schedule for Existing Wells and Springs

The due date for submitting an initial DWSP Plan for existing wells, springs, and tunnels for community and non-transient, non-community public water systems has passed. Subsequently, DWSP Plans must be resubmitted every six years. The rule requires that plans be updated often enough to ensure that they reflect current conditions in the protection areas. Among other requirements, this includes:

- Documenting in the recordkeeping section of your source protection plan that each item listed in the implementation schedule is carried out according to schedule;
- ensuring that the protection zone delineation is accurate (for example, increased pumping rates increase the size of the protection areas);
- adding new potential contamination sources to the inventory as they move into the protection areas;
- deleting potential contamination sources from the inventories as they move out of the protection areas; and
- updating information about the hazards used at the potential contamination source facilities.

The following table identifies the deadlines for resubmitting these plans:

Population Served by PWS:	Type of Source:	DWSP Plans Initially Due by:	Updated Plans Next Due by:
Over 10,000	Wells	December 31, 2002	December 31, 2014
3,300 - 10,000	Wells	December 31, 2003	December 31, 2015
Less than 3,300	Wells	December 31, 2004	December 31, 2016
All Populations	Springs	December 31, 2005	December 31, 2017

TABLE 1 - Submit DWSP Plans for wells and springs according to this schedule.

We have prepared a *Standard Report Format for Ground-Water Source Protection Plan Resubmittals* to assist PWSs in preparing their updated plans for resubmittal. We strongly advise that this format be followed to ensure that none of the important parts of these documents are left out. Call (801) 536-4200 to request copies.

Note: Compliance with this rule continues to be voluntary for **existing** ground-water sources of drinking water, which are used by transient non-community water systems. However, their new sources are required to meet the requirements of source protection.

Consulting Services

If you choose to employ the services of a consultant to assist you in source protection, be sure to specify that you require a plan that is written for you; demand one that is easy to understand. Any geologic report or document that is submitted to DDW must be stamped and signed by a licensed geologist or licensed engineer. You should be specific about which sections you want them to write and which ones you want to write. It is especially critical that you have input in developing the management sections of the plan. Additionally, you should be able to tell exactly what you need to do to implement the plan. The implementation schedule is one of the most important sections of the DWSP Plan because it is a summary list containing every land management strategy and beginning implementation date that is to be carried out by the PWS. Tables and checklist are also very important for summarizing many of the other sections of an effective DWSP Plan.

The Source Protection Team

We strongly suggest that you form a source protection team to assist you in developing and carrying out the management strategies of source protection. This is because source protection teams have planned the most successful protection programs in the United States. A team will help ensure that your source protection plan works. Refer to Appendix C for information about putting a source protection team together.

Additional Resources

We have tried to address the specific needs of PWS personnel in this *Ground Water Source Protection User's Guide*. We have not tried to separate what is mandatory from what is not. If you would like to know what is mandatory, please request a copy of the Drinking Water Source Protection Rule (R309-600, Utah Administrative Code). DDW has prepared a *Standard Report Format for New Wells and Springs*, a *Standard Report Format for Existing Wells and Springs*, and a *Standard Report Format for Ground-Water Source Protection Plan Resubmittals* to assist PWSs in preparing PERs, DWSP Plans, DWSP Plan Resubmittals. We strongly advise that you follow these formats to ensure that all of the important parts of these documents are addressed. Call (801) 536-4200 to request the rule or the standard report formats.

Other guidance is also available. **Wellhead Protection: A Guide for Small Communities**, (EPA/625/R-93/002) may be obtained from the Environmental Protection Agency (EPA), along with other EPA references cited later in the User's Guide. To order EPA publications, call (800) 490-9198.

Additional Source Protection Assistance

The Rural Water Association of Utah manages a program to help PWSs develop DWSP Plans. Additionally, they periodically sponsor DWSP workshops and address DWSP topics in their annual and semi-annual conventions. Contact Michael Osborn at 801-756-5123.

Part I

PRELIMINARY EVALUATION REPORTS FOR PROPOSED NEW GROUND WATER SOURCES

Use this part of the Guide to develop a Preliminary Evaluation Report for proposed new wells, springs, and tunnels. Remember that this report must be reviewed and approved before you begin constructing these sources. Preliminary Evaluation Reports must be refined to meet the requirements of Drinking Water Source Protection plans within one year of their approval date. Part II, contains the guidance to develop Drinking Water Source Protection Plans.

CHAPTER 1 - THE PRELIMINARY EVALUATION REPORT

A Preliminary Evaluation Report (PER) is required for all new wells, springs, and tunnels that are to be used as sources of drinking water by public water systems (PWSs). This includes new sources for transient non-community systems. PERs are not required for wells that are classified as replacement wells. The PER and the Engineering Plans and Specifications should be submitted concurrently allowing for concurrent review. The Division of Drinking Water (DDW) will **not** grant approval to begin construction, or subsequently issue an operating permit until both of these documents are reviewed and approved.

Replacement Wells

A PER is not required for proposed wells, if the PWS receives written notification from DDW that the well is classified as a replacement well. The PWS must submit a letter requesting that the well be classified as a replacement well and include documentation to show that the following definition and conditions are met: A replacement well is a public-supply well drilled for the sole purpose of replacing an existing public-supply well which is impaired or made useless by structural difficulties and in which the following conditions are met:

- The proposed well location shall be within a radius of 150 feet from an existing ground-water supply well, as defined in R309-600-6(1)(k); and
- The PWS provides a copy of the replacement application approved by the State Engineer (refer to Section 73-3-28 of the Utah Code Annotated).

If a proposed well is classified as a replacement well, the PWS is still required to submit: A Drinking Water Source Protection (DWSP) Plan in accordance with R309-600-13(6); and all other information required in the Outline of Well Approval Process (refer to R309-515-6).

PERs must Receive Concurrence before a Source is Developed

One of the purposes of the source protection program is to ensure that PWSs will have the ability to protect their proposed new wells and springs *before* they are constructed. Because of this, PERs and construction specifications must be submitted to DDW, and receive written approval, before a new source is constructed. A detailed description of what to include in a PER is included in *The Standard Report Format for New Wells and Springs*. Call us at (801) 536-4200, if you would like to request a copy of this document. It is very important that the PER be approved before construction begins. ***PWSs take an enormous risk if they drill a well or develop a spring before its PER is approved. The money that has been invested in the construction cost of a new source may be lost if a subsequent review of the PER reveals that it cannot be approved.***

If a new public source of drinking water is being planned for a system, approval from DDW and a permit from the Division of Water Rights (DWR) is required. ***It is very important to obtain both an approval from DDW and a permit from DWR before the well is drilled.*** R309-600-13(1)

states: " Prior to constructing a new ground-water source of drinking water, each PWS shall develop a PER which demonstrates whether the source meets the requirements of this section and submit it to DDW. Additionally, engineering information in accordance with R309-515-6(5)(a) or R309-515-7(4) must be submitted to DDW. The Executive Secretary will not grant plan approval until both source protection and engineering requirements are met."

Purpose of Preliminary Evaluation Reports

PERs and Drinking Water Source Protection (DWSP) Plans are the primary means for PWSs to protect their sources of drinking water from contamination. These documents should not be developed just to meet the "letter of the law" required by the Rule. *They should be working documents that will be used on a regular basis by the PWS. The DWSP Plan should be written as a "how-to" handbook for a water system to protect their sources of drinking water now and in the future.* They should be logical and the protection strategies should be easily understood.

Drinking Water Source Protection Plans

The PER must be refined to meet the requirements of a Drinking Water Source Protection (DWSP) Plan within one year of the date of the PER approval letter. Additional sections and specific information regarding the properties of the source and any changes to the protection zones must be included in the DWSP Plan. Part II, of this guide will give you the specific information required to develop the DWSP Plan.

Delineation Procedure for New Wells

The Preferred Delineation Procedure must be used to delineate protection zones for new wells. The Preferred Delineation Procedure or the Optional Two-Mile Radius Delineation Procedure may be used to delineate new springs.

Protected and Unprotected Aquifers

The Rule now classifies wells as being in *protected* or *unprotected* aquifers. New wells in protected aquifers are required to have land use agreements for zone one (refer to Chapter 4, for an explanation of protection zones). New wells in unprotected aquifers are required to have land use agreements for zones one and two. This is because unprotected aquifers are more vulnerable to contamination. Land use agreements assure that landowners are willing to safeguard your water sources by agreeing not to locate uncontrolled potential contamination sources or pollution sources within specified areas.

To be classified as a well in a protected aquifer the following conditions must be met:

1. A naturally protective layer of clay, at least 30 feet in thickness, is present above the aquifer;

2. the PWS provides data to indicate the lateral continuity of the clay layer throughout the extent of zone two; and
3. the public-supply well is grouted with a grout seal that extends from the ground surface down to at least 100 feet below the surface, and through the protective clay layer.

Required Sections of a PER

An explanation of each section of a PER follows:

The Delineation Report (refer to Chapter 4) - The delineation report describes the protection zones and the scientific procedures, which are used to define them. Because there is no specific information available from the proposed well, such as an aquifer test, best available data may be used to determine the protection zones. The zones should be developed keeping in mind that they may change when more specific information about the aquifer is available after the well is drilled and tested.

The Inventory of Potential Contamination Sources (refer to Chapter 5) - The inventory is a prioritized list of all of the PCSs within the protection zones. A PER cannot be approved if there are:

- Uncontrolled PCSs or pollution sources within zone one of wells in protected aquifers; or
- Uncontrolled potential contamination or pollution sources within zone one or uncontrolled pollution sources within zone two of wells and springs in unprotected aquifers.

Sewer lines are permitted under the following conditions:

- Unprotected aquifer –
 - Zone one - sewer lines and laterals shall be at least 50 feet from the wellhead or margin of the collection area, and be constructed in accordance to R309-515-6.
 - Zone two - all sewer lines and laterals within zone two or a management area shall be constructed in accordance with R309-515-6.
- Protected aquifers -- in zone one all sewer lines and laterals shall be constructed in accordance to R309-515-6, and shall be at least 10 feet from the wellhead or margin of the collection area.

The Identification and Assessment of Current Controls (refer to Chapter 6) - The assessment allows you to determine which PCSs are adequately controlled and which are not.

Land Ownership Map and List - A land ownership map is required that includes all land within zones one and two or the entire management area. Additionally, a list is required which exclusively identifies the landowners in zones one and two or the management area and specifies the zone or management area in which they own land. A land ownership map and list are not required if ordinances are used to protect these zones.

Land Use Agreements, Letters of Intent, or Zoning Ordinances - Land use agreements are required in zone one for wells in protected aquifers. They are also required in zones one and two for wells in unprotected aquifers and for springs. Land use agreements must be in writing wherein an owner agrees not to locate uncontrolled PCSs within zone one. Additionally, an owner must agree not to locate pollution sources in zone two unless design standards are implemented to prevent contaminated discharges. Any restrictions must be binding on all heirs, successors, and assigns and must be recorded with the property description in the local county recorder's office. This provision applies even if the landowner and the PWS is the same person. Copies of this recording must be submitted to DDW.

Land use agreements on publicly owned lands need not be recorded in the county recorder's office. However, a signed statement from the administrator is required. This statement must contain the same information required in the land use agreements, which are described above.

Be aware that some agencies will not sign land use agreements. Some landowners will not sign them, either. That is why it is so important that you include these agreements in your PER and have it approved by DDW before you begin construction on any new source. There are a few PWSs that have unapprovable sources that they cannot use because the required land use agreements were not obtained.

Three examples of land use agreements follow. The first is for a well in a protected aquifer:

1. *I(we), the undersigned landowner(s), acknowledge the Drinking Water Source Protection Plan for the Greenville, Utah, Big Well. We agree not to locate or allow the location of any uncontrolled potential contamination sources, as defined in R309-600-6(1)(w) of the Utah Administrative Code, within zone one. This agreement is binding on all heirs, successors, and assigns.*

2. The second is for a well in an unprotected aquifer:

I(we), the undersigned landowner(s), acknowledge the Drinking Water Source Protection Plan for the Greenville, Utah, Little Well. We agree not to locate or allow the location of any uncontrolled potential contamination sources, as defined in R309-600-6(1)(w) of the Utah Administrative Code, within zone one. We also agree not to locate or allow the location of any pollution sources, as defined in R309-600-6(1)(v) of the Utah Administrative Code, within zone two unless design standards are implemented to prevent contaminated discharges. This agreement is binding on all heirs, successors, and assigns.

3. The third is for a spring in an unprotected aquifer written by a land management agency:

The U. S. Forest Service acknowledges the Drinking Water Source Protection Plan for the Greenville, Utah, Bounty Spring. We understand that protection areas are delineated for this spring and agree not to allow any uncontrolled potential contamination sources, as defined in R309-600-6(1)(w) of the Utah Administrative Code, to be located within zone one.

We also agree not to allow any pollution sources, as defined in R309-600-6(1)(v) of the Utah Administrative Code, within the two-mile radius management area unless design standards are implemented to prevent contaminated discharges or unless a hydrogeologic report shows that discharges will not affect the spring.

Letters of Intent to Record a Land Use Agreement - Notarized letters of intent from the land owner(s) may be used when initially submitting a PER. These letters must include the language required in a land use agreement and a statement that, the owner(s) agree to record a land use agreement in the county recorder's office if the source proves to be an acceptable source. **A copy of the land use agreement, which has been recorded in the county recorders office, must be submitted to DDW and an approval letter must be issued before the PWS will be permitted to introduce the new source into its public system.**

Zoning Ordinances - Zoning ordinances may be used in place of land use agreements if they contain the same restrictions as land use agreements. In other words, uncontrolled PCSs must be restricted from zone one for wells in protected and unprotected aquifers. Pollution sources that are not controlled by design standards must be restricted from zone two for wells and springs in unprotected aquifers. It is the responsibility of the PWS to cite and quote references and interpret the zoning ordinance to substantiate these restrictions. Please do not send a zoning ordinance and expect DDW to do this research. Appendix F contains an example of a source protection ordinance.

Waivers (only required if you want to maintain or apply for waivers) -

You must submit verification that certain pesticides and VOCs are not used within zones one, two, and three to be eligible for a Use Waiver for a new well. These pesticides and VOCs are identified in the *Water Quality Maximum Contaminant Levels, Rule R309-103 Summary*. Guidance for obtaining these waivers is included in Chapter 12. If pesticides and VOCs are used within zones one, two, and/or three, the source may be eligible for a susceptibility waiver. However, a Drinking Water Source Protection Plan must be developed for the source before susceptibility waivers will be considered.

CHAPTER 2 - CHECKLIST FOR LOCATING AND DEVELOPING A NEW DRINKING WATER SOURCE

In addition to finding water, there are other things to consider before deciding on the site location of a source of drinking water.

To Do before Construction

Preliminary Evaluation Report (PER)

- Delineation Report** - The expertise of a ground-water professional is usually required to develop a delineation report. If a delineation report contains geology work, it must be stamped and signed by a licensed geologist or licensed engineer. This report will provide the public water system (PWS) with a map that delineates the four protection zones required by the Drinking Water Source Protection Rule (R309-600 of the Utah Administrative Code). It will also report whether the well is in a protected or an unprotected aquifer.

Is the well located in a protected aquifer?

Consideration: If a new well is located in a protected aquifer, land use agreements that restrict uncontrolled potential contamination sources (PCSs) are only needed in zone one. If the well is located in an unprotected aquifer, land use agreements that restrict pollution sources, unless they are controlled by design standards, are also needed in zone two.

Consideration: Protected aquifer status is the most important consideration when the Division of Drinking Water evaluates the system's eligibility for a pesticide and/or VOC susceptibility reduced monitoring waiver.

- Inventory of Potential Contamination Sources and Identification and Assessment of Controls** - An inventory that includes any facility or site that employs an activity or procedure, which may potentially contaminate groundwater. Further, for it to be a PCS, a hazardous substance is usually associated with the processes used at the facility. This includes use, storage, manufacture, transportation, and disposal of hazardous substances. The specific hazards may be chemical, biological, or radiological in nature. The assessment allows you to determine which PCSs are adequately controlled and which are not.

Are there uncontrolled PCSs within zone one?

Consideration: A new well cannot be approved if there are uncontrolled PCSs within zone one.

Are there uncontrolled pollution sources within zone two?

Consideration: If a new well is located in an unprotected aquifer, it cannot be approved if there are uncontrolled pollution sources within zone two.

Are there sewer lines within zones one or two?

Consideration: Sewer lines that have at least five feet of suitable soil under them are permitted if they are set back at least 10 feet from the well and are specially constructed within zone one in accordance with R309-515-6(4). If there are unsuitable soil conditions (groundwater or bedrock) within 5 feet under any sewer lines they must be set back at least 300 feet from the well and be specially constructed within zone two.

Are there any PCSs on the inventory that may be impossible to control?

Consideration: Even though, public water systems may work with existing PCSs through memoranda of agreement, best management practices, and public education, etc., some may still be so difficult to control that the PWS may want to consider a different location for the well.

- Land Ownership Map** - A land ownership map that includes all the land within zones one and two is required. Additionally, include a list which exclusively identifies the land owners in zones one and two or the management area, the parcel(s) of land which they own, and the zone(s) in which they own land. A land ownership map and list are not required if ordinances are used to protect these areas.
- Land Use Agreements, Letters of Intent, or Zoning Ordinances** - Land use agreements which meet the requirements of the definition in R309-600-6(1)(p) are required. Zoning ordinances that are already in effect or letters of intent may be substituted for land use agreements; however, they must accomplish the same level of protection that is required by a land use agreement. Letters of intent must be notarized, include the same language that is required in land use agreements, and contain the statement that, "the owner agrees to record the land use agreement in the county recorder's office, if the source proves to be an acceptable drinking water source." The PWS shall not introduce a new source into its system until copies of all applicable recorded land use agreements are submitted to DDW.

Will the landowners within zone one (and zone two, if the well is in an unprotected aquifer) sign land use agreements? If the landowners will not sign land use agreements, are zoning restrictions possible?

Consideration: *A new well or spring cannot be approved without the necessary land use agreements or zoning restrictions.*

- Waivers** - A use waiver for the pesticide and/or VOC parameter groups may be issued if the chemicals in these parameter groups have not been used, disposed, stored, transported, or manufactured within zones one, two, and three for the past five

years. Additionally, initial sampling must indicate that none of the chemicals within these parameter groups are present.

If a use waiver is not possible, the PWS may consider applying for a susceptibility waiver when the Drinking Water Source Protection Plan is submitted.

Are pesticides and VOCs used within zone three?

Consideration: Pesticide and VOC use waivers cannot be issued if pesticides and VOCs are used within zone three within the past five years.

- Engineering Plans and Specifications** - Engineering plans and specifications governing well drilling must be prepared and submitted to the Engineering Section; the PER must be prepared and submitted to the Special Services Section. A letter that covers the approval of both the engineering plans and specifications and the PER must be received by the PWS before well drilling commences.

To Do during Construction

- Grouting Inspection** - An engineer from DDW, or a district engineer from the Department of Environmental Quality, or an authorized representative of the State Engineer's Office shall be contacted at least three days before the anticipated beginning of the well grouting procedure (see R309-515-6(6)(i)). The well grouting procedure shall be witnessed by one of these individuals or their designee.

To Do After Construction

The following applicable information must be submitted after the source is constructed in order for the PWS to obtain an Operation Permit that allows them to introduce a source into the system:

- A copy of the "Report of Well Driller";
- a copy of the letter certifying that the well was grouted in accordance with the well drilling specifications and the requirements of the R309-515;
- a copy of the pump test including the yield vs. drawdown test as described in R309-515-6(10)(b);
- a copy of the chemical analyses required by R309-515-4(5);
- documentation indicating that the water system owner has a right to divert water for domestic or municipal purposes from the well source;
- a copy of the complete plans and specifications covering the well equipment and diversion piping necessary to introduce the water from the well into the distribution system;
- a bacteriological analysis of the water obtained from the well after the installation of permanent equipment, disinfection, and flushing; and
- if *letter of intent* was submitted, then a copy of the recorded *land use agreement* must be submitted.

Part II

DRINKING WATER SOURCE PROTECTION PLANS

Use this part of the Source Protection User's Guide to develop Drinking Water Source Protection plans. The schedule for submitting plans is in the introduction. A concise description of what needs to be in each section of a plan is in the *Standard Report Format for Existing Wells and Springs*. Call us at 536-4200, to request a copy of this document.

CHAPTER 3 - THE DRINKING WATER SOURCE PROTECTION PLAN

A Drinking Water Source Protection (DWSP) plan is required for each well, spring, and tunnel which is used as a source by a public water system (PWS). There is one exception: Compliance with this rule is voluntary for existing sources that are used by transient non-community water systems. Transient non-community systems must still submit and meet the requirements for Preliminary Evaluation Reports (PERs) and DWSP Plans for any new sources that they develop. Also, Drinking Water Source Protection Plans are required from non-transient, non-community systems. Additionally, PERs for new wells, springs, and tunnels must be refined to meet the requirements for DWSP Plans within one year of the PER approval letter date. The submittal schedules for these source protection documents are found in the Introduction of this User's Guide. DWSP Plans are briefly described below; a detailed description is in the *Standard Report Format for Existing Wells and Springs*. Call us at 536-4200, to request a copy of this document.

Purpose of Drinking Water Source Protection Plans

DWSP Plans are the primary means for PWSs to use to protect their sources of drinking water from contamination. These plans should not be developed just to meet the "letter of the law" required by the Rule. ***They should be working documents that will be used on a regular basis by the PWS. The DWSP Plan should be written as a "how-to" handbook for the water system to protect their sources of drinking water now and in the future.*** They should be logical and easily understood. The implementation schedule is one of the most important sections of the DWSP Plan because it is a summary list containing every land management strategy and beginning implementation date that is to be carried out by the PWS to protect their sources.

Required Sections of DWSP Plans

A brief explanation of each section of a DWSP Plan follows:

- *The Delineation Report* (refer to Chapter 4) - The delineation report describes the protection zones and the scientific procedures that are used to define them and includes other supporting data.
- *The Inventory of Potential Contamination Sources* (refer to Chapter 5) - The inventory is a prioritized list of all of the PCSs within the protection area.
- *The Identification and Assessment of Current Controls* (refer to Chapter 6) - The assessment allows you to determine which PCSs are adequately controlled and which are not.
- *The Management Program for Existing Potential Contamination Sources* (refer to Chapter 7) - The program you develop to control each of the PCSs within your protection area.

- *The Management Program for Future Potential Contamination Sources* (refer to Chapter 8) - The program you develop to control PCSs that may want to move into your protection areas.
- *The Implementation Schedule* (refer to Chapter 9) - A summary list of the land management strategies you have identified in your management programs and the date you will begin to implement each of them.
- *The Resource Evaluation* (refer to Chapter 9) - An assessment of the financial and other resources that you estimate will be required to carry out your DWSP Plan. It also includes an evaluation of how you plan to acquire these resources.
- *The Recordkeeping Section* (refer to Chapter 9) - A section of the plan for you to document the implementation of each land management strategy you identify in the Implementation Schedule. Documents may include zoning ordinances, codes, permits, memoranda of understanding, public education programs, land use agreements, etc.
- *The Contingency Plan* (refer to Chapter 10) - A plan submitted concurrently with your first DWSP Plan. It may address emergencies, rationing, cleanup, and new source development.
- *Public Notification* (refer to Chapter 11) – A public notification must be distributed to your consumers.
- *Pesticide and VOC Waivers* (refer to Chapter 11) - Explains use and susceptibility monitoring waivers for pesticides and VOCs.

The remaining chapters and appendices of this User's Guide will help you ensure that each section of your DWSP Plan is complete and fulfills the requirements of the DWSP Rule.

CHAPTER 4 - THE DELINEATION REPORT

A drinking water source protection area is the surface and subsurface area surrounding a well, spring, or tunnel through which contamination is likely to move toward and pollute a source. Hydrogeologic methods are available to define drinking water source protection areas. These methods rely on scientific procedures to identify reasonably accurate source protection areas. Once source protection areas are delineated, the public water system (PWS) can focus their attention on inventorying potential contamination sources (PCSs) and strategies to control them.

Drinking Water Source Protection Zones

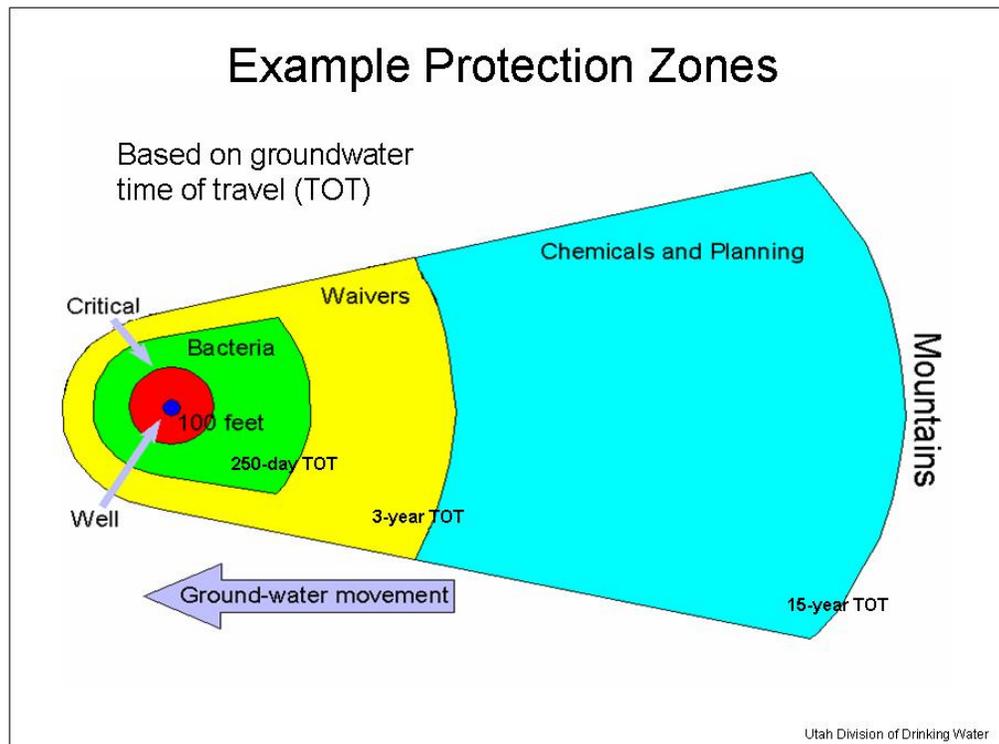
Qualified licensed professionals must prepare geologic reports and documents. Any report addressing the following topics must be stamped and signed by a professional geologist or professional engineer. These include delineation reports that are produced using the Preferred Delineation Procedure, reports to verify protected aquifer conditions, reports which address special geologic conditions, or hydrogeologic reports to exclude a potential contamination sources.

Two procedures to delineate source protection areas are described in Utah's DWSP Program: the Preferred Delineation Procedure and the Optional Two-Mile Radius Delineation Procedure.

The Preferred Procedure establishes thresholds for four zones:

- *Zone One* is the area within a 100-foot radius from the wellhead or margin of the collection area.
- *Zone Two* is the area within a 250-day ground-water time of travel to the wellhead or margin of the collection area, the boundary of the aquifer(s) which supplies water to the ground-water source, or the ground-water divide, whichever is closer.
- *Zone Three* (waiver criteria zone) is the area within a 3-year ground-water time of travel to the wellhead or margin of the collection area, the boundary of the aquifer(s) which supplies water to the ground-water source, or the ground-water divide, whichever is closer. *Zone three* is a three-year time-of-travel zone because use and susceptibility waivers must be renewed every three years. Refer to Chapter 11, for more information about waivers.
- *Zone Four* is the area within a 15-year ground-water time of travel to the wellhead or margin of the collection area, the boundary of the aquifer(s) which supplies water to the ground-water source, or the ground-water divide, whichever is closer.

If the aquifer test or driller's log indicate a layer within the producing aquifer(s) with higher ground-water velocity, then time-of-travel calculations must be based on that layer.



The Optional Two-Mile Radius Delineation Procedure is best applied in remote areas where no PCSs threaten the groundwater. This is because an area this large is unmanageable if there are many PCSs located within it. **The two-mile radius delineation procedure cannot be used for new wells.**

The Optional Two-Mile Radius Delineation Procedure establishes one protection zone and a management area:

- *Zone One* is the area within a 100-foot radius from the well or margin of the collection area.
- *For Wells the DWSP Management Area* is the area outside the 100-foot radius and within the two-mile radius of a well. Land may be excluded from the DWSP management area at locations where it is more than 100 feet lower in elevation than the total drilled depth of the well.
- *For Springs and Tunnels the DWSP Management Area* is all land at elevations equal to or higher than, and within a two-mile radius of, the spring or tunnel collection area. The DWSP management area also includes all land lower in elevation than, and within 100 horizontal feet of, the spring or tunnel collection area. The elevation datum to be used is the point of water collection. Land can be excluded from the DWSP management area at locations where it is separated from the ground-water source by a surface drainage, which is lower in elevation than the spring or tunnel collection area.

The Preferred Delineation Procedure

A Delineation Report that is developed using the preferred procedure includes a description of the geology in the area of the water source, construction and aquifer data, and a description of the hydrogeologic methods that were used. Then, this information is used to determine the boundaries of the source protection area. Refer to the *Standard Report Format for Existing Wells and Springs* and the *Standard Report Format for New Wells and Springs* for more information.

Having an accurate preferred delineation will save you time and money as you complete further phases of your DWSP Plan. Even though the DWSP Rule requires that geologists and engineers completing geologic work be licensed, money spent for these experienced professionals is usually worth the cost. The information required in these reports is very technical. Appendix A contains a list of consultants that may be able to help you. When you employ a consultant to delineate your protection area using the preferred delineation method, use the same care you would use in obtaining the services of any other professional firm. Also refer to R309-600-9(5)(a).

Delineation Reports for the Optional Two-Mile Radius Delineation Procedure

You should be able to develop the delineation report for the optional two-mile radius delineation procedure without the assistance of a hydrogeologic consultant, unless a hydrogeologic report is necessary for any of the PCSs within Zone one or the management area. The management area must be plotted on a map showing the location of the ground-water source of drinking water and the DWSP management area boundary. The base map must be a 1:24,000-scale (7.5-minute series) topographic map, such as is published by the U.S. Geological Survey. Although zone one (100-foot radius around the well or margin of the collection area) need not be plotted on the map, the complete two-mile radius must be drawn and labeled. More detailed maps are optional and may be submitted in addition to the map required above.

You have two options to address any PCSs located within the two-mile radius:

The first is to assume that these PCSs could contaminate your ground-water source, then plan and implement land management strategies to control them.

Otherwise, you must submit a hydrogeologic report for each PCS, as required in R309-600-9(5)(b)(ii). The purpose of this report is to determine if it is possible for a particular PCS to contaminate your well, spring, or tunnel. Hydrogeologic reports can be commissioned by owners of PCSs to determine their potential to contaminate. If a report proves there is no potential to contaminate, there is no need to plan or implement control strategies.

CHAPTER 5 - THE INVENTORY OF POTENTIAL CONTAMINATION SOURCES

The inventory of potential contamination sources (PCSs) identifies the facilities within your protection zones that could possibly contaminate drinking water unless you plan and implement a protection program. Once you have an inventory of PCSs, it must be prioritized from the PCS that poses the greatest risk to the one that poses the least risk. Additionally, the location of each PCS must be identified and plotted on a map.

Potential Contamination Source Definition

Potential contamination source (PCS) means any facility or site that employs an activity or procedure which may potentially contaminate groundwater. Further, for it to be a PCS, a hazardous substance is usually associated with the procedures employed at the facility. This includes use, storage, manufacture, transportation, and disposal of hazardous substances. Hazards may be chemical, biological, or radiological in nature. List only PCSs that are currently located within your protection zones - **don't list possible future PCSs, they are covered in Chapter 8.**

Survey Methods

Windshield, door-to-door, mail, and telephone surveys are some of the different types of surveys available to help you compile a complete inventory. Any reasonable survey method or combination of methods is acceptable. Use the type of survey that will meet your needs. However, be sure to use a survey form to conduct the survey. The Division of Drinking Water has one you may request at 536-4200, or you may design your own.

Surveys are designed by combining a number of discrete steps, including designing the survey, obtaining a list of contacts, mailing the survey or telephoning the contacts, following up on responses to the survey, and finally, tabulating and interpreting the results. Although windshield surveys may be time consuming, one study found that they identified the highest percentage of total sources among the source inventory methods that were used. Door-to-door surveys are ideal for gathering detailed inventories; although, it is usually necessary to train a service group, such as Retired Senior Volunteer Program (RSVP) members, to conduct the survey because of the large number of homes and businesses that usually need to be contacted.

Potential Contamination Source Inventory

Using your survey form and the following list as a guide, compile your list of PCSs. If you find other potentially contaminating activities that are not on this list, be sure to include them also:

1. Active and abandoned wells
2. Agricultural pesticide, herbicide, and fertilizer storage, use, filling, and mixing areas

3. Airport maintenance and fueling sites
4. Animal feeding operations with more than ten animal units
5. Animal watering troughs located near unfenced wells and springs that attract livestock
6. Auto washes
7. Beauty salons
8. Boat builders and refinishers
9. Chemical reclamation facilities
10. Chemigation wells
11. Concrete, asphalt, tar, and coal companies
12. Dry cleaners
13. Farm dump sites
14. Farm maintenance garages
15. Feed lots
16. Food processors, meat packers, and slaughter houses
17. Fuel and oil distributors and storers
18. Furniture strippers, painters, finishers, and appliance repairers
19. Grave yards, golf courses, parks, and nurseries
20. Heating oil storers
21. Industrial manufacturers: chemicals, pesticides, herbicides, paper and leather products, textiles, rubber, plastic, fiberglass, silicone, glass, pharmaceutical, and electrical equipment, etc.
22. Industrial waste disposal/impoundment areas and municipal wastewater treatment plants, landfills, dumps, and transfer stations
23. Junk and salvage yards
24. Laundromats
25. Machine shops, metal platers, heat treaters, smelters, annealers, and descalers
26. Manure piles
27. Medical, dental, and veterinarian offices
28. Mortuaries
29. Mining operations
30. Muffler shops
31. Pesticide and herbicide storers and retailers
32. Photo processors
33. Print shops
34. Radiological mining operations
35. Railroad yards
36. Research laboratories
37. Residential pesticide, herbicide, and fertilizer storage, use, filing, and mixing areas
38. Residential underground storage tanks

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| 39. Roads, highways, and freeways | 49. Submersible pumps used to pump wells |
| 40. Salt and sand-salt piles | 50. Taxi cab maintenance garages |
| 41. Sand and gravel mining operations | 51. Tire shops |
| 42. School vehicle maintenance barns | 52. Toxic chemical and oil pipelines |
| 43. Sewer lines | 53. Vehicle chemical supply storers and retailers |
| 44. Single-family septic tank/drain-field systems | 54. Vehicle dealerships |
| 45. Sites of reported spills | 55. Vehicle quick lubes |
| 46. Small engine repair shops | 56. Vehicle rental shops |
| 47. Stormwater impoundment sites and snow dumps | 57. Vehicle repair, body shops, and rust proofers |
| 48. Subdivisions using subsurface wastewater disposal systems (large and individual septic tank/drain-field systems) | 58. Vehicle service stations and terminals |
| | 59. Wood preservers |

Databases

Databases maintained by various agencies may also help you identify PCSs within your protection zones. These databases may contain valuable information about PCSs within your protection zones. Other sources of information include old and new telephone books, assessors' maps and records, city business licenses, and aerial photographs. Other databases may be available, these are some that we know about:

State Geographic Information Database (SGID): The Utah Automated Geographic Reference Center maintains this database. It can tell you the locations of abandoned mines, CERCLA sites, RCRA sites, SARA Title III sites, underground storage tanks, class V injection wells, coal deposit sites, groundwater permit sites, toxic release inventory sites, etc. There may be a fee to obtain this information. This office is located in the State Office Building, 450 N Main, SLC, UT, and can be contacted at (801) 538-3163.

Local Emergency Planning Committees: These committees maintain information about toxic substances that are stored or used at PCS facilities. SARA Title III requires these committees to maintain information about toxic chemicals that are stored, used, or manufactured at these facilities above certain threshold amounts. The information they maintain is available to the public upon

request. Local Emergency Planning Committees may also be able to furnish you with Material Safety Data Sheets (MSDSs). These information sheets provide information about the properties and health effects of the toxic chemicals used at these sites. If they can't furnish you with the specific MSDSs you need, the chemical manufacturer is required to provide them to you upon request. MSDSs are also available on the Internet; one site is located at <http://msds.pdc.cornell.edu/msdssrch.asp>. Refer to Appendix E for a list of the Local Emergency Planning Committees in Utah.

The Division of Water Rights: This division of state government maintains information about the locations of wells that have been drilled in Utah. Additionally, they maintain files containing the Report of Well Driller for these wells. The Division of Water Rights is located at 1636 W North Temple, SLC, UT, and can be contacted at (801) 538-7240.

The Department of Community and Economic Development: This department publishes the *Directory of Business and Industry*. It contains listings for business and manufacturing firms that have more than ten employees. These listings are classified by a "standard industrial code." This department is located at 324 S State, SLC, UT, and can be contacted at (801) 538-8700.

Even if information from databases is readily available, the listings will only identify facilities that have complied with requirements to file notification or obtain permits. Other inventory approaches must be used to identify unpermitted facilities.

Point and Nonpoint Sources of Contamination

Point sources of pollution are usually easy to inventory because they are visible and discrete; nonpoint sources are diffuse and often hard to trace to their sources. Another characteristic of nonpoint source pollution is that rules and regulations are usually not adequate to control it. Since many of these types of potential sources are unregulated, your effort should be focused on locating and inventorying them so effective control measures can be planned. Following are some examples of both point and nonpoint PCSs that are usually **not adequately controlled** and are often difficult to locate and inventory:

- Petroleum and other toxic chemicals that are stored underground for certain uses or below certain threshold quantities.
- Petroleum and other toxic chemicals that are stored above ground.
- Light industry processes that store and use toxic chemicals, but do not produce a "waste stream." The storage and use of these chemicals by light industry also increases the potential for accidental spills involving transfers from one container to another or leaks caused by rupture or corrosion of containers. Small spills or leaks in the same area over a long period of time have been linked to major contamination problems.

- On-site wastewater disposal systems (septic tanks/drain-fields) have controls on their construction and site locations, but very few controls on their maintenance or what is actually disposed in them. Improper disposals of toxic chemicals in septic systems have been sources of major contamination incidents. Despite efforts to regulate their placement and use, septic systems still represent the largest reported cause of ground-water contamination resulting in disease outbreaks in the United States.
- Water wells and other types of wells that have been improperly constructed, maintained, repaired, or abandoned may provide a conduit that can contaminate aquifers used for drinking water sources.
- Under certain geologic conditions, some pesticides applied to the land can leach to groundwater even from normal application procedures.
- Pesticides may enter groundwater through irrigation wells connected to chemigation systems unequipped with check valves to prevent back-siphonage of chemicals into the wells. When check valves are used at the wellhead to protect aquifers, they should be routinely tested and adequately maintained to ensure their integrity.
- Small but repeated pesticide spills over long periods of time in the same filling and mixing site by bulk handlers have been identified as significant sources of contamination.
- Fertilizers leaching into the groundwater and increasing nitrate to high levels have been associated with methemoglobinemia ("blue-baby syndrome") in infants.
- Class 5 injection wells include a wide range of shallow injection wells that are generally used to dispose of industrial wastewater and water runoff. These include motor vehicle waste disposal (MVWD) wells that receive fluids from vehicular repair and maintenance activities and shallow injection wells that receive storm water runoff. Regulations restrict the construction of all new MVWD wells in any area and are phasing out all existing MVWD wells in groundwater protection areas.

Hazards

Identifying potential sources of contamination is meaningless unless steps are taken to further identify the specific hazards employed at each facility. This information-gathering step may be completed as the survey is carried out or you may choose to make a personal contact at a later time with a representative of the PCS. Hazardous substances may be chemical, biological, or radiological in nature. They are usually labeled and display one or more of the following properties:

- Ignitable - capable of burning or causing a fire
- Corrosive - capable of eating away materials and destroying living tissue

- Explosive - capable of causing an explosion or releasing poisonous vapors when exposed to air, water, or other chemicals
- Toxic - capable of poisoning someone, either immediately (acutely toxic) or over a long period of time (chronically toxic)
- Radioactive - capable of damaging and destroying cells

Be sure to identify all of the specific hazards at a PCS. The hazards are the specific materials present. For example, the chemical hazards present at a PCS may be Dursban, Roundup, paints, cleaning solvents, gasoline, etc. A PCS may also have a septic system, which would include both chemical and biological hazards. Hazards associated with septic systems would include household hazardous waste, bacteria, viruses, and nitrate.

Telephone contact is appropriate for some personal interviews to gather information about the hazards used certain PCSs; a site visit is valuable to help you understand the hazards at certain other facilities. There should be a place on your survey form to document hazard information. The personal interview is a critical step in the information gathering process. Don't try to avoid it by sending letters or by assuming that you understand the potential hazards at a particular potential contamination facility. This information must be accurate in order for control strategies to effectively prevent contamination. Also, a personal interview is an excellent opportunity for you to convey the idea that both the PWS and the PCS should be working toward the same ground-water protection goals. Do your best to avoid adversarial relationships because uncooperative PCS personnel may defeat some of your source protection goals.

The Priority Order

The list of PCSs is arranged in priority order to help direct your resources to activities that are the highest risk to your well or spring. Although, you must explain the basis for the way you prioritize the inventory, your judgment is usually all that is necessary to arrange this list into a priority order. **Managing Groundwater Contamination Sources in Wellhead Protection Areas - A Priority Setting Approach**, (EPA 570/9-91-023) or some other priority setting guidelines may be used to establish an order if, in your judgment, there are circumstances that require a more precise order.

Identify and Plot Location

The location of each PCS must be identified in the inventory (zone 1-4 or the management area) and be plotted on the delineation map.

Inventory Maintenance

Maintaining a list of PCSs is a continuous effort. This list should be updated often enough to ensure that it reflects current conditions in your protection areas. This includes adding PCSs that

have moved into your protection areas, deleting PCSs that have moved out, and updating the data you are gathering to improve your knowledge about the potential sources in your protection areas.

CHAPTER 6 - THE IDENTIFICATION AND ASSESSMENT OF CONTROLS

There are four types of hazard controls: Regulatory, best management/pollution prevention, physical, and negligible quantity. Public water systems (PWSs) are not required to plan and implement land management strategies for potential contamination source (PCS) hazards that are assessed as *adequately controlled*. Hazards that are assessed *adequately controlled* must be reassessed periodically to ensure that conditions do not worsen without your knowledge. A reassessment schedule must be established according to the instructions that follow.

Any hazard that is **not** assessed as *adequately controlled* is considered to be *not adequately controlled*. Additionally, if the hazards at a PCS cannot be identified, the PCS must be assessed as *not adequately controlled*. Many PCS hazards have no controls and must to be assessed as *not adequately controlled*. Refer to Chapter 7, for a discussion about planning land management strategies for these PCSs. It is usually redundant to identify more than one hazard control; therefore, only one hazard control should be identified for each hazard. The instructions for assessing each type of control must be followed exactly or the assessment will be considered to be incomplete. Refer to Appendix D, for a list of government agencies and the programs they administer to control PCSs. The following controls are the only way hazards can be assessed as adequately controlled. *Protected aquifer classification cannot be used to assess any hazard as adequately controlled.*

Regulatory Controls

Regulatory controls are the codes, ordinances, rules, and regulations that are in effect to regulate a PCS hazard. The following six steps are required to assess a hazard as adequately controlled by a regulatory control:

1. Identify the enforcement agency.
2. Quote and/or cite specific references in the regulation, rule, or ordinance that pertain to controlling this hazard.
3. Explain how this regulatory control will prevent ground-water contamination.
4. Verify that this PCS hazard is actually being regulated by the enforcement agency.
5. Assess the hazard as *adequately controlled* and indicate that no further land management strategies will be planned and implemented unless conditions change.
6. Set a schedule to periodically reassess this control.

Best Management and Pollution Prevention Practices

Identify the best management and pollution prevention practices that are currently being used by the PCS to control the hazardous substances at the facility. The following five steps are required to assess a hazard as adequately controlled by best management/pollution prevention practices:

1. List the best management/pollution prevention practices which are being used to control this hazard.

2. Indicate that PCS management is willing to continue the use of these best management/pollution prevention practices to prevent ground-water contamination.
3. Explain how these best management/pollution prevention practices will prevent ground-water contamination.
4. Assess the hazard as *adequately controlled* and indicate that no further land management strategies will be planned and implemented unless conditions change.
5. Set a schedule to periodically reassess this control.

Physical Controls

Physical controls are man-made structures and impoundments, such as spill protection, that are in place to prevent a hazard from entering the groundwater. The following four steps are required before you can assess a hazard as adequately controlled by a physical control:

1. Identify the physical control(s) that has been constructed to control this hazard.
2. Explain how these controls prevent contamination.
3. Assess the hazard as *adequately controlled* and indicate that no further land management strategies will be planned and implemented unless conditions change.
4. Set a schedule to periodically reassess this control.

Negligible Quantity Controls

Negligible quantity controls refer to the amount or toxicity of a hazardous substance that is used by a PCS at their facility. It means that the risk of ground-water contamination is so negligible that it is not worth the time and effort to plan land management strategies to control it. The following four steps are required before you can assess a hazard as adequately controlled by a physical control:

1. Identify the hazardous substance and the quantity that is being used, disposed, stored, or transported.
2. Explain why this amount should be considered a negligible quantity.
3. Assess the hazard as *adequately controlled* and indicate that no further land management strategies will be planned and implemented unless conditions change.
4. Set a schedule to periodically reassess this control.

Once you have separated the *adequately controlled* PCSs from the *not adequately controlled* PCSs, you can begin to plan land management strategies. **Land management strategies must be planned and carried out for each PCS that is assessed as not adequately controlled.** The next chapter discusses The Management Plan for Existing PCSs.

CHAPTER 7 - THE MANAGEMENT PROGRAM FOR EXISTING POTENTIAL CONTAMINATION SOURCES

The Rule requires that land management strategies be planned for potential contamination source (PCS) hazards that are *not adequately controlled*. Public water systems (PWSs) have complete discretion to choose the land management strategies that will work best for them. The Division of Drinking Water (DDW) understands that these are local problems that require local solutions. We will not disapprove a plan because we disagree with management strategies. We may offer suggestions, but the PWS is responsible to make the final decisions about the land management strategies that it implements.

Regulatory and Non-regulatory Land Management Strategies

Land management strategies may be either regulatory or non-regulatory. Some examples of regulatory land management strategies are zoning and subdivision ordinances, site plan reviews, design and operating standards, and source prohibitions. Some examples of non-regulatory land management strategies are public education programs, purchase of property or development rights, household hazardous waste collection programs, ground-water monitoring, water conservation programs, memoranda of understanding, and written contracts and agreements. Refer to **Wellhead Protection Programs: Tools For Local Governments**, (EPA 440/6-89-002) for more information.

Don't make the mistake of assuming that the most effective land management strategies will always be regulatory. Remember that regulations usually require enforcement and there are many activities that are very difficult to enforce. These include pesticide and fertilizer application, waste disposal in septic tanks, the use and disposal of household hazardous waste, etc. Public education programs and memoranda of understanding which identify specific best management practices (BMPs) are much more effective in addressing these types of activities.

Best Management Practices for Commercial, Industrial, and Agricultural PCSs

Commercial, industrial, and agricultural PCSs that have been assessed as *not adequately controlled* should be contacted and informed that they are within the system's source protection zones. The PWS should provide them with a list of general best management practices (BMPs) that apply to their type of standard operation. Explain that following these BMPs is the first step in preventing drinking water contamination. DDW can provide general BMPs for the following facilities: Dry cleaners, metal finishers, print shops, vehicle maintenance, and use of pesticides and fertilizers. More facilities will be added to this list, so check with us at (801) 536-4200, from time to time to see what is available.

The next step is to encourage PCSs to develop their own facility specific BMPs. Each PCS's goal should be to prevent hazardous chemicals from coming in contact with the ground. Suggest the following procedure:

- Identify each hazardous chemical used at the facility that could contaminate groundwater;
- draw a separate flow chart for each chemical that details its flow through the facility; and
- identify the critical points in the flow charts where each chemical could potentially come in contact with the ground and subsequently enter the groundwater and contaminate it.

Keep the flow chart simple and be sure to ask the following questions to help develop it:

- How is it received and checked into inventory?
- Where is it stored?
- How is it used at the facility?
- Is there a waste stream from it that must be disposed?
- If so, how is it disposed?

Once they have drawn the flow chart and marked the critical points where chemicals could be spilled or deposited on the ground, the next step is fairly simple: Develop a list of BMPs for each hazardous chemical to prevent it from being spilled or deposited on the ground. An employee training program to implement the facility specific BMPs is the last and most important step of this process. Additionally, the PCS should post their facility specific BMPs in work areas and share them with the water system so they can be documented in the Recordkeeping Section of the source protection plan. A memorandum of agreement, which lists the BMPs and is signed by both the PWS and the PCS, is also very important so that each party clearly understands what is expected.

Additionally, you may request a fact sheet from DDW by calling (801) 536-4200, which explains pollution prevention programs. Pollution prevention programs are very similar to BMPs, and are another common sense approach in preventing groundwater contamination.

Residential PCSs

Residential PCSs may be more effectively addressed using a different approach. You may be able to address them collectively through public education programs. Bill stuffers, newspaper or newsletter articles, and workshops provide an effective vehicle for these public education programs. The critical topics for residential PCSs include pesticide and fertilizer application, use and disposal of household hazardous waste, and proper use and maintenance of septic tank/drain-field systems. We have developed fact sheets for each of these topics that you may request at 801-536-4200.

Information Sheets

Appendix G lists the PCS information sheets that are available from DDW. Refer to this material for guidance in identifying current controls and assessing them. It also contains suggestions about best management and pollution prevention practices. DDW can supply you with some fill-in-the-blank forms to help you record and organize the information you gather about each PCS. Please call 801-536-4200 to request this material.

CHAPTER 8 - THE MANAGEMENT PROGRAM FOR FUTURE POTENTIAL CONTAMINATION SOURCES

The Rule requires that a program be established to manage potential contamination sources (PCSs) that may want to locate within your protection zones some time in the future. This management program must be consistent with the provisions of the Rule to an extent allowed under your authority and jurisdiction. This should be a local program to identify PCSs that can control their contamination from those PCSs that cannot. Those that can and will control their contamination should be allowed to locate within protection areas and those that cannot should not be permitted.

Minimum Requirement for a Controlling Future PCSs

The PWS must establish and write into their plan the following process to fulfill the minimum requirement for controlling future PCSs:

1. Contact each PCS as it locates within your protection zones,
2. add it to the inventory of potential contamination sources,
3. identify and assess its controls, and
4. plan and implement land management strategies, if it is not adequately controlled.

Planning and Zoning Ordinances

The intent of the Rule is that you address such issues as: What if a subdivision, recreational facility, mining, or logging company wanted to locate or operate in your protection areas. We recommend that you address these issues by examining land ownership and future potential uses. Then you can pursue appropriate land management strategies depending on whether the land is publicly or privately owned. If you don't seek to address these issues now they will be much more difficult to address as future intended land uses are made known by various developers.

Adopting zoning ordinances is the most effective way to control future PCSs. Zoning ordinances allow you to:

- Control subdivision development and industrial growth at desirable levels,
- conduct site plan reviews,
- evaluate design and operating standards,
- ensure adequate spill protection and waste disposal procedures, and
- prohibit facilities that would discharge contamination to your aquifer.

Refer to Appendix F, for an example of a Source Protection Zoning Ordinance.

Authority and Jurisdiction

The Rule requires that land management strategies be planned which are consistent with its provisions and to an extent allowed under the authority and jurisdiction of the PWS. Cities, towns, and counties have the authority to pass and enforce zoning ordinances to control potential contamination. Some PWSs are owned by municipal governments and some are not. However, even those that are owned by municipal government may have protection zones that extend outside of their boundaries. Many PWSs lack the authority or jurisdiction to pass and enforce zoning ordinances within their protection zones. Planning and carrying out effective land management strategies may be difficult under these circumstances but in most situations it is still possible. Consider the following solutions:

- Protecting our drinking water should be a high priority objective for all local governments. Because of this, the city, town, or county outside of your jurisdiction may be willing to pass zoning ordinances to protect your sources of drinking water. Draft a protection strategy and discuss it with them in one of their meetings. They may ask you to work with their planner to develop an ordinance that is agreeable to all concerned.
- Section 10-8-15 of the Utah Code gives cities and towns the extraterritorial authority to enact ordinances to protect a stream or source from which their drinking water is taken... "For 15 miles above the point from which it is taken and for a distance of 300 feet on each side of such stream..." Class I cities (greater than 100,000 population) are granted authority to protect their entire watersheds. Section 10-8-15 applies to ground-water sources of drinking water.

Subdivisions

Many subdivisions provide a water supply for their residents through a public water system. They must also meet the requirements of source protection. Since subdivision developers own the land, they should provide for source protection to an extent required by the Rule. This includes providing setbacks and open spaces to provide a buffer area free of PCSs. Additionally, public education programs relating to the household use of pesticides and fertilizers, household hazardous waste, and disposal practices in septic tank/drain-field systems may be required.

CHAPTER 9 - THE IMPLEMENTATION SCHEDULE, RESOURCE EVALUATION & RECORDKEEPING SECTIONS

Following are guidelines to help you complete the Implementation Schedule, Resource Evaluation, and Recordkeeping sections of your plans.

Implementation Schedule

The implementation schedule is one of the most important sections of the DWSP Plan because it is a summary list containing every land management strategy and beginning implementation date that is to be carried out by the PWS. This summary list contains all of the land management strategies that you have identified in the management programs for both existing and future potential contamination sources (PCSs). Each *not adequately controlled* PCS hazard must be addressed. The Rule requires that land management strategies be implemented according to this schedule.

Resource Evaluation

This section requires you to evaluate the financial and other resources you will need to plan and carry out your Drinking Water Source Protection Plan. It also helps you assess the resources you will need to acquire before it can be implemented. Do you have adequate staff support? Will community volunteers help make up any resources you are lacking? Do you need to increase your fees or water rates? The Resource Evaluation may be as brief or as detailed as you choose.

Recordkeeping

Each land management strategy that is implemented according to the list in the Implementation Schedule must be documented in this section of the plan. Actual copies of any ordinances, codes, permits, memoranda of understanding, public education programs, bill stuffers, newsletters, training session agendas, minutes of meetings, memoranda for file, etc. are required to document the implementation of these management strategies. Additionally, actual copies must be submitted in the recordkeeping section of the Updated Plans that are due every six years.

CHAPTER 10 - THE CONTINGENCY PLAN

Contingency Plans should focus on the identification and possible solution of problems that may arise in the event that the Drinking Water Source Protection (DWSP) plan fails. Additionally, Contingency Plans address problems public water systems (PWSs) need to solve in the event of water shortages or contamination incidents that may impact their ability to supply safe drinking water to the public. Contingency planning includes emergency response, rationing, remediation, and new source development plans. Prior planning helps PWSs avoid crisis planning during emergency situations. Refer to Guide To Ground-Water Supply Contingency Planning For Local And State Governments, (EPA 440/6-90-003) for more information.

PWSs shall submit a Contingency Plan that includes all sources of drinking water for the entire water system to DDW concurrently with the submission of their first DWSP Plan. There are four possible parts to Contingency Plans:

1. Emergency Response;
2. Rationing;
3. Remediation; and
4. Source Development Plans.

PWSs should coordinate their contingency plans with plans developed in accordance with SARA Title III by local Emergency Planning Committees. *Guidelines for developing the four possible parts of a Contingency Plan are discussed in the remainder of this chapter. Since these guidelines may not apply to every PWS or every emergency situation, each PWS should design a contingency plan that specifically addresses their needs.*

Emergency Response Plans

Emergency response planning focuses on short-term solutions to likely problems the PWS may encounter because of accidents and natural disasters. The solutions will likely require the mobilization of resources for repairing the physical structure of the water system and sampling or issuing a "boil order" to assure that water is safe to drink. Please refer to the Emergency Response Handbook, available from DDW at (801) 536-4200, for detailed guidelines on emergency response planning.

Rationing Plans

Rationing plans establish a course of action to be implemented when water shortages occur. Drought, seasonal overuse, contamination, or accidents may cause these shortages. Plans should contain clearly defined, step-by-step procedures that assure the public a sufficient water supply for basic hygienic and culinary needs. Consider the following:

1. Each PWS should determine the "action level" caused by a water shortage, which will initiate their rationing plan. An "action level" is the critical point of water shortage that signals a PWS to implement their rationing plan.
2. List the positions and administrative duties of each person in the chain-of-command responsible for implementing the rationing plan.
3. Determine the resources available to the water system in dealing with water shortages. The following should be assessed: alternate water supplies; emergency water supply equipment; replacement equipment; technical assistance; and communication equipment.
4. Develop a step-by-step procedure for implementing the conservation measures to be taken.
5. Identify the public education, follow-through, and compliance actions to be taken to ensure consumers are following the rationing directives.
6. Determine how consumers and the media will be kept informed of the status of the emergency situation and the augmentation of the rationing plans.

Water Supply Decontamination Plans

The technology is available for reducing some contaminants in drinking water to acceptable levels. The most common example of this approach is disinfection to remove microbiological contamination. Another example is air stripping to remove volatile organic compounds, such as solvents. As contamination continues to threaten drinking water sources throughout the country, new remediation technology is being developed. Water system management should apprise themselves of what is currently available in the field of remediation technology. After protection zones have been delineated around each wellhead and spring collection area, and PCSs have been inventoried, it is recommended that the PWS identify the technology available to remediate each specific potential contaminant. There is only one alternative to not remediating a contaminated water supply and that is to abandon the drinking water source.

Source Development Plans

Developing new water supply sources is an important enterprise for a growing public drinking water system. It is also an important enterprise for any water system in the event their present sources are compromised due to contamination or water shortages. In evaluating source development, the following are important considerations:

1. Identify all undeveloped sources of water that have a potential for future development as drinking water sources. Start by listing backup wells and springs currently in the system, then list wells and springs that are abandoned, but could possibly be reclaimed and redeveloped. Finally, list potential springs and new well sites along with possible surface sources. PWSs may

want to keep this information confidential to prevent others from filing a claim on a water right first. This information need not be submitted to DDW with the Contingency Plan.

Proposed alternative sources may draw from the same aquifer as an existing water source that could potentially be lost to contamination. Therefore, when identifying potential alternative water supply sources for future development, the PWS should, if possible, first identify sources from different aquifers. If sources in a different aquifer are not possible, it is preferable to identify sources that would draw from parts of the aquifer up gradient from existing sources.

2. Determine the probable production of each of these sources and the percentage of your current and projected needs that would be supplied by each potential source.
3. List the steps required to obtain ownership and water rights for each potential new source. PWSs may be granted water rights based on anticipated water demand.
4. Determine the approximate protection zones around each potential new well or spring. Consider purchasing land or development rights, and enacting protective ordinances or land use agreements to protect the water source within the protection zones.
5. Inventory all PCSs within each approximate protection zone that may affect the quality of the drinking water now or in the future.
6. Identify the microbiological, chemical, and radiological quality of each potential drinking water source. Ensure that all parameters are below established maximum contaminant levels (MCLs).
7. Estimate when each new drinking water source will need to be introduced into the system to meet projected supply requirements.
8. Determine the financial resources that may be required for each drinking water source development project. List possible sources of revenue.
9. List the positions and administrative duties of each person responsible for implementing the drinking water source development plan.
10. Submit a Preliminary Evaluation Report to DDW concurrently with engineering plans and specifications before construction begins on any new ground-water source of drinking water.

CHAPTER 11 - PUBLIC NOTIFICATION

A public that is informed about source protection issues is your most important ally in furthering your source protection goals. When the public understands source protection principles, they are less likely to use pesticides contrary to label instructions, over fertilize their yards, and dispose of household chemicals improperly. They may even alert you to activities within your source protection zones that may threaten the drinking water quality of your water sources.

Public notification does **not** mean that you must identify the exact location of your wells and springs. It does **not** mean that you must identify individual potential contamination sources (PCSs). Additionally, public notification should **not** alarm the public about their drinking water and where it comes from, rather, the public should be informed about how human activities can and do affect all sources of water.

The deadline for completing the public notification requirement is December 31, 2003. Public notifications must address the following three criteria:

- Notify consumers that the PWS's complete Drinking Water Source Protection Plans are available for their review.
- Notify consumers of the two, three, or more highest priority potential contamination sources within their protection zones or state there are no potential contamination sources, if there are none.
- Rate the susceptibility of the PWS's sources (low, medium, or high) to contamination in the event that they are subjected to contamination.

Write a Public Notification Statement using the template that follows and distribute it to your consumers in your Consumer Confidence Report or by inserting it as a bill stuffer in your next billing or including it in your system's newsletter. There is no need to follow the template word-for-word; its purpose is to help ensure that you include all of the information that is required. Remember that the Public Notification Statement should generally address all of the wells, springs, and surface sources in your system. Use your own judgment along with the information in your Drinking Water Source Protection Plan to assess the susceptibility (low, medium, or high) of your sources to potential contamination. The template follows:

The Drinking Water Source Protection Plan for *(System Name)* is available for your review. It contains information about source protection zones, potential contamination sources, and management strategies to protect our drinking water. Potential contamination sources common in our protection areas are *(identify general kinds of greatest concern, such as septic tanks, roads, residential areas, industrial areas, etc.)*. Additionally, our *(well(s) and/or spring(s))* have a *(low, medium, high)* susceptibility to potential contamination. We have also developed management strategies to further protect our sources from contamination. Please contact us at _____, if you have questions or concerns about our source protection plan.

For security purposes, it is acceptable to remove or black out portions of the plan, which you make available to the public, that refers to source locations. Maps with source locations may also be removed.

Finally, send a copy of the Public Notification Statement to us and indicate how it was distributed to your consumers. That's all you need to do to accomplish this requirement.

CHAPTER 12 - PESTICIDE & VOC MONITORING REDUCTION WAIVERS

Certain monitoring waivers can potentially save Utah's public water systems (PWSs) a substantial amount of money each year. Systems currently pay about \$1,000 per sample for pesticide group analysis, \$200 per sample for Volatile Organic Chemical (VOC) group analysis, and \$200 per sample for unregulated group analysis. Reduced monitoring waivers for these parameter groups can be issued to systems based on their Source Protection Program.

Types of Monitoring Reduction Waivers

Three types of monitoring waivers are available to PWSs. They are reliably and consistently, use, and susceptibility. The criteria for establishing a reliably and consistently waiver are set forth in R309-205 and are summarized in the table at the end of this chapter. The criteria for use and susceptibility waivers follows and is summarized in the table at the end of this chapter.

If a source's DWSP Plan is due according to the schedule in R309-600-3, and is not submitted to the Division of Drinking Water (DDW), its use and susceptibility waivers for the VOC and pesticide parameter groups will expire. That is, unless an exception (refer to R309-600-4) for a new due date has been granted. Additionally, current use and susceptibility waivers for the VOC, pesticide and unregulated parameter groups will expire upon review of a DWSP Plan, if these waivers are not addressed in the plan.

Use Waivers

If the chemicals within the VOC and/or pesticide parameter group(s) have not been used within the past five years within zones one, two, and three, the source may be eligible for a use waiver. To qualify for a VOC and/or pesticide use waiver, a PWS must complete the following two steps:

1. List the chemicals which are used, disposed, stored, transported, and manufactured at each potential contamination source within zones one, two, and three where the use of the chemicals within the VOC and pesticide parameter groups are likely; and
2. submit a dated statement which is signed by the system's designated person that none of the VOCs and pesticides within these respective parameter groups have been used, disposed, stored, transported, or manufactured within the past five years within zones one, two, and three.

Susceptibility Waivers

If a source does not qualify for use waivers, and if reliably and consistently waivers have not been issued, it may be eligible for susceptibility waivers. Susceptibility waivers tolerate the use, disposal, storage, transport, and manufacture of chemicals within zones one, two, and three as long as the PWS can demonstrate that the source is not susceptible to contamination from them. To

qualify for a VOC and/or pesticide susceptibility waiver, a PWS must complete the following three steps:

1. Submit the monitoring results of at least one applicable sample from the VOC and/or pesticide parameter group(s) that has been taken within the past six years. A non-detectable analysis for each chemical within the parameter group(s) is required;
2. submit a dated statement from the designated person verifying that the PWS is confident that a susceptibility waiver for the VOC and/or pesticide parameter group(s) will not threaten public health; and
3. verify that the source is developed in a protected aquifer, as defined in R309-600-6(1)(x), and have a public education program which addresses proper use and disposal practices for pesticides and VOCs which is described in the management sections of the DWSP Plan.

Special Waiver Conditions

Special scientific or engineering studies or best management practices may be developed to support a request for an exception to paragraph R309-600-16(4)(c) due to special conditions. These studies must be approved by DDW before the PWS begins the study. Special waiver condition studies may include:

- Geology and construction/grout seal of the well to demonstrate geologic protection;
- memoranda of agreement which addresses best management practices for VOCs and/or pesticides with industrial, agricultural, and commercial facilities which use, store, transport, manufacture, or dispose of the chemicals within these parameter groups;
- public education programs which address best management practices for VOCs and/or pesticides;
- contaminant quantities;
- affected land area; and/or
- fate and transport studies of the VOCs and/or pesticides which are listed as hazards at the PCSs within zones one, two, and three, and any other conditions which may be identified by the PWS and approved by DDW.

Pesticide and VOC Parameter Groups

We have not included the actual listing of these parameter groups in the User's Guide because they are subject to change. These pesticides and VOCs are identified in the *Water Quality Maximum Contaminant Levels, Rule R309-103 Summary*. You may request a copy from us at 801-536-4200. Contact <http://ace.ace.orst.edu/info/extoxnet/> on the Internet to help you convert the chemical names of pesticides to commercial names.

Protect Your Waivers

Once a PWS is granted *use* or *susceptibility* waivers it should take steps to ensure that it will not lose these waivers in the future. Protection areas should be guarded against new PCSs moving into protection areas and using or misusing VOCs or pesticides within the parameter groups.

VOC and Pesticide Summary Table

Use, susceptibility, and reliably & consistently waivers for VOCs and pesticides are summarized in the table below.

Waivers						
	VOCs			Pesticides		
	Baseline :	With Waiver:	To Qualify:	Baseline:	With Waiver:	To Qualify:
Use	Annual	1/6 years	Signed statement of no use, disposal, storage, transport, or manufacture of chemicals within the VOC parameter group with the past 5 years.	Quarterly	No Monitoring	Signed statement of no use, disposal, storage, transport, or manufacture of chemicals within the pesticide parameter group with the past 5 years.
Susceptibility	Annual	1/6 years	1. Negative VOC sample within past 6 years 2. Protected Aquifer – Public Education 3. Dated statement from PWS that a susceptibility waiver will not threaten public health	Quarterly	Pop > 3,300 2/3 years Pop < 3,300 1/3 years	1. Negative pesticide sample within past 6 years 2. Protected Aquifer – Public Education 3. Dated statement from PWS that a susceptibility waiver will not threaten public health
Reliably & Consistently	Annual	1/3 years	3 annual negative VOC samples	Quarterly	Pop > 3,300 2/3 years Pop < 3,300 1/3 years	Pop > 3,300 1 year of negative quarterly pesticide samples Pop < 3,300 1 negative pesticide sample

APPENDICES

SUPPLEMENTAL GUIDANCE FOR DEVELOPING SOURCE PROTECTION PLANS

APPENDIX A - CONSULTING GROUND-WATER PROFESSIONALS (June 2012)

All DWSP reports which include hydrogeologic work must be prepared by a qualified licensed professional geologist or professional engineer [see R309-600-9(2)]. These reports include: a Delineation Report using the Preferred Delineation Procedure that is part of a PER or DWSP Plan, a report to verify protected aquifer conditions or special conditions, and a Hydrogeologic Report to Exclude a Potential Contamination Source. Someone that is knowledgeable and has experience with groundwater should complete the delineation work. The information required in these reports is quite technical and consulting services may be required. This appendix contains a list of consultants that have asked to be included; it is not intended to be an endorsement of their capabilities. Additionally, it is not a complete listing of all of the consultants doing this type of work for public water systems in Utah. If you choose to employ a consultant to delineate your protection area, use the same care you would use in obtaining the services of any other professional firm. For other persons or companies who may be qualified to provide these delineations consult listings, such as the Internet or telephone books, under the headings of hydrologists, geologists, hydrogeologists, engineers-environmental, engineers-geological, and engineers-geotechnical.

Firm	Address	Phone
Access Environmental Services, Inc.	1217 East 8725 South Sandy UT 84094	801-561-8279
Air-Water-Soil (AWS) Engineering, Inc.	5046 N 2400 W Smithfield UT 84335-9628	435-563-2522
Alpha Engineering and Surveying	148 E Tabernacle St. George UT 84770	435-628-6500
Paul B. Anderson, Consulting Geologist paul@pbageo.com	807 E South Temple Ste 200 Salt Lake City UT 84102	801-364-6613
Barnett Intermountain Water Consulting	106 W 500 S #101 Bountiful UT 84010	801-292-4662
Bingham Engineering	5160 Wiley Post Way Salt Lake City UT 84116	801-532-2520
Bowen Collins & Associates Inc Christopher D. Mikell, P.G.	756 E 12200 S Draper UT 84020	801-495-2224
Bulloch Brothers Engineering	2460 W 400 N Ste 6 Cedar City UT 84720	435-586-9592
Caldwell Richards Sorensen http://www.crsengineers.com	2060 East 2100 South Salt Lake City, Utah 84109	801-359-5565

Firm	Address	Phone
Cascade Water Resources John Files, P.G. john@cascadewaterresources.com	472 Wasatch Way Park City, UT 84098	801-573-8507
CH2M Hill Gary Colgan	215 S State Ste 1000 Salt Lake City UT 84111	801-350-5276
ERM - Rocky Mountain, Inc	102 W 500 S #650 Salt Lake City UT 84101	801-595-4800
EarthFax Engineering	7324 South Union Park Ave. Midvale UT 84047	801-561-1555
Franson Civil Engineers	1276 S 820 E American Fork UT 84003	801-756-0309
GEM Engineering, Inc. Joel Myers, P.E.	485 North Aviation Way Cedar City UT 84721	435-867-6478
Geo Consultants	580 N Main Cedar City UT 84720	435-586-8089
Granite Environmental, Inc. Austin F. Legler, P.E.	2469 E 7000 S #212 Salt Lake City UT 84121	801-943-1222
Preston L. Hafen Consulting Geologist	115 S Main Veyo UT 84782	435-574-2760
Hansen Allen & Luce	6771 S 900 E Midvale UT 84047	801-566-5599
JBR Environmental Consultants Inc	8160 S Highland Drive #A4 Sandy UT 84093	801-943-4144
Jones and DeMille www.jonesanddemille.com	1535 S 100 W Richfield, UT 84701	435-896-8266
J-U-B Engineering	2875 S Decker Lake Dr. Suite 575 Salt Lake City, UT 84119	801-886-9052
Kleinfelder	849 W Levoy Dr Ste 200 Taylorsville UT 84123	801-261-3336
Loughlin Water Associates Bill Loughlin, P.G. Bill@LoughlinWater.com	3100 W Pinebrook Rd. Suite 1100 Park City, UT 84098	435-649-4005
Millennium Science & Engineering	2319 Foothill Drive #180 Salt Lake City UT 84108-1488	801-461-0888

Firm	Address	Phone
Montgomery Watson	10619 South Jordan Gateway #100 South Jordan UT 84095	801-617-3200
North American Exploration	447 N 300 W Ste. 3 Kaysville UT 84037	801-544-3421
Paul Hansen Associates	paul@paulhansenassociates.com Sandy UT 84094	801-816-9119
R B & G Engineering	1435 W 820 N Provo UT 84601	801-374-5771
Riding & Associates Jack Riding	19469 S 1000 W South Jordan, UT 84095	801-254-9550
Jack R. Rogers, Geologist LASR Geo Consulting	P.O. Box 1103 Castle Dale UT 84513	435-381-5359
Scott Clark - Geologist SHC Consulting	279 West 100 South Logan UT 84321	435-760-4915
Secor International	308 E 4500 S Ste 100 Murray UT 84107-3957	801-266-7100
Stantec Consulting, Inc	3995 S 700 E Ste 300 Murray UT 84107	801-261-0090
Gene Stevenson (Southeastern Utah only)	PO Box 317 Bluff UT 84512	435-672-2277
Strata Consultants	330 S 300 E #200 Salt Lake City UT 84111-2525	801-355-0633
Sunrise Engineering	12227 S Business Park Dr. Draper, UT 84020	801-523-0100
SWCA Environmental Consultants John Christensen, P.G. jchristensen@swca.com	257 E 200 S Suite 200 Salt Lake City, UT 84119	801-322-4307
Terracon Ben Bowers	12217 S Lone Peak Prkwy Ste 100 Draper UT 84020-9449	801-545-8500
Wall Engineering Lynn Wall, P.E.	55 South Main #2 P.O. Box 39 Fillmore UT 84631	435-743-6800 435-743-4214

APPENDIX B - GUIDANCE FOR GROUND-WATER PROFESSIONALS

Delineation of Drinking Water Source Protection Zones

This guidance is intended for experienced ground-water professionals that are licensed geologists or licensed engineers. Requirements for delineation reports are specified in Section 9 of the Drinking Water Source Protection (DWSP) Rule (R309-600-9, Utah Administrative Code) and in the *Standard Report Formats for New and Existing Wells and Springs*. Call us at 801-536-4200 to request these documents. Many subjects discussed in this section are not explicitly explained in the DWSP Rule, but are generally accepted hydrogeologic standards or policies of the Division of Drinking Water (DDW).

A DWSP delineation report may be disapproved if the report is inaccurate or is missing any of the required information. When delineating the Source Protection zones, you must use the best data that is reasonably available. Protection zones must be accurate, but the cost of determining them should not be prohibitively expensive for the PWS.

References or Sources of Hydrogeologic Information

The sources for the hydrogeologic data in the delineation report must be documented. Documentation of your work is standard scientific/professional practice, and the delineation work must be documented in case the public water supplier receives inquiries concerning the delineation.

Aquifer Thickness (saturated thickness of the producing aquifer(s))

A generally accepted hydrogeologic method to determine aquifer thickness is to use the screened or perforated interval in the well. Another method is to use the thickness of aquifer layers adjacent to the screened interval as shown on the geologic log or Report of Well Driller. When only limited data are available, the aquifer thickness should not be extended below the depth of the well. If available, geologic logs of nearby wells, geologic cross sections, or other data may be used to demonstrate a greater aquifer thickness. If a well only partially penetrates the aquifer, use applicable interpretation and delineation methods.

Fine-grained layers (such as clay and silt) are generally not considered part of a producing aquifer. If the aquifer is confined, the confining layer(s) and all layers above or below it are not part of the producing aquifer. The producing aquifer will generally not include the complete saturated interval shown in the well.

Maximum Pump Rate

The maximum anticipated pump rate for the well must be used for determining the protection zones. Using average values for the pump rate will not give accurate results, because it does not take into account the effects of drawdown such as the higher ground-water velocities near the well created by the change in the potentiometric surface.

Effective Porosity of the Producing Aquifer

When estimating effective porosity of the aquifer use only the lithology of the producing aquifer; do not use an average of all lithologies described in the Report of Well Driller log. Reports published by the Utah Division of Water Rights, the Utah Geological Survey, or the U.S. Geological Survey often list porosity values determined for specific aquifers. If these are not available for the area of your well, porosity may be estimated from textbooks or other reports. Values for effective porosity should not exceed 30% unless there is direct evidence, such as laboratory analyses, that demonstrate a higher value.

Hydraulic Gradient and Groundwater Flow Direction

If hydraulic gradient or flow direction changes through the extent of the protection zones, adjustments must be made in the calculations. If the protection zones include a change from an alluvial aquifer to bedrock, this change must also be considered in the delineation.

A cone of depression develops in the potentiometric surface around most pumping wells. Because the hydraulic gradient in the cone of depression is significantly steeper than the regional hydraulic gradient, you can not use the ground-water velocity equation ($v=Ki/n$) for ground-water velocity to wells. Delineations completed in this manner will underestimate ground-water velocity near the well, and will yield inaccurate protection zones.

Hydraulic Conductivity and Aquifer Testing

A constant rate aquifer test is required for every new well. A constant rate aquifer test is also required for all existing wells, unless the necessary data can be obtained from previously run aquifer tests. Aquifer tests to determine hydraulic conductivity and transmissivity must be conducted and interpreted properly to obtain meaningful results. Each aquifer test should be designed, conducted, and interpreted by an experienced ground-water professional.

Delineation reports may be disapproved if the aquifer test is conducted improperly or the interpretation method is not appropriate for the test or aquifer environment. Graphs, field data, and printouts showing the interpretation of the aquifer test must be included in the delineation report. Requirements for aquifer tests are explained in two sections of the Utah Rules for Public Drinking Water Systems:

Source Development chapter, Well Development section (R309-515-6(10)(b)), and Drinking Water Source Protection chapter, Delineation of Protection Zones section (R309-600-9(5)).

If the tested well is pumping from an alluvial aquifer, the values determined from the aquifer test can only be used in the alluvial aquifer. If the well is located near bedrock and the protection

zones reach into bedrock areas, then adjustments must be made in the hydraulic conductivity where the groundwater is moving through bedrock.

Many books and professional papers have been written that discuss aquifer testing and groundwater hydraulics. A few of these publications include:

- Dawson, K.J., and Istok, J.D., 1991, *Aquifer Testing: Design and Analysis of Pumping and Slug Tests*: Lewis Publishers, Chelsea, Michigan, 344 p.
- Kruseman, G.P., and deRidder, N.A., 1994, *Analysis and Evaluation of Pumping Test Data, Second Edition*: International Institute for Land Reclamation and Improvement, The Netherlands, 377 p.
- Lohman, S.W., 1979, *Ground-water hydraulics*: U.S. Geological Survey Professional Paper 708, 70 p.
- Nelson, Dennis, 1995, *How to prepare for your aquifer test*: Pipeline, Drinking Water Program, Oregon Health Division, v. 10, issue 3, p. 1-4.
- Osborne, P.S., 1993, *Suggested Operating Procedures for Aquifer Pumping Tests*: Ground Water Issue, U.S. Environmental Protection Agency, 23 p.
- Rovey, C. W., II, and Cherkauer, D.S., 1995, *Scale dependency of hydraulic conductivity measurements*: *Ground Water*, v. 33, no. 5, p. 769-780.
- Stallman, R.W., 1983, *Aquifer-test design, observation, and data analysis*: *Techniques of Water-Resources Investigations of the United States Geological Survey*, Book 3, Chapter B1, 26 p.
- Sterrett, R.J., editor, 2007, *Groundwater and Wells*, third edition: Johnson Screens, St. Paul, Minnesota, 812 p.
- Walton, W.C., 1970, *Ground Water Resource Evaluation*: McGraw-Hill Book Co., New York, 664 p.
- Walton, W.C., 1987, *Groundwater Pumping Tests*: Lewis Publishers, Chelsea, Michigan, 201 p.

During an aquifer test, water level readings should be taken at the proper intervals from the pumping well and available observation wells. An example of time intervals for water level readings is shown in Table 1. This example may need to be modified for different testing methods, or hydrogeologic or well characteristics. Recovery tests may yield better data than the pumping portion of the test.

Table 1. Example aquifer-test time intervals for recording water level in wells

Time Since Pumping Started	Time Interval
0 - 2 minutes	10 seconds
0 - 5 minutes	30 seconds
5 - 15 minutes	1 minute
15 - 60 minutes	5 minutes
1 - 2 hours	10 minutes
2 - 8 hours	30 minutes
8 - 24 hours	1 hour
1 - 4 days	4 hours
4 days - end of test	1 day

If the constant-rate aquifer test does not work or is not practical to run, you may use another appropriate method to determine hydraulic conductivity. If hydraulic conductivity is determined from a nearby well or a published report, the values must be for the same aquifer. If the aquifer test does not work or cannot be conducted, explain in your report why you cannot use the aquifer test to determine aquifer parameters. The best method to determine hydraulic conductivity of an aquifer is an aquifer test. Other methods include specific capacity, drill-stem tests, slug tests, and laboratory tests.

Ground-Water Boundaries

Ground-water boundaries may also be used in delineation. Topographic divides and surface-water divides are not always ground-water divides. If a topographic divide is used in a delineation as a ground-water divide, evidence for the ground-water divide must be explained in the delineation report. Geologic structure and stratigraphy may be important in determination of ground-water divides.

Well Fields

In some situations it is useful to group nearby wells together as one source for delineation of protection zones. A group of wells may be considered a well field if two or more wells are located very close together, the wells are producing from the same aquifer, and there is significant well interference between the wells.

Fractured Bedrock Aquifers

If the aquifer is in fractured or faulted bedrock, then the delineation must account for these structures. Hydrogeologic mapping in the field is often necessary to determine fracture location, orientation, density, and aperture. Most ground-water models are designed for areally extensive homogeneous aquifers, and may yield inaccurate results in fractured bedrock areas (Wisconsin

Geological and Natural History Survey, 1991). If you use a ground-water model in a fractured rock aquifer, you must explain why the fractured aquifer can be modeled as a homogeneous porous medium, or using the particular model.

Ground-Water Models

There are many different ground-water models available, from simple analytical equations to complex numerical computer models. The DWSP Rule does not specify one model or method for delineation, but the method must be accurate and appropriate for the aquifer setting. The choice of hydrogeologic methods should be based on the type and complexity of the aquifer setting, limitations of the ground-water model, surrounding wells, and nearby PCSs. Before choosing and applying a ground-water model, the scientist must have a good concept of the ground-water environment, and must understand the assumptions and limitations of the model.

The simple ground-water velocity equation ($v=Ki/n$) cannot be used for pumping wells. This equation does not include calculations for the increase in the ground-water gradient near the well (in the cone of depression), and the protection zones would therefore be inaccurately small.

Interference Between Wells

Interference between pumping wells affects the size and shape of protection zones. When other pumping wells are located nearby, interference between wells must be a part of the delineation in order to calculate accurate protection zones. Some of the analytical and numerical computer models can model interference between wells.

References and Suggested Reading

General Groundwater References

- Fetter, C.W., Jr., 1988, Applied Hydrogeology: Merrill Publishing Company, Columbus, Ohio, 592 p.
- Freeze, R.A., and Cherry, J.A., 1979, Groundwater: Prentice-Hall, Inc., New Jersey, 604 p.
- Heath, R.C., 1989, Basic Ground-Water Hydrology: U.S. Geological Survey Water-Supply Paper 2220, 84 p.
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Delineation of Protection Zones

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APPENDIX C - THE SOURCE PROTECTION TEAM

Community involvement is the primary characteristic of a successful Drinking Water Source Protection (DWSP) program; organizing a source protection team helps get the community involved. Members of the source protection team should then seek to involve the rest of the community at even greater levels. Team members should represent the various interests of the community. Public water system (PWS) personnel, local governmental representatives, health department personnel, community residents, and industrial, agricultural, and commercial representatives, etc. should be members of the team.

Source Protection Team Responsibilities

A team leader should be appointed by the PWS or chosen by the team. This person should have organizational and consensus-building skills and have the support of the other team members and the community.

Once the source protection team is established, its members should determine their long-term goals. These should include defining a protection area, inventorying PCSs, and determining management approaches. After the long-term goals are established, they should be broken down into short-term tasks and assigned to members of the team.

Source Protection Team Functions

Many PWSs use a source protection team for the planning process and then disband it. However, since source protection is not static and is never really complete, it is a good idea to keep a source protection team active as long as protecting groundwater is an objective of your system. With the experience team members acquire during the planning process they will be valuable resources in working with both existing and new PCSs, continuing community education programs, and following through to ensure that management approaches are effectively implemented.

Suggestions for the Team to Help with Delineation

The source protection team may want to collect certain data and information about the ground-water source and the producing aquifer. The collection of this information will be valuable to your own technical staff, and may save you the money a consulting firm would charge if it were to collect this data for you.

Geologic Data - Any geologic data that may have been collected when choosing the site for the well, during drilling and development of the well, and that the PWS may have acquired since the well was drilled.

Aquifer Test - Provide data and results from pumping or aquifer tests performed using the well. Your consultant will probably need to conduct an aquifer test at the well site to determine

aquifer properties such as hydraulic conductivity and transmissivity. An experienced person should conduct and interpret the test; however, the source protection team members may be able to assist.

Well Data - Some or all of this data is probably stored in your system's files. It includes the Report of Well Driller and well construction data. If you don't have your Report of Well Driller, it can probably be obtained from the Utah Division of Water Rights, located at 1636 W. North Temple, Salt Lake City, Utah. The Division of Water Rights also has regional offices in different parts of Utah.

Pump Data - Again, this information is probably in your system files. It includes the model, type, make, series, and rating of your pump along with its installation date.

Here are a few ideas to further involve the community:

- Announce all of the meetings of the source protection team and report its progress in your local newspaper.
- Train a service group, such as Retired Senior Volunteer Program (RSVP) members, a Boy Scout troop, or a school science class, etc., to compile information for the plan.
- Some counties in Utah have organized Water Quality Task Forces through their County Extension Service. Contact your County Extension Agent if you would like to request the assistance of these folks in developing various parts of your DWSP Plan.
- Educate the community or appropriate segments of the community concerning subjects, such as the use and disposal of household hazardous waste, the use and maintenance of septic tank systems, disposal of used oil, etc.
- Some people in the community may come forward with information about historic potential contamination sites if they read or hear about your source protection objectives.

APPENDIX D - STATE, LOCAL, AND FEDERAL AUTHORITIES

State Agencies

The Division of Water Quality

Ground Water Quality Protection Rule - R317-6, Utah Administrative Code (UAC) - The Ground Water Quality Protection Rule establishes a permit system to regulate contaminated discharges to groundwater. Any contamination source that discharges contaminants to groundwater must obtain a permit from the Division of Water Quality. The Ground Water Quality Protection Rule contains five sections: 1. Groundwater quality standards; 2. groundwater classification; 3. protection levels; 4. groundwater classification procedures; and 5. groundwater discharge permit system.

Underground Injection Control Rule - R317-7, UAC - The Underground Injection Control Rule regulates the subsurface emplacement of fluids through bored, drilled, or driven wells; or through dug wells, where the depth of the dug well is greater than the largest surface dimension. Examples of underground injection wells include floor drains in service stations that discharge into sumps dug into the ground or drilled wells into which wastewater or other fluids are discharged.

This rule establishes a permit system to regulate underground injection wells. The Underground Injection Control Rule contains five parts: 1. Classification of injection wells; 2. prohibition of unauthorized injection; 3. permit requirements; 4. technical requirements; and 5. hazardous waste injection restrictions.

Class II underground injection wells are regulated by the Division of Oil, Gas and Mining.

Utah Pollutant Discharge Elimination System Rule - R317-8, UAC - The Utah Pollutant Discharge Elimination System (UPDES) program requires permits for the discharge of pollutants from any point source into waters of the State. The program also applies to owners or operators of any treatment works treating domestic sewage.

Large Underground Wastewater Disposal System Rule - R317-5 of the UAC - The Large Underground Wastewater Disposal System Rule applies to large underground disposal systems for domestic wastewater discharges that exceed 5,000 gallons per day (gpd) and all other domestic wastewater discharges not covered under the definition of an "Individual wastewater disposal system." Usually these systems should not be designed for over 15,000 gpd. In general, it is not acceptable to dispose of industrial wastewater in an underground disposal system.

The Division of Solid and Hazardous Waste

Hazardous Waste Rules - Resource Conservation and Recovery (RCAC) - R315-1 through R315-15 and R315-50, UAC - The Hazardous Waste rules provide for "cradle-to-grave" management of substances classified as hazardous wastes. Their objective is to prevent contamination of the environment, which includes groundwater, and potential adverse effects on

human health. These rules also identify those solid wastes, which are subject to regulation as hazardous wastes and to notification, transportation, and disposal requirements. Facilities that treat, store, or dispose of hazardous waste are regulated by this rule.

Solid Waste Permitting and Management Rules (Landfills) - R315-301 through R315-320, UAC - The Solid Waste Permitting and Management Rules are promulgated under the authority of the Solid and Hazardous Waste Act, Chapter 6 of Title 19, to protect human health, to prevent land, air and water pollution, and to conserve the state's natural, economic and energy resources by setting minimum performance standards for the proper management of solid wastes originating from residential, commercial, agricultural, and other sources.

The Division of Environmental Response and Remediation

Underground Storage Tank Rules - R311-200 through R311-211, UAC - The Underground Storage Tank Rules protect groundwater resources by preventing and detecting leaks and spills from underground storage tanks. Sites that are contaminated by leaking underground storage tanks must be cleaned up. Also, a fund has been established in the state to make sure that owners and operators of underground storage tanks can pay for correcting the problems they create if their underground storage tanks leak.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA commonly called Superfund) - Section 19-6-301 through Section 19-6-325 of the Utah Code Annotated - The Hazardous Substances Mitigation Act authorizes the executive director of the Department of Environmental Quality to regulate hazardous substances releases by making rules consistent with the substantive requirements of CERCLA, to establish the requirements for remedial investigation studies and remedial action plans.

40 CFR Part 300 of the Code of Federal Regulations - The National Oil and Hazardous Substances Pollution Contingency Plan establishes the organizational structure and specifies the procedures for remediating pollution when oil or hazardous substances are discharged or released into the environment.

SARA Title III - 40 CFR part 355 of the Code of Federal Regulations - SARA Title III provides early comprehensive emergency planning for responding to potential releases of toxic chemicals.

Facilities must notify the local emergency planning committee (refer to Appendix C for local emergency planning committees in Utah) when an "extremely hazardous substance" is present in an amount greater than the appropriate "threshold planning quantity." These facilities are required to prepare or have available a material safety data sheet (MSDS) for each hazardous chemical and submit it to the appropriate local emergency planning committee.

This regulation requires public access to information submitted to local emergency planning committees. Each emergency response plan, MSDS, inventory form, toxic chemical release form,

and follow-up emergency release notification is to be made available to the general public during normal working hours at the location designated for the local emergency planning committee.

The Division of Water Rights

Water Well Rule - R655-4, UAC - The Water Well Rule assists in the orderly development of underground water, insures that minimum construction standards are achieved in the drilling and repairing of water wells, **prevents pollution of aquifers within the state**, prevents wasting of flowing wells, obtains accurate records of well drilling operations, and insures compliance with the state engineer's authority for appropriating water.

Abandoned Water Wells - R655-4-12, UAC - These requirements are part of the Water Well Rule. When any well is temporarily removed from service, the top of the well shall be sealed with a watertight cap or seal. If the well is temporarily abandoned during construction, it shall be assumed that the well is permanently abandoned after 90 days. Any well that is to be permanently abandoned shall be completely filled in such a manner as to prevent vertical movement of water within the borehole as well as preventing the annular space surrounding the well casing from becoming a conduit for possible contamination of the groundwater supply.

The Division of Oil, Gas, and Mining

Oil, Gas and Mining; Abandoned Mine Reclamation - R643, UAC - The Abandoned Mine Reclamation Rule establishes land and water eligibility requirements, reclamation project objectives and standards, and project selection factors. These provisions apply to all reclamation projects to be carried out with money from the Account and administered by the Division. Lands and water are eligible for reclamation activities if:

- They were mined or affected by mining processes;
- They were mined prior to August 3, 1977, and left or abandoned in either an unreclaimed or inadequately reclaimed condition; and
- There is no continuing responsibility for reclamation by the operator, permittee, or agent of the permittee under statutes of the state or federal government, or the state as a result of bond forfeiture. Bond forfeiture will render lands or water ineligible only if the amount forfeited is sufficient to pay the total cost of the necessary reclamation. In cases where the forfeited bond is insufficient to pay the total cost of reclamation, additional moneys from the Account may be sought.

Oil, Gas and Mining; Non-Coal - R647, UAC - The Non-Coal Rule establishes land and water eligibility requirements for non-coal reclamation. Non-coal lands and water are eligible for reclamation if:

- They were mined or affected by mining processes;

- They were mined prior to August 1977, and left or abandoned in either an unreclaimed or inadequately reclaimed condition;
- There is no continuing responsibility for reclamation by the operator, permittee, or agent of the permittee under statutes of the state or federal government or the state as a result of bond forfeiture. Bond forfeiture will render lands or water ineligible only if the amount forfeited is sufficient to pay the total cost of the necessary reclamation. In cases where the forfeited bond is insufficient to pay the total cost of reclamation, additional moneys from the Account may be sought;
- The reclamation has been requested by the Governor;
- The reclamation is necessary for the protection of the public health and safety or all coal related reclamation has been accomplished; and
- Moneys allocated to the Division are available for the work.

Oil, Gas and Mining; Coal - R645, UAC - The Coal Rule applies to coal exploration and coal mining and reclamation operations.

Oil, Gas and Mining; Oil and Gas - R649, UAC - The Oil and Gas Rule applies to all lands in the state in order to conserve the natural resources of oil and gas in the state, to protect human health and the environment, to prevent waste, to protect the correlative rights of all owners and to realize the greatest ultimate recovery of oil and gas.

Class II Injection Wells - R649-5, UAC - These requirements are part of the Oil and Gas Rule. Class II injection wells must be completed and operated to prevent pollution or damage to any Underground Source of Drinking Water. The application for injection must include evidence that the proposed injection will not initiate fractures in overlying strata that could allow the injected fluid to enter the fresh water strata. The application must also include a review of all wells within a one-half mile radius of the injection well to determine that a conduit does not exist for fluids to move up or down the well bore to enter other strata. The casing of the injection well must be pressure tested before use, and thereafter the well must be tested at least once every five years, or the pressure may be monitored during injection operations.

The Department of Agriculture

Pesticide Control Rule - R68-7 of the UAC - The Pesticide Control Rule requires that pesticide application be consistent with the label for that pesticide and that pesticide application not violate the restrictions on the use of that pesticide.

Local Health Departments

Section 26A-1-114-(1)(a) of the Utah Code authorizes local health departments to "enforce state and local laws, regulations, and standards relating to public health and sanitation." Cities, towns, and counties are encouraged to enact local ordinances in conjunction with their source protection programs. Local health departments can strengthen local protection programs since they can enforce the ordinances relating to public health and sanitation.

Individual Wastewater Disposal Systems (Septic Tank/Drain-fields) - R317-501, UAC - These rules apply to individual wastewater disposal systems for domestic wastewater discharges which do not exceed 5,000 gallons per day. Plans, specifications, and a site evaluation are required to be submitted to the local health department having jurisdiction for review and approval prior to construction of these systems. Construction standards apply to the building sewer, septic tank, and drain-field. Isolation distances are required to protect wells, springs, surface water, and any other waters that might be affected by the pollutants discharged by individual wastewater disposal systems.

The site evaluation reports information about the proposed location of the system, such as, soil percolation rates, soil classifications, and distances to groundwater and bedrock. A final inspection by a registered sanitarian from the local health department is required to ensure the system is constructed as per plans and specifications prior to backfilling the system.

Scavenger Waste Disposal - R317-550, UAC - The Scavenger Waste Disposal Rule pertains to the collection, storage, transportation, and disposal of all wastes by liquid scavenger operators and requires that they be accomplished in a sanitary manner. It also requires these processes do not create a public health hazard or nuisance, or adversely affect the quality of the waters of the State.

Vault and Earthen Pit Privies - R317-560, UAC - The Vault and Earthen Pit Privy Rule permits privies as a substitute for water closets, for temporary or limited use in remote locations where provisions for water supply or wastewater disposal pose a significant problem. The intended primary use of vault and pit privies in this rule is for facilities such as labor camps, semi-developed and semi-primitive recreational camps, temporary mass gatherings, and other approved uses. Potable water under pressure may or may not be available.

Requests for the use of vault privies or earthen pit privies shall be evaluated on a case-by-case basis by the local health department having jurisdiction and must receive the written approval of the local health officer or his designated representative prior to the installation of such devices.

Federal Requirement

Under the Federal Safe Drinking Water Act Amendments of 1986, any department or agency of the federal government having jurisdiction over any potential source of contaminants within drinking water source protection zones or management areas identified by a State Drinking Water Source Protection Program, is subject to, and must comply with, all requirements of the State's

Program. This includes the payment of reasonable charges and fees levied in connection with the management or remediation of potential sources of ground-water contamination within drinking water source protection zones or management areas.

APPENDIX E - LOCAL EMERGENCY PLANNING COMMITTEES

SARA Title III requires Local Emergency Planning Committees to maintain information about toxic chemicals that are stored, used, or manufactured at potential contamination sources above certain threshold amounts. The information they maintain is available to the public upon request. They may also be able to furnish you with Material Safety Data Sheets (MSDSs) for the chemicals at the PCSs within their county. MSDSs can also be obtained on the Internet at <http://msds.pdc.cornell.edu/msdssrch.asp>.

When hazardous material spills occur on roads and highways within your protection zones, the chairperson of your local emergency planning committee will take charge of coordinating emergency response. You should contact this committee, provide them with a map of your protection zones, and ask them to notify you if there is a spill so you can provide them with important information about your well or spring. Your DWSP Plan contains hydrogeologic information that is a valuable resource in emergency response decisions. This information includes:

- What is the approximate time of travel from the spill to your well or spring,
- direction of ground-water flow, and
- whether the aquifer is protected or unprotected.

LOCAL EMERGENCY PLANNING COMMITTEES FOR COUNTIES

County	Chairperson	Address	Phone
Beaver	Les Whitney	PO Box 125 Milford, UT 84751	435-387-2107
Box Elder	Randy Wilde	125 S 100 W Tremonton, UT 84337	435-257-3318
Cache	Craig Humphreys	179 N Main Ste 302 Logan, UT 84321	435-750-5495
Carbon	Dennis Dooley	120 E Main Price, UT 84501	435-636-3290
Daggett	Richard Zohner	PO Box 219 Manila, UT 84046	435-784-3154
Davis	Brian Law	PO Box 618 Farmington, UT 84025	801-451-4129
Duchesne	Georg Adams	PO Box 228 Duchesne, UT 84021	435-738-1181
Emery	Martin Wilson	PO Box 817 Castle Dale, UT 84513	435-381-2404
Garfield	Sandra Francisco	PO Box 202 Tropic, UT 84776	435-834-8088
Grand	Corky Brewer	45 S 100 E Moab, UT 84532	435-259-5557

County	Chairperson	Address	Phone
Iron	Mark Gower	2132 N Main St Cedar City, UT 84720	435-867-7500
Juab	Fred Smalley	PO Box 133 Nephi, UT 84648	435-623-1349
Kane	Dave Owens	76 N Main Kanab, UT 84741	435-644-4911
Millard	Forrest Roper	765 S Hwy 99 Fillmore, UT 84631	435-743-5302
Morgan	Terry Turner	PO Box 886 Morgan, UT 84050	435-845-4048
Piute	Ryan Horton	550 N Main Junction, UT 84740	435-577-2893
Rich	Bryce Nielson	1065 N Bear Lake Blvd Garden City, UT 84028	435-946-2717
Salt Lake	Matt Morrison	3380 S 900 W Salt Lake City, UT 84119	801-743-7122
San Juan	Rick Bailey	PO Box 9 Monticello, UT 84535	435-587-3225
Sanpete	Bevin Blackham	241 N 100 W Moroni, UT 84646	435-436-8406
Sevier	Delbert Lloyd	835 E 300 N Richfield, UT 84701	435-896-2614
Summit	Butch Swenson	7988 Springshire Park City, UT 84098	435-640-1910
Tooele	Harry Shinton	47 S Main Tooele, UT 84047	435-843-4725
Uintah	Gary Roberts	152 E 100 N Vernal, UT 84078	435-781-5497
Utah	Tom Augustus	80 S 300 W Provo, UT 84601	801-852-6315
Wasatch	Robert Giles	1485 S US Hwy 40 Heber City, UT 84032	435-654-2500
Washington	Dean Cox	197 E Tabernacle St St George, UT 84770	435-634-5734
Wayne	Vicky Bower	PO Box 247 Bicknell, UT 84715	435-425-3100
Weber	Ray Strong	PO Box 135 Hooper, UT 84315	801-626-1222

LOCAL EMERGENCY PLANNING COMMITTEES FOR CITIES

City	Chairperson	Address	Phone
Salt Lake City	Dan Andrus	315 E 200 S Salt Lake City, UT 84111	801-550-0451
Sandy City	Ken Kraudy	10000 E Centennial Parkwy Sandy, UT 84070	801-568-7279
West Valley City	Kris Romijn	3660 Constitution Blvd West Valley, UT 84119	801-908-5757

APPENDIX F - DRINKING WATER SOURCE PROTECTION ORDINANCE

The following is an example of a source protection ordinance. Wellhead Protection Technology Transfer Centerpiece Workshop (EPA/600/K-92/015) was used as a reference. It has been changed to reflect recommendations in the Drinking Water Source Protection Rule, R309-600 of the Utah Administrative Code.

BE IT ORDAINED by the Mayor and Council of the City of _____ in Council duly assembled and it is hereby ordained by the authority of same that the following ordinance known as the Drinking Water Source Protection Ordinance is adopted and made a part of the Code of Ordinance of the City of _____, to wit:

Section 1. Short title and purpose.

- (a) This ordinance shall be known as the "Drinking Water Source Protection Ordinance."
- (b) The purpose of this ordinance is to insure the provision of a safe and sanitary drinking water supply for the City by the establishment of drinking water source protection zones surrounding the wellheads for all wells which are the supply sources for the City water system and by the designation and regulation of property uses and conditions which may be maintained within such zones.

Section 2. Definitions. When used in this ordinance the following words and phrases shall have the meanings given in this Section:

- (a) Design standard - means a control that is implemented by a potential contamination source to prevent discharges to the groundwater. Spill protection is an example of a design standard.
- (b) Land management strategies - means zoning and non-zoning controls which include, but are not limited to, the following: zoning and subdivision ordinances, site plan reviews, design and operating standards, source prohibitions, purchase of property and development rights, public education programs, ground-water monitoring, household hazardous waste collection programs, water conservation programs, memoranda of understanding, written contracts and agreements, and so forth.
- (c) Pollution source - means point source discharges of contaminants to groundwater or potential discharges of the liquid forms of "extremely hazardous substances" which are stored in containers in excess of "applicable threshold planning quantities" as specified in SARA Title III. Examples of possible pollution sources include, but are not limited to, the following: storage facilities that store the liquid forms of extremely hazardous substances, septic tanks, drain fields, class V underground injection wells,

landfills, open dumps, land filling of sludge and septage, manure piles, salt piles, pit privies, and animal feeding operations with more than ten animal units. The following clarify the definition of pollution source:

- (1) Animal feeding operation - means a lot or facility where the following conditions are met: animals have been or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12 month period, and crops, vegetation forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility. Two or more animal feeding operations under common ownership are considered to be a single feeding operation if they adjoin each other, if they use a common area, or if they use a common system for the disposal of wastes.
- (2) Animal unit - means a unit of measurement for any animal feeding operation calculated by adding the following numbers; the number of slaughter and feeder cattle multiplied by 1.0, plus the number of mature dairy cattle multiplied by 1.4, plus the number of swine weighing over 55 pounds multiplied by 0.4, plus the number of sheep multiplied by 0.1, plus the number of horses multiplied by 2.0.
- (3) Extremely hazardous substances - means those substances which are identified in the Sec. 302(EHS) column of the "TITLE III LIST OF LISTS - Consolidated List of Chemicals Subject to Reporting Under SARA Title III," (EPA 560/4-91-011).
- (d) Potential contamination source - means any facility or site which employs an activity or procedure, which may potentially contaminate groundwater. A pollution source is also a potential contamination source.
- (e) Regulatory agency - means any governmental agency with jurisdiction over hazardous waste as defined herein.
- (f) Sanitary landfill - means a disposal site where solid wastes, including putrescible wastes, or hazardous wastes, are disposed of on land by placing earth cover thereon.
- (g) Septic tank/drain-field systems - means a system that is comprised of a septic tank and a drain-field that accepts domestic wastewater from buildings or facilities for subsurface treatment and disposal. By their design, septic tank/drain-field system discharges cannot be controlled with design standards.
- (h) Wellhead - means the upper terminal of a well, including adapters, ports, seals, valves and other attachments.

Section 3. Establishment of drinking water source protection zones. There are hereby-established use districts to be known as zones one, two, three, and four of the drinking water source protection area identified and described as follows:

- (a) **Zone one** is the area within a 100-foot radius from the wellhead.
- (b) **Zone two** is the area within a 250-day ground-water time of travel to the wellhead, the boundary of the aquifer(s) which supplies water to the ground-water source, or the ground-water divide, whichever is closer.
- (c) **Zone three** (waiver criteria zone) is the area within a 3-year ground-water time of travel to the wellhead or margin of the collection area, the boundary of the aquifer(s) which supplies water to the ground-water source, or the ground-water divide, whichever is closer.
- (d) **Zone four** is the area within a 15-year ground-water time of travel to the wellhead, the boundary of the aquifer(s) which supplies water to the ground-water source, or the ground-water divide, whichever is closer.

Section 4. Permitted uses. The following uses shall be permitted within drinking water source protection zones:

- (a) Any use permitted within existing agricultural, single family residential, multi-family residential, and commercial districts so long as uses conform to the rules and regulations of the regulatory agencies.
- (b) Any other open land use where any building located on the property is incidental and accessory to the primary open land use.

Section 5. Prohibited uses. The following uses or conditions shall be and are hereby prohibited within drinking water sources protection zones, whether or not such use or condition may otherwise be ordinarily included as a part of a use permitted under Section 4 of the ordinance.

- (a) **Zone one** - The location of potential contamination sources as defined herein, unless they are controlled with design standards.
- (b) **Zone two** - The location of pollution sources as defined herein, unless their contaminated discharges are controlled with design standards.
- (c) **Zones three and four** - The location of potential contamination sources unless they are controlled through land management strategies.

Section 6. Administration. The policies and procedures for administration of any source protection zone established under this ordinance, including without limitation those applicable to

nonconforming uses, exception, enforcement and penalties, shall be the same as provided in the existing zoning ordinance for the City of _____, as the same is presently enacted or may from time to time be amended.

This Ordinance shall be effective as of _____(date). All ordinances and parts or ordinances in conflict herewith shall not be and the same are hereby repealed.

ENACTED AND ADOPTED this _____ day of _____, 19__.

Mayor

Attest: _____
City Clerk

APPENDIX G - POTENTIAL CONTAMINATION SOURCE FACT SHEETS

General information about potential contamination sources (PCSs) is contained in the Fact Sheets listed below. They are intended to be used to provide information about PCSs and to make general best management and pollution prevention practice recommendations. They are **not** intended to be used as a "cookbook" for source protection. Public water systems may find them helpful in getting started; however, best management and pollution prevention strategies should be tailored to fit the specific situations at each PCS. *You are encouraged to develop well thought out protection strategies that will effectively protect the quality of your drinking water.*

The following *Potential Contamination Source Fact Sheets* are available from the Division of Drinking Water. Call 536-4200 to request copies:

Dry Cleaning

Fertilizer

Household Hazardous Waste

Metal Finishers

Pesticides

Pollution Prevention

Printing Shops

Septic Tank/Drain-field Systems

Vehicle Maintenance & Repair

APPENDIX H – FEDERAL MULTI-AGENCY SOURCE WATER AGREEMENT



FEDERAL MULTI-AGENCY SOURCE WATER AGREEMENT

INTEGRATION OF STATE, TRIBAL AND LOCAL DRINKING WATER SOURCE ASSESSMENT AND PROTECTION INITIATIVES WITHIN A WATERSHED FRAMEWORK



I. BACKGROUND

The Clean Water Action Plan

The President's *Clean Water Action Plan* (CWAP) provides a blueprint for a cooperative approach to restoring and protecting water quality. Under this approach, state, federal, tribal, regional, and local governments, as well as private partners, will work collaboratively to focus resources and implement effective strategies for protecting and restoring watersheds identified by states and tribes as priorities through unified watershed assessments. A key element of the *Action Plan* is the integration of public health and aquatic ecosystem goals when identifying priorities for watershed restoration and protection. To facilitate the development of a comprehensive framework, the CWAP asks federal agencies to enter into an agreement for "directing program authorities, technical assistance, data and enforcement resources to help states, tribes and local communities design and implement their drinking water source assessment and protection programs" within an integrated watershed framework and to "draw on program authorities under relevant laws to assign priority to drinking water source areas needing protection" (*Action Plan*, Action #15, page 29).

The undersigned federal agencies are entering into this agreement to affirm their interest in federal, state, tribal and local partnerships that support state and tribal government efforts to complete drinking water source assessments nationwide and support source water protection programs with the primary goal of protecting the nation's drinking water.

The Safe Drinking Water Act Amendments Drinking Water Source Assessment Provisions

Section 1453 of the Safe Drinking Water Act as amended in 1996, requires all states to complete assessments of their public drinking water supplies. By 2003, each state and participating tribe will delineate the boundaries of areas in the state (or on tribal lands) that supply water for each public drinking water system, identify significant potential sources of contamination, and determine how susceptible each system is to sources of contamination. These drinking water source protection areas for which assessments are required include federal lands that support non-federally-owned public water systems as well as non-federal lands that support federally-owned public water systems. The assessments will synthesize existing information about the sources of each drinking water supply, to provide a national baseline on the potential contaminant threats and help guide future watershed restoration and protection. States have received FY1997 Federal Drinking Water State Revolving Fund set-aside funds to complete drinking water source assessments.

Benefits of Federal Cooperation

The Safe Drinking Water Act directs the states to use all available data, including federal information. Many federal agencies have general information on water quality and surface and groundwater hydrology as well as specific information on watersheds or aquifers, and federally-owned public water supplies. Federal agencies can help the states and tribes complete mandated drinking water source assessments by providing, within the confines of their limited resources and authorities, technical expertise and copies of existing information on drinking water source protection areas collected under other statutes or initiatives that involved water quality assessment and protection efforts. This data could supply much of what is required for certain drinking water source assessments.

State and tribal drinking water source assessments, when completed, will provide additional input for water resource protection efforts of federal agencies and enable such agencies to direct education, research, remediation, and protection programs to highest priority source waters. Additionally, state and tribal information on source water quality will help guide federal agency decisions regarding placement and construction of new facilities.

II. GOALS

In keeping with the spirit of the Safe Drinking Water Act Amendments of 1996 and the President's Clean Water Action Plan, the goals of this agreement are:

A. To encourage field or regional offices of the undersigned agencies to continue with existing or enter into new partnerships with states, tribes, and local communities nationwide as a means of directing technical assistance to such partners in the development and implementation of their drinking water source assessment and protection activities.

B. To increase general awareness among federal entities of how existing, ongoing water quality research, monitoring, data, and management plans relate to state, tribal, regional and local drinking water source assessment and protection activities. The attached "[On-going Federal Initiatives and Project Expansions in Support of Drinking Water Source Assessment and Protection](#)" highlights many ongoing and new source water-related initiatives by the undersigned federal agencies.

C. To encourage field and regional offices of the undersigned federal agencies to use the results of state and tribal drinking water source assessments when developing relevant natural resource, technical assistance, facility management plans and water resource plans.

III. OBJECTIVES

A. Directing Technical Assistance. Within each of their missions, budgeted resources, and legal authority, the undersigned federal agencies agree to, but are not limited to the following objectives, as they partner with states, tribes and local communities in the development of drinking water source assessment and protection programs:

(1) Streamlining accessibility of existing relevant data.

(2) Sharing or assisting in development of assessment methodologies, including QA and QC procedures. (Past water quality assessment methodologies developed through unified watershed assessments, total maximum daily load assessments, national water quality inventorying, and water quality monitoring, may prove useful to states and tribes).

(3) Cooperating in the completion of drinking water source assessments for federally-owned systems and inventories on federal lands and facilities within drinking water source protection areas.

(4) Encouraging federal liaisons at the field or regional level with state and local technical and/or citizen's advisory committees.

(5) Incorporating drinking water source assessment and protection into federal drinking water quality education efforts and outreach materials.

B. Assigning Priority to Drinking Water Areas Identified as Needing Protection.
Within each of their missions, budgets, and legal authority, the undersigned federal agencies will make use of the tribal and state drinking water source assessment results by:

- (1) Considering state, tribal, and local drinking water source protection priorities when developing management plans for federal lands and facilities, including decisions regarding placement and construction of new facilities.
- (2) Examining how state, tribal, and local drinking water source protection concerns may be incorporated into existing and new regional and field level watershed research, management and outreach activities, such as those associated with the state and tribal unified watershed assessments, and collaborating where appropriate.

IV. **IMPLEMENTATION**

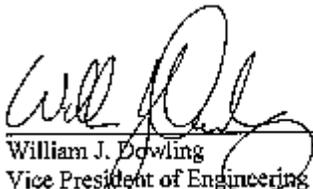
Within each of their missions, budgeted resources and legal authorities, the undersigned federal agencies will implement this agreement consistent with the attached Implementation Plan ([Attachment A](#)). This plan will be reviewed and updated as necessary. This plan includes steps to:

- I. Facilitate Regional and Field Office Planning for Agreement Implementation
- II. Improve Accessibility to Source Water-Related Federal Data
- III. Coordinate Drinking Water Source Assessment and Protection Efforts with Unified Watershed Assessments and Other Related CWAP Action Items
- IV. Measure Performance of Agreement Implementation.

Clean Water Action Plan

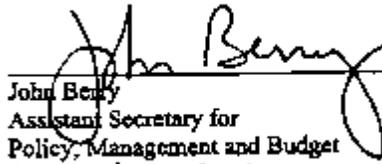
Federal Multi-Agency Source Water Agreement

Signatories



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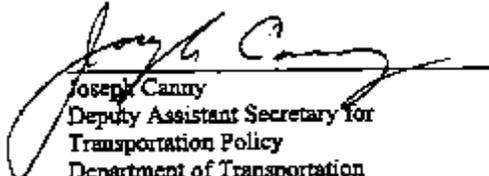



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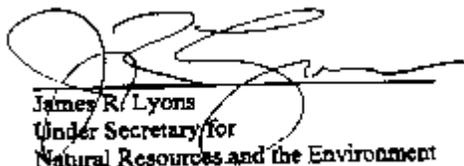



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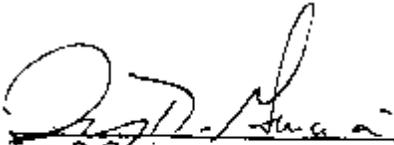



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